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Ġ.F. Abela Junior College

The Junior College
Multi-Disciplinary Conference:
Research, Practice and Collaboration

Breaking Barriers

Conference Proceedings

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Foreword

For the second consecutive year, the University of Malta Junior College organised the International Multidisciplinary Conference which focused on the theme Breaking Barriers.

Barriers can take a variety of forms and not all barriers have a physical nature although they may still be as resilient and very strong. Barriers can be of a cultural, linguistic, social, philosophical, economic, psychological and scientific nature. A barrier by definition is a kind of division that has the potential of keeping one side isolated from the other. Barriers keep us from seeing what lies on the other side, and prevent the free flow of matter, ideas, views, communication, and connections. While some may view barriers as essential to providing protection to those on one side from those on the other, a barrier essentially excludes and may be the cause of various unfair realities.

Perhaps the most straightforward interpretation of the theme of the conference is the removal of physical division. However the theme can also be interpreted, as ceasing to behave in the same way, asceasing to think in a particular way, as embracing different views, or of finding alternative possibilities of doing things.

Barriers can also be enriching in that they can create opportunities for people to collaborate and to work together in order to overcome them, perhaps even to leap over them. The barrier hence becomes a launching pad for something new.

Organising such a conference involves a lot of work, energy and determination. I would like to take this opportunity to thank all the members of the Conference Organising Committee, of the Scientific Committee and the support team.

Special thanks also go to her Excellency, the President of the Republic, for accepting to officially open the conference, the illustrious keynote speakers, and to all those who presented a paper, chaired a panel and attended. I would also like to thank the main sponsors of the conference: the University of Malta Junior College, the Ministry of Finance, and Buzzer Stationery.

Paul Xuereb

Official Opening of the Conference Breaking Barriers 2018
by H.E. Marie-Louise Coleiro Preca, President of Malta

Winning entry of the
Breaking Barriers
Photography Competition 2018 -
Enlightenment by
Amanda Calleja

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Development of an Augmentative and Alternative Communication App for the Maltese Language

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Abstract

Augmentative and Alternative Communication (AAC) embodies all methods of communication, serving to augment or function as an alternative to speech. Maltese children having complex communication needs use various AAC devices on a daily basis. Their conversation skills are mainly limited by two key factors. The fact that AAC users communicate up to 20 times slower than those who use regular speech is the first of these two limiting factors. The second one is the unavailability of an AAC app for the Maltese language. This paper presents the development of an AAC app targeted for the Maltese language, which provides an intelligent word suggestion mechanism to improve AAC rates. The app is based on a trigram language model which is able to predict the subsequent word by considering the previous two. The model was trained by means of a specifically created corpus and uses the Interpolated Kneser-Ney Smoothing technique to correctly resolve contexts which were not observed during training. The app enables users to retrain and update the language model, such that it may provide additional personalised word suggestions. The app was evaluated by a number of clinicians and educators who regularly work with AAC users. They remarked that it will be potentially helpful in aiding Maltese children during intervention sessions in view of its effective features. The underlying language model features an average perplexity of 90.47 when tested with non-similar training and test data and an average perplexity of 3.61 when evaluated for highly similar training and test data. The low perplexity values suggest that the language model employed in this app is remarkably accurate and is effectively performing as other trigram language models reported in the literature.

Keywords: AAC, Natural Language Processing, *n*-grams, Statistical Language Modelling, App Development

Introduction

For most people, the process of converting thoughts into words and making the necessary muscle movements to speak them out loud occurs naturally. However, there are some individuals who are either unable to speak or whose speech in

unintelligible. This creates the need for an AAC system. AAC is the term used to refer to any method of communication serving to augment or as an alternative to speech (Glennen and DeCoste, 1997). Common examples of AAC systems include unaided systems which do not require any equipment, such as gestures and facial expressions, and aided systems including communication boards and speech generating devices (SGD) containing pictograms that correspond to different words (Agius and Vance, 2015; Borg et al., 2015). Aided AAC systems are in turn categorised into low and high tech systems. Low tech AAC systems enable the user to communicate by pointing to pictures on a picture board or in a communication book, as shown in **Figure 1a**, while high technology systems refer to SGDs which produce spoken words in response to the user touching the computer screen (**Figure 1b**).

The main limitation of AAC systems is the communication rate. While most people communicate their thoughts effortlessly using speech, AAC users must type letters in a text box or choose pictures from a display to construct sentences. In practice, AAC users have communication rates which are below 10 words per minute, compared to speech rates which may range between 130 and 200 words per minute (Trnka et al., 2009). Communication rates in high tech AAC systems can, however, be improved significantly by implementing next word prediction (Trnka et al., 2009; Garay-Vitoria and Abascal, 2006; Langer and Hickey, 1999).

(a) Communication Book
(Garay-Vitoria and Abascal, 2006)

(b) Speech Generating Device (SGD)
(Langer and Hickey, 1999)

Figure 1. Low technology and high technology AAC systems.

The Access to Communication and Technology Unit (ACTU) is an agency responsible for assessing children for AAC solutions and providing AAC interventions in Malta (Agius and Vance, 2015). Emerging studies show that children require more effort to use a low technology AAC system as opposed to a smart SGD such as a tablet (Borg et al., 2015). Therefore, in order to facilitate AAC interventions, the agency also recommends high technology AAC systems. Unfortunately, AAC technologies are still very limited in Malta, as no AAC app is currently available for the Maltese language. As an alternative, the ACTU customises existing AAC apps which were designed for

the English language. This is inadequate, since the structure of the English language is very dissimilar to that of Maltese. In addition, this approach is limited, as only very basic Maltese structures can be created. Furthermore, customisation to the Maltese language is extremely time consuming. Due to these issues, Maltese children have, currently, no other option but to use the English language for communication purposes. The aim of this project is to develop a mobile app (MaltAAC), with the intention of breaking the barrier between the Maltese language and high tech AAC systems. The app was developed to:

i) allow Maltese children with speech, motor, or cognitive impairments to communicate in their native language;

ii) reduce the amount of effort they require to communicate their message by improving their communication rates when making use of AAC.

The app features a user interface (UI) which is similar to that of most high technology AAC systems, and an initial dictionary of around 400 Maltese words which are commonly used by children to express their needs. The central UI component is the image grid, which may display categories, words, or predictions at any point in the life-cycle of the app (**Figure 2**). The app also includes a smoothed trigram language model which generates a list of the most probable next word each time the user selects a new word, thus improving a child's communication rate and reducing the amount of effort required to exchange information. MaltAAC includes a mechanism which enables the user to add new words, delete unused words, change images and sounds, change the category to which a particular word pertains or change the word itself.

Figure 2. Central user interface of the developed AAC.

A search icon is available on the action bar at the top of the screen. When this icon is tapped, the search bar is expanded and the on-screen keyboard is displayed to the user. One can search for words using the keyboard, and word suggestions are shown based on the characters which have already been typed. MaltAAC provides

the option to set a security pin. If this pin is set, then an incorrect pin entry would deny access to settings and certain features of the app, such as profile backup/restore, screen un/pinning, and updating predictions (Abela, 2018).

Background

Natural Language Processing (NLP) is a branch of Artificial Intelligence in which natural languages are studied from a computing perspective to enable human beings to have flowing language interactions with computers (Kumar, 2011). Next word prediction in NLP is concerned with predicting the next word in a sentence given a sequence of words. This can be achieved by making use of a statistical language model which estimates the probabilities of all the possible words that can follow a given context. In next word prediction applications, training a language model involves using an algorithm to calculate next word probabilities based on what is observed in the training data (Jurafsky and Martin, 2009). The collection of sentences on which a language model is trained is called the training corpus, which is a collection of written words that are gathered based on specific criteria (Manning and Schütze, 1999). In order for the language model to provide satisfactory results, this collection of sentences should be taken from the same genre of words which is likely to be encountered in the NLP application (Jurafsky and Martin, 2009). In this work, a new corpus was created to train the language model on Maltese sentences which are commonly used by children to express their needs, thus maximising the accuracy of the word suggestions provided by the app.

Rosenfeld (2000) surveyed the various language models that can be used for word prediction applications, namely the n-gram language model, the context-free grammar model, decision tree models and maximum entropy models, among others. Subsequently, Goodman (2001) compared the accuracy of these models and found that the n-gram language model has the best performance. While some of the other models result in more accurate predictions than the n-gram model, this comes at the expense of much greater time and space complexity, making them impractical to use in mobile applications. An n-gram model is a type of probabilistic language model for predicting the next item in a sequence in the form of an $n-1$ order Markov model. Two benefits of n-gram models are simplicity and scalability – with a larger order n, a model can store more context with a well-understood space–time trade-off, enabling an efficient scale up. In practice, it is not necessary to consider the entire sequence of words to determine the probability of the next word. Thus, in an n-gram language model, the probability of the next word is approximated by limiting the context for conditional probability to the preceding $n-1$ words (Jurafsky and Martin, 2009). The probability of each n-gram (sequence of n words) is calculated during the language model training. The simplest method to calculate n-gram probabilities is the Maximum Likelihood Estimation (MLE) (Abela, 2018).

A language model trained using MLE incorrectly assigns a probability of zero to sequences of words which are never observed during training. In order to improve the probabilities of *n*-grams having zero or low-frequency counts in the training corpus, smoothing must be implemented when training the model. In statistical language modelling, smoothing refers to adjusting the MLE probabilities to produce more accurate probabilities for word sequences which rarely or never occur in the training corpus (Chen and Goodman, 1999). This is achieved by reducing some of the probability mass from *n*-grams with large counts in the training corpus and redistributing it to *n*-grams with zero or low-frequency counts, resulting in a smoother probability distribution. This is known as discounting (Jurafsky and Martin, 2009; Manning and Schütze, 1999). Various smoothing methods have been proposed to improve the accuracy of *n*-gram probabilities, namely Laplace smoothing, Good-Turing discounting, Jelinek-Mercer smoothing, Katz smoothing, Witten-Bell smoothing, absolute discounting, and Kneser-Ney smoothing. These smoothing techniques have been compared and evaluated by Chen and Goodman (1999) and Kneser-Ney smoothing was found to be the most accurate method. This is why Kneser-Ney smoothing was adopted in this work (Abela, 2018).

Design Considerations

The top two mobile operating systems for smart devices are Android and iOS, with market shares greater than 70% and 25% respectively (StatCounter, 2018). In order to create a widely accessible AAC tool, the proposed app was targeted for Android, since it has the largest mobile operating system market share and since Android devices are generally cheaper than their Apple counterparts. This AAC app was developed using a combination of Java and Extensible Markup Language (XML). XML was used to create the outline of the app's graphical user interface (GUI) and Java was used to create the app's functional components and make programmatic changes to the GUI. Java was chosen as the programming language since it is an official language of the Android platform and therefore all Android operating system features can be accessed through application programming interfaces (APIs) written in Java (AndroidDevelopers, 2018a).

Storage

Database Selection

The need for a storage method that can archive categories and words together with their relationship was identified. An intuitive way to model and store related pieces of information is to use a relational database (Halpin and Morgan, 2008). Since the app is targeted for mobile devices, a set of criteria had to be met when

deciding on which database to use. The database had to provide a lightweight solution, since storage space is limited on most mobile devices. Moreover, it had to provide server-less functionality, since internet connectivity is not always available. Lastly, the selected database had to provide a very fast access, with very low memory and power consumption. Several database options exist for the Android operating system, namely BerkeleyDB, CouchbaseLite, LevelDB, ORMLite, Realm, and SQLite. Most of these databases fulfil the specified criteria, but SQLite was the most ideal solution for this work since it is the only database which is fully supported by Android (AndroidDevelopers, 2018b).

Storage of Media Files

Initially, storing media files as binary large objects (BLOBs) in the database looked promising, since it was the best way to keep the words, images and sounds consolidated in one structure (Shapiro, 1999). However, during the testing phase of the app, it became evident that this approach had to process excessively large amounts of data, resulting in slower response times. Indeed, Shapiro (1999) found that the query response time is inversely proportional to the size of the database. To improve the app's performance and usability, the image and audio files were stored in the app folder and accessed directly from the internal storage. As a result, query response times became considerably shorter and independent of the image and audio file sizes.

Storage of User Preferences

While storing user preferences as records in a relational database was possible, it was more feasible to use the *SharedPreferences* interface from the Android software development kit (SDK). Primarily, storing or retrieving a user preference can be achieved in a simpler way by calling the required method provided by the *SharedPreferences* interface, as opposed to constructing structured query language (SQL) queries. Secondly, the *SharedPreferences* interface works in tandem with the *PreferenceActivity* class from the Android SDK. By inheriting this class, it was possible to create an activity which displays a hierarchy of preferences that can be set by the user. These preferences are stored as key-value pairs of primitive data types (Wei, 2012) and are used to determine the app's behaviour in different scenarios, according to the user's preference.

Performance Considerations

Multithreading

Accessing a file from internal storage is a rather slow operation compared to, say, fetching a message from a *String* variable and displaying it on screen, since secondary storage has a much slower access speed than main memory (Hamacher et al., 2012**)**. If such a lengthy operation were to be carried out on the same thread which is responsible for generating the UI (known as the main thread or UI thread), then any other operations would be blocked until it completes, hence causing the UI to hang. Thus, lengthy operations are carried out on separate threads.

Foreground Services

Users can continue using their device while backing up or restoring a profile, since the cloud backup and restore operations were implemented as foreground services (MacLean, Komatineni and Allen, 2015). MaltAAC gives a foreground notification while uploading the backup file to the cloud, which displays the progress as a percentage, and provides the option to cancel the upload. Similarly, a foreground notification displaying progress is shown while restoring a user profile.

Data Structure Selection

An appropriate data structure was required to store *n*-grams in main memory together with the occurrence frequency of each *n*-gram in the training corpus. The main criteria for selecting the data structure were insertion time, searching time and memory consumption. Robenek, Platos and Snasel (2013) compared the performance of seven data structures for indexing *n*-grams, and the *HashMap* data structure was found to be the fastest solution in terms of insertion time and searching time. The *HashMap* data structure ranked fourth in terms of memory consumption, but since training speed was a priority for MaltAAC, the *HashMap* structure was still the most practical option.

Optimal Order of n-gram

Initially, MaltAAC was based on a 5-gram language model that needed an excessively long training time. Goodman (2001) tested the performance of *n*-gram models up to an order of $n = 20$ and found that the performance of Kneser-Ney smoothing saturates at the order of $n = 3$. Since training speed was a priority for MaltAAC, and little performance improvements could be obtained by training a model of order $n = 5$, it was decided to opt for a trigram language model instead.

Results and Evaluation

Perplexity

A language model can either be evaluated extrinsically, i.e. embedding the model into the application and measuring end-to-end performance, or intrinsically, where the performance of the model is measured independently of the application. The most common metric for intrinsic evaluation of *n*-gram models is perplexity (Jurafsky and Martin, 2009). Perplexity is used to measure how effectively a language model can predict the next word, where a low value indicates a high model accuracy. The calculation of the perplexity of a language model for a given test data set was implemented in Java. The program uses the *HashMaps* containing the *n*-gram probabilities to calculate the conditional probability of each word in the test set. The developed language model was trained and tested on 10 different pairs of training and on test data sets which were randomly generated from a corpus specifically created for this project. An average perplexity of 3.61 was obtained (refer to **Table I**).

A perplexity value of *k* suggests that on average, the language model is as uncertain as it would be if it were to predict the next word out of *k* equally probable words (Manning and Schütze, 1999). The obtained results were remarkably low due to the high similarity between the training and test data sets. Children with complex communication needs often tend to use the same simple sentence structure (Binger and Light, 2008) and so most sentences formed using MaltAAC will have the same syntax as the ones used to train the language model, which is essentially equivalent to having identical training and test data sets. Hence, in spite of its artificially low value, the resulting average perplexity implies that the language model is able to predict the next word in a given sequence by choosing one out of four equally probable words. Since the initial dictionary contains 400 distinct words, the language model is capable of narrowing the list of possible next words to 1% of the initial dictionary size. This performance is quite satisfactory and results in reasonably accurate word predictions.

Test Number	Perplexity
1	3.615
2	3.636
3	3.582
4	3.631
5	3.635
6	3.556
7	3.562
8	3.517
9	3.612
10	3.776
Average	**3.6122**

Table I. The language model's average perplexity for training and test data sets taken from the created corpus.

Table II presents the perplexity results obtained by the language model when trained and tested on data sets taken from the same genre, but which were not as similar as the training and test data sets generated from the created corpus. The training and test data were taken from the same children's book, so as to maintain the same style of vocabulary. An average perplexity value of 90.47 was obtained.

Book	Number of Training Words	Number of Test Words	Perplexity
Roses and Forget-Me-Nots	1,925	240	76.048
Marjorie's Three Gifts	3,169	376	90.88
Jack and Jill	47,286	504	77.171
The Lost Prince	7,649	849	89.197
The Secret Garden	11,879	1,409	119.047
		Average	**90.4686**

Table II. The language model's average perplexity for training and test data sets of the same genre.

This is marginally lower than typical perplexity values reported in literature. Indeed, with a vocabulary size of 19,979 words, Jurafsky and Martin (2009) obtained a perplexity of 109 for a trigram model which was trained on 38 million words taken from the Wall Street Journal and tested on 1.5 million words, whereas Kneser and Ney (1995) obtained a perplexity of 105.4 for a trigram model which was trained and tested on data sets generated from the 30,000 word German Verbmobil corpus, with a vocabulary of 2,000 words. The improved perplexity value does not necessarily imply that the developed language model is any better than other trigram models, but merely suggests that sentences in children's books are typically more uniform and easier to predict than newspaper contents. Nonetheless, the obtained perplexity results show that the developed language model can perform at least as well as other trigram language models, when trained and tested on data sets taken from the same genre.

Book	Perplexity
Roses and Forget-Me-Nots	117.716
Marjorie's Three Gifts	128.060
Jack and Jill	120.720
The Lost Prince	120.792
The Secret Garden	162.704
Average	**129.998**

Table III. The language model's average perplexity for training and test data sets of different genres.

Table III shows the perplexity results of the developed language model when trained on data taken from the technology genre and tested on sentences from children's books. The average perplexity was 43.7% higher than the average perplexity acquired for training and test data sets taken from the same genre. This increase in perplexity is quite significant and it confirms that the language model's accuracy is highly dependent on the genre of the training and test data sets. Especially when compared to the average perplexity value presented in **Table I**, this result proves that creating a training corpus which was tailor-made for MaltAAC was indeed more practical than using generic training data.

Time Complexity

Since MaltAAC provides the option to update the word predictions by retraining the language model, training time minimisation was key. However, as the number of words in the training corpus increases, so does the number of possible *n*-grams and the number of iterations in each *HashMap*. In order to assess how the training time varies as the number of *n*-grams increases, the language model was trained on different sized data sets obtained from the Gutenberg corpus. The plots presented in **Figure 3** show that the training time follows a cubic trend when plotted against the number of *n*-grams. A time complexity of $O(n^3)$ for the training process falls short of being satisfactory. While the number of *n*-grams in this AAC app may increase if the user chooses to add new words and retrain the language model, it is not likely to grow to a point where the training time becomes excessively long, since the number of words used by children is rather limited. Thus, in contrast to other NLP applications, the language model training time is tolerable for the purposes of MaltAAC.

App Functionality

White-box testing was useful to identify, debug and solve certain issues such as memory leaks, out of memory exceptions caused by the loading of large bitmaps and audio files into main memory, security exceptions due to missing permission requests, unpredictable UI behaviour, and flawed input control mechanisms. The app was given to seven professionals who work with AAC systems on a daily basis for black-box testing. Among these professionals were three occupational therapists, two speech and language therapists and two learning support educators who work at the ACTU. This enabled them to test MaltAAC's functionality from a user's perspective, identify any bugs which had been overlooked, and determine whether the app is suitable for AAC purposes. MaltAAC was tested for a month, after which a focus group was then formed to obtain feedback from the testers. The black-box testing stage verified that the app satisfies the initial requirements, although there is room for improvement. The suggested potential enhancements were taken into consideration for integration in future releases of MaltAAC.

Impact of Trigram Count on Training Time

$y = -3E\text{-}12x^3 + 2E\text{-}07x^2 - 0.0002x + 1.6958$

Impact of Bigram Count on Training Time

$y = -6E\text{-}12x^3 + 4E\text{-}07x^2 - 0.0006x + 1.7507$

Impact of Unigram Count on Training Time

$y = 2E\text{-}10x^3 + 3E\text{-}06x^2 - 0.0006x + 0.7891$
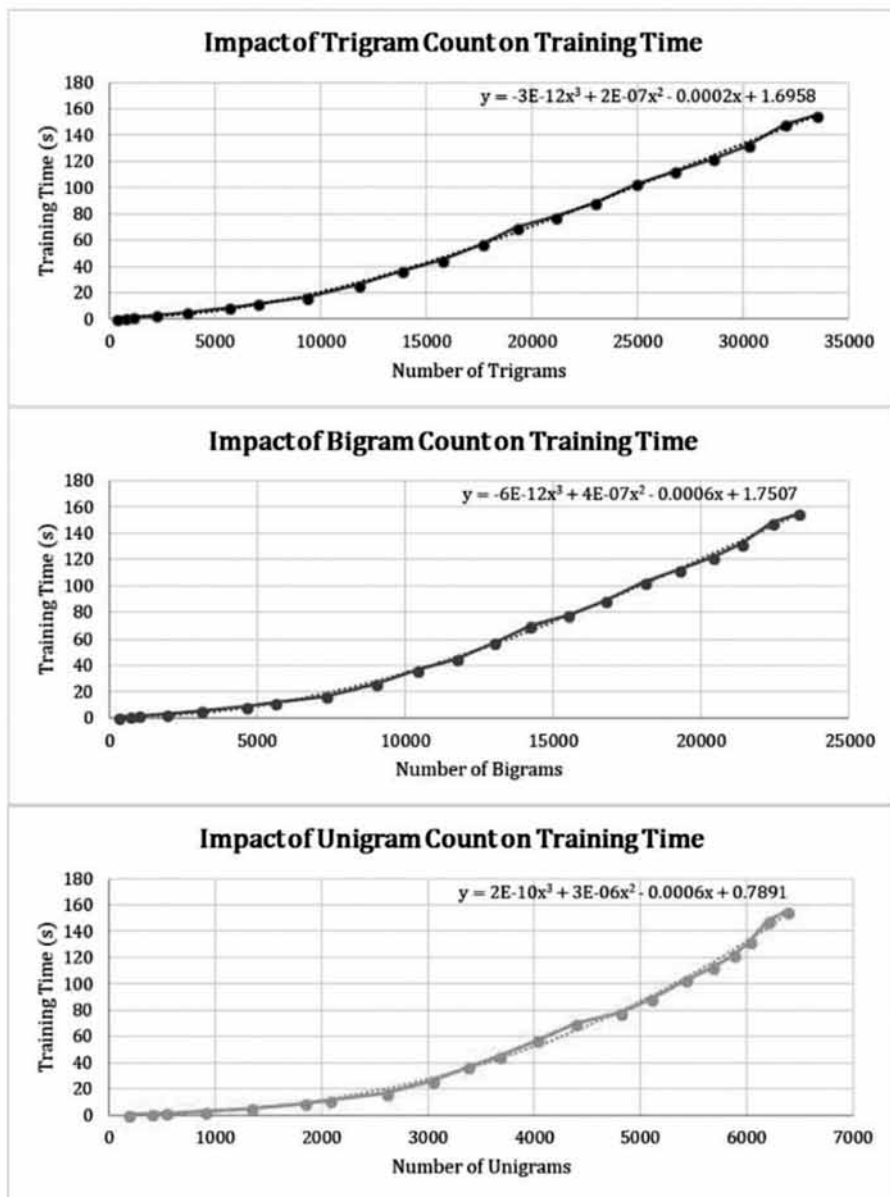
Figure 3. The impact of increasing the number of n-grams on the training time.

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Conclusion

This paper presented the development of an app to provide an AAC solution for the Maltese language. MaltAAC features a smoothed trigram language model which predicts the next word given the sequence of previously selected words, with the aim of improving children's communication rates while reducing the effort required to convey their message. Interpolated Kneser-Ney smoothing was used to train the language model and calculate the *n*-gram probabilities. The accuracy of the developed trigram model was evaluated using the perplexity metric, and the app functionality was assessed using white-box and black-box testing. The generated word predictions were found to be remarkably accurate, especially when the language model was trained on a corpus specifically created for this AAC app.

MaltAAC was tested by specialists who are well acquainted with AAC technologies. These specialists commended MaltAAC, saying that it is a very helpful AAC tool. One minor limitation of the app is the substandard time complexity of the language model's training process, although its impacts are somewhat insignificant, especially for a small vocabulary size. On the whole, this app was completed successfully and may greatly improve the quality of AAC interventions for Maltese children. Nevertheless, there are still numerous improvements which can be made in future releases of MaltAAC, in order to design an even more convenient and complete AAC solution for the Maltese language, including an Android text-to-speech engine for Maltese.

MaltAAC is a solid step forward towards promoting the use of the Maltese language while providing an accessible solution to Maltese children having complex communication needs. In addition to assisting native speakers, MaltAAC can potentially be taken a step further and serve as a linguistic first aid to immigrants coming over to Malta, in order to facilitate their communication and integration with Maltese citizens. MaltAAC is currently available on the Google Play Store and there are plans to initiate the work on an iOS implementation of the app.

References

Abela, S. (2018). *Development of an Augmentative and Alternative Communication App for the Maltese Language*. Msida: Unpublished B.Sc. Dissertation, University of Malta.

AndroidDevelopers (2018a). Platform architecture. Available at https://developer.android.com/guide/platform/ [Accessed 1 February 2018].

AndroidDevelopers (2018b). Data and file storage overview. Available at https://developer.android.com/guide/topics/data/data-storage.html [Accessed 1 February 2018].

Agius, M.M. and Vance M. (2015). A Comparison of PECS and iPAD to teach requesting to Pre-schoolers with Autistic Spectrum Disorders. *Augmentative and Alternative Communication*, 32(11), 58–68.

Binger, C. and Light, J. (2008). The Morphology and Syntax of Individuals who use AAC: Research Review and Implications for Effective Practice. *Augmentative and Alternative Communication*, 24(2), 123–138.

Borg S., Agius M. and Agius L. (2015). A User and their Family's Oerspective of the use of a Low-tech vs a High-tech AAC System," *Studies in Health Technology and Informatics*, 217(11), 811–818.

Chen, S.F. and Goodman, J. (1999). An Empirical Study of Smoothing Techniques for Language Modelling. *Computer Speech and Language*. 13(10), 359–394.

Garay-Vitoria, N. and Abascal, J. (2006). Text Prediction Systems: A Survey. *Universal Access in the Information Society*, 4(3), 188–203.

Glennen, S.L. and DeCoste, D.C. (1997). *The Handbook of Augmentative and Alternative Communication*. San Diego: Singular Pub. Group.

Goodman, J. (2001). A Bit of Progress in Language Modeling. Computer Speech and Language, 15(10), 403–434.

Halpin, T. and Morgan, T. (2008). *Information Modeling and Relational Databases*. Morgan Kaufmann.

Hamacher, C., Vranesic, Z., Zaky, S. and Manjikian, N. (2012). *Computer Organization and Embedded Systems*. McGraw-Hill.

Jurafsky, D. and Martin, J.H. (2009). *Speech and Language Processing - An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition*. Upper Saddle River, NJ, USA: Prentice Hall.

Kneser, R. and Ney, H. (1995). Improved Backing-off for m-gram Language Modeling," Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 181–184.

Kumar, E. (2011). *Natural Language Processing*. I.K. International Publishing House PVT.

Langer, S. and Hickey, M. (1999). Augmentative and Alternative Communication and Natural Language Processing: Current research activities and prospects. *Augmentative and Alternative Communication*. 15(12), 260–268.

MacLean, D., Komatineni, S. and Allen, G. (2015). *Pro Android 5*. Apress.

Manning, C.D. and Schütze, H. (1999). *Foundations of Statistical Natural Language Processing*. Cambridge, MA: MIT Press.

Robenek, D., Platos, J. and Snasel, V. (2013). Efficient in-Memory Data Structures for n-grams Indexing. *Proceedings of the Annual International Workshop on Databases, Texts, Specifications and Objects*, 48–58.

Rosenfeld, R. (2000). Two Decades of Statistical Language Modeling: Where do we go from here? *Proceedings of the IEEE*. 88(8), 1270–1278.

Shapiro, M. (1999). Managing Databases with Binary Large Objects. *16th IEEE Symposium on Mass Storage Systems in cooperation with the 7th NASA Goddard Conference on Mass Storage Systems and Technologies* (Cat. No.99CB37098), 185–193.

StatCounter (2018). Statcounter Globalstats. Available at http://gs.statcounter.com/os-market-share/mobile/malta [Accessed 26 August 2018].

Trnka, K., McCaw, J., Yarrington, D., McCoy, K.F. and Pennington, C. (2009). User Interaction with Word Prediction: The effects of prediction quality. *ACM Transactions on Accessible Computing (TACCESS)*. 1(3), 17:1–17:34.

Wei, J. (2012). *Android Database Programming*. Packt Publishing.

Bio-notes

Mr Sylvan Abela has recently completed a bachelor's degree in Computer Engineering at the Faculty of ICT within the University of Malta. As part of his final year project, he developed the first AAC app targeted for the Maltese language in collaboration with ACTU, with the intention to break the barrier between the Maltese language and high technology AAC systems. His interests include software development, microcontroller-based system design and artificial intelligence, particularly natural language processing and robot learning.

Dr Ing. Owen Casha received his bachelor's degree in electrical engineering from the University of Malta in 2004. From September 2007 till June 2008, he was on a research collaboration with CEA-LETI (Grenoble, France) and ST-Microelectronics. He received a PhD in RFIC design from the University of Malta in 2010. He is currently a Senior Lecturer with the Department of Microelectronics and Nanoelectronics. His research interests include the design of high speed integrated circuits, embedded systems, RF MEMS and assistive devices.

Ms May Agius is currently a PhD candidate at the Manchester Metropolitan University. She also works as a Speech and Language Therapist with ACTU. Her interests include the use of AAC systems to support children with special needs to communicate. Her current research focuses on factors which influence the clinical decision making processes for children requiring AAC and have a diagnosis of Autism Spectrum Disorder. She presented this research on a number of occasions at international conferences such as ISAAC. She is particularly interested in supporting the development of AAC systems for children who require communication systems in Maltese.

Ir-Romantiċiżmu Femminili:
Qari mill-Ġdid ta' Dun Karm
Feminine Romanticism:
A Rereading of Dun Karm

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Abstract

In my paper I attempt to break down a barrier that restricted the interpretation of the most prominent Romantic poet in the Maltese literary context. My rereading of some of Dun Karm's poems goes against the conventional perception that always construed the national poet as the paradigm of the local Romantic era and, as a consequence, as the anathema of a feminist approach vis-à-vis the female characters he depicts in his poetry. Often, critics classify authors into rigid categories that hardly leave any possibility for reinterpretation; however, Thompson, in "Errors and Labors: Feminism and Early Shakespearean Comedy" inquires how even Shakespeare, considered by some as a chauvinist playwright, can also be assessed in this new light. The freeing from the liberal ideology that ironically fosters prejudices towards poets like Dun Karm could pave the way for considering the innovative idea that a male poet's expression may also be "feminine." Mellor in *Gender and Romanticism*, introduces the concept of "feminine Romanticism" and suggests that this does not pertain exclusively to female writers; she explains how poets like Keats expressed feminine feelings in his verses. As Shakespeare and Keats are being reread, I propose the same for Dun Karm.

L-istudju ta' Simone Galea "A Place Called Home. Women and Philosophy of Education" jistħarreġ il-possibbiltà li n-nisa jsibu spazju u jistabbilixxu "dar" fid-diskors filosofiku dwar l-edukazzjoni (2017, p.2). Fost l-oħrajn, Galea tiddiskuti kif l-interpretazzjoni Femminista tal-parabbola tal-għar wasslet biex dan ir-rakkont Platoniku jitqies bħala miżoġinista: ir-raġel irid joħroġ mill-jasar tal-ambjent femminili tal-għar sabiex jilħaq il-milja intellettiva tiegħu. Iktar ma r-raġel jitbiegħed mill-għar, simbolu tal-ġuf, iktar iżid iċ-ċans li jersaq lejn il-kisba tal-verità. Ovvjament, il-Femministi interpretaw dan bħala turija li sa mill-bidu tagħha, it-tradizzjoni filosofika perpetwalment warrbet lill-ħassieba nisa u, agħar minn hekk, stmathom bħala inferjuri intellettwalment f'konfront mal-irġiel. Iżda l-istudju ta' Galea jmur lil hinn:

hija tuża l-metamorfizzazzjoni tal-għar bħala ġuf sabiex tillustra kif il-qari mill-ġdid ta' din l-allegorija jista' jwassal għal riinterpretazzjoni pożittiva: minn ambjent sterili intelletwalment, l-għar jiġi interpretat, paradossalment, bħala l-ambjent femminili li jippromovi l-prokreazzjoni u l-kreattività. Għaldaqstant, Galea taqbel ma' Luce Irigaray li temmen li r-rakkont tal-għar-ġuf jista' jiġi pperċepit bħala "strateġija li tfittex li tbiddel in-nisa f'ħallieqa u ġeneraturi ta' għarfien fi ħdan l-ispazji li tippermettilhom l-ordni soċjali" (Galea, 2017, p.4).

Il-kxif ta' dan ir-rwol femminili ridimensjonat jista' jmur lil hinn minn kamp speċifiku: ir-riinterpretazzjoni ta' rakkont fundamentali għall-filosofija jista' jsawwar mill-ġdid il-mod ta' kif il-preżenza femminili tiġi pperċepita wkoll fil-letteratura. Jekk, ngħidu aħna, isir qari mill-ġdid tal-poeżiji ta' Dun Karm, il-paradimma tal-era Romantika Maltija li sa minn ewl id-dinja tqieset bħala l-anatema tal-ottika Femminista, jistgħu jingħelbu l-barrieri li jikkonfinawna f'perspettiva kritika monolitika. Tradizzjonalment, Dun Karm tqies mill-akkademja bħala dak li, minħabba poeżiji bħal "Nudiżmu," "It-Tifla tar-Raba'" jew "Lill-Għonnella," dejjem seddaq l-isterjotip tal-mara ideali tar-raħal f'konfront mal-mara immorali tal-belt.

Huwa possibbli li tinqabeż din il-fruntiera li tillimita l-viżjoni ermenewtika tagħna? Jista' allura Dun Karm jinqara fid-dawl tal-perspettiva friska ta' Irigaray u ta' Galea? Sa mill-konċepiment tagħha, proposta bħal din tiċħad l-idea li l-kitba femminili trid toħroġ neċessarjament mill-pinna femminili. Xi drabi jiġri li maż-żmien l-kritiċi jitfgħu l-awturi fil-konfini ta' garżelli riġidi (anke abbażi tal-ġeneru tagħhom) li qajla jħallu lok għall-interpretazzjoni mill-ġdid ta' xogħlijiethom. Ann Thompson, f'"Errors and Labors: Feminism and Early Shakespearean Comedy," tindaga kif anke awtur bħal William Shakespeare, meqjus minn ħafna bħala drammaturgu xovinista, jista' jiġi vvalutat f'dawl differenti. Ngħidu aħna, fid-drammi *Love's Labor's Lost* u *The Comedy of Errors*, Shakespeare joħloq karattri nisa li huma aktar prattiċi, effiċjenti u intelliġenti mill-karattri rġiel. L-osservazzjonijiet ta' Thompson huma turija li jekk il-kritika tkun flessibbli anke fil-mod ta' kif jiġi pperċepit l-enfasi tax-xogħol inkwistjoni, tista' toħloq ambjent adatt sabiex kittieba tal-imgħoddi jerġgħu jingħataw il-ħajja bil-qari mill-ġdid ta' xogħlijiethom. Bħalma Shakespeare qiegħed jinqara mill-ġdid, hekk ukoll jista' jsir fil-każ ta' Dun Karm li spiss ħassu komdu jipproduċi dik li fis-snin sebgħin il-Femministi Franċiżi bħal Hélène Cixous u Luce Irigaray sejħulha "*écriture féminine*."[1] Biex nestendi s-simboliżmu Platoniku, Dun Karm tant kien komdu ġol-għar li ma ħassx il-ħtieġa li joħroġ minnu, għax fil-kenn tal-għar irnexxielu jaddatta biex xorta waħda jilmaħ id-dawl ta' barra.[2]

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1 Skont Cixous l- "*écriture féminine*" ma tappartjeniex lill-awturi nisa biss; bħala eżempji ta' din it-tip ta' kitba hija fil-fatt tuża xogħlijiet ta' William Shakespeare, Heinrich von Kleist u Jean Genet.

2 Hawn ta' min isemmi l-każ ta' Rużar Briffa, ħabib ta' Dun Karm u li miegħu jirrappreżenta r-Romantiċiżmu Malti. Bil-versi tiegħu, Briffa xxennaq biex jerġa' lura lejn il-ġuf; din ix-xewqa rigressiva, li tixhed ukoll dak li qalu Irigaray u Galea fuq il-parabbola tal-għar, tinħass f'poeżiji ta' Briffa bħal "Ilbieraħ" u "Lura."

Jista' awtur raġel jikteb b'vuċi ta' mara? Fost l-ilħna femminili kontemporanji Maltin hemm dak ta' Immanuel Mifsud, awtur li jista' jitqies bħala Femminista. F'diversi xogħlijiet minn tiegħu, Mifsud uża l-ewwel persuna singular femminili b'manjiera tant konvinċenti li jagħmilha ferm diffiċli għall-qarrejja biex jifhmu li n-narrazzjoni ħarġet mill-pinna ta' raġel. Mifsud huwa għalhekk turija konkreta li l-vuċi femminili ma għandhiex titqies bħala legat esklussiv tal-kittieba nisa. Meta Eli Badica saqsiet lil Mifsud dwar il-femminilità tal-iben fir-rumanz *Fl-Isem tal-Missier*, l-awtur wieġeb hekk:

> F'xi punt jew ieħor, dil-parti femminili titla' fil-wiċċ għax ħafna nies jemmnu li għandi vuċi femminili qawwija ħafna. Ħafna nies osservaw li l-karattri nisa tiegħi huma ħafna aktar prominenti minn dawk maskili – li jagħmel dan il-ktieb eċċezzjoni aktar b'saħħitha. Qarrejja nisa qaluli li jistgħu jidentifikaw mal-karattri tiegħi li jidhru nisa reali u mhux kostruwiti. Dan kien wieħed mill-argumenti ewlenin tal-kritika letterarja Femminista bikrija dwar il-kitba maskili, qalu li n-nisa tagħhom ma kinux reali. Kif jirnexxili nagħmel dan? Onestament m'għandix idea. Iżda kien hemm perjodu ta' żmien – sentejn – meta qrajt biss kittieba nisa (2015).

Din "il-parti femminili" aktarx li ilha preżenti fix-xena letterarja Maltija, għalkemm qajla ġiet rikonoxxuta. Jekk in-nisa ma kinux frekwentament u direttament preżenti bħala awturi fil-kanonu letterarju Malti, aktarx li kienu wkoll preżenti b'dan il-mod, preżenza li komprensibbilment mhijiex ideali jew biżżejjed għall-Femministi. Il-femminilità fil-letteratura Maltija ma kinitx totalment assenti proprju għax anke l-kittieba rġiel Maltin tal-era Romantika kienu jiċċelebrawha billi, konxjament jew inkonxjament, jesponu kontinwament b'kitbiethom dak li Anne Mellor sejħitlu "r-Romantiċiżmu femminili" (1993, p.31). Osservazzjoni bħal din, aktar milli twassal għal ristrutturar kanoniku, tista' tipprovoka perċezzjoni Femminista aġġornata ta' kif il-kanonu letterarju Malti jista' jiġi evalwat u fformulat mill-ġdid f'moħħna.

Kif timmanifesta ruħha l-femminilità Dunkarmjana? Fil-poeżija "Biki ta' Omm" Dun Karm juża l-ewwel persuna singular sabiex jinħeba wara l-persona femminili u jittanta jirraġuna b'moħħ ta' omm. Il-karatterizzazzjoni fil-poeżija hija ddominata totalment mill-preżenza femminili; kemm in-narratur kif ukoll in-narratarju huma nisa. Il-femminilità tal-omm li qiegħda titkellem, titħabbeb faċilment mal-femminilità tal-bint indirizzata. Il-kompatibbiltà femminili bejn l-omm u l-bint hija żona emottiva u psikika li naturalment ebda raġel ma jista' qatt ikollu sehem sħiħ fiha. Għalkemm juri li hu konxju minn dan mill-kliem "Żgur ħadd ma jfisser," il-poeta sensittiv xorta waħda jesperimenta bil-vuċi fl-ewwel u fit-tieni persuna sabiex, b'rispett lejn in-nisa u l-femminilità ontoloġika tagħhom, iġarrab, jaħseb, iħoss, jitkellem u jikteb f'isimhom. F'din il-poeżija Dun Karm ma tnaffarx milli jinża' l-maskulinità tiegħu sabiex jidħol f'ġisem u fi psike femminili; hija deċiżjoni kurraġġuża tal-poeta raġel,

aktar u aktar jekk titpoġġa mill-ġdid fil-kuntest soċjokulturali li fih immaterjalizzat ruħha. L-għażliet relattivament avventurużi li għamel Dun Karm fil-proċess tal-kitba ta' "Biki ta' Omm," apparti li jimplikaw element intenzjonat ta' empatija, jevokaw ukoll kemm sens ta' umiltà, kif ukoll ta' ammirazzjoni lejn min kapaċi jġarrab emozzjonijiet b'intensità akbar li tmur lil hinn mill-erlebnis tiegħu. Iktar milli paternalistiku jew kondixxendenti, hawn il-poeta Romantiku jinħass sottomess għal forzi emottivi superjuri għalih għax fil-verità qatt ma jista' jaħkimhom tassew: il-poeta raġel ma jistax jesperjenza l-emozzjonijiet li ħasset l-omm meta kienet tqila b'bintha, meta wilditha, meta rabbietha u bintha lissnet l-ewwel kelma u meta finalment ratha tmut. Dun Karm jipprova jifhem, billi jazzarda jmur lil hinn mil-limiti imposti bijoloġikament fuqu, x'tinvolvi l-femminilità bi kliem bħal:

> Kif intemmejtli f'qasir żmien, maħbuba
> Ta' qalbi, dawl għajnejja! u kif intemmet
> Miegħek għal dejjem il-ħolma sabiħa
>   Tal-hena tiegħi.
> Nissiltek u ħabbejtek b'saħħti kollha,
> Binti l-għażiża, u fik, fik biss kien moħħi
> Minn qabel ma twelidtli; għaqli ħlejtu
>   Naħseb kif nista'
> Inqiegħdek mill-aħjar malli titwieled.
> Inti għamiltni omm, u x'ħassejt f'qalbi
> Dik il-lejla li smajtek l-ewwel darba
>   Tibki ma' ġenbi (1980, p.105)

Hemm aspetti oħra tar-reviżjoniżmu tal-femminilità Dunkarmjana li indirettament ikomplu jseddqu x-xewqa tal-ideal essenzjalment Femminista għal preżenza akbar tal-mara fil-letteratura. Dun Karm, sakemm kien umanament possibbli u sakemm ippermettewlu l-kundizzjonijiet soċjokulturali li għammar fihom, stinka b'kitbietu sabiex il-figura femminili ma tingħatax il-ġenb. Huwa jinvoka l-figura femminili sabiex jimmedita l-purità innoċenti tal-fażi bikrija tal-ħajja (ara "Tfajla" jew "Lil Marija – Tfajla ta' Għaxar Xhur") daqskemm jitnebbaħ minnha sabiex jirrifletti fuq it-tmiem kiebi tal-ħajja (ara "Bewsa" jew "Soru"). Fis-sunett "Wied Qirda," li wkoll jimmedita il-mewt fit-terzini, Dun Karm jagħżel protagonista femminili għall-kwartini: "l-aħħar xbejba – li x-xemx għamlet samra – / titla' b'xi midra jew b'luħ mgħobbija" (2004, p.77). Hawn liberalment seta' inserixxa suġġett maskili, imma l-poeta ried jippreżenta din il-mara bidwija li tant hi ħabrieka li baqgħet taħdem aktar tard mill-bdiewa l-oħrajn (li nassumu li fil-maġġoranza kienu rġiel). Għall-kuntrarju ta' kif ħafna jaħsbu, għal Dun Karm il-ħidma sfiqa tal-mara Maltija ma kinitx limitata għall-konfini tad-dar u għar-rwol tat-trobbija tat-tfal. Hawn il-poeta jofroq l-fruntieri konvenzjonali għax juri mara ddedikata u kapaċi għall-ħidma agrarja daqs jew aktar mir-raġel.

Apparti li jiżviluppa l-motiv tal-omm, il-poeta jesplora aspetti oħra tal-femminilità xi drabi anke b'modi kurjużi. Poeżija li bħal "Biki ta' Omm" tinstema' l-vuċi femminili fl-ewwel persuna imma li din id-darba titlissen mill-perspettiva opposta tal-bint, hija "Mingħajr Omm." Hawn ukoll is-sensittività poetika tempatizza mal-ħsus tal-protagonista femminili. Il-poeta jispekula li l-imħabba paterna, għalkemm ġenwina, qatt ma tista' tieħu post dik materna (li tiġi bħala konsegwenza naturali tar-rabta intrinsika bejn l-omm u l-bint, kif toħroġ ġenwinament, ngħidu aħna, fin-narrazzjoni awtodijeġetika fir-rumanz *Ir-Rota Daret Dawra (Kważi) Sħiħa* ta' Nadia Mifsud Mutschler):

> Tmien snin biss għandi, - għadni tarbija
> U ġa, jaħasra, - sfajt mingħajr omm;
> Iżjed għal qalbi – ma hemmx thennija,
> Iżjed daħkani – ma jkunx dal-fomm.
> Għandi 'l missieri – qalbu ħanina
> Iħobbni mħabba – bħal ta' miġnun.
> Imma x'iservi? – Faraġ għalina
> Qatt u qatt iżjed – ma jista' jkun (Dun Karm, 1980, p.87).

Iżda xi drabi jiġri li ma ssirx ġustizzja kritika fil-konfront ta' poeti rġiel, l-aktar dawk Romantiċi, li vrushom jiġu kkwotati esklussivament biex isaħħu l-argumentazzjoni sessista, filwaqt li vrus oħra jiġu kapriċċożament injorati. Emery Ross f'"Something Darker Than Love: Language Considerations in the Poems of Pablo Neruda" targumenta li l-poeżiji ta' Neruda, li spiss jitqiesu bħala xovinisti minħabba "l-oġġettivizzazzjoni sesswali" tal-mara u "l-lingwa patrijarkali jew, agħar minn hekk, miżoġinista," jistgħu jiġu interpretati lil hinn minn din it-tip ta' kritika limitata li ma tqisx il-kuntest storikokulturali u elementi essenzjali oħra bħall-ineżattezzi fit-traduzzjoni (Ross, 2014). Fost l-oħrajn, Ross issemmi lil Dominic Moran u Margaret Persin li jiddefendu lill-akbar poeta Ċilen f'dan il-konfront billi jipproponu l-qari mill-ġdid ta' xogħlijietu b'sensittivita akbar għall-intenzjonijiet tiegħu, bħal, ngħidu aħna, dik li jittratta t-tematika sesswali fil-poeżija sabiex jisfida l-forzi politikosoċjali ta' żmienu. Leħen poetiku korrispondenti iżda f'kuntest kulturali ferm differenti huwa dak ta' Niżar Qabbani, wieħed mill-aqwa poeti Għarab tas-seklu 20. Bħal Neruda, Qabbani spiss kiteb versi dwar il-mara; skont Ivana Peric f'"The Feminism of Nizar Qabbani" dan il-poeta Għarbi wkoll ppreżenta "immaġini kuraġġużi u senswali li invokaw is-sbuħija tan-nisa, ta' ġisimhom għarwien u tas-sesswalità ħielsa tagħhom" (2014) kif ftit jew wisq għamel Dun Karm fil-poeżija bl-isem suġġestiv ta' "Xenqet ir-Raba'" fejn sider it-tfajla bidwija "jiżfen mal-mixja" u ġenbejha "jaqbżu/ Ma' kull medda ta' riġel" (1980, p.187). Peric tikkowota lil Wen-chin Ouyang li jqabbel lil Qabbani ma' Neruda għax skontu, it-tnejn ma jirnexxilihomx "jiddivorzjaw il-mara min-nazzjon," kwalità li faċilment tista' tiġi attribwita wkoll lil Dun Karm. Għaldaqstant, il-kritika letterarja

tinsab f'pożizzjoni vantaġġuża sabiex tevalwa aħjar ix-xogħlijiet "femminili" ta' din ix-xorti ta' poeti li t-trattament tagħhom tal-mara għandu skop usa'. Bħalma għamel Dun Karm f'"Biki ta' Omm" u "Mingħajr Omm," hekk ukoll għamel Qabbani f'xi xogħlijiet minn tiegħu: il-poeta raġel isir mara permezz tal-poeżija. Fl-artiklu tagħha, Peric tikkwota dawn il-versi ta' Qabbani:

> Jiena mara
> Jiena mara
> Il-jum li fih wasalt f'did-dinja
> Sibt ma' wiċċi s-sentenza tal-eżekuzzjoni tiegħi
> Filwaqt li ma rajtx il-bibien tal-qorti tiegħi
> Filwaqt li ma rajtx l-uċuħ tal-imħallfin tiegħi (Qabbani, 2014).

L-anafora inizjali hija proprju intenzjonata sabiex tenfasizza d-dewbien tal-identità maskili u l-assimilazzjoni sħiħa ta' dik femminili sabiex Qabbani jagħti vuċi lin-nisa Għarab li qajla tħallew jesprimu rwieħhom fil-kuntest soċjali Sirjan. Peric tikkummenta li "permezz tal-poeżija ta' Qabbani, dawn in-nisa kienu ammirati, irrispettati, u mfaħħra" (2014), osservazzjoni li wkoll tista' tiġi applikata fil-konfront ta' Dun Karm. Dan għaliex il-poeta Malti ssublimizza lill-mara billi għollieha fuq il-pedestall tal-uman ideali u saħansitra ssuġġerixxi li hija aħjar mir-raġel. F'"In-Nissieġa," il-poeta jeżalta l-bżulija femminili, tant li jpoġġiha fil-livell divin ta' "Omm Alla," filwaqt li jikkundanna l-għażż maskili. Dan il-kuntrast huwa espliċitu l-aktar fl-aħħar żewġ strofi kuntrastanti tal-poeżija,

> Il-għażżien biss li jmur mifluġ fis-sodda,
> Mifluġ iqum u 'l hawn u 'l hinn jitlajja;
> Il-għażżien biss jisraq m'nn idejn ħaddieħor
> Il-ħobż li jiekol.
> Aħdem, ja xbejba, u f'nofsinhar istaħja;
> Iżjed hu bnin il-ħobż jekk qlajtu b'ħiltek.
> Omm Alla, iftakar, f'din id-dinja kienet
> Ħaddiema bħalek (Dun Karm, 1980, p. 149).

Fil-poeżija "Waħda Biss ...," Dun Karm jerġa' jikkuntrasta l-figura femminili ma' dik tar-raġel. Il-ġenwinità antiteka tal-"mara tad-dnub" tispikka viċin il-viljakkerija tal-irġiel; il-massa ta' rġiel bigotti li ċaħdu lil Kristu tistona ħdejn il-mara li waħedha sfidat il-forzi soċjali li ppromulgaw l-oppressjoni tan-nisa u użat il-femminilità tagħha biex tesprimi l-ogħla sentimenti umani. L-aħħar parti tal-poeżija tikxef id-disparità sesswali u l-iżbilanċ preferenzjali Dunkarmjan favur il-figura femminili. L-irġiel ingrati waslu biex ċaħdu lil Kristu filwaqt li l-mara wettqet miegħu l-opri tal-ħniena:

ħadd minnhom – mill-elf illi fiequ, -
ħadd minnhom – mill-elf illi għajtu
"Hosanna!" - ma daħal għalih,
ma għenu, ma sabbru, ma ħjieh,
ma tala' fuq l-għolja tal-waħx.

Waħda biss,
waħda
li kienet il-mara tad-dnub,
li ħabbet, li xegħret, li nħafret,
wennsitu lil dak il-mislub
sal-aħħar, sat-tmiem
u f'niket bla kliem,
imgħannqa mal-għuda mifdija,
fuq ir-riġlejn tal-mejjet
aktar mill-balzmu jfuħ
xerrdet qalbha fi dmugħ. (Dun Karm, 1980, p.366).

Dun Karm saħansitra jinnewtralizza l-klixè tat-taqbida klassika Femminista kontra l-idea tas-superjorità fiżika maskili li skont Peggy Rice għadha tiġi pperċepita bħala stat ta' fatt anke fi żminijietna. (2000, p.211). F'"It-Tifla tar-Raba'," minbarra li jidentifika għadd ta' kwalitajiet karatterjali pożittivi, il-poeta raġel jisfida mill-ġdid il-kurrenti tradizzjonali meta "jgħir" għas-saħħa fiżika tas-suġġett femminili,

Jien rajtek kemm-il darba u għirt għall-qawwa
Ta' dirgħajk u riġlejk, ja bint ir-raba';
Rajtek hiena u daħkana s-sjuf u x-xtiewi
Tbakkar u tishar (Dun Karm, 1980, p. 174).

Iżda għax miktuba minn poeta Romantiku u raġel, versi bħal dawn faċilment jitwarrbu minn kritiċi b'aġenda speċifika (bħal dik Femminista) bil-konsegwenza sfortunata li jirriduċu l-kanonu letterarju għal fdal ta' oppressjoni minn dawk li l-antikanonisti jsejħulhom "l-Irġiel Ewropew Bojod u Mejtin" (Bloom, 1997, p.xviii). Naqbel ma' Jonathan Wolff li l-istudenti għandhom jiġu esposti kemm għal kittieba mejtin irġiel, kif ukoll nisa (2016). Iżda naqbel ukoll mal-idea li x-xogħlijiet ta' dawn l-irġiel jerġgħu jinqraw mingħajr il-preġudizzji li, ironikament, il-ħsieb pseudopluralista rawwem fostna l-aħħar deċennji. Il-ħelsien minn ideoloġija oppressiva bħal din jista' għalhekk iwassal għall-għarfien tal-idea li l-espressjoni ta' poeta raġel tista' tkun femminili wkoll (għalkemm m'iniex nimplika li tkun femminili *daqs* dik ta' poeta mara).

Permezz tal-kunċett tar-"Romantiċiżmu femminili," Mellor tispjega kif poeta bħal John Keats esprima ħsus essenzjalment femminili fil-poeżiji tiegħu (1993, p.129), filwaqt li kittieba nisa bħal Emily Bronte setgħu ħaddnu "Romantiċiżmu maskili" (p.189). Ir-rispett lejn id-dinjità tal-mara, il-bżonn li l-femminilità tieħu sehem kontinwu fil-proċess kreattiv tal-kitba letterarja u l-esplorazzjoni bla waqfien u bla riedni tal-"jien" femminili potenzjalment jistgħu jappartjenu lill-kittieba letterarji kollha, irrispettivament mill-ġeneru tagħhom. Il-kittieba, kif jgħid Jonathan Culler, jistgħu jħaddmu "l-etika tal-alterità" (2011, p.121) sabiex xogħlijiethom ikunu rappreżentattivi mhux biss tal-grupp li jappartjenu strettament għalih imma ta' kull grupp ieħor li jaqa' taħt il-kappa tat-tiġrib uman. Allura, ir-riinterpretazzjoni tal-kanonu tradizzjonali tista' tikxef preżenza massiċċa tal-element femminili fil-letteratura Maltija.

Lawrence Buell isaqsi jekk ir-reviżjoniżmu Femminista għandux joħloq mill-ġdid il-kanoni u fuq kollox jekk għandux jirrifjuta li jissieħeb mal-idea tal-kanonu abbażi tal-fatt li kanonu ġdid li jissimpatizza mal-kittieba nisa xorta jimplika "bażi androċentrika" (1987, p.]102). Hawn it-teorista jwieġeb lilu nnifsu meta jistqarr, "Essenzjalment, l-esperjenzi letterarji taż-żewġ ġeneri, bħall-esperjenzi soċjali tagħhom, huma inseparabbli; u fl-inseparabbiltà tagħhom huma spiss idawlu lil xulxin b'modi aktar pożittivi milli negattivi" (p.104). Hawn nikkondividi l-perspettiva ta' Buell għax nemmen li l-kitbiet tal-irġiel, kif urejt b'dan l-istudju, jikkumplimentaw l-kitbiet tan-nisa aktar milli jidħlu f'tellieqa kanonika magħhom, tant li jiffurmaw parti essenzjali u, x'aktarx neċessarja u indispensabbli, mill-hekk imsejħa "*écriture féminine*." Kif argumentajt, dan il-fenomenu ta' konverġenza jista' jkun mezz sabiex titwessa' l-ottika dejqa u preġudikata ta' min jiddarras mill-kunċett ta' "kanonu letterarju Malti" għax dejjem assoċjah mad-dominanza maskili.

Referenzi

Bloom, H. (1997). *The Anxiety of Influence: A Theory of Poetry.* Oxford: Oxford University Press.

Buell, L. (1987). "The Extra: Literary History Without Sexism? Feminist Studies and Canonical Reconception", *American Literature*, 59(1).

Culler, J. (2011). *Literary Theory: A Very Short Introduction*. Oxford: Oxford University Press.

Dun Karm (1980). Fl-antoloġija ta' O. Friggieri, *Dun Karm – Il-Poeżiji Miġbura*, Malta: KKM.

Dun Karm (2004). Fl-antoloġija ta' O. Friggieri, *Il-Poeżija Maltija*, Malta: University Publishers.

Galea, S. (2017). A Place Called Home. Women and Philosophy of Education. *Educational Philosophy and Theory*. Disponibbli f'doi.org/10.1080/00131857.2017.1359781, p.2 [Moqri fit-2 ta' Frar 2018].

Mellor, A. (1993). *Romanticism and Gender*. New York & London: Routledge.

Mifsud Mutschler, N. (2017). *Ir-Rota Daret Dawra (Kważi) Sħiħa.* Malta: Merlin.

Mifsud, I. Intervistat minn Eli Badica (2015). Interview with Immanuel Mifsud: 'I'm always embarrassed to say how I became a writer'. *bookaholic.ro*. Disponibbli f'www.bookaholic.

ro/interview-with-immanuel-mifsud-im-always-embarrassed-to-say-how-i-became-a-writer.html [Moqri fit-18 ta' Frar 2017].

Peric, I. (2014). The Feminism of Nizar Qabbani. *muftah.org*. Disponibbli f'www.muftah.org/feminism-nizar-qabbani/#.WkdJF9-nHIV [Moqri fis-6 ta' Mejju 2017].

Qabbani, N. (2000). Ikkwotat minn Peggy Rice f'Gendered Readings of a Traditional "Feminist" Folktale by Sixth-Grade Boys and Girls. *Journal of Literacy Research*, 32(2), 211–236.

Rice, P. (2000). Gendered Readings of a Traditional "Feminist" Folktale by Sixth-Grade Boys and Girls. *Journal of Literacy Research*, 32(2), 211–236.

Ross, E. (2014). Something Darker Than Love: Language Considerations in the Poems of Pablo Neruda. *emeryross.wordpress.com*. Disponibbli f'www.emeryross.files.wordpress.com/2014/04/something-darker-than-love [Moqri fl-4 ta' Settembru 2017].

Thompson, A. (1999). Errors and Labors: Feminism and Early Shakespearean Comedy. *enotes.com*. Disponibbli f'www.enotes.com/topics/william-shakespeare/critical-essays/errors-and-labors-feminism-and-early [Moqri fis-7 ta' Settembru 2017].

Wolff, J. (2016). Students don't mind studying dead white men, but they want dead women too. *theguardian.com*. Disponibbli f'theguardian.com/education/2016/jul/19/students-studying-dead-white-men-women-higher-education-syllabus [Moqri fis-7 ta' Lulju 2018].

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Breaking the Barriers:
Ontological Aspects of Relation and Mutuality in Contemporary Theories of Atomic Structure and in Philosophy of Personalism

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Abstract

The paper focuses on the interdisciplinary field between the sciences and the humanities. It explores the subject matter of breaking barriers and 'individuality' in terms of the subatomic particles as building blocks of the matter and the human beings according to existentialism and personalism as philosophical traditions. The 'overcoming the barrier' theme is considered in a twofold perspective in this paper: on the one hand, as an ontological, structural and organisational principle, and, on the other hand as a condition for interaction, relation and mutuality. Theoretical and conceptual references to some of the fundamental ideas and concepts of the Quantum Mechanical Model of the atom and the Standard Model of particles are made, emphasising the primary importance of the entanglement as the variation of relationality and mutuality in the field of natural sciences. Moreover, references are made as well as to Martin Buber's and Emmanuel Lévinas's philosophy. This paper will serve as a basis for the development of an interdisciplinary series of seminars in the Secondary school curriculum aiming to deepen the relation between the natural sciences (chemistry and physics) and the humanities.

Key words: ontology, personalism, subatomic particles, relation, mutuality.

> *In face of the directness of the relation*
> *everything indirect becomes irrelevant.*
> (Buber, 2008, p.12)

Both in philosophy and in natural sciences, *curiosity* and *wonder* have always been appointed to be unlocking mechanisms of crucial importance. Great scientific discoveries are the results of questioning the surrounding reality taken previously for granted. In today's digitally revolutionised society, information and images, especially the visual ones, are overflowing and thus are challenging the human psychic rhythm and cognitive capacity of dealing with them. Taking the latter into consideration,

the specialists in the educational field face the responsibility to preserve and foster their students' curiosity and wonder, providing them with effective instruments and methodologies for orientation in the overabundant data.

Two mainstream tendencies could be profiled on the last decades' scientific geography map. On the one hand, this is the profound specialisation of some researchers, digging deeper and deeper in their relatively narrow niche. On the other hand, there is the constantly increasing interest in interdisciplinary fields, urged by the need of integrity corresponding to the diversity of complex world phenomena. Overwhelmed by the potential of the second tendency mentioned, we have decided to expand the requirements for interdisciplinary connections included in the Bulgarian educational standards and curricula. Therefore, in order to 'break barriers' and to open up wider epistemological horizons for our students from 11th and 12th grades of 32 Secondary language school "St. Kliment Ohridski" in Sofia, we have tried to build up *a series of seminars lying at the intersection between natural sciences (chemistry and physics) and philosophy*. As experienced teachers, reflecting upon and trying to meet the cognitive needs and interests of our students, we assess these seminars as adequate and useful *curiosity and thought-provoking stimuli*.

This paper presents our reflections and deals with our arguments vis à vis the first series of these interdisciplinary seminars, dedicated to *the common concept of relation (relationality)* in both fields – natural sciences and philosophy. (Here it is appropriate to recall, for example, the primal 'melting' of the origins and concerns of today's philosophy and physics.) Approaching the field of *ontology of relations* (sometimes articulated as *relational ontology*) as well as that of *philosophy of science*, our paper explores the conditions for, and possibilities of, 'breaking barriers' and overcoming 'individuality' or the state of separate 'entity' in terms of the *subatomic particles as building blocks of the matter* and the human beings according to the *philosophy of existentialism and personalism*. The mediation between natural sciences and philosophy could be made on the basis of a rich spectrum of phenomena explored by these sciences through applying different theories, concepts and instruments, for instance *matter*, *space*, *time*, *energy*, *light*, *interaction* and *relationality*. Therefore, we have decided to choose the latter as the bridge-maker for our interdisciplinary extra curricula seminars.

Bearing in mind the theoretical accumulations and the conceptual intricacies characterising the phenomenon of interconnectedness and relationality in both disciplines, an extracautious selection of approaches and instruments should be made. Nevertheless, we argue that the extremely complex nature of the subject matter 'relief' should not refrain the secondary school teachers, like us, from involving our students in research horizons usually opened up in the academic context of university education. Thus, observing these methodological assumptions, we apply the approach of *phenomenology*, largely used in both scientific fields and perfectly fitting the complex nature of the problem of 'breaking barriers' and relationality. Referring to some of the recent theories of the structure of matter in

chemistry and physics as well as to Martin Buber's and Emmanuel Lévinas's person-based philosophical reflections, we claim that, in both fields, the phenomena of *relationality* and *mutuality* create important *ontological implications* which emphasise further their scientific priority and importance.

Due to the word limit assigned, the order that our paper will follow includes a brief observation of: first, the semantic depth and the theoretical complexity of the key concepts (relation, mutuality, atom), as well as the assets of phenomenology as a leading approach; second, the conceptual framework of Buber and Lévinas concerning the transformation of ontology into ethics and thus the ontological/ethical implications of human relations; third, the foundations of the Standard Model of the subatomic particles, revealing the 'endless' multiplication of elementary particles (reductionism) with an emphasis on the postulated necessary relationality and interconnectedness of the quarks; fourth, presentation of the content of the interdisciplinary seminars, whose educational goals and assumptions have already been stated.

Some etymological and semantic sketches

The concepts of *relationality* and *mutuality* have already been declared as central for the subject matter of the paper. It is worth observing that these notions, residing extensively in the everyday language practices, serve to describe a wide range of situations and contexts, and their common-sense usage does not problematise their semantic sediments to a high extent. On a deeper level, however, reconsidering them from a scientific point of view, the concepts seem to reveal their rich semantic and philosophical storages. It would be impossible here to make a reconstruction of the 'cultural history' of the basic concept of relation/relationality and of every theoretical model dealing with it, and indeed, this is not done here. Our intention, tailored to the needs of the subject, rather includes the elucidation of the Greek or Latin origin of the key concepts and their potential for generating ontological implications. The Latin word '*relatio'* opens up a fan of meanings including 'connection, correspondence', 'act of telling, a report', *'a bringing back, restoring'*. Similarly, the corresponding verb *'referre'* means 'to refer, to report', *'bring back, bear back, carry back home, return'*.

What really counts in terms of our research interest is the idea of 'hidden direction or drive-back'. Referring to hermeneutics and its potential, we could build up the hypothesis of a deeply anchored dialectics underlying the meaning of the concept of relationality. On the one hand, it conveys the idea of an entity breaking its own 'barrier' or individual existence, and directing towards another 'foreign' entity; a hint of losing one's 'proper' place is detected. On the other, this movement forth is, in itself, a backwards movement (*'a bringing back, restoring'*). Then, we could summarise, on the basis of these semantic oscillations, that through

relationality the separate 'entities' involved in it are *brought back* and *restored* in a higher and richer reality as if this *restoration* is the natural, teleological 'state' of the 'entities'. The 'breaking' of one's own barrier seems to be the necessary condition for discovering oneself in a more complex 'reality' or 'state', which might be one's true 'ordination', one's very 'home'.

The obviously crucial idea of breaking or overcoming a 'barrier', of taking 'an initiative, direction', or making a beginning, lies at the heart of *ontology – the study of what there is and its general features (relations included)*. The Latin verb *ex-sistere* is the equivalent of the Greek verbs for 'to be' – *ειναι (einai)* and *υπαρχειν (hyparkein)*. 'E*x-sistere'* means 'arise, come to light, emerge, appear, project, *become, come into being, be produced*' (Edwards, 1967, p.141; Williams, 1981, p.3; Salmon, 1987; Fine, 2009). It is reasonable then to accept the phenomena of relationality and interconnectedness as imbued with ontological and metaphysical implications. Without going into too much detail, we should say that a distinction between *substantivist and relational ontology* is made, the former giving the priority to substances or entities, the latter to relations between them as more fundamental for being (Wildman, 2006; Imaguire, 2012; Brower, 2015; MacBride, 2016).

The same semantic layer of 'breaking barriers' and possessing a direction could be discovered in the Aristotle's reflections on *relation* in his treatise *Categories*. Relations comprise 'one of the accidental categories and must be understood as items inhering in particular substances' (Brower, 2015). Moreover, Aristotle names the relations 'things *toward* something (ta *pros* ti)[1]' (Brower, 2015). Referring again to the previously mentioned dialectics hidden in the nature of relations, we could agree with Jeffrey Brower that Aristotle speaks of relations „as inhering in one thing and somehow pointing toward (pros) another" (Brower, 2015). And that is the semantic zenith our subject needs – relation/relationality is an ontological category par excellence, enabling the variety of interactions between substances/entities[2].

Furthermore, the complex nature of relationality and mutuality, both in natural sciences and in philosophy, requires an approach able to encompass it, and the late 19th-century-born *phenomenology* seems to be the right choice. Phenomenology could be described as the method of 'focality', thus paying attention to each possible perspective on nature and human interpersonal world. Considered to give 'an idea of world's depth and density' (Internet Encyclopedia of Philosophy, n.d), this theoretical and methodological perspective reconstructs the world as having a multifaceted and multiprofiled character, due to the unique perspective of the observer. Ready to grasp an ever-changing phenomenon, this approach could deal with the 'surprises' and the new discoveries in the scientific field. This fact makes it a perfect match for the subatomic particle theories challenging humankind fundamental intuitions

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1   The Latin equivalent to be 'ad aliquid'.
2   The possible classifications of the relations on the basis of different criteria (dyadic/triadic; symmetric/non-symmetric/asymmetric; internal/external, etc.) would not be explored further in this paper (Macbride, 2016).

about the world we live in. However, phenomenology's epistemological capacity is not exhausted with its sensitivity toward the phenomena and observers' diversity. It usually recombines the scattered reality it explores, relating the pieces and addressing the hermeneutics potential to make it full of meaning.

'Breaking barriers' and relationality: ontological/ethical principle in Buber's and Levinas's philosophy

> *… to reverse the relation is to abolish the reality…*
> (Buber, 2008, p.9)

Not only full of meaning, but predominantly full of relations seems to be the world for the Austrian philosopher and theologian Martin Buber and the French philosopher Emmanuel Lévinas. Both major representatives of the late 19th and 20th century *philosophy of personalism* (Mounier, 1952; Macmurray, 1961), a movement tightly intertwined with *existentialism* (Cooper, 1999; Judaken & Bernascony, 2012), Buber and Lévinas focus their work on the phenomena of *relationality* and *mutuality*. As the name of the movement is self-revealing, the concept of 'person' is considered as a fundamental ontological and epistemological principle: 'Personalism posits ultimate reality and value in personhood – human… as well as divine… Personhood… gives meaning to all of reality' (Williams & Bengtsson, 2018). So far in this paper, relations' ontological content and implications have been stated, but these two thinkers make a step further, emphasising the priority of *the ethical over the ontological aspect of relations*. An important epistemological shift is made in Buber's and Lévinas's reflective approach toward reality considering philosophy less as ontology and more as ethics.

Without any exaggeration, Martin Buber could be appointed an apologist for the relationality phenomenon. His best known work is the philosophical essay *I-Thou* (1923) which treats *relationality and mutuality as structural, organisational and ethical principles of existence*. Buber creates *two primal combinations/relations* as key concepts of his philosophy – *I-It relation* and *I-Thou relation*, the former describing the interconnectedness between the human beings and the world of nature, while the latter refers to the way human beings (persons) interact. These relations exist in the field of *the word* and *dialogue*, breaking the barrier of the sound and the vocalisation: 'There is only the one primal being unconfronted by another. We should plunge into the silent unity.' (Buber, 2002, p.28).

The two elements of the combination, especially as far as the *I-Thou* one is concerned, go inevitably together: 'If *Thou* is said, the *I* of the combination *I-Thou* is said along with it… The primary word *I-Thou* can only be spoken with the whole being' (Buber, 2008, p.3). Buber does not assume the solitary, 'individual' existence of either of the two elements of the combination: 'There is no *I* taken in itself, but only the *I* of the primary word *I-Thou* and the *I* of the primary word *I-It*' (Buber, 2008,

p.4). Furthermore, in the lap of the relation *I-Thou*, the real presence and the word that denotes it coincide, so we could talk about the ontological plenitude of this interaction: 'The existence of *I* and the speaking of *I* are one and the same thing' (Buber, 2008, p.4).

Being a philosopher, a Jewish theologian, and a fervent religious at the same time, Buber sees the world primarily as 'the world of relation' (Buber, 2008, p.6) and traces three spheres to perform this relationality: 'our life with nature', 'our life with men', and 'our life with intelligible forms' (Buber, 2008, p.6). Moreover, primary combinations/words/relations reflect the existence of the ontological higher figure of the One God: 'in each *Thou* we address the eternal *Thou'* (Buber, 2008, p.6). Here it is worth remarking that the inauguration of Jewish monotheism is realised precisely through the set of the interpersonal relation between the self-revealing One God and the patriarch Abraham following the Biblical evidence. It is not surprising that Buber's religious sensitivity brightly tinges his ontological/ethical reflections and feeds his philosophical conceptual framework.

According to Buber, the semantically close concept of *mutuality* constitutes 'the peculiar nature of the relation' (Buber, 2002, p.p.116-117). An emphasis on mutuality should be made here, revealing further *the dynamic depths of relationality*. The Latin roots of the word convey the idea of 'motion, action, change', as 'something reciprocal', which means that the relation is not static, but vital and enriching.

Submerged in a quite similar religious and philosophical atmosphere, Emmanuel Lévinas's major writing *Totality and Infinity. An essay on exteriority* (1961) sharpens further the conditions of relationality. The elements of Buber's primary relation *I-Thou* are transformed here into *the same* and *the other* or *I* and *the Stranger*. Again, the ontological/ethical horizon is widely open. The conceptual figures of *the other* or *the Stranger* refer to the fellow human being, the fellow person and behind them always is hidden *the Other*, without being explicitly revealed as God himself. The concept of *exteriority* corresponds to the idea of breaking the barriers of one's individual and solitary existence – of one's *totality*. Lévinas thinks of it as an openness of *the same* to encounter *the otherness* in *the face of the other*. The face is the only guarantee for a true relation and ontological/ethical horizon: „A relation whose terms do not form a totality can hence be produced within the general economy of being only as proceeding from the I to the other, as a face to face" (Lévinas, 1969, p.39). The experience of relation is one of *transcendence* as well. It includes the readiness to welcome the higher ontological orders.

Similarly to *the dialogic principle* in Buber's relational ontology/ethics, Lévinas describes *the language* and *the conversation* as conditions for the *revelation/epiphany* of the otherness. Again overcoming the sound parameters, the conversation is responsible for the preserving of the otherness of the other in relation. The relation does not delete the otherness: on the contrary, it feeds it as a condition for its own reality: „Conversation… maintains the distance between me

and the Other, the radical separation asserted in transcendence which prevents the reconstitution of totality" (Lévinas, 1969, p.40).

Both Buber's and Lévinas's philosophical paradigms on relationality and mutuality are a prominent illustration of the previously mentioned 'hidden' initiative and direction of the separate 'substances'/'entities'. Lévinas's *Totality and Infinity* opens up with the striking statement: 'The true life is absent.' But we are in the world. Metaphysics arises and is maintained in this alibi. It is turned toward the "elsewhere" and the "otherwise" and the "other" (Lévinas, 1969, p.33). In the field of relation these 'entities' ensure their existence and are brought back 'home', maybe to 'the true life'.

Together-in-separation

> *Indeed, the foundational laws governing nature*
> *blur the distinction between individual things*
> *and their surroundings.*
> (Mann, 2014)

Even though lacking the full dignity and ontological/ethical depth of the interpersonal relation *I-Thou*, the relation *I-It* also bears important ontological implications. We said that this primal combination reflects *the interconnectedness between the human beings and the nature* in Buber's philosophy. The scientific picture of the world we live in has been dramatically changing with the last decades' discoveries in natural sciences, in chemistry and physics in particular. The modern *theories of the atomic structure as an entity made of different subatomic particles and the structure of the subatomic particles itself*, developed by scientists as Niels Bohr, Max Planck, Albert Einstein, Boris Podolsky, Nathan Rosen, Werner Heisenberg, Alain Aspect, Georg Zweig, Murray Gell-Mann, Sheldon Glashow and many others seem to turn the common-sense epistemology upside down. We shall reconstruct here some of the fundamental ideas and concepts of the Q*uantum Mechanical Model of the atom and the Standard Model of particles*, emphasising the primary importance of the *entanglement* as the variation of relationality and mutuality in the field of natural sciences and its ontological implications.

In the beginning of the 20th century, natural sciences proved that the atom is a complex particle. For a long time considered a fundamental particle, the atom turns out to be composed of nucleus and electron shell. The nucleus itself encompasses positively charged protons and neutral neutrons called nucleons, while the electron shell consists of negatively charged electrons. Whereas the electron turns out to be a fundamental particle, the same statement could not be said about to the nucleons – it turns out that they are divisible into even smaller particles, called *quarks*. Furthermore, there are carrier particles – *gluons* – which "glue" together

the quarks into the nucleons, thus implementing a so-called "strong interaction". This interaction holds protons in the nucleus together, thus preventing nucleus of decomposition. As colour-charged particles, *the quarks cannot exist individually*, because the color-force increases as they are pulled apart so they are confined in groups with other quarks, thus building hadrons. Hadrons are colour-neutral composite particles. Nucleons, for example, are hadrons.

The Standard Model as quantum theory finally breaks the barriers of imagination and reorders the image of the world, explaining what really holds it together. The subject matter of this paper requires that the emphasis is less on the variety of elementary particles (6 quarks, 6 leptons, and force carrier particles[3]) and in favour of their modes of complex interactions. The universe, which we constantly explore, exists because of the fundamental particles' interactions. These interactions include attractive and repulsive forces, decay, and annihilation. Basically, there are four fundamental interactions between particles – strong, weak, electromagnetic and gravitational interactions. All aforementioned bonds and mutual interactions present the idea of *togetherness-in-separation*.

However, in terms of the potential for relationality of the particles, the phenomenon of *entanglement* deserves special attention. Robert Mann (2014) defines it as „blurring the distinction between individual things and their surroundings… between the subsystems of a system". This quantum phenomenon generates significant philosophical consequences,

> 'implying that interconnectedness is a central feature of existence. It is so central that the relationships between the bits and pieces of nature can produce effects that each bit or piece on its own cannot produce. *Nature is intrinsically relational*…'
>
> (Mann, 2014).

The entanglement of particles has to do with the so called *EPR effect[4]*, making evidence of the „counterintuitive *togetherness-in-separation*" (Polkinghorne, 2002, p.79; Polkinghorne, 2010) between particle 1 and particle 2:

> 'Quantum entities that have interacted with each other remain mutually entangled however far they may eventually separate spatially… The EPR effect's implication of deep-seated relationality present in the fundamental structure of the physical world is a discovery that physical thinking and metaphysical reflection have still to come to terms… the EPR effect is ontological and not simply epistemological'
>
> (Polkinghorne, 2002, p.79).

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3   It is possible that, in some future development of the quantum theory, new even smaller particles are discovered.

4   The effect brings the first letters of the last names of Albert Einstein, Boris Podolsky and Nathan Rosen, its discoverers.

Reminding Aristotle's concept of *potentia*, Werner Heisenberg concludes that the elementary particles 'form a world of potentialities or possibilities rather than of things or facts.' (Polkinghorne, 2002, p.85). In the end, we should recall the idea of 'going back home' conveyed by the semantic field of the word *relation* and again Aristotle's idea of the relations as 'directing toward'. Could we suggest that the world of the nature and that of the personhood are both affected by the same ontological urge for relationality and mutality providing a higher (or the only true!) access to existence?

Interdisciplinary seminars programme *Stay-in-relation: philosophy and/of natural sciences*

Seminar 1	Introduction. The interconnectedness of the curricula disciplines according to the national educational standards. Philosophy and natural sciences, philosophy of science. The spectrum of complex phenomena, explored in both fields – *matter*, *atom*, *space*, *time*, *energy*, *light*, *interaction*, *relationality*. Bibliography of major writings
Seminar 2	Ontological and epistemological concerns. Basic conceptual instruments. The methodological potential of phenomenology
Seminar3	Relationality according to personalism and existentialism
Seminar 4	Structure of matter theories. Relationality according to the Standard Model. Philosophical implications
Seminar 5	Practical assignment: *Capture-the-relations* (in a painting, photos, 3D model, poem, essay, song, etc.)

References

Brower, J. (2015). Medieval theories of relations. Available at https://plato.stanford.edu/entries/relations-medieval/ [Accessed 12 July 2018].

Buber, M. (2002). *Between man and man*. Routledge.

Buber, M. (2008). *I-Thou*. Hesperides Press.

Cooper, D. (1999). *Existentialism.* Oxford, Blackwell.

Edwards, P. (1967) (ed.) *Encyclopedia of philosophy*. Vol. 7-8. New York, Macmillan.

Fine, K. (2009). *The question of ontology. Metaphysics.* In D. Chalmers, D. Manley, & R. Wasserman (eds.). Oxford, Oxford University Press.

Imaguire, G. (2012). On the ontology of relations. *Disputatio*, IV, 34, December.

Internet Encyclopedia of Philosophy (n.d.). Phenomenology and natural science. Available at https://www.iep.utm.edu/phenomsc/ [Accessed 15 July 2018].

Judaken, J. & Bernascony, R. (eds.) (2012). *Situating Existentialism: Key Texts in Context.* New York, Columbia University press.

Lévinas, E. (1969). *Totality and infinity. An essay on exteriority*. Duquesne.

Macbride, F. (2016). Relations. Available at https://plato.stanford.edu/entries/relations/ [Accessed 15 July 2018].

Macmurray, J. (1961). *Persons in relation.* London, Faber and Faber.

Mann, R. (2014). Physics at the theological frontiers. *Perspectives on science and Christian faith*, 66(1).

Mounier, E. (1952). *Personalism.* Mairet, P. (trans.). Notre Dame, University of Notre Dame Press.

Polkinghorne, J. (2002). *Quantum theory. A Very Short Introduction*. Oxford University press.

Polkinghorne, J. (2010). *The Trinity and an entangled world. Relationality in physical science and theology.* Eerdmans Publishing company.

Salmon, N. (1987). Existence. *Philosophical Perspectives* 1, In J. Tomberlin (ed.). Atascadero, Ridgeview press.

Wildman, W. (2006). An introduction to relational ontology. Available at http://people.bu.edu/wwildman/images/docs/(72)%202010%20-%20Wildman%20-%20Introduction%20to%20Relational%20Ontology%20(final%20author%20version)%20-%20Polkinghorne%20ed.pdf [Accessed 15 July 2018].

Williams, C. J.F. (1981). *What is Existence?* Oxford, Oxford University Press.

Williams, T., & J. Bengtsson, (2018). Personalism. Available at https://plato.stanford.edu/entries/personalism/ [Accessed 15 July 2018].

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Communication as Education:
A Study about the Experiential Factors that Contribute towards Low Maltese Language Examination Performance amidst Cultural Contradictions between Curricular Priorities and Teaching Practice

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Abstract

This work gives a description of an on-going study that sets out to investigate the root causes of poor performance in formal Maltese Language examination by fifteen and sixteen years old pupils. As reported in recent years in the Matriculation and Secondary Education Certificate (MATSEC 2015, 2016, 2017) examination reports, results show that there has been minimal improvement in performance amongst pupils who sit for this Secondary Examination Certificate (SEC). These exam performance results are important on a National scale because they have a direct influence on the pupils' progression into higher education and other career streams. Lack of pupils' performance in the (SEC) Maltese Language Examination raises substantial amount of discourse within the Maltese learning community on how this subject should be taught, developed, managed and examined. To this effect, this study sees lack of pupils' performance in this specific subject as a phenomenon that warrants a case study to investigate key factors that contribute towards the low performance results. It enquires about the nature of the current problem and why this is happening. The information gathered may seek to build foundations for future and further enquiries. The objective of this study is to go beyond the scope of the examiners' statistical reports and to learn about the nature of this problem from the experiential views of the pupils and other learning stakeholders (parents/teachers/examiners) of this specific SEC examination. The intended outcome of this study is to propose a series of action points that might help to improve pupils' performance in the SEC Maltese Language examination.

Keywords: Underperformance, Systematic, Qualitative, Experiential, SEC

Introduction

For years, there has been many concerns about the need to bridge the gap between formal learning ideology and multifaceted learning needs and abilities in Malta (Bezzina, 1991; Sultana, 1992; Cutajar, 2013). Since the emergence of the 21st Century learning framework, new learning challenges were introduced to Malta's education system in which such a framework brought a shift in the rethinking of traditional teaching, learning and assessment models.

Different local and international published reports seem to agree that the driving forces in the bridging of the gap between formal learning ideology and multifaceted learning needs and abilities of fifteen and sixteen years old pupils in Malta (PISA 2015) refer to the lack of opportunity for pupils to exercise constructive type of learning in formal education environments. This is important data. However, the published reports do not give us a first-hand systematic analysis to understand the root causes that prompt such a lack of performance. This research will explore factors that lead to pupils' poor performance. These factors can range from pupil-intrinsic factors, such as the learning experience, emotional impact and reading motivation, to pupil-independent factors, such as instructional practice, curriculum demands, assessment procedures and traditional learning ideologies. From the results of this exploration, the aim is to enrich the understanding of what stops pupils from performing well in this specific formal stage of education by performing a systematic analysis of underlying the causes that motivate this poor examination performance.

This on-going study is seeking to understand the nature of this problem by focusing on the SEC Maltese Language examination as a case study. This study applies a methodology that looks at the problem from various perspectives through a qualitative systematic analysis. In this paper, the methodological approach of this study shall be explained. Moreover, this paper shall also include a sample from the initial findings of this study, including themes that emerged from a systematic analysis of the first three-year sample (2003-2005), from primary literature that is available in the public domain.

In the following sections, the stages of a specific qualitative systematic analysis will be discussed, along with how the initial findings are informing the development of a theory-building exercise about the nature of the problem enquired in this study. Moreover, a short summary of the initial findings and a discussion of what has emerged so far will also be given.

Method

This study is an on-going case study that sets out to explore what might be the factors that motivate poor performance amongst pupils who sit for the SEC Maltese Language examination. The objective is to analyse and code topics from a sample of

available primary literature that describe key factors that contribute towards poor performance in this specific examination. Through a thematic analysis of different types of primary literature, this study is looking for common patterns, contrasting and recurring concepts about pupils' performance to help understand (Dixon-Woods et al., 2006) the key features that describe the nature of the problem from experiential perspectives. Differently from other thematic studies, this research does not see this enquiry being based on a set of prescribed research questions, but an enquiry that evolves as the study progresses.

In other words, a conventional systematic review would require specific research questions to be formulated *a priori* of a review. This could be limiting for this study, since factors that challenge pupils' performance can also be personal and subjective, and hence, subject to change. Moreover, there may also be contradictions and different views of the problem from different stakeholders, and factors leading to the problem in question may be several and multifaceted.

A Critical Interpretative Synthesis (CIS) approach allows the exploration of diverse types of arguments from available primary literature and the translation of meanings as themes in relation to the philosophical principles that are central to this study. "We suggest that using CIS to synthesize a diverse body of evidence enables the generation of theory with strong explanatory power" (Dixon-Woods et al., 2006, p.2). For this specific case study, research questions need to be subject to modification in response to search results, findings and discussion of the analysed documents. Eakin and Mykhalovskiy suggest that in such cases "the research question functions more as a compass than as an anchor, and is sometimes not really known until the end of the research." (Eakin and Mykhalovskly, 2002, p.190)

Critical Interpretative Synthesis (CIS)

In 2015, Malta's official examination board (MATSEC) called out for further studies that aim to research further into the nature of the problem of pupils' underperformance by eliciting 'lived experiences' in this specific study area.

> "Why is this happening? Is it because of the boys' low esteem? Low expectations? Other reasons? Only systematic qualitative research, which is beyond the scope of this report, can answer these questions." (MATSEC, 2015).

MATSEC's call for action communicates the strong message that factors leading to pupils' low performance can be independent from institutions and hard to elicit from statistics and quantitative reports. There are various types of methods that one can employ to achieve a qualitative systematic analysis (McInnes, 2011). CIS gives the reviewer the opportunity to view the problem from multiple perceptions and

from diverse types of literature to provide the basis of new and reflective meaning of the available data. (Dixon-Woods et al., 2006).

There are numerous studies that enlighten us about quantitative and qualitative methods of research that focus on teaching and assessment strategies to improve pupils' performance. Every research method approaches central problems in different ways and works with innovative methodologies that fits the study's educational settings and circumstances. Other researchers have explored factors that impact pupils' performance in education (Kern, 1989; Alfassi, 1998; Lau & Chan, 2003; Dreyer & Nel, 2003; Cutajar, 2003; Van Keer & Verhaeghe, 2005; Boakye, 2017; Ibqal et al., 2015; Gilakjani 2016; Lau, 2017). Different results have been achieved, depending on the scope and the underpinning philosophies of each research method.

In the absence of specific data that describes the nature of the problem that motivates pupils to underperform in the SEC Maltese Language examination, this research attempts to develop a theory that describes an understanding of the problem, based on various experiences, perspectives and interventions that took place in recent years. CIS is different from other synthesis methods, because it allows this study to:

1. synthesise diverse types of literature
2. address broad research areas
3. generate theory from diverse literature
4. understand each article in relation to itself
5. translate studies into one another
6. compare translations in terms of what is agreed and not agreed
7. generate synthesised reflections
8. deliver a synthesised argument of topics (McInnes, 2011).

As Dixon-Woods suggested, using CIS allows the opportunity to be flexible in the selection of the literature sample. The analysis can be based on '… the credibility of the evidence, to make critical judgements about how it contributes to the development of the synthesising argument." (Dixon-Woods et al., 2006).

Synthesised arguments are key to the generation of themes that describe the nature of the problem from various perspectives. This approach helps this study come to the realisation that there is no one singular reality to this problem. This approach also helps this research to identify ways that can help to establish what pupils and learning stakeholders perceive as good pedagogic initiatives that can help towards improving their own learning experience in preparation to their formal Maltese Language examinations. Thus, the result shall seek to contribute towards the development of a theory that describes an understanding of the current problem, developed from a critical and reflective understanding of the nature of issues that impact the pupils' performance in the SEC Maltese Language examination. An initial overview of data from available literature will be discussed in the initial findings sections.

Background

From an initial familiarisation process of the available primary data, one can see that several factors that demotivate pupils' performance exist within an examination culture that strives to understand and to communicate its role in Malta's educational landscape. Sultana (1999) suggests that the introduction of a Maltese independent education system prompted an on-going investigative journey that seeks to establish the meaning of salient milestones that characterises pupils' educational development.

> "A stratified and selective state school system which practices intra and inter school streaming from primary school onwards, and which is intent on channeling students to different educational spaces offering different curricular diets, creating a hierarchical system of prestige for both teachers and taught" (Sultana, 1999, p.146).

Pupils' low performance in education has been studied in the past (Sultana, 2010; Borg et al., 1995; Bezzina, 1991; Cutajar, 2013; Zammit Mangion, 1992). However, fifteen years ago, in a study by Cutajar (2003), it has been pointed out that the problem of low performance, specifically in the SEC Maltese Language examination, goes beyond pupils' lack of language and orthographic skills.

> "These exams not only serve as a benchmark for attainment of 16+ candidates taking them, but are also highly prized by educators, parents and students..." (Cutajar, 2003, p.95).

Cutajar's (2003) study claims that pupils' performance, particularly in the SEC Maltese Language examination, can improve if pupils and learning stakeholders could identify with the importance of what they are learning. Cutajar's comprehensive work addressed key factors that limited pupils' performance in the SEC Maltese language examination. The study recommended;

> "All stake holders must feel the need to inculcate a love of the language in students…" (Cutajar, 2003, p.110).

Cutajar's work focused on an analysis of examination perspectives by pupils and other learning stakeholders between 1997 and 2003. Through a quantitative inquiry, this study communicates significant concerns by teachers, pupils and parents about the need for change in the examination process. In the past fifteen years, various interventions took place in an attempt to address the need for change, mainly by introducing learning assessment initiatives such as the General Certificate of Education Exam (2002), the SEC Vocational Subject Examinations (2014) and the Learning Outcome Framework (on-going). However, these interventions prompted several ideological concerns amongst the educational community about how these curricular actions might have an ideological impact on Malta's educational landscape.

This study sees Cutajar's work as an important starting point, because since this study took place, there has been an increased amount of interest in the root causes that induce underperformance in key SEC examinations. The initial stages of this study explore the root causes from various perspectives communicated in reports and articles that are available to the public since 2003. The reports and articles were sampled on the merit of how these documents share significant views about the role of the SEC examination in Malta's educational landscape, SEC examination policy and structure as well as factors highlighted in documents that are significant towards the understanding of the nature of poor performance in the SEC Maltese Language examination.

The following section consists of a sample overview of some initial findings from an analysis of data based on a 3-year selection of primary literature. The purpose of this initial exploration is to identify effective ways to elicit primary themes from an inductive study of various types of data to help formulating a theory about the understanding of what causes pupils to underperform. Data mainly consists of learning stakeholders' concerns, pressures, and proposed interventions that aim to improve exam results.

Initial Findings

Since the early stages of this analysis, various 'themes' were generated to gradually help in distinguishing factors that are holding back pupils from performing well in their SEC Maltese Language examination. Word cloud diagrams 1, 2 and 3 provide a visual description of most popular codes that emerged after the thematic analysis of available literature published in 2003, 2004 and 2005.

The CIS approach of eliciting data involves various stages to be completed during this on-going case study. In this initial exploration of the available primary literature, various viewpoints were established that describe the nature of what might impact pupils' performance, why this is happening and how viewpoints change from year to year.

The following sections give a short description of what has emerged from the initial review findings.

Diagram 1: Word cloud diagram of word codes generated in 2003 primary literature analysis

Diagram 2: Word cloud diagram of word codes generated in 2004 primary literature analysis

Diagram 3: Word cloud diagram of word codes generated in 2005 primary literature analysis

Communication as Education

Since 2003, there seems to be a common focus point amongst pupils and the teaching community that link good educational practice and performance directly to the SEC exam results. For several years, there has been an evident concern about the current SEC examination as a process that pressures pupils into a "right of passage" (Times of Malta, 2003) educational scenario. This factor has attracted the attention of various learning stakeholders.

In 2002, concerns about this examination system were routed towards how pupils and close learning stakeholders conceptualise compulsory secondary educational schooling in Malta. The educational spirits of pupils can be considered as an identifying factor. However, data from the available literature show that preoccupations mainly focus on how the system lacks in giving pupils opportunity to communicate and think critically about their learning. In the following sections, the term 'communication as education' will be further discussed and supported by several excerpts from different perceptions about the problem of underperformance at this specific stage, as reported by newspapers, journals and academic reports between 2003 and 2005.

The Examination Pass Rates

The statistical results of the SEC examinations published every year seem to communicate different interpretations on student performance. This concern raised questions about a communication misalignment between MATSEC and the National Minimum Curriculum (NMC).

"… despite the many good points of the national minimum curriculum (NMC)… the SEC and MATSEC examinations still do not reflect as well as they ought to the standards of the NMC." (Times of Malta, 2003).

This misalignment is perceived as an important factor that drives towards a controversial discourse amongst different educational stakeholders. Moreover, this misalignment creates pressure amongst pupils and learning stakeholders to prioritise work preparation specifically for the SEC examination and to pass this examination. This pressure emerges when specific targets were introduced during the preparation stages to make sure that teachers and pupils cover what is necessary to complete and pass the examination.

"… blind faith in 'past papers coaching'. Basing the students' preparation solely on these and ignoring the syllabus instils a misguided sense of complacency, which could be shattering on examination day." (Times of Malta, 2003).

To counteract this misalignment, it was also suggested to formalise a forum of key education stakeholders to normalise communication issues between the MATSEC board, NMC and the education division and to find alternative solutions to improve pupils' performance; this problem, according to MEDE, creates a high probability of underperformance among pupils in key SEC examinations. This forum consisted of members from the MATSEC board, several heads of schools and teachers.

"For this reason, the Ministry of Education should carefully consider the recent suggestion by a leading educationist for the creation of an alternative to SEC for which he, and presumably his colleagues, suggest the old familiar name of General Certificate of Education." (Times of Malta, 2003).

The SEC Maltese Language examination has an important role in this discourse, since it is considered as a core subject for pupils to enrol in most post-secondary institutions. In general, more than 30% of the candidates do not qualify with at least a pass grade, making the Maltese language examination to be perceived as a high-stake examination. This statistic prompted a qualitative report, spearheaded by MEDE in 2003, to identify how pupils' learning performance is being evaluated in schools. This research highlighted the dominant types of assessment that feature in secondary schools during the preparation stages towards the SEC examinations. This study puts light on factors that explain why most schools opt for summative types of

assessment practice, including annual tests and exams, as the most popular format of recording a pupil's progress (64% of participating schools). Moreover, others opt for a half yearly test and exams (59% of participating schools), class/homework (57% of participating schools) and classroom tests (50% of participating schools).

> "Other forms of assessment such as practical work, class presentations and fieldwork do feature but at a very minimal percentage namely at 1% of participating schools." (Grima & Chetcuti, 2003).

This report also highlights the lack of school participation in this study and the lack of schools with an official school assessment policy. It was also highlighted that there seems to be a common interest amongst the teaching community (this study consists of perspectives given by teachers and heads of schools only) to give pupils a "true picture" about where they stand academically.

> "… helps students to know where they stand. There are few illusions about the ability of the students." (Grima & Chetcuti, 2003).

This quote is a direct quote from one of the heads of the participating schools. Examination type of assessment is believed by teachers and heads of schools in general to be the "fairest" and most "reliable" form of assessment to evaluate pupils' performance.

Moreover, this MEDE report also indicated that pupils and parents/guardians were not interested in feedback or how pupils can improve their performance. Pupils and learning stakeholders, according to the participating teachers and heads of schools, were only interested in their final results. It is important to point out once again that these views were communicated from just the teachers' views on the problem.

In reflection, there has been general concerns about ways how pupils are being examined for quite some time. However in MEDE's 2003, the report outlines specific factors that describe perceptions about the uses of assessment. Factors that lead to these concerns are mainly rooted to what every individual learning stakeholder perceives as a fair judgement of a pupils' ability to demonstrate their learning. Issues of preoccupations relating to high student dropouts and the pupils' performance also seem to be a priority in the policy makers' agenda. Nevertheless, specific perceptions that emerged in the 2003 report show that fair judgement and pupils' performance should be evaluated and achieved within a wide variety of factors. Although such concerns seem to agree about the fact that a change is needed in the assessment process and the policies helping pupils to progress, on one hand, concerns seem to focus on factors related to assessments' suitability for the pupils, while on the other, there seems to be a focus on factors that relate to assessment practicality and objective targets.

Discussion

So far, the CIS approach is resulting to be an effective data analysis tool and it is allowing this study to provide reflective discussion of controversial views about factors that can lead to pupils' underperformance from diverse types of communication. From the reflective contributions so far, several codes and themes are being generated with the scope to enrich the understanding of what might disallow pupils to underperform in the SEC Maltese Language examination.

From an initial survey of the available primary data, one can sense a tension in people's perceptions, specifically about the SEC process, as ideological in nature. This ideological tension seems to be based on continuous preoccupations that contrast between idealist and pragmatist philosophical views about what stops pupils from performing well and what should be done to improve the problem. This tension is mainly evident by those who voice their concerns about the examination, the examining body or any other element that contribute towards the pupils' performance in this SEC examination process. This tension is apparent in the primary literature and can be distinguished as an underlying influence that motivates a controversial discourse about the nature of this problem.

A parallel or a similar conflict of ideologies could be drawn between the scholarly arguments and the learning philosophies of Bertrand Russell and John Dewey. Similarly, perceptions from the available literature seem to prioritise an obligation towards thriving in instilling an 'educational culture in pursuit of excellence' (Mintrom, 2014) for everyone and within the confines and practicalities of the SEC examination system and Malta's National interests. From an initial overview of the available literature, one can sense this ideological tension between idealist and pragmatist perspectives about how to achieve excellence. Conflicting, dichotomous views emerge, such as the concept of 'organizational culture' (Schein, 1990) and 'the notion of excellence as a moral category' (Mintrom, 2014).

This dichotomy shares similar principles to Russell and Dewey's ideological conflicts of education, because the discourse about achieving excellence found in the primary literature, specifically about the SEC examinations, seems to be challenged by a division of views about how the ideal education should be. The initial findings of this case study highlight these conflicting concepts. From these concepts, this study aims to further investigate and elicit more concerns in pursuit of discovering what is the nature of poor performance in the SEC Maltese Language examination.

Conclusion

In conclusion, this paper has explained how components of this study fit within the broader scopes of identifying the nature of factors that drive poor performance in the SEC Maltese Language examination. The initial findings of this study have

established a version of the type of problem that needs to be investigated in order to subsequently establish the study's main research questions. The initial findings serve as data to help in the development of the foundations of what this study needs to ask to unveil relative information about the nature of what motivates underperformance. CIS was described as a method that allows this research to get close to different sources of information and to perform a reflective synthesis of diverse types of primary literature that describe the problem from various perspectives. This method of analysis has been discussed in terms of how each stage of the process shall attempt to connect patterns of information elicited from different sources and how each stage links with one another to establish the philosophical underpinnings of this research. Finally, a sample from the initial findings has been given to show the reflective process of analysis and how various topics of research are being generated through this process to identify the nature of factors that can lead to pupils' underperformance in the SEC Maltese Language examination. Through these topics, a theory can eventually be established, a theory that can potentially serve as a foundation to be able to articulate what might be the nature of this phenomenon.

References

Alfassi, M. (1998). Reading for Meaning: The Efficacy of Reciprocal Teaching in Fostering Reading Comprehension in High School Students in Remedial Reading Classes. *American Educational Research Journal*, 35(2), 309-332.

Bezzina, C. (1991). Improving the Quality of Schooling in Malta. *International Journal of Educational Management*, 5(4), 14-18.

Boakye, N. (2017). Efficacy of a reading intervention for first-year university students. *A Journal for Language Learning*, 33(1), 1-24.

Borg, C., Camilleri, J., Mayo, P. and Xerri, T. (1995). Malta's National Curriculum: A Critical Analysis. *International Review of Education*, 41(5), 337-356.

Chan, D. & Lau, K. (2003). Reading strategy use and motivation among Chinese good and poor readers in Hong Kong. *Journal of Research in Reading*, 326(2), 177-190.

Cutajar, M. (2003). The Maltese SECE: An Evaluation. *Journal of Maltese Education Research*, 1(2), 95-111.

Cutajar, M., Bezzina, C. and James, C. (2013). Educational reforms in Malta: A missed opportunity to establish distributed governance. *Management in Education*, 27(3), 118-124.

Dixon-Woods, M., Cavers, D., Agarwal, S., Annandale, E., Arthur, A., Harvey, J., Hsu, R., Katbamna, S., Olsen, R., Smith, L., Riley, R. and Sutton, A.J. (2006). Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups. *BMC Medical Research Methodology,* 6(1), 1-35.

Dreyer, C. & Charl, N. (2003). Teaching reading strategies and reading comprehension within a technology-enhanced learning environment. *System*, 31, 349-365.

Gilakjani, A. (2016). A Study of Factors Affecting EFL Learners' Reading Comprehension Skill and the Strategies for Improvement. *International Journal of English Linguistics*, 6(5), 180-187.

Grima, G. & Chetcuti, D. (2003). Current Assessment Practices in Schools in Malta and Gozo – A Research Project. *Journal of Maltese Education Research*, 1(2), 57-94.

Kern, R. (1989). Second Language Reading Strategy Instruction: Its Effects on Comprehension and Word Inference Ability. *The Modern Language Journal*, 73(2), 135-149.

Lau, K. (2017). Classical Chinese reading instruction: Current practices and their relationship with students' strategy use and reading motivation. *Teaching and Teacher Education*, 64(1), 175-186.

MATSEC (2015). Statistical report, SEC Examinations 2015. MATSEC Support Unit University of Malta. Report number: 1. Available at https://www.um.edu.mt/__data/assets/pdf_file/0005/282641/Maltese2015.pdf [Accessed 7 August 2018].

McInnes, L. (2011). Challenges in conducting systematic reviews of qualitative research: Methods and analytical techniques. [Presentation] University of Sydney, 22nd March.

Mirtom, M. (2014). Creating cultures of excellence: Strategies and outcomes. *Cogent Education*. Available at http://dx.doi.org/10.1080/2331186X.2014.934084 [Accessed 16 August 2018].

Mubashir, I., Noor, M., Muhabat, F. and Kazemian, B. (2015). Factors Responsible for Poor English Reading Comprehension at Secondary Level. *Communication and Linguistics Studies*, 1(1), 1-6.

Mykhalovskiy, M. & Eakin, J. (2002). Reframing the evaluation of qualitative health research: reflections on a review of appraisal guidelines in the health sciences. *Journal of Evaluation in Clinical Practice*, 9(2), 187-194

PISA. (2015). PISA 2015, Malta Report. Research and Development Department (MEDE). Report number: 1.

Schein, H. (1990). Organizational Culture. *American Psychology Association*, 45(2), 109-119.

Sultana, R. (1999). Educational Assessment in Malta. *International Assessment in Education: Principles, Policy & Practice*, 6(1), 145-157.

Times of Malta. Editorial: An alternative to SEC, 18 March 2003. Available at https://www.timesofmalta.com/articles/view/20030318/editorial/editorial.154260 [Accessed 14 July 2018].

Van Keer, H. & Verhaeghe, J. (2005). Effects of Explicit Reading Strategies Instruction and Peer Tutoring on Second and Fifth Graders' Reading Comprehension and Self-Efficacy Perceptions. *The Journal of Experimental Education*, 73(4), 291-329.

Zammit Mangion, J. (1992). *Education in Malta*, Malta: Masprin.

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Breaking the Barriers between Aesthetics and Theory in Literature

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Abstract

Up to few decades ago, aesthetics and theory were considered two separate disciplines in the realm of literature. More recent studies have indicated that the experience and also the study of literature are breaking these existing boundaries by revealing common factors present in both aesthetics and theory. Several literary theorists and aestheticians have emphasized this close relation which is woven within literature itself. John Gibson, Derek Attridge and Peter Lamarque are few of the theorists who argue in favour of such a relation. They contend that the perspectives of both aesthetics, as a branch of philosophy, and theory, do not exclude each other. Furthermore, they suggest that both aesthetics and theory can be complementary to each other and combine the philosophical concern with clarity, and the creativity which pertains to theory.

The aim of this paper is to show how the study of literature can break the barriers between aesthetics and theory by combining them together in several ways, suggesting possible ties within the creation and the act of reading literature, with particular reference to fictitious narratives. In this paper I shall discuss firstly how ambiguity and imagination can have the potential to effect both literary aesthetics and literary theory offering different results. Secondly I shall focus on fictitious narratives from both the aesthetical and the theoretical points of view. I intend to emphasize the manner we view and discuss literature in the process of reading it. My literary discussion will include theories proposed by the literary philosophers Attridge, Lamarque and McGregor and how these theories can be combined through particular readings, thus breaking the barriers between aesthetics and theory in literature.

Keywords: ambiguity, imagination, narrative thickness, staging, opacity

Introduction

During the last few decades of the twentieth century, several conflicting arguments have taken place in the discussion of the relation between analytic philosophy and post-structural theory. By time the barriers which kept apart these two disciplines

got weaker when a connecting link was revealed in the study of literature. The importance of both theory and aesthetics in literature is undeniable and their perspectives should not exclude one another. In fact referring to Derrida's *Acts of Literature* (1992) which was edited by Derek Attridge, the emphasis was on literature which has the potential to combine theory to aesthetics. Such aspects include literature as free from limitation, the necessary relation between literary experience and pleasure, literature as an institution and the uniqueness of each new literary work. As Attridge claims in his introduction to Derrida's volume "Literary theory… has always consciously worked under the sign of philosophy" (1992, p.4). The very fact that Derrida, one of the twentieth century leading philosophers, chose to discuss literature, indicates that literature itself is an excellent example to illustrate the closeness between aesthetics and theory.

Gerard Genette commented on the theory of authorial intention while discussing the aesthetic object. "Whether an object attains the status of a work basically depends, then, on whether its receiver considers the possibility that an aesthetic intention is present within it…" (1999, p.39). Although later he appears to change his position, he stresses that the aesthetic aspect depends on the author's intention which is a theoretical aspect of literature. The discussion which follows on ambiguity, imagination and narrative thickness, can be considered to be both theoretical and aesthetic. The emphasis is on literary works especially narratives and a balance is kept between the two perspectives so that the aesthetic/theory division will not be evident. Therefore this study will reinforce the tentative ties between literary aesthetics and literary theory.

The Concept of Ambiguity

The concept of ambiguity may be looked at as a bridge between aesthetics and literary theory. This may be understood more clearly when one keeps in mind that this concept in relation to literature has formed the vocabulary, foundations and assumptions of empirical aesthetics and cognitive literary theory. As Otty and Roberts claim, ambiguity suggests a shift from **aesthesis** to **poesis** (2013, p.38). The term "aesthesis" here is the process of a relatively passive reception when reading a literary work whereas "poesis" is the process of interpretation which is both creative and generative. These terms seem to be antithetical as the former suggests a passive experience of reception taken from a sensory aspect, while the latter suggests the creation of an interpretation.

Objectivity and subjectivity play an important role within the concept of ambiguity as the definition of one includes the definition of the other. While objectivity entails the restriction of different aspects of the self, subjectivity encourages personal points of view. As a result artists, including writers, were urged to voice their subjectivity whereas scientists were restricted to express theirs. According to Andrew Bowie

aesthetic autonomy consists in a transformation of the arrangement of parts in a literary work. "The literary text can in this respect also become the focus... of the manifestation of language's capacity to resist conversion into 'meanings'" (1997, p.25). This implies that looking at literature as autonomous means that it resists all types of rationalization which are dominating our society now more than ever. Literature is powerful when it rejects one clear meaning which is also rational. At this point the concept of ambiguity is present. Interpretation through ambiguity has become a central feature of a literary text.

However, this does not mean that literature is irrational. As Otty and Roberts assert, literature is "the *product* of rationalization" (2013, p.40). In contrast to the techno-scientific world in which we live, literature has a more limited aesthetic field because it expresses what is left of the natural relation of the world. This is the reason why literature is ambiguous because it has kept all that was lost in the process of rationalization. Language is a basic feature of literature which distinguishes literary texts from other types of writing. Rational language seeks clarity while literary language may contain ambiguity which can help and at the same time hinder literary criticism. This is because through ambiguity, the critic is freer to interpret the subtleties a literary text can offer. On the other hand, this freedom may encourage interpretation without limits while sacrificing rational analysis. Subjective, ambiguous, literary language marks the aesthetic approach to literature. In contrast, objective, clear and rational language marks a theoretical and critical approach to literature. This may be one of the divergences in distinguishing between these two literary approaches.

One of the aims of modern literature is to engage the reader in the subjective activity of interpretation. This involves the creation of meaning in a completely free environment, presenting the reader with various choices. The emphasis here is on subjectivity which exists both in aesthetics and theory and which results in diverging attitudes towards ambiguity. Such acceptance of subjectivity in literature emanates from the concept of impersonality or invisibility of the author, a concept which can be traced back to T. S. Eliot's *Tradition and the Individual Talent* (1919). According to Otty and Roberts, this concept embodies "the forms of 'contained' ambiguity associated with the New Criticism... via Eco's notion of the 'open work', and Barthes structuralist... celebration of the 'plural text'... to deconstruction" (2013, p.42). Therefore, ambiguity encourages polyvocality by means of creativity and imagination but it also can result in problematic interpretation.

Imagination in fiction

The close relationship between fiction and the mental activity of imagining was never denied. Kathleen Stock refers to the theory of "extreme intentionalism" in which the interpretation of the fictitious work depends on what the author intended the reader

to imagine (2017, p.1). Although many literary theorists and also aestheticians do not agree with this theory, Stock shows how, by means of the imagination, such a theory can be of extreme help when the reader interprets fiction. This implies that the reader is looking for the fictional truth and intentionalism helps him to reach a literary meaning. This does not mean that intentionalism is the only method to provide meaning to a fictitious narrative. There are other aesthetic properties such as the beautiful, the emotional aspects and the unconscious thoughts which are not directly determined by the author's intention. It is a popular belief among aestheticians such as Walton, Currie, Davies, Lamarque and Olsen, that fiction is directly related to imagining or pretence. As Stock claims "A fiction is best understood as a set of instructions to imagine things… in constructing a fiction, an author makes certain utterances, intending that the reader imaginatively engages with them" (2017, p.7). This statement implies that what the author intends the readers to imagine, becomes the content of the literary work itself.

In this sense, the concept of imagination becomes indispensible as it is the creative faculty of the mind. Peter Lamarque distinguishes between two aspects of the imagination. He claims that imagination can be either an 'activity' or an 'attitude' (1994, p.243). By means of the imagination, the mind is capable to combine different activities such as assembling and reconstructing ideas. These activities make it creative. However, when imagination is regarded as an attitude, it is more reflective than creative. It takes the form of a long-term emphasis which keeps something in the mind to form an attitude. The following example illustrates the difference between the author and the reader. The author's imagination, that is his/her mental activity, creates several images which make the reader reflect on this content forming in the reader a mental attitude. Of course, there might be some exceptions to this example. But it is the imagination in the sense of activity which is mostly related to fiction as the latter can be based on the imagination of objects which are both real and unreal.

The reading experience

In discussing the value of literature, many philosophers emphasize the extra-literary aspects of it, such as truth and morality. Though literary works may represent the truth and offer lessons about various aspects in life which may be important, they do not do so *as* literature. Literature is more concerned with the experience of events and as Derek Attridge claimed, such an experience brings about "a modification of the reader's outlook" (2015, p.2). The reader may not be aware of such a metamorphosis as it may be very slight. In spite of this and also because this experience is an act, the reader has to be involved in the act of reading in such a way as to read the work in a very particular way and not to seek extra-literary characteristics in this experience. During this process the reader has to adopt a

"willed passivity" as Attridge calls it (2015, p.2). This means that the reader has to be disposed to open-up and forget any constraints in order to be transformed. It is this commitment of the reader to the text that renders the work literary and thus aesthetically valuable to him/her.

This brings us to question about the role of the aesthetic in this process. I would undoubtedly discard the idea that beauty has an instrumental value of producing better people. The concept of beauty goes far beyond this because it is ideological. According to Attridge an instrumental attitude to literature means treating the text "as a means to a predetermined end" (2004, p.9). This principle opposes the aesthetical approach to literature because it must be understood that creation includes the idea of working actively towards an aim and also passively allowing oneself to discover what one could not have predicted. At this point the roles of the author and the reader are intertwined in a way that, the reader's passivity is not passive at all. It becomes also active in the sense that s/he opens himself/herself to the work and is thus participating in the author's openness. Such a literary experience is not only the reaction to a beautiful form but it also recreates a beautiful work which is witness to that original openness. Such openness was described by Attridge "as a hospitality to the other, on the part of both the artist and the one who responds fully to, who welcomes and does justice to, the work of art" (2015, p.5). This process was also discussed by Maurice Blanchot who stated that each time a literary work is read, it is as if it is read for the first time because each reading is unique. The active openness referred to by Attridge, here is emphasized by Blanchot who defines reading as a process of taking part in the development of the work itself. Blanchot calls this process "the unfolding of something in the making, the intimacy of the void which comes to be" (1989, p.202).

This approach to reading is a critical one because the reader becomes curious to know how the work was designed. Therefore, at this point, the reader becomes just like the author because both go through the experience of its creation. This change of attitude in the reader keeps the work alive or as Blanchot puts it "to make it [reading] communicate with the work's intimacy, to keep this intimacy from congealing and protecting itself in the vain solitude of the ideal" (1989, p.203). In this sense, reading becomes a medium for breaking the barriers of time by communicating several aspects. Communication depends on the way a work is read and therefore on the experience it generates. Reading gives life to the work and must be present during all the work's stages because according to Blanchot "it retains in itself everything that is really at stake in the work. That is why in the end it alone bears all the weight of communication" (1989, p.204).

All this is evidence enough that literature can be the cause of several aesthetic effects since both literary creativity and literary reception are capable to bring about changes. However, the reader has no possibility to know beforehand what s/he is opening himself/herself to. S/he should be ready for surprises. Moreover, this suggests that the value of literature cannot be instrumentalised. It follows that the

value of literature depends on its effects. While a literary work suggests movement because there is action all the time, the notion of beauty suggests a stationary state. Therefore, while keeping in mind that a literary work is a verbal text, when read in the appropriate manner, it can offer enjoyment through its manipulation of its formal properties such as sounds, syntax, metaphors, imitation and so on. As Attridge states, "the literary is to be found wherever these properties are exploited in a verbal event" (2015, p.7). Therefore, the reader has to be able to follow the movements of thought especially if s/he is reading fictitious narrative. Such an experience is salient because since a literary work is read as literature, its effect combines both body and mind as these two dimensions cannot be separated from each other. This experience is not only intellectual but it is also emotional as several emotions on the part of the reader result in the pleasure of reading. The feelings involved are not simple to describe. However, this experience transforms a literary work into an event rather than an object. Aesthetically speaking, this perspective changes the reader both intellectually and affectively. The reader is guided how to feel and therefore his/her sensibility is enlarged and refined through an experience. If s/he limits himself/herself only to the intellectual aspect as opposed to the affective aspect, s/he will be only looking for meanings, and as a result a literary work will not be read as literature and therefore will not be an event.

The inseparability of form and content

I agree very much with Rafe McGregor's way of phrasing his ideas in *The Value of Literature*: "the value of a work of literature qua literature is the value of experience afforded by the work. And the experience afforded by the work is valuable to the degree that this experience is finally valuable – that is, produces literary satisfaction" (2016, p.ix). This statement suggests that literary form and literary content are inseparable. McGregor seems to agree with Attridge's claim that the mode of reading a literary work is that of going through an experience. McGregor calls this experience "narrative thickness" (2016, p.69).

Derek Attridge comments on the intimate relationship between literary form and literary content in which form prevails over content because the latter depends on form to produce meaning. Therefore, literary forms are also loaded with meaning. Attridge states that "forms are made out of meanings quite as much as they are made out of sounds and shapes" (2004, p.114). He calls this inseparability of form and content in literary works as 'staging'. This process of staging is the outcome of regarding the literary work as a "performance" or "an act-event" (2004, p.108). By performance Attridge means the particular reading of a work, for example a novel or short story, by a particular individual. At this point, literature becomes singular according to the response of the reader. This singularity does not only give way to potential interpretation and re-interpretation, but it also allows different readings,

even by the same person, leading to different experiences. In literature, this aspect is important because it highlights not only the literary form but also the value of what is literary in a work especially if it is fictitious. Every time a reading occurs, the act of performance is renewed. At this point there is a clear distinction between the value of literature as literature, and the instrumental value literature might possess. For Attridge, words are composed of sounds and shapes which communicate meaning and feeling, which in turn are the roots of human experience. Therefore, staging takes place in performative reading. Literature can be appreciated more by means of the process of staging and it leads to pleasure when literature is regarded as literature. By means of such a process, literary form exhibits literary content. Staging is mentioned also by John Gibson who calls it "dramatic" but attributes it with the same functions. "A literary narrative is in effect a sustained dramatic gesture, a way not only of presenting some content or material but of responding to it" (2007, p.117). Both Attridge and Gibson are using the same theatrical metaphor when they are referring to the combination of form and content which emerges from a particular mode of reading. In fact, the terms used to illustrate this staging process are connected with the theatre such as 'dramatic', 'performance' and 'staging' itself.

Since the reading of literature is regarded as an experience or an event, staging can create new content because it has the potential to mobilize meanings. It can leave an effect on the events of meanings in various ways, for example in their interrelationship or in their sequentiality and also in their intensity or satisfaction. As a result, staging is capable of organizing certain linguistic characteristics such as intentionality, creating metaphoric language, and creating references. Thus, in the reading experience of a literary work, sound and meaning come closer to each other in order to produce one of the aesthetic values which emphasizes the bond between form and content.

In *The Opacity of Narrative*, Peter Lamarque also refers indirectly to the process of staging with particular reference to literary narratives. He claims that certain narratives are opaque when the mode of narration is prominent. This suggests that the form in which a story is narrated is important for the value of the narrative itself (2014, p.146). He clearly states that narratives which are transparent generally are not literary and therefore carry instrumental values. Lamarque's discussion sets aside such narratives because narrative opacity is not concerned only with facts. However, it **is** concerned with the reader's imaginative involvement in the narrative work and thus preserving the identity of the fictional work. The relation between form and content in the light of narrative opacity focuses on the importance of form which influences the content. In literary narrative, as opposed to historical, biographical or philosophical works, the content always relies on its form. This renders the narrative opaque. Therefore the way people, places and events are described, are put into a perspective. This is the reason why Lamarque states that narrative content is "not merely loosely or contingently connected to its mode of presentation, but is partially constituted by it" (2014, p.12). This opacity may also be evident in literary narratives

where they employ real people, places or events. Also here, the mode of narration may be prominent.

In literary fictional narrative, description is important since its content is mixed with opacity. Fictional characters and events which are found in the narrative "acquire their nature and very existence from the modes of their presentation" (2014, p.166). However, this statement can be also true in real world settings as these are presented from a particular point of view. Lamarque fully agrees with Attridge because both refer to the inseparability of the perspective which is the form and the character, place or event which are the content. He calls this notion the "form-content indivisibility" (2014, p.154).

I would say that Attridge's conception of staging and Lamarque's theory of narrative opacity are complementary because the literary singularity claimed by Attridge is similar to Lamarque's emphasis on narrative form, which when absent or limited, renders a narrative transparent and not opaque. As a result of this situation, the reader does not focus on the form and gives prominence to the content. Newspaper reports are one example of transparent narratives which cannot be 'singular' in Attridge's terms, because each reading will be the same and therefore will not lead to different interpretations. Opacity is "a standing assumption" in literary narratives (2014, p.155).

If I come back to the conception of narrative thickness as proposed by McGregor, the combination of the two concepts of staging and opacity is easily applicable to narrative thickness. While staging is a necessary condition of literature, opacity is a necessary condition of literary narratives. According to McGregor "narrative thickness is a demand which is satisfied by a work rather than a property of a text" (2016, p.78). This concept is characteristic of literary narratives in a way that rewards the need for narrative thickness. The conclusion of this discussion is that literary form and literary content are inseparable in the experience of literary narratives in a way that neither of them can be isolated. Narrative thickness can be defined as such.

Concluding reflections

The concepts of ambiguity and imagination, the process of reading literature, and the content/form relation are but a few aspects which can be discussed by both literary philosophers and theorists. According to Didier Coste, the difficulty lies not in uniting theory and aesthetics in literature in as much as in separating them especially in the post-modern literary world. He states that, the way narrative aesthetics operate depends on narrative theory as the latter accounts for the various operations of the former (2016, p.31). Referring to Currie's comments, he emphasizes that it is misleading to claim that "new directions in literary theory are the cause of fictional change" (1998, p.54). Philosophical thought discovered that this happens because of the power of language and its autonomy. However, Coste seems to be against too

much theory when it comes to literature. "Theoretical fictions… deconstruct and kill narrative seduction, which may be a good thing for the critical mind and a bad one for the senses" (2016, p.32). This statement suggests that the best thing is to keep a balance between theory and aesthetics.

I believe that such a balance can be reached by the basic attitude we assume when we appreciate literary works especially when they are fictitious. Breaking the barriers between theory and aesthetics depends on what Lamarque and Olsen called "the fictive stance" (1994, p.43). This attitude is found in the reader's disposition to treat literary narratives as fictional and be appreciated as such. The idea that the same stance cannot have both the fictional and the real as its object is quite mistaken, as the difference between them is not so clear. John Gibson strengthens this idea with the presentation of a humanistic approach in which literature is importantly connected with reality and therefore can be appreciated both theoretically and aesthetically (2007, p.12).

References

Attridge, D. (2004). *The Singularity of Literature*. New York: Routledge.

Attridge, D. (2015). *The Work of Literature*. Oxford: Oxford University Press.

Blanchot, M. (1989). *The Space of Literature*. United States of America: University of Nebraska Press.

Bowie, A. (1997). *From Romanticism to Critical Theory: The Philosophy of Literary Theory*. London and New York: Routledge.

Coste, D. Narrative Theory and Aesthetics in Literature. *Oxford Research Encyclopedia of Literature*. June 2017. Available at literature.oxfordre.com/view/10.1093/acrefore/9780190201098.013.116 [Accessed 10 April 2018].

Currie, M. (1998). *Postmodern Narrative Theory*. New York: St. Michael's Press.

Derrida, J. (1992). *Acts of Literature*. New York: Routledge.

Genette, G. (1999). *The Aesthetic Relation*. Ithaca: Cornell University Press.

Gibson, J. (2007). *Fiction and the Weave of Life*. Oxford: Oxford University Press.

Lamarque, P. & Olsen S. H. (1994). *Truth, Fiction and Literature: A Philosophical Perspective*. Oxford: Clarendon Press.

Lamarque, P. (2014). *The Opacity of Narrative*. London: Rowman & Littlefield International.

McGregor, R. (2016). *The Value of Literature*. London: Rowman & Littlefield International.

Otty, L. & Roberts, A. M. (2013). 'Dim-conceived glories of the brain': On Ambiguity in Literature and Science. *Culture Theory and Critique*, . 54(1), 37-55.

Stock, K. (2017). *Only Imagine. Fiction, Interpretation and Imagination*. Oxford: Oxford University Press.

Bio-note

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Diagnosis of Misconceptions about Force and Motion Held by First-Year Post-secondary Students

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Abstract

The present study aims to detect misconceptions in force and motion among Maltese post-secondary students aged 16-17. The revised version of the Force Concept Inventory (FCI) originally designed by Hestenes, D., Wells, M., & Swackhamer, G. (1992) was used. A total of 395 students participated in the study by answering the FCI test at the beginning of their first-year and again at the end of the said year. Data were analysed by using a method used by Martín-Blas, T., Seidel L. & Serrano-Fernández A. (2010). In this study all of the known misconceptions given in the original paper by Hestenes, but modified by Bani-Salameh 2017, were examined. The dominant misconceptions from the students' wrong answers for each of the 30 questions in the FCI were determined. A comparison of the dominant misconceptions held by the cohort studied in the pre- and post-test showed that a number of misconceptions persisted. This study reveals that the impetus, active force and action/reaction pairs misconceptions were the most problematic for the students. Only the pre- and post-test results for all students are reported in this study, leaving gender differences for future work.

Keywords: Force Concept Inventory, post-secondary, Physics, Maltese, misconceptions

Introduction

Students' weak performance in physics occurs worldwide as Bani-Salameh (2017b) points out and has been addressed by many researchers. When students start learning physics at post-secondary level, they bring various misconceptions as a result of their experience, intuition and perception of the real world. Halloun and Hestenes (1985) indicate the problem of preconceptions (or misconceptions) that students acquire in their life experience. These preconceptions will interfere into their learning process leading to incorrect conclusions about the behaviour of motion. Their study led the way to the design of the force concept inventory (FCI) intended to be given as a pre- and post-test for the determination of possible gain in clearing misconceptions after a course in mechanics. The FCI has been used worldwide by many physics teachers (Martín-Blas, T., Seidel L. & Serrano-Fernández

A. (2010)) and has been proved to be a valid tool to evaluate both correct and wrong concepts in any given group of students as has been shown by Savinainen and Viiri (2008). The FCI consists of thirty multiple-choice questions with qualitative nature examining simple motion and force concepts. Each question has one correct Newtonian concept and four carefully-written plausible distractors to appeal to students' perception of real-world phenomena. Although a copy of the FCI would have been helpful to the reader, for reasons of copyright it is not included. One may get a copy from the Modelling project (Halloun, I., Hake, R., Mosca, E. & Hestenes, D. (1995)). In order to make teaching more effective, it is imperative to identify students' misconceptions before instruction even starts as noted by Bani-Salameh (2017a). Such identification will help educators to focus their attention on those syllabus areas which need a change in the students' way of thinking.

The authors of the FCI (Hestenes, D., Wells, M., & Swackhamer, G. (1992)) make it clear that this test must never be used to select students for a course but to assess understanding of concepts and to check the effectiveness of different teaching modes and styles. Hestenes, D., Wells, M., & Swackhamer, G. (1992) classify concepts in the FCI into six dimensions, namely Kinematics, First Law, Second Law, Third Law, Superposition Principle and Kinds of Force. They also give a taxonomy of misconceptions grouped into six categories corresponding closely to the six concept dimensions. Bani-Salameh (2017a) modified this taxonomy as shown in Table 1 and is adopted in this study. This taxonomy indicates that when a student gives a wrong answer for item 19 (any distractor A, B, C or D), then distractors B, C or D, correspond to the misconception about 'position-velocity undiscrimination' and the 'velocity-acceleration undiscrimination' for option A. All the options shown in the table belong to the distractors in the FCI.

Table 1 Taxonomy of misconceptions about force and motion after Bani-Salameh [2017a].

Code	Misconception	Inventory item
K1	Position-velocity undiscriminated	19B,C,D
K2	Velocity-acceleration undiscriminated	19A; 20B,C
K3	Nonvectorial velocity composition	9C
K4	Ego-centered reference frame	14A,B
I1	Impetus supplied by 'hit'	5C,D,E; 11B,C; 27D; 30B,D,E
I2	Loss/recovery of original impetus	7D; 8C,E; 21A; 23A,D
I3	Impetus dissipation	12C,D; 13A,B,C; 14E; 23D; 24C,E; 27B
I4	Gradual/delayed impetus build-up	8D; 10B,D; 21D; 23E; 26C; 27E
I5	Circular impetus	5C,D,E; 6A; 7A,D; 18C,D
AF1	Only active agents exert forces	15D; 16D; 17E; 18A; 28B; 30A
AF2	Motion implies active force	5C,D,E; 27A

AF3	No motion implies no force	29E
AF4	Velocity proportional to applied force	22A; 26A
AF5	Acceleration implies increasing force	3B
AF6	Force causes acceleration to terminal velocity	3A; 22D; 26D
AF7	Active force wears out	22C,E
AR1	Greater mass implies greater force	4A,D; 15B; 16B; 28D
AR2	Most active agent produces greatest force	15C; 16C; 28D
CI1	Largest force determines motion	17A,D; 25E
CI2	Force compromise determines motion	6D; 7C; 12A; 14C; 21C
CI3	Last force to act determines motion	8A; 9B; 21B; 23C
CF	Centrifugal force	5E; 6C,D,E; 7C,D,E; 18E
Ob	Obstacles exert no force	4C; 5A; 11A,B; 15E; 16E; 18A; 29A
R1	Mass makes things stop	27A,B
R2	Motion when force overcomes resistance	25A,B,D; 26B
R3	Resistance opposes force/impetus	26B
G1	Air pressure-assisted gravity	3E; 11A; 17D; 29C,D
G2	Gravity intrinsic to mass	3D; 11E; 13E; 29C
G3	Heavier objects fall faster	1A; 2B,D
G4	Gravity increases as objects fall	3B; 13B
G5	Gravity acts after impetus wears down	12D; 13B; 14E

In this study, the FCI was used to identify the dominant misconceptions before and after instruction in mechanics in Maltese post-secondary students. Azzopardi (2016) analysed the correct answers in the same cohort of students in the pre-test. The Hake's normalised gain and possible relationships between different teaching styles and gain were reported by Azzopardi (2017).

Methods

The goal of this study is to investigate the students' dominant misconceptions on admission to a post-secondary institution and those which persisted after their first-year of instruction in mechanics. All students were informed that their participation in the FCI, is voluntary and in no way will it affect their assessment or performance in

their course. The FCI took thirty minutes to complete, was administered as a pre-test under the supervision of the lecturers with their respective groups in the beginning of the course (October 2015) and again later at the end of the same scholastic year (May 2016) as a post-test. Students were encouraged to attempt all items and to base their judgement on their opinion, experience, perception and conviction. All the first-year students in the physics department took part, but only those students (N = 395), who participated in both pre- and post-tests, were considered in this study.

The pre- and post-test FCI results were analysed by a method introduced by Martín-Blas, T., Seidel L. & Serrano-Fernández A. (2010) dealing with the dominant incorrect answers for each question as discussed below. SPSS version 24 was used to analyse the data.

Results and discussion

Overview of the correct answers

Before analysing the wrong answers, the overall performance of students in the pre- and post-tests is illustrated by reporting the percentage of students obtaining a certain number of correct questions from the thirty FCI ones. The histogram in Figure 1 indicates similar distributions for both tests ranging from 0 – 20 correct answers out of 30 in the pre- and 1 – 24 in the post-test. The highest pre-test score obtained
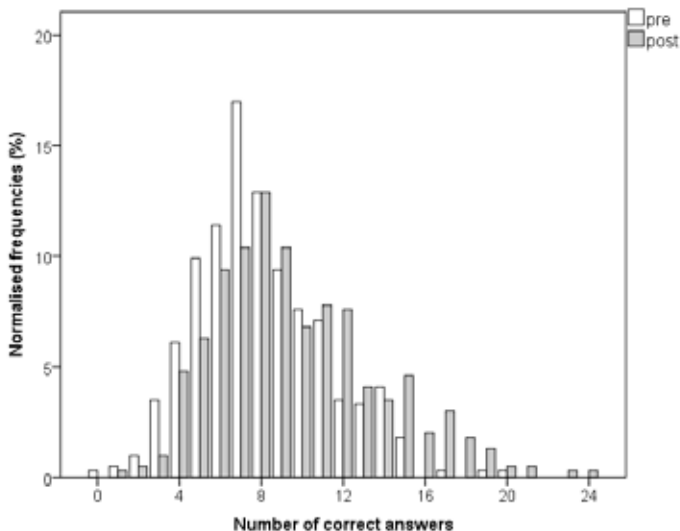
Figure 1 Percentage of students who answered a certain number of the FCI questions correctly.

in this study (20) is higher than that obtained by Bani-Salameh (2017b) which was 14. The reverse applies for the post-test, where in this study the number was 24 and that reported by Bani-Salameh (2017b) was higher. Although the majority of students obtained a similar number of correct answers (8 in pre- and 9 in post-test), a shift to a higher number of correct answers is observed in the post-test indicating an improvement in performance.

The mean percentage score of correct answers per question as shown in Figure 2, (pre-test average score: 26.61% ± 10.43; post-test average score: 32.33% ± 13.42) is very low since the threshold score established by Hestenes, D., Wells, M., & Swackhamer, G. (1992) for Newtonian thinking is 60%. The mean scores obtained in the present study, however, are consistent with research conducted by various authors including Bani-Salameh (2017b) (pre-test average score: 22.3% ± 2.7; post-test average score: 30.4% ± 3.9) and Bayraktar (2009) who reported a mean percentage score of 40.89 ± 12 for Turkish student-teachers.

For analysis purposes, Hake (1998) proposes that the normalised gain ⟨g⟩ is calculated by (%post − %pre)/(100%–%pre) and classifies class averages to have a high-gain if ⟨g⟩ ≥ 0.7, medium-gain if 0.3 ≤ ⟨g⟩ < 0.7 and low-gain if ⟨g⟩ < 0.3. The normalised gain ⟨g⟩ is 0.08 which is low for the students investigated, pointing towards the fact that instruction has made little difference. This value agrees with published data from Bani-Salameh (2017b) (⟨g⟩ = 0.10), but not with Hake (1998) (⟨g⟩ = 0.23 and 0.48 for two different groups).

Figure 2 shows an increase in the percent of correct answers for 24 out of 30 questions in the post-test, two of which show a remarkable increase (*Q7*: 47% to 67% and *Q12*: 42% to 56%). Five questions out of 30 showed a minor decrease in the

Figure 2 Percentage of correct answers for each question in the FCI for both pre- and post-tests. The mean and standard deviation are 26.61 ± 10.31 for the pre- and 32.33 ± 13.42 for the post-test.

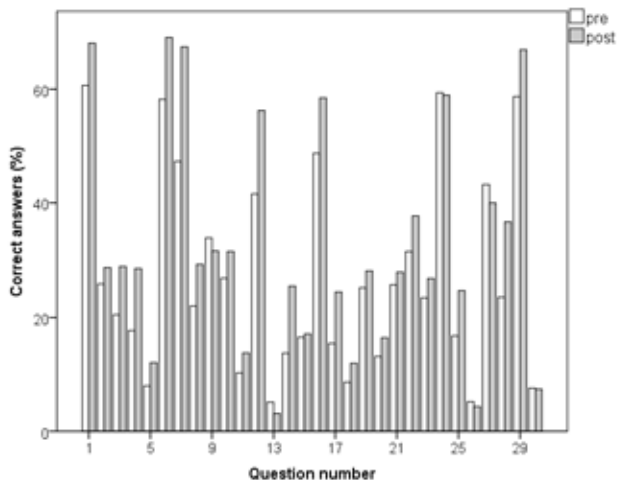correct answers by around 2%, indicating a negative impact of tutor instructions on students. No change was recorded in **Q24**, meaning that no improvement occurred.

Analysis of the dominant incorrect answers

The second analysis focused on all incorrect answers for each question of the FCI (both pre- and post-tests) to determine the most dominant and persistent misconceptions. Table 2 describes the misconceptions probed in the items of the FCI along with the percentages of incorrect answers in both pre- and post-tests for that item. The aim of this investigation is to identify misconceptions held by the students and compare them with those found elsewhere. A dominant incorrect answer must have more than 50% of total number of incorrect answers for a specific question. To obtain this percentage, a number of incorrect answers in the FCI which qualify for the same misconception (as per taxonomy shown in Table 1) were added together. For example, in the section 'impetus' (I1), there are 4 questions (5C, D, E; 11B, C; 27D; 30B, D, E) that probe the misconception 'Impetus supplied by hit'. For each question, the number of students selecting those options, were added together and a percentage from the total wrong replies in that question was calculated. Four percentage values are thus obtained but only those greater than or close to 50% (**Q27** eliminated) were considered as shown in Table 2.

A striking result emerging from Table 2 is the high percentage of students choosing the same wrong answers in many questions, indicating a common way of thinking about force and motion. This result is similar to that found by Bani-Salameh (2017b). The data in Table 2 indicate not only the persistence in the same misconceptions held by students, but also almost with same percentage in pre- and post-tests. The same table also indicates that no dominant misconceptions were held by students in 'centrifugal force' and 'obstacles exert no force'. For the misconceptions 'motion implies active force' and 'Force causes acceleration to terminal velocity', a drop in the dominance level (50%) in the post-test results occurred. For the former, probed by **Q27**, a drop of 8.7% was recorded while for the latter, probed by **Q22**, it was 5.5%. It may tentatively be concluded that instruction cleared these misconceptions but one has to be cautious since an element of guessing can contribute to such a result.

In Table 2, the majority of percentages increase in the post-test values indicating that these particular misconceptions have become more dominant. The aim of this study was to identify misconceptions held by post-secondary students and a full list was found as reported in Table 2. The major misconceptions were found in sections 'kinematics: Ego-centred reference frame' (**Q14**: (91.5/90.8), 'impetus: by hit' (**Q5**: 87.4/93.4, **Q30**: 94.8/97.3), 'impetus: dissipation' (**Q12**: 84.0/90.4; **Q13**: 96.5/96.1) 'active force: motion implies active force' (**Q5**: 87.4/93.4), 'action/ reaction pairs: greater mass implies greater force' (**Q4**: 96.0/93.6) and 'resistance: mass makes things stop' (**Q27**: 89.1/90.8) because the percentage in the post-test

remained higher than 90%. This finding is similar to that reported in other countries as indicated by Bani-Salameh (2017a).

Table 2 – Dominant misconceptions with corresponding inventory item and percentages of students who had the particular misconception both in pre- and post-tes

	Misconception	Inventory item (percentage pre/post)
0. Kinematics		
K1	Position-velocity undiscriminated	19(69.6/71.2)
K2	Velocity-acceleration undiscriminated	20(46.8/49.8)
K4	Ego-centered reference frame	14(91.5,90.8)
1. Impetus		
I1	Impetus supplied by 'hit'	5(87.4/93.4), 11(87.0/88.6), 30(94.8,97.3)
I2	Loss/recovery of original impetus	23(53.9/50.7)
I3	Impetus dissipation	12(84.0/90.4), 13(96.5/96.1)
I4	Gradual/delayed impetus build-up	10(54.5/57.9)
I5	Circular impetus	5(87.4/93.4), 6(81.5/72.4), 7(79.5/73.1), 18(60.9/62.9)
2. Active force		
AF2	Motion implies active force	5(87.4/93.4), 27(47.6/38.9)
AF6	Force causes acceleration to terminal velocity	3(49.2/50.4), 22(49.5/44.0)
3. Action/Reaction pairs		
AR1	Greater mass implies greater force	4(96.0/93.6), 28(51.3/60.2)
AR2	Most active agent produces greatest force	15(64.2/74.7), 16(66.3/67.1), 28(51.3/60.2)
4. Concatenation of influence		
CI1	Largest force determines motion	17(80.6/86.0)

CI3	Last force to act determines motion	8(46.9/40.8), 9(49.6/50.4)
5. Other influence on motion		
Resistance		
R1	Mass makes things stop	27(89.1/90.8)
R2	Motion when force overcomes resistance	25(71.6/80.5)
Gravity		
G3	Heavier objects fall faster	2(69.9/80.2)
G4	Gravity increases as objects fall	13(45.9/47.3)
G5	Gravity acts after impetus wears down	13(45.9/47.3)

Conclusions

This study was done to test if dominant misconceptions are present in the students when they answered the FCI questions before starting and after completion of their first year at a post-secondary institution. The analysis of students' results in the FCI, was adopted from Bani-Salameh (2017b). The correct answers for all questions in the FCI were represented as histograms for both pre- and post-tests as a percentage of students obtaining that question correct. From this information, it resulted that the performance was well below the Newtonian thinkers in both pre- and post-tests although performance in the latter was slightly improved. Yet this finding is comparable to other published results. Another histogram shows the percentage of students obtaining a correct answer in each of the thirty questions in the FCI. The second part of this study focused on the dominant misconceptions held by students in both pre- and post-tests. This analysis was based on the counting of the number of incorrect answers for each question. The taxonomy of misconceptions listed in Table 1 was used. The most dominant misconceptions in our study where a percentage of more than 90 was shown in the post-test, were found in 'kinematics: Ego-centred reference frame', 'impetus: by hit', 'impetus: dissipation', 'impetus: circular', 'active force: motion implies active force', 'action/reaction pairs: greater mass implies greater force' and 'resistance: mass makes things stop'.

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References

Azzopardi, C. (2016) The Misconceptions in Mechanics among students after completing their Secondary Level Education in Malta. In: Pixel (ed) *International Conference, The Future of Education 2016, Conference Proceedings (Florence, Italy 30 June - 1 July 2016)* p.511. Florence: Libreriauniversitaria.

Azzopardi, C. (2017) The impact of teaching style and FCI gain on the performance in mechanics test. In: *GIREP-ICPE-EPEC 2017, Conference Programme (Dublin, Ireland 3 July – 7 July 2017)* p.163

Bani-Salameh, H. (2017a) Using the method of dominant incorrect answers with the FCI test to diagnose misconceptions held by first year college students. *Physics Education.* [Online] *52* 015006 (8 pages). Available from: http://iopscience.iop.org.ejournals.um.edu.mt/article/10.1088/1361-6552/52/1/015006/pdf [Accessed 05 May 2018]

Bani-Salameh, H. (2017b) How persistent are the misconceptions about force and motion held by college students? *Physics Education.* [Online] 52 014003 (7 pages). Available from: http://iopscience.iop.org.ejournals.um.edu.mt/article/10.1088/1361-6552/52/1/014003/pdf [Accessed 05 May 2018]

Bayraktar, S. (2009) Misconceptions of Turkish pre-service teachers about force and motion. *International Journal of Science and Mathematics Education*. [Online] Vol. 7 pp.273–291. Available from: https://hydi.um.edu.mt/primo-explore/fulldisplay?docid=TN_ericEJ829762&context=PC&vid=356MALT_VU1&lang=en_US&search_scope=all&adaptor=primo_central_multiple_fe&tab=default_tab&query=any,contains,Misconceptions%20of%20Turkish%20pre-service%20teachers&sortby=rank&offset=0 [Accessed 05 May 2018]

Halloun, I. A., & Hestenes, D. (1985). Common sense concepts about motion. *American Journal of Physics.* [Online] 53(11), p.1056. Available from: https://aapt-scitation-org.ejournals.um.edu.mt/doi/pdf/10.1119/1.14031 [Accessed 06 May 2018]

Hestenes, D., Wells, M., & Swackhamer, G. (1992). Force Concept Inventory. *The Physics Teacher.* [Online] 30(141), pp.141-151. Available from: https://aapt-scitation-org.ejournals.um.edu.mt/doi/pdf/10.1119/1.2343497 [Accessed 06 May 2018]

Halloun, I., Hake, R., Mosca, E. & Hestenes, D. (1995). Force Concept Inventory (revised 1995). Password protected at http://modeling.asu.edu/R&E/Research.html Accessed on 3.05.2018

Hake, R. (1998). Interactive-engagement vs traditional methods: a six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics*. [Online] 66, pp.64-74. Available from: https://aapt-scitation-org.ejournals.um.edu.mt/doi/pdf/10.1119/1.18809 [Accessed 06 May 2018]

Martín-Blas, T., Seidel L. & Serrano-Fernández A. (2010) Enhancing Force Concept Inventory diagnostics to identify dominant misconceptions in first-year engineering physics. *European Journal of Engineering Education.* [Online] Vol. 35, No. 6 pp.597-606. Available from: https://www-tandfonline-com.ejournals.um.edu.mt/doi/pdf/10.1080/03043797.2010.497552?needAccess=true [Accessed 6 May 2018]

Savinainen, A. & Viiri, J. (2008) The force concept inventory as a measure of students' conceptual coherence *International Journal of Science and Mathematics Education*. [Online] 6, pp.719–40. Available from: https://link-springer-com.ejournals.um.edu.mt/content/pdf/10.1007%2Fs10763-007-9103-x.pdf [Accessed 06 May 2018]

Bio-note

Carmel Azzopardi has been teaching physics since 1991 at all levels in various schools. He is the author of the book *Mathematical Requirements for Advanced and Intermediate Level Physics*. He also took part in the making of a TV series entitled *Physics Highway* in collaboration with Mr. J. Bonnici. Carmel Azzopardi is also the creator of a series of videos about physics experiments and demonstrations uploaded on YouTube (www.youtube.com/carmelazzopardi). He presented a paper entitled *The Misconceptions in Mechanics among Students after Completing their Secondary Level Education in Malta* in 'The Future of Education' conference in 2016 and another entitled *The Impact of Teaching Style and FCI Gain on the Performance in Mechanics Test* at the GIREP conference in 2017.

Breaking Paradigms: Abrams' Paradigm and Contemporary Art Anomalies.
Proposals for a New Approach

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Abstract

Meyer Howard Abrams described a paradigm which implicitly underlies most of the Anglo-Saxon philosophy of art; the artwork is the core of the scheme: an artwork-centered structure, in which any other element (artist, audience, universe) is analysed as an exclusive connection to it. This way, the paradigm can undergo modification without defacing the structure. The '60s were the stage of a gentle revolution in art-practice and Mandelbaum's, Danto's and Dickie's suggestions add a further tag in the scheme: the context. This paradigm works accordingly within a compartmentalisation that does not take into account the evolution of contemporary art. Working from a bottom-up perspective, some anomalies are highlighted, requiring a new lens (or paradigm) to develop proper theoretical tools in philosophy of art.

Keywords: Meyer Howard Abrams, Paradigm, Philosophy of Art, Ontology of Art, Contemporary Art, Decentralisation, Art Market

Abrams' paradigm

Meyer Howard Abrams was a lean and elegant man. He used to smoke a tobacco pipe, hung sideways from his lips. As a man of another age, he gave us a practical conceptual scheme – a kind of orientation among critical theories and statements on philosophy of art. While Ivor Armstrong Richard (1924) was drowning in contradictory and conflicting philosophies of art - since he couldn't establish any guidelines - Abrams developed a useful compass to find orientation in an area where others got lost.

According to Thomas Kuhn, scientific research has a cyclical pattern: scientists write down a paradigm (a conceptual scheme) around which further researches clot. A paradigm directs explorations, it is logically economical – summing up scientific observations in a comprehensive grid – and psychologically familiar since it draws borders thereby building a close and easily investigable world. Moreover, as a lighthouse, it fosters analysis: no studies exist outside the paradigm itself. In other

words, paradigms "provide models from which spring particular coherent traditions of scientific research" (Kuhn, 1962, p.10) – in other words, "normal science".

Nevertheless, puzzling problems can arise; sometimes they are solved with minor adjustments to the paradigm-nature and in other cases, they could be delayed. Yet, there are cases where anomalies turn into sources of crisis which become widely recognised by some of the field-professionals. The paradigm loses its power, it gets weaker and scientists start developing new examples of actual scientific practice thereby developing a new paradigm.

As a field of scientific research, philosophy of art is somewhat different. Abrams outlines an actual paradigm – "a frame of reference simple enough to be readily manageable, yet flexible enough" (Abrams, 1953, .5). Four elements emerge in all theories: the work of art, the artist, the audience and the universe; and, as props, these coordinates define the conceptual scheme. Each theory is concerned with outlining a precise theoretical proposal by highlighting two overriding elements – one of which is always the artwork. Four main directions emerge as a result: mimetic theories, expressive theories, pragmatic theories and objective theories. Each resultant theory is concerned with defining particular borders for each prop, since each element has pliable semantic boundaries.

UNIVERSE

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WORK OF ART

AUDIENCE   ARTIST
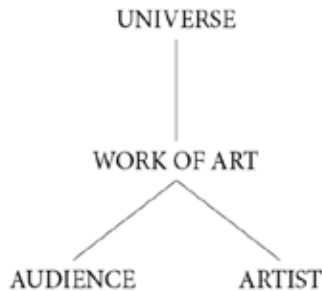
"*X* is an artwork only if it is an imitation" (Carroll, 1999, p.21). The *motto* of mimetic theorists holds that artworks are nothing but imitations, emphasising the relation between artwork and universe. It is the most enduring approach, becoming a sort of theoretical myth – endorsed by several authors, Batteaux (1746) and Lessing (1836) among others. Goodman's account (1969) – on the difference between representation and imitation – allows for an extension: "*x* is an artwork only if *x* has a subject about which it makes some comment" (Carroll, 1999, p.26). It is reminiscent of Danto's *aboutness* (Danto, 1981) and allows the addressing of neo-representationalists from the same perspective.

Expressive theories (artwork-artist) focus on the internal and emotive life of the artist as a starting point for speculation. Artworks are soliloquies and artists

are scientists since, "engaged in expressing emotions" (Hospers, 1956, p.293), they select highly individualised states of feeling and clarify them by means of lines, shapes and colors. According to Langer (1957), an artwork expresses "its creator's idea of immediate, felt, emotive life" (p.8). Croce-Collingwood's theory fits into this set as Kemp (2013) states that "art is expression that we engage with via the intuitive capacity".

Pragmatic theories insist on artworks-audience biunivocal relations: the former's purpose is "to achieve certain effects in an audience" (Abrams, 1953, p.14). They recall Horace's *delectare et movere*, expand in rhetoric *compendia* and spread through Hurd's and Johnson's pages – "the end of poetry is to instruct by pleasing" (Raleigh, 1908, p.16). On the other hand, artworks might also possess "the capacity of affording aesthetic experience" (Carroll, 1999, p.162). As an example, Jerome Stolnitz (1960) and Edward Bullough (1973), regardless of how divergent their arguments may be[1], unveil a common ground: the ontological attribution relies on audience reactions while looking at discreet objects.

Finally, objective theories identify artworks as self-sufficient entities, characterised by internal relations that establish their own criteria. Art is neither a mirror nor a reflection: art for art's sake declares its autonomy. As Carroll (1999, p.115) concludes, "*X* is a work of art if and only if *x* is designed primarily in order to possess and to exhibit significant form".

We are reassured of the implicit presence of the paradigm that covers a quite broad timeframe and is utterly evident in the analytical tradition. Abrams' outspoken admission is comparable to Carroll's overview (1999): their historical surveys are placed at the limits of a straddle between essentialist and non-essentialist traditions. Abrams sums up the long pathway that leads to this divergence, while Carroll's summary is a working-tool for the understanding of the last forty years of the previous century. Ultimately, Carroll supports Abrams' paradigm's implicit presence, despite the aforementioned straddle.

A contemporary Aristotelian could advance a counter-argument since the Aristotlean aesthetic is not just an example of a mimetic approach. Even if Aristotle's account is usually mentioned under the heading of mimetic theories, his aesthetic shows pragmatic and objective approaches as catharsis is an emotional education. In other words, it seems as though the idea of a hierarchical preponderance of a couple of elements is reductive. I am not suggesting that centuries of reflections on art have fought the complexity of art phenomena with unequal weapons and neither is Abrams doing so. However, each theory has a starting point. Take the case

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1   Stolnitz and Bullough propose affected-oriented accounts – insisting on peculiar kinds of actions or attitudes. The former proposes a common action (contemplation) realised with specific skills – "disinterested and sympathetic attention to and contemplation of any object of awareness whatever, for its own sake" (Stolnitz, 1960, p. 34-35), while the latter defines a *sui generis* action, since the artwork has to be "distanced" from our "practical needs and ends" (Saxena, 1978, p.81).

of Aristotle: the tragic work is "analysed formally as a self-determining whole made up of parts, all organised around the controlling part: the tragic plot" (Abrams, 1953, p.27). Tragedy is therefore recognised in its autonomy. Nevertheless, such a result is made possible by a mimetic approach: verisimilitude permits further pragmatic or objective considerations.

To sum up, Abrams' paradigm follows two dogmas – with few exceptions. On the one hand, a biunivocal relation grounds any possible philosophical reflection on art: a couple of elements sets its theoretical and explanatory power among the others, while the remaining elements are understood as ancillaries – understood following the aforementioned couple. On the other hand, the artwork is placed at the center. It is the starting and ending point of a circularly built analytical structure which creates a pyramidal picture: the artwork, as a mysterious chamber of secrets, becomes the theoretical target which is the only concern the philosopher keeps in mind in approaching art phenomena. The *explanandum* and the *explanans* collapse, the pathway itself becomes the destination.

A gentle revolution: the artworld

Carl Andre's humble tiles, Dan Flavin's fluorescent neon lights, Lawrence Weiner's Xerox copies and all the things that Robert Barry knows: a revolutionary tide sweeping away previous preconceptions. During the '60s, artworks transformed their very ontological *status*. Artists claimed an expanded field, as if the work of art itself would not stand alone, requiring the presence of some sort of context as a source of validity.

During the '60s, the *limen* that separated life from art got thinner, resulting in a final overlapping of the two thereby collapsing any *differentia* (Danto, 1986, 1996). Yvonne Rainer's *Room Service* is an example in which dancers carry a mattress around the ballroom and move from the stage to the emergency exits and back again. It is indiscernible to professional movers' actions and only the context – as a fictional marker – can help us. It sounds Wittgensteinian: the meaning is nothing but the use (Wittgenstein, 1953). Minimalism offers two interpretations. Firstly, meaning undergoes continuous modifications – the context determines the explanation of the artwork itself. Secondly, meanings arise in spaces of mutual exchange[2]; hence, the autonomy of authors' intention is rejected. *Untitled* (L-beams) (1965) by Robert Morris supports this point. Three indistinguishable modules are installed with different orientations, so that the visitor cannot perceive them as identical, proving that space modifies shapes. Visitors' moving eyes and bodies construe and reorient spaces – these are the early signs of Rosalind Krauss' "expanded field" (1981).

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2   *The Death of the Author* (1967) by Roland Barthes – corroborates such interpretations. The intention of the author cannot guarantee meanings and purposes of artworks. Meanings emerge from a mutual interchange between audience's members.

Moreover, Duchamp's 'ready-mades' are understood in their performative and linguistic power. If selection is creation (Groys, 2005), an artwork requires nothing but a declaration – a linguistic act composed against a background that validates it. As Hal Foster (2004) highlights, artists undertake common strategies to eliminate any ontological or intrinsic definition of their artworks.

To sum up, meaning as use suggests the presence of a framework that warrants art's vocabulary. George Dickie (1962), Arthur Danto (1964) and Maurice Mandelbaum (1965) develop similar instances in philosophy creating a gentle revolution. Dickie (1962) argues, against pragmatic theories, that psychic distance or aesthetic attitude cannot help in perceiving artworks. Instead, picture frames, raised devices and the like serve "merely as a signal (if any is needed) that certain rules are to be obeyed" (p.299). If there are rules, there is an institution that handles them – or at least a context that handed them down. Danto's (1964) renowned article – *The Artworld* – talks about artistic theories and knowledge of the history of art as keys (or paradigms, see Jones, 2000) for the understanding of specific activities. Therefore, without any theories, one will never get the chance to see art – ironically, just a few years later, Tom Wolfe (1975) wrote that "believing is seeing" (p.4). Danto (1964) recalls "something the eye cannot decry" (p.580) as a necessary condition for the existence of art phenomena. Finally, Mandelbaum (1965) criticises Wittgensteinian's anti-essentialist approach on art, invalidating family resemblance accounts which rest on genetic properties, meaning that they are just generic resemblances. Thereby, Mandelbaum suggests that a common ancestor is required – to be found in the right place, "without assuming that any [common] feature [...] must be some manifest characteristic" (p.222). Such a feature could insist on relational properties – again, a reference to a validating framework.

Abrams' paradigm (1953) does not accommodate such instances and it seems that something is missing. Such philosophers record an anomaly, without questioning the validity of the paradigm. Instead, they propose minor adjustments, leaving the scheme's functioning unchanged.

UNIVERSE   CONTEXT

WORK OF ART

AUDIENCE   ARTIST

Institutional theories – or rather, contextual theories – insist on the relation between artworks and a *status*-validating framework, the "context". So what does context specify? My proposal follows from Dickie's (1969) and Danto's (1964, 1992) suggestions[3] and recalls Carroll's (1994) narrative theory and Levinson's (1979) historical oriented account. The context comprises a sociological dimension – defining procedures that assign artistic *status* – and a historically determined world inhabited by artistic and aesthetic theories that train the eye to watch contemporary productions: a social institution and a cultural atmosphere – a rule and its meaning, container and contents, syntax and semantic.

Yanal's (1998) account describes the context as a set of practices and intentions rooted in a social and cultural domain. He is right, yet the definition seems too broad. The context is made of conventions (among which are artistic techniques, perceptive conventions &c....) and procedures for *status* attribution. Procedures define semantic domains – the "discourse of reasons" (Danto, 1992, p.46) for ontological attributions, the set of thoughts that drives the artist's or the insider's reflections – and syntactical structures – models of act that allow for *status* attributions[4]. Syntax and semantic are mutually inflected: syntactical structures ensure *status* attribution under proper reasons, while semantic domains rely on the issuing of syntactical structures – thereby neutralising Wollheim's claim (1984). Such procedures are enacted by qualified insiders that inhabit the framework.

Facing anomalies

Abrams' paradigm accommodates almost every theoretical account explaining art phenomena – including the revolutionary instances of the '60s, with just a minor change. Yet, art practice is showing essential transformations which the paradigm does not account for. Three main changes attract my attention, suggesting theoretical issues that can eventually break Abrams's quite perfect construction.

Artworks – as outputs of an accurate artistic research – become ephemeral entities which modify their very ontological structure. *E-flux* was founded by Anton Vidokle and Julieta Aranda, when they organized *The Best Surprise is No Surprise* (1998), an exhibition at a Holiday Inn in San Francisco. At that time, Vidokle had just opened his first email account and he decided to send some exhibition invitations to his friends. The opening was outstanding. They had a right intuition: internet could spread invitations all around the world and, at the same time, become an archive of past events. This is *e-flux*, both a service for art institutions and a comprehensive collection of press releases and today, also a publishing company. Nobody argues that *e-flux* is an artwork, yet some claim its artistic *status* (Foster et al., 2004). It recalls conceptualism – the idea that artworks are a particular piece of reflexive information, that artworks are nothing but comments on art, as Kosuth posits (1968). It insists on conditions of art production – the art project produces its own

existence conditions. As Vidokle posits "I would say that *e-flux* is [...] closer to a long-term artists' project" (Obrist et al., 2007, p.18).

Artworks become projects – a terminological transformation that records an ontological modification. The project, as Claire Bishop (2012) argues, recalls an open process that alters with a participative collaboration, as opposed to artworks as finite objects. An anomaly in the paradigm therefore appears: a decentralisation of artworks encompasses a fluid temporality and the space of production is virtually unlimited. Equally, the project points out the underlying ongoing artistic research, as though artworks were leftovers of a comprehensive research. The project reflects a defined netjuhy of knowledge, roles, actors and skills. Again, "our attention is [...] shifted away from the production of a work (including a work of art) onto life in the art project – a life that is not primarily a productive process" (Groys, 2010, p.78). Groys underlies biopolitical urgencies, arguing that art is becoming a life-managing technique. Nevertheless, both Groys and Bishop manifest attitudes that are redefining artworld behaviors following Boltanski's and Chiapello's (1999) notes on the relation between connective capitalism and art as project.

David Hammons: The Unauthorized Retrospective (2006) is an exhibition curated by the curatorial collective 'Triple Candie'. It includes color as well as black and white copies of Hammons' artworks taken from existing reproductions in exhibition catalogues or websites. No artworks are in the show. Peter Nesbett and Shally Bancroft founded the curatorial collective in 2001, although they unveiled a new type of exhibition-making in 2006: *artless* exhibitions. Their activity focuses on the power that interference institutions are responsible for and it displays the process of ascribing value to an artist's work. Their political attitude follows Agamben's (2007) call to arms: profaning the unprofanable is the political task of the coming generation. They show how art discourse is independent from materialisation or dematerialisation of artworks, revealing the autonomy of curators' activities.

Curators have been equated with artists. Wilde (1891) predicted something similar when he highlighted an increasing predominance of discourse in art production before the 20th century avant-gardes' and Wolfe's (1975) suggestion that "these days, without a theory to go with it, I can't see a painting" (p.2). As Wilde argues, the critic – or rather the curator – as artist specifies the autonomy of curator in producing legitimising reasons for seeing something as art. Contemporary art – as Senaldi (2012) and Dal Lago and Giordano (2006), to name a few, stated – is intrinsically related with the discourse on itself. So, if – thanks to such a discourse – one can recognise artistic value in objects and actions and the curator is the author of the discourse, then the curator is a demiurge. The curator endorses artists' productions since he provides semantic reasons using specific types of syntactic structures, conferring peculiar ontological *status* upon them. Indeed, curators have a creative role. As Becker (1974) argues, artistic production is a collective activity, since a great part is played by the creation of artistic value (see also Balzer, 2015). In Bourdieu's (1993) words, "the production of discourse about the work of art is one

of the conditions of production of the work" (p.35). There has been a fundamental change: curators do not only take care of artworks, they collaborate in the creation and their discourse has a performative power.

Ultimately, such changes reveal a progressive autonomy of curators' activity from past duties. Curators, independent and charismatic figures (see Richter, 2013), are anomalies: their performative activity is not accounted for in Abrams' scheme. A theoretical reflection on exhibition-making is required since exhibitions express autonomous researches rather than display discrete artworks. In other words, artistic practices are expressed in various forms; artworks are one choice among others.

Market, as a key actor, suggests another anomaly in Abrams' paradigm functioning. Artist Lee Lozano used to say that action was in the extreme. Her performative pieces – dipped in minimalist and conceptualist commitments – coincided with self-sacrifice: *General Strike Piece* (1969) signs her dismissal from artworld – she rejected an invitation for a solo curated by Dick Bellamy – and from New York life in general. Her career was built on denials, however her recent rediscovery shows that nothing sells more than denials: "Lozano's rediscovery by the artworld, as much as her withdrawal from it, belongs to a larger market dynamic" (Siegel, 2008, p. 391). The story is simple: gallerist Mitchell Algus in 1998 organises a Lozano solo after several decades. Here, critic Bob Nickas meets her work and proposes a drawings exhibition at MoMA P.S.1 in January 2004. Such moves would probably have gone unnoticed had Hauser & Wirth, one of world's leading art galleries, not acquired Lozano's estate. As Siegel (2008) argues, "press hardly matters if not accompanied by the right gallery context" (330).

Lozano's rediscovery is one among many other stories. It shows the power of market in shaping art history and attributing artistic value. As Bourdieu (1993) argues, alongside the pursuit of 'economic' profit […] there is also room for the accumulation of symbolic capital" (p.75). Symbolic capital determines economic value and *vice versa*, at the point that "success in market terms justifies and validates anything, replacing all the theories" (Houellebecq, 2011, p.219; see also Ullrich, 2009). Art value is an extrinsic property (see Varzi, 2008): it requires for its existence the presence of observers. In other words, the *circle of belief* (Bourdieu, 1993) – those who recognise an artist's value or create it – warrants such value, sustaining artworld's productions by construing a shared belief in the distinctness of art objects and in the legitimising discourse held by artworld's members. Value rests on the ongoing artistic research (while the artwork is merely a leftover), on the ability to create relationships and maintain a constant presence in artworld rituals. As stated by Steyerl (2016) "contemporary economy of art relies more on presence than on traditional ideas of labour power tied to the production of objects". Moreover, "the art sells the artist, and its price is directly connected to the added value associated with the artist's media profile" (Davies & Ford, 1998, p.3). Such dynamics reinforce the decentralisation of artworks thus refocusing artworld's primary urgencies. Again,

here, Abram's paradigm is ineffective. Its semantic boundaries exclude market as an object of theoretical interest – maybe following the Cartesian distinction or resting of Christian separation between spiritual and material. Yet, market is a main actor in the system and its presence is influencing art history.

Conclusions

These three examples should provide ideas for further research. Primarily, it seems that Abram's paradigm must be abandoned since the two *dogmas* are irreconcilable: artworlds' recent events checkmate their validity. The centrality of artworks – both in theoretical research and artists' productions – is denied in many ways. Artists' concerns turn away from the production of objects; curators care more about their own artistic research while art market rests on new kind of economies – reputational economy, cognitive economy and economy of presence. The primacy of a biunivocal relation, on the other hand, does not account for the complexity of artworld dynamics, while only an inflected and circular reflection accounts for a circular social phenomenon. I hope my analysis has highlighted this.

A new paradigm might be proposed. The artwork should be understood merely as one of artworld's output – not the most important one. Decentralised artworks allow for a deeper reflection on artworld's dynamics and an understanding of the nature of its internal relations, actors and ways of attributing values. Moreover, a theoretical analysis of the market's procedures and its power is required for an appropriate understanding of art phenomena; yet, insiders ask for theoretical tools beyond preconceptions.

References

Abrams, M. H. (1953). *The Mirror and the Lamp. Romantic Theory and the Critical Tradition*. Oxford: Oxford University Press.

Agamben, G. (2005). *Profanazioni*. Milan: Edizioni Nottetempo.

Balzer, D. (2015). *Curationism. How Curating Took Over the Art World and Everything Else.* Toronto: Coach House Books.

Batteaux, C. (1746). *Les Beaux Arts réduits à un même principe*. Paris: Durand.

Becker, H. S. (1974). Art as Collective Action. *American Sociological Review*, 39(6), 767-776.

Binkley, T. (1977). Piece: Contra Aesthetics. *The Journal of Aesthetics and Art Criticism*, 35(3), 265-277.

Bishop, C. (2012). *Artificial Hells. Partecipatory Art and the Politics of Spectatorship*. New York: Verso Books.

Boltanski, L., Chiapello, E. (1999). *Le Nouvel Esprit du Capitalism*. Paris: Gallimard.

Bourdieu, P. (1993). The Field of Cultural Production. In R. Johnson, eds. *The Field of Cultural Production. Essays on Art and Literature.* New York: Columbia University Press, 29-141.

Bullough, E. (1973). Psychical Distance. In M. M. Rader, eds. *A Modern Book of Esthetics.* New York: Holt-Rinehart Winston, 368-384.

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Carroll, N. (1994). Identifying Art. In R. J. Yanal, eds. *Institutions of Art. Reconsiderations of George Dickie's Philosophy*, Pennsylvania: The Pennsylvania State University Press, 3-38.

Ibid. (1999). *Philosophy of Art. A Contemporary Introduction.* New York-London: Routledge.

Dal Lago, A. & Giordano, S. (2006). *Mercanti d'Aura. Logiche dell'Arte Contemporanea*. Bologna: Il Mulino.

Danto, A. C. (1964). The Artworld. *The Journal of Philosophy*, 61(19), 571-584.

Ibid. (1981). *The Transfiguration of the Commonplace. A Philosophy of Art*. Cambridge-London: Harvard University Press.

Ibid. (1986). *The Philosophical Disenfranchisement of Art*. New York: Columbia University Press.

Ibid. (1992). The Artworld Revisited. Comedies of Similarity. In Ibid., *Beyond the Brillo Box. The Visual Arts in Post-Historical Perspective*, Berkley: University of California Press, 33-53.

Ibid. (1996). *After the End of Art. Contemporary Art and the Pale of History*. Princeton: Princeton University Press.

Davies, A. & Ford, S. (1998). Art Capital. *Art Monthly*, 213, 1-4.

Dickie, G. (1962). Is Psychology Relevant to Aesthetics? *The Philosophical Review*, 71(3), 285-302.

Ibid. (1969). Defining Art. *American Philosophical Quarterly*, 6(3), 253-256.

Ibid. (1984). *The Art Circle. A Theory of Art*. New York: Haven Publications, New York.

Ibid. (2001). *Art and Value*. Oxford: Blackwell Publishers.

Foster, H., Krauss, R., Bois, Y. A., Buchloh, B. H. D., Joselit, D. (2004). *Art since 1900. Modernism, Antimodernism, Postmodernism*. New York: Thames & Hudson.

Goodman, N. (1969). *Languages of Art. An Approach to a Theory of Symbols*. Indianapolis: Hackett.

Groys, B. (2005). Multiple Authorship. In B. Vanderlinden & E. Filipovic, eds. *The Manifesta Decade: Debates on Contemporary Art Exhibitions and Biennials in Post- Wall Europe*, Cambridge (MA): MIT Press, 93-99.

Ibid. (2010). The Loneliness of the Project. In Ibid., *Going Public*, Berlin: Sternberg Press/e-flux, 70-83.

Hospers, J. (1956). The Croce-Collingwood Theory of Art. In *Philosophy*, 21(119), 291-308.

Houellebecq, M. (2010). *The Map and the Territory*. London: William Heinemann.

Jones, C. A. (2000). The Modernist Paradigm. The Artworld and Thomas Kuhn. *Critical Inquiry*, 26(3), 488-528.

Kemp, G. (2016). Collingwood's Aesthetics. In E. N. Zalta, eds. *Stanford Encyclopedia of Philosophy*. Available at https://plato.stanford.edu/entries/collingwood-aesthetics/ [Accessed 20 August 2018].

Kosuth, J. (1968). *Art after Philosophy I, II, III*. London: Studio International.

Krauss, R. (1981). *Passages in Modern Sculpture*. Cambridge (MA): MIT Press.

Kuhn, T. (1962). *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.

Langer, S. K. (1957). *Problems of Art*. London: Macmillan Publisher Ltd.

Lessing, G. E. (1836). *Laocoon: or, The limits of Poetry and Painting*. London: Ridgeway.

Levinson, J. (1979). Defining Art Historically. *British Journal of Aesthetics*, 19(3), 232-250.

Mandelbaum, M. (1965). Family Resemblances and Generalization Concerning the Arts. *American Philosophical Quarterly*, 2(3), 219-228.

Obrist, H. U., Vidokle, A. and Aranda, J. (2007). Ever. Ever. Ever. In H. U. Orbits, A. Vidokle, D. Birnbaum, eds. *The Best Surprise is No Surprise*, Zurich: JRP|Ringier/e-flux, 16-24.

Raleigh, W. (1908). *Johnson on Shakespeare*. Oxford: Henry Frowde.

Richards, I. A. (1924). *Principles of Literary Criticism*. London: Kegan Paul. Trench. Trubner.

Richter, D. (2013). Artists and Curators as Authors. Competitors, Collaborators or Team workers? *OnCurating.org*, 19, 43-57.

Saxena, S. K. (1978). The Aesthetic Attitude. *Philosophy East and West*, 28(1), 81-90.

Senaldi, M. (2012). *Definitively Unfinished. Filosofia dell'arte contemporanea*, Milan: Guerini.

Siegel, K. (2008). Lee Lozano. *Artforum*, 46(8), 330-331; 390-392.

Steyerl, H. (2016). The Terror of Total Dasein. Economies of Presence in the Art Field. *DIS Magazine*. Available at http://dismagazine.com/discussion/78352/the-terror-of-total-dasein-hito-steyerl/ [Accessed 20 August 2018].

Stolnitz, J. (1960). *Aesthetic and the Philosophy of Art Criticism. A Critical Introduction*. Boston: Houghton Mifflin.

Ullrich, W. (2009). Icons of Capitalism: How Prices Make Art. In J. Bradburn, P. Dossi, B. Groys, F. Nori, P. L. Sacco, J. Stallabrass, eds. *Art, Price and Value. Contemporary Art and the Market*, Florence: Centro di Cultura Contemporanea Strozzina, Firenze. Available at http://www.strozzina.org/artpriceandvalue/catalogue_ullrich.html#content [Accessed 20 August 2018].

Varzi, A. (2008). Che cos'è un derivato? Appunti per una ricerca tutta da fare. In A. Berrini, eds. *Le Crisi Finanziarie e il "Derivatus Paradoxus"*, Saronno: Editrice Monti, 143-171.

Wilde, O. (1981). *The Picture of Dorian Gray*. London: Ward Lock & Co.

Wittgenstein, L. (1953). *Philosophische Untersuchungen*. Berlin: Akademie.

Wolfe, T. (1975). *The Painted Word*. New York: Bantam.

Wollheim, R. (1984). *Painting as an Art*. New Jersey: Princeton University Press.

Yanal, R. J. (1998). The Institutional Theory of Art. In M. Kelly, eds. *The Encyclopedia of Aesthetics*, Oxford: Oxford University Press.

Bio-note

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The Phases of the Translation Process: Are They Always Three?

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Abstract

In general, there is agreement among translation scholars (e.g. Mossop, 2000; Jakobsen, 2002; Englund Dimitrova, 2005) that the translation process is divided into three clear-cut phases, which Mossop (2000) terms as pre-drafting, drafting and post-drafting. In the first phase, the translator gets acquainted with the source text; in the second phase, a full version of the translation is created; and the third phase commences after the translator has produced a first full draft of the translation.

This contribution discusses the findings of a recently completed doctoral study (Borg, 2016) which investigated in-depth the coming into being of a whole literary translation. The detailed case study provided a rich description of the evolution of the translation from first draft to publication and analysed thoroughly the different phases the translation went through. It was found that the translation process was composed of five phases and that every phase has a specific pace and particular functions. Thus, it was suggested that Phases 3-5 are phases in their own right and not sub-phases of the post-drafting phase. The findings indicated that the number of phases in the translation process and their length might vary among translators and that this might be linked to their process profile. The results therefore challenge the subdivision of the translation process into three fixed phases.

Keywords: phases of the translation process, literary translation, translation process research, process profiles

Introduction

This paper examines the phases a French-Maltese literary translation went through and how the translator approached the task. The phases of the translation process are a main topic in translation process research (TPR) and translation scholars (e.g. Mossop, 2000; Jakobsen, 2002; Englund Dimitrova, 2005) generally concur that the process is divided into three clear-cut phases. However, different authors employ different terminology for the same three phases, albeit defining the three phases very similarly. For example, Jakobsen (2002) applies i) *orientation,* ii) *drafting* and iii) *revision*, while Mossop (2000) employs i) *pre-drafting,* ii) *drafting* and iii) *post-drafting*. The current study utilises Mossop's terminology and delineates the three

phases as follows: in the first phase, the translator familiarises himself/herself with the source text (ST); a full version of the translation is produced in the second phase; and the third phase begins "after sentence-by-sentence drafting is complete" (Mossop, 2000 p.40).

Translation Studies (TS) distinguishes between revising one's own work and revising other translators' work, termed by Mossop "self-revision" (2001/2010) and "other-revision" (2007) respectively. In self-revision translators correct their own work, while in other-revision, the translation is revised by a third party. In this study, the translation process is considered as ceasing when the role of third parties begins, hence at the end of the post-drafting phase (Figure 1).

Translation process

Pre-drafting   Drafting   Post-drafting
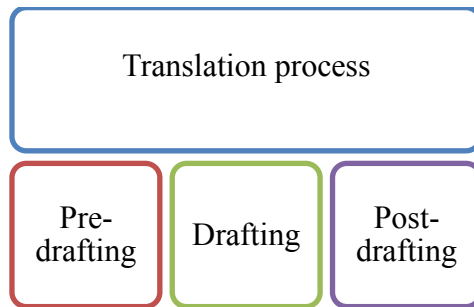
Figure 1. The translation process

Functions of the different phases

Phase 1 serves as a familiarisation phase where translators read and interpret the ST before composing the target text (TT). Comprehension is a main feature of this phase (Jakobsen, 2002) as is planning (Englund Dimitrova, 2005). Yet, previous studies (e.g. Jakobsen, 2002; Carl, Dragsted and Jakobsen, 2011) have shown that the length and activities performed during this phase differ considerably among translators and this variation seems unrelated to translation experience (Englund Dimitrova, 2005). Some translators jot down words/phrases and/or carry out research, some read the whole ST, others browse it quickly, whereas certain translators start translating immediately, skipping this phase altogether.

In Phase 2, the translation is drafted but this is not the only action taken. Translators read the ST (again) and engage with it, resort to external resources such as dictionaries and the Internet, evaluate the emerging text and self-revise it. Most studies have found the second phase to be the longest (e.g. Jakobsen, 2002; Englund Dimitrova, 2005; Dragsted and Carl, 2013) but individual differences and exceptions were reported here too in terms of duration, approach and activities performed.

In the third phase, translators review and/or hone the translation. Self-revision, however, is not restricted to this phase but often takes place both in the drafting and the post-drafting phases. Moreover, "the post-drafting phase can include non-checking work such as term research" (Mossop, 2001/2010, p.168) and some decisions could be postponed until this phase. Still, "the main activity is monitoring of existing text" (Jakobsen, 2002, p.193). Some translators choose to subdivide this phase in various subphases (Englund Dimitrova, 2005), which begins when the translator finishes a first draft of the translation and ends when s/he considers the translation complete (Jakobsen, 2002; Englund Dimitrova, 2005).

It will be interesting to find out what the translation process of this study's participant is composed of, and whether it is also divided into three phases.

Methodology

This case-study forms part of a larger research project (Borg, 2016) which investigated in-depth the coming-into-being of a Maltese literary translation: *Is-Sur Ibrahim u l-Fjuri fil-Koran* (henceforth *Is-Sur Ibrahim*) rendered from French by Toni Aquilina (Schmitt, 2014). It collected data through draft translations, the ST and the final TT, think-aloud, observation, and interviews. The data elicited were triangulated and analysed qualitatively and quantitatively. The present study focuses on the phases of the translation process and analyses pertinent data extracted from Drafts 1-4 (D1-4), the initial interview, think-aloud and observations (for details on the methodology see Borg, 2016). Since D1 of *Is-Sur Ibrahim* was completed in 2008, prior to the start of the research project, data about Phases 1 and 2 were obtained through an initial interview, in which the translator described all the phases of his translation process; the results are presented in section 4.1. The researcher then observed the translator as he self-revised D1 and D2 while thinking aloud, corresponding to Phases 3 and 4[1] respectively; these data were recorded in Translation Process Protocols (TPPs). Data about Phase 5 were gathered through a telephone call and analysis of D4. These results are found in section 4.2.

Analysis

Overview of the phases gleaned from the interview: the translation process as conceived by the translator

The translator immediately asserted that he has his own translation method: "I always follow my method" (ISSI/TA047). He perceives his translation process in terms of phases, each one of which is analysed below:

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1   Phase 3 yielded D2 and Phase 4 D3.

Phase 1

For Aquilina, the first step in translating a literary work consists of reading and understanding the text. He first reads the whole text, as many times as required to get a full grip of the work. A thorough understanding of the text to be translated and a complete grasp of the meaning of words in context are considered crucial. During this phase, he also carries out research which includes background reading about the author, reading other works by the same author and searching words in dictionaries. Only once he is confident of having achieved a good grasp of the text, will he move to the next phase.

Phase 2

The next step consists of drafting the translation. First, he divides the text into what he calls units of work. This involves segmenting the ST in chunks comprising between five and eight pages, based on the amount of time available for translation. A unit of work is tackled in one go. During this phase he works regularly on the literary translation at hand until D1 is completed, in order to maintain the impetus gained as well as to capitalise on the research done in the previous phase, while this is still fresh in his mind.

No recourse to dictionaries is made during drafting, in order to produce the draft swiftly, in an uninterrupted flow. During the production of the draft, he does not necessarily look at the research undertaken because he gets carried away. It could be argued that in the phase preceding drafting he internalises the research done, stocking up on his internal resources so that the draft TT is produced in a natural burst. Once a paragraph is translated, he rereads it and checks whether it can be improved. However, he clarified that changes done at this phase are minor. D1 is not intended to be perfect. In D1 he is not concerned with details such as spelling; optimisation of the TT is reserved for later.

Phase 3

Aquilina asserts that he likes to leave an interval between this phase and the previous one as it allows him to approach the draft with fresh eyes. Here, the translation is typed and fine-tuned and he sets himself no targets and time limits. In fact, he explained that this phase normally takes longer than the preceding one. Fine-tuning the TT involves carrying out minor and not so minor changes. At this stage, the focus is on improving the text. Use of dictionaries and other external resources resurfaces here. Interestingly, he envisages this phase not as the revision stage, but as the stage where he improves the writing.

Phase 4

Now, he focuses on the TT, enhancing and polishing it, making it sound as natural as possible, ensuring that it works on its own. All this is done with the potential reader

in mind and thereby for acceptability reasons. Reference to the ST is made at this stage too, in order to quickly eliminate any remaining doubts.

Phases 5
Phase 5 is only discussed fleetingly; it is nonetheless referred to as a phase. At this point the translator takes on the role of a proofreader and endeavours to spot as many mistakes as possible before the TT is passed on to the actual proofreader.

Translating Is-Sur Ibrahim (Phases 1-2)
D1 of *Is-Sur Ibrahim* was created while on holiday in France. He had already read the book in Malta and reread it during this vacation. He estimates having worked on Phases 1 and 2 for circa ten days. As part of the groundwork, he read four or five other books by Schmitt to acquaint himself with the author's writing style. He affirms having adopted his normal translation process for the production of D1.

Phases 3-5 as observed by the researcher

Phase 3
Phase 3 transpired to be the longest phase of the process, extending over eighteen sessions each lasting between two and six hours. This phase involved a painstaking comparative self-revision: departing from the ST, the translator read a ST chunk, compared it with the corresponding TT segment and revised it when he reckoned it necessary. Once satisfied with the TT chunk, he moved to the next ST segment and its TT counterpart until the end of the document was reached. This resulted in a great deal of self-revisions, in extensive rewriting. Typically, once a whole paragraph is revised, it is reread and, at times, further amendments are made. As a result, Phase 3 is cyclical and recursive: a comparative self-revision at the sentence level is followed by a unilingual self-revision at the paragraph level. Once this cycle is completed the translator moves to the next ST-TT segment and a new sequence begins. This phase was characterised by other recurrent process patterns which the translator seemed to perform as part of a routine developed through experience, such as i) starting the session by reading part of the TT revised during the previous session and ii) concluding it by a unilingual rereading of the text revised during the same session.

These iterative process routines give a non-linear slant to Phase 3: the translator does not approach this phase in an entirely linear fashion but operates in "recursive loops" (Dam-Jensen & Heine, 2013, p.93). Nevertheless, most of the time the translator processes the TT linearly, tackling one sentence after the other, sequentially.

In Phase 3 the translator brings into play a combination of internal and external resources. He constantly resorts to the internal resources acquired through

education, practice, life experiences and so forth. Moreover, extensive use of external resources was observed. Use of book dictionaries was by far the most dominant. This seems to be a particular feature of Phase 3, where reference to dictionaries was frequent and consistent. Every single little doubt is checked. Consequently, this phase is slow and lengthy.

Think-aloud revealed a whole range of reasons motivating translatorial decisions. There seems to be two constant preoccupations in Aquilina's decision-making: i) loyalty to the ST/ST author and ii) TL/TT considerations/requirements. The translator appears to be continuously pulled between these two forces and he is all the time striving to strike a balance between the two. Personal preferences are a third significant factor in this translator's decision-making, particularly his penchant for Semitic words.

Phase 4

There was a three-week gap between the end of Phase 3 and the start of Phase 4. This phase was completed in two sessions, each lasting approximately 4.5 hours. The ST still played a role and loyalty to the ST/ST author remained a concern at this stage. Yet, consultation of ST was not as frequent as in Phase 3. On the other hand, TL considerations were frequent and a main concern in Phase 4: as the translation process progresses, the translator's focus slowly shifts from the ST to the TT, becoming increasingly TT-oriented.

Attention to detail also intensifies as the translation process advances, with the translator focusing more and more on microscopic details such as punctuation, spelling, and spaces between words. When compared to the previous phase, the self-revisions carried out in Phase 4 are less complex involving mainly orthography, informativity, and lexical changes. Notably, only fifteen verbalisations relate to the translator's preferences, ideology or poetics while in the previous phase these were overriding concerns. In this phase, self-revisions are less frequent with the result that Phase 4 was completed in a much shorter timespan than Phase 3.

Likewise, it was observed that although the translator did generate verbal ATSs, these were much less frequent when compared to the previous phase where there was a continuous generation of verbal ATSs. Recourse to dictionaries decreased too. As regards linearity, it was found that the self-revision process in Phase 4 is more linear than in Phase 3.

In the current phase, the translator read the TT aloud. He seemed to be listening to the text, hearing how it reads out, how it sounds. At this stage, importance is thus given to the acoustic texture of the Maltese text, attributing attention to the rhythm of the words, the cadence of sentences, the tempo of the text. Upon encountering a mistake or an inadequate segment, the reading aloud is interrupted and thinking aloud commences. The switch from reading aloud to thinking aloud and vice-versa was generally seamless.

Phase 5

D3, revised in Phase 4, was completed on 09.09.13 and on 16.09.13 the translator was scheduled to meet the proofreader to give him the translation for proofreading. The day before his appointment with the proofreader was due, Aquilina called to inform the researcher that earlier on during the day he printed a copy of the TT, read it again, did some amendments on the printout which were later inputted on the computer and that a copy of D4 will be provided. The researcher inquired whether the ST was consulted during this phase and he answered in the negative. He explained that the changes undertaken mainly pertain to punctuation and word order, and were "mostly dictated by the harmony experienced during the reading aloud of the text" (personal communication 15.09.13). The indications are that this phase was short: it was completed in one session lasting a few hours, the time required to read through a text of 8891 words and carry out the changes.

Analysis of D4 reveals that most of the self-revisions in D4 are minor. Since the translator concentrated on the TT allegedly without consulting the ST, they were performed because of TT and TL considerations. Moreover, this phase also points to the perfectionist nature of the translator: he strives to give the proofreader a draft with the least amount of mistakes possible, thus he self-proofreads the TT before handing it to third parties.

Discussion

A five-phased translation process

Analysis of the various data sources showed that the translation *Is-Sur Ibrahim* was created in five distinct phases and went through four drafts. Section 1 discussed how scholars traditionally divide the translation process in three phases. In cases where several phases succeed the drafting phase, these are grouped as subphases under one phase, the post-drafting phase (e.g. Englund Dimitrova, 2005; Shih, 2013). Now, in Aquilina's process Phases 3-5 seem to be three distinct phases. Consequently, his translation process emerges as consisting of five phases, not three. From the analysis, it is evident that each phase has specific purposes, its own pace, and builds on the previous one.

Phases: their function and pace

Phase 1: Preparing the groundwork - the comprehension phase

In Phase 1 the preparatory work for the translation is done: the translator acquaints himself with the ST, engages deeply with it and lays the foundations for the translation. This phase precedes the drafting of the TT although the translator stated that he jots down some notes after looking up words in dictionaries. The

research carried out on and around the ST and the multiple readings of the entire text highlight the importance attributed to understanding the ST, which is the main purpose of this phase of Aquilina's process. These findings are consistent with previous studies showing that: i) this phase comes before the systematic writing of the translation (e.g. Mossop, 2000), ii) certain translators resort to aids and write notes during this phase (e.g. Englund Dimitrova, 2005), iii) it serves as an orientation/planning phase (e.g. Carl, Dragsted and Jakobsen, 2011) and iv) it "is dominated by comprehension" (Jakobsen, 2002 p.192). The several readings of the entire ST accompanied by research indicate that this phase is not short in Aquilina's case. However, it should be pointed out that not all translators read the whole ST before starting to translate (e.g. Jakobsen, 2002; Englund Dimitrova, 2005; Alves et al., 2009) and this counts both for non-literary and literary (e.g. Rabassa, 2005) translators. The importance given to understanding the ST in Phase 1 demonstrates that the translator wants to approach Phase 2 with the certainty of having mastered the meaning of the ST.

Phase 2: Producing a draft translation
In Phase 2 Aquilina produces a handwritten first draft rapidly with the aim of capturing the spirit of the ST gleaned from Phase 1 and transferring it to the TT. In his process, Phase 2 is not the longest which contrasts with previous TPR findings showing that most professional participants dedicate the largest part of the task time to drafting (e.g. Jakobsen, 2002; Englund Dimitrova, 2005; Shih, 2013). However, in the same studies these authors all report at least one experienced translator not spending most of their time drafting. Moreover, Ros Schwartz (Schwartz & de Lange, 2006), who translates contemporary Francophone prose, also works very rapidly on her first draft and sets daily targets. Therefore, there are translators who, like Aquilina, actually produce the first draft quite fast. It is, however, likely that since in previous studies these translators were in a minority, they were lost in the crowd despite authors highlighting significant individual differences in approaching the task (e.g. Jakobsen, 2002; Antunović & Pavlović 2011).

In D1, Aquilina sketches the outline of his translation. It seems that through practice he has developed a number of process strategies to facilitate the drafting process and to work more efficiently and effectively (see Borg, 2016). Further, attention to detail does not pertain to D1; in Phase 2 he does not let himself get bogged down with details and microlevel decisions. In this phase, only slight corrections are done since fine-tuning is reserved for the next phases. As Peter Bush (2006) puts it "[t]he first draft is the first stab at the rewriting" (p.30).

Phase 3: Redrafting - fine-tuning the draft translation
There is a clear change of pace and approach in Phase 3 reflecting the functions of this phase in this translator's process. The TPPs have revealed that Phase 3 involves a thorough comparison of the ST with the TT and a conscientious self-revision of D1.

The comparative revision is generally followed by two unilingual revisions, one at the paragraph level and another one at the end of the self-revision session. Phase 3 thus encompasses several levels of monitoring; it is also characterised by heavy use of dictionaries and constant generation of verbal ATSs. As a result, the translator proceeds very slowly and meticulously. This is the lengthiest phase in Aquilina's process and comprises substantial rewriting. Reworking parts of the draft TT is not unusual in literary translation. For instance, D.H. Lawrence rewrote whole sections of his first draft translation of Verga's *Mastro-don Gesualdo* (Arnold, 1968).

Phase 3 is significant in Aquilina's process, both in terms of length and role. This goes against previous studies' results which found that D1 is generally the most time-consuming. Yet, researchers report important individual variation, for instance, "[i]n one task, one of the professionals spent more time end revising the draft than actually drafting it" (Jakobsen, 2002, p.194).

This is the phase where Aquilina's TT really takes shape, where most translation solutions survive till the final product. The analysis indicates that the main aims of this phase are to refine the TT by increasing its accuracy in relation to the ST but also its fluency. However, TT/TL considerations are also given importance. Personal preferences are another main focus in Phase 3. The translator spends a great deal of time dealing with such factors which contributes to making Phase 3 slow and lengthy.

Phase 4: Polishing the style of the TL

Phase 4 is much shorter than the preceding one which correlates with the tasks and functions attributed to it. While in D2 he was more concerned with macro aspects, in D3 he switches gears focusing more on the microlevel of the text, paying attention to details such as spelling and punctuation, which are less complex and hence less time-consuming. Focus is also shifted to the TT and TL. In Englund Dimitrova's (2005) study, certain participants too had different aims for their different subphases of the post-drafting phase.

In this phase, both the generation of verbal ATSs and the consultation of dictionaries diminish whereas linearity increases. As self-revisions, ATSs, recourse to external resources and non-linearity are all associated with problematic segments (e.g. Angelone, 2010), this provides evidence that problematic segments decrease as the TT unfolds. Shorter phases and less numerous self-revisions also indicate that the translator's satisfaction with the TT is increasing.

Phase 5: Self-proofreading

Phase 5 was short but with precise aims nonetheless: to increase the readability of the translation and to eliminate as many mistakes as possible from it. Here the translator assumes the role of a proofreader: he proofreads his own text before sending it for actual proofreading. Phase 5 appears to be completely TT-oriented as the translator declared not having referred to the ST during this phase and having focused on rendering the TT more readable, more harmonious.

A compartmentalised and incremental process resulting from strategic behaviour

In view of the above, Aquilina's translation process could be described as compartmentalised and incremental, each phase having specific purposes and building on the former one. Assigning different tasks to each of the phases seems to help him be more self-disciplined, methodical and focused on the task at hand. This division of tasks points towards strategic behaviour on the translator's part: through experience he has learnt how best to approach the TT and distribute tasks throughout the production process.

Questioning the phases of the translation process

Scrutinising the findings of the current study and of previous ones raises questions about whether the translation process is always composed of three phases. Previous research has shown that the translation process is characterised by significant individual variation (e.g. Jakobsen, 2002; Englund Dimitrova, 2005; Dragsted & Carl, 2013; Hansen, 2013). For instance, certain translators read the entire ST before commencing drafting, others familiarise themselves quickly with the text or the first part of it while others skip this phase altogether and start drafting immediately (e.g. Carl, Dragsted and Jakobsen, 2011). Inevitably, all translators have a drafting phase, although individual variation occurs here too (e.g. Englund Dimitrova, 2005). Researchers report that translators generally perform a post-drafting phase (e.g. Jakobsen, 2002), though not all translators implement changes to the TT during this phase (e.g. Carl, Dragsted and Jakobsen, 2011) and the length of the post-drafting may vary considerably among translators (e.g. Shih, 2013). Moreover, some translators check their draft more than once. For example, Englund Dimitrova, (2005) reported that two of her participants had five subphases in the post-drafting phases and several of Shih's (2013) participants had four subphases. Yet, although translators seem to allocate different functions to the different subphases they are all subsumed under post-drafting.

As things stand, whether a translator performs a pre-drafting phase or not, it is assumed that there is a pre-drafting phase in his/her process and, if a translator meticulously checks the draft several times, these are all counted as one phase. In view of this and of the significant individual variation found in how translators handle texts, should we start questioning whether the translation process is always divided into three phases? Jakobsen's (2002) assertion that "[w]hether or not the initial orientation phase is treated as a separate phase or as part of drafting (Phase 2) is a matter of definition" (p.192) strengthens the point as it allows for alternative definitions of the phases and hence for alternative divisions of the process depending on how translators spread the tasks over the phases and on the approach they adopt. It is being posited that Aquilina translated *Is-Sur Ibrahim* in five phases and each phase had its own particular function; consequently each phase could be considered

a phase in its own right. Interestingly, Göpferich (2010) seemed to think along similar lines as she did not speak of subphases of the post-drafting phase but asserted that "[t]here may be one or several post-phases depending on the number of revisions (*post-phase 1, post-phase 2,* etc. in the TPPs)" (p.10). If the translation process has a "pre-phase", a "main phase" and possibly "several post-phases" (Göpferich, 2010), then it follows that the phases are not necessarily limited to three. Johnsen's (2014) study also provides empirical evidence of an additional phase, therefore signalling that the phases of the translation process are not always three.

Generalisation is of course not possible from the present case study yet, in view of its results, previous studies' results, and assertions by various scholars that the translation process is characterised by variability (e.g. Séguinot, 1997; Breedveld, 2002), the question being raised seems legitimate. Englund Dimitrova (2005) asserts that "[t]he relative allocation of time for the phases is a consequence of how the main cognitive process components of the task are distributed and applied throughout the task" (p.22). To this, one could add that another consequence is the number of phases in a translator's process. If cognitive process components[2] are distributed by a translator over two phases, then it could be argued that his/her translation process consists of two phases; if on the other hand, they are distributed say over five, as in the participant's case, then his translation process consists of five phases.

This variety in the handling of the task has been linked to individual process profiles, i.e. how translators approach a task and distribute the activities performed over the different phases of the translation process (Antunović and Pavlović, 2011). Dragsted and Carl (2013) found that a translator's behaviour does not change much from one translation to another "and that one may thus postulate that translators are characterised by individual translator profiles" (p.149). In line with this, Aquilina confirms that his translation process remains constant across his practice; other translators too seem to have their own steady way of working (e.g. Schwartz & de Lange, 2006). It may thus be suggested that the number of phases and their length in a translator's process are related to his/her process profile. In this scenario, Aquilina's process would consist of five phases and he would be considered an oil painter, or a second draft writer, according to writing researchers (e.g. Chandler, 1993) as he dedicates good time to Phase 1, produces a quick first draft and then engages in major self-revision in the subsequent phases. Mossop (2001/2010) affirms that "[r]egarding self-revision, some people 'steamroll' through the text, not stopping to make corrections as they go. [...] They do almost all their self-revision after drafting is complete" (p.19). This is very similar to how Aquilina approaches the task which goes to show that his translational behaviour is not completely idiosyncratic but is in many ways similar to other translators' (and writers') approach. Since the vast majority of process studies carried out so far focused on identifying patterns common to all

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2   Hayes et al. 1987 suggested that the monolingual writing process is composed of planning, text generation and revision and TS scholars have applied this to translation (e.g. Englund Dimitrova, 2005).

translators, translators who approach the task in a different way were overlooked because of the need to generalise from research studies, although significant individual variation in how the task is approached was consistently highlighted by the same studies. As "translation […] necessarily involve[s] variation" (Séguinot 1997, p.104), studying in-depth the translatorial behaviour of individual translators and taking into consideration individual differences seems a natural next step for TS.

References

Alves, F., Pagano, A. and da Silva, I. (2009). A new window on translators' cognitive activity: methodological issues in the combined use of eye tracking, key logging and retrospective protocols. In I. M. Mees, F. Alves and S. Göpferich, eds. *Methodology, technology and innovation in translation process research: a tribute to Arnt Lykke Jakobsen,* Copenhagen: Samfundslitteratur, 267–291.

Angelone, E. (2010). Uncertainty, uncertainty management and metacognitive problem solving in the translation task. In G. Shreve & E. Angelone, eds. *Translation and cognition*, Amsterdam: John Benjamins, 17–40.

Antunović, G. & Pavlović, N. (2011). Moving on, moving back or changing it here and now: self-revision in student translation processes from L2 and L3. *Across Languages and Cultures*, 12(2), 213–234.

Arnold, A. (1968). Genius with a dictionary: reevaluating D. H. Lawrence's translations. *Comparative Literature Studies* [on-line]. 5(4), 389–401. Available online at http://www.jstor.org/stable/40467785 [Accessed 28 November 2015].

Borg, C. (2016). *A literary translation in the making: an in-depth investigation into the process of a literary translation from French into Maltese*. PhD Thesis, Aston University.

Breedveld, H. (2002). Writing and revising processes in professional translation. *Across Languages and Cultures*, 3(1), 91–100.

Bush, P. (2006). The writer of translations. In S. Bassnett & P. Bush, eds. *The translator as writer*, London: Continuum, 23–32.

Carl, M., Dragsted, B. and Jakobsen, A. L. (2011). A taxonomy of human translation styles. *Translation Journal* [on-line]. 16(2), 155–168. Available at http://translationjournal.net/journal/56taxonomy.htm [Accessed 21 January 2015].

Chandler, D. (1993). Writing strategies and writers' tools. *English Today*, 9(2), 32–38.

Dam-Jensen, H. & Heine, C. (2013). Writing and translation process research: bridging the gap. *Journal of Writing Research* [on-line]. 5(1), pp.89–101. Available at http://www.jowr.org/ [Accessed 12 June 2016].

Dragsted, B. & Carl, M. (2013). Towards a classification of translation styles based on eye-tracking and keylogging data. *Journal of Writing Research* [on-line]. 5(1), 133–158. Available at http://www.jowr.org/ [Accessed 10 April 2014].

Englund Dimitrova, B. (2005). *Expertise and explicitation in the translation process.* Amsterdam: John Benjamins.

Göpferich, S. (2010). The translation of instructive texts from a cognitive perspective: novices and professionals compared. In S. Göpferich, F. Alves and I. M. Mees, eds. *New approaches in translation process research*, Copenhagen: Samfundslitteratur, 5–55.

Hansen, G. (2013). Many tracks lead to the goal: a long-term study on individual translation styles. In C*. Way, S.* Vandepitte, R. Meylaerts and M. Bartłomiejczyk, eds. *Tracks and treks in translation studies*: *selected papers from the EST Congress*, *Leuven 2010*, Amsterdam: John Benjamins, 49–62.

Hayes, J. R., Flower, L., Schriver, K. A., Stratman, J. F. and Carey, L. (1987). Cognitive processes in revision. In S. Rosenberg, ed. *Advances in psycholinguistics, Vol. 2. Reading, writing and language learning,* Cambridge: Cambridge University Press, 176–240.

Jakobsen, A. L. (2002). Translation drafting by professional translators and by translation students. In G. Hansen, ed. *Empirical translation studies: process and product.* Copenhagen: Samfundslitteratur, 191–204.

Johnsen, Å. (2014). Revision and cohesion in translation. *Translation and Interpreting Studies*, 9(1), 70–87.

Mossop, B. (2000). The workplace procedures of professional translators. In A. Chesterman, N. G. San Salvador and Y. Gambier, eds. *Translation in context: selected papers from the EST Congress, Granada 1998*, Amsterdam: John Benjamins, pp.39–48.

Mossop, B. (2001/2010). *Revising and editing for translators*. St Jerome: Manchester.

Mossop, B. (2007). Empirical studies of revision: what we know and need to know. *Journal of Specialised Translation* [on-line]. 8, 5–20. Available at http://www.jostrans.org/issue08/art_mossop.php. [Accessed 28 March 2013]

Rabassa, G. (2005). *If this be treason: translation and its dyscontents. A memoir*. New York: New Directions.

Schmitt, E.-E. (2001). *Monsieur Ibrahim et les Fleurs du Coran*. Paris: Albin Michel.

Schmitt, E.-E. (2014). *Is-Sur Ibrahim u l-Fjuri fil-Koran*. Translated by T. Aquilina. Malta: Faraxa Publishing.

Schwartz, R. & de Lange, N. (2006). A dialogue: on a translator's interventions. In S. Bassnett & P. Bush, eds. *The translator as writer*, London: Continuum, 9–19.

Séguinot, C. (1997). Accounting for variability in translation. In J. H. Danks, G. M. Shreve, S. B. Fountain and M. K. McBeath, eds. *Cognitive processes in translation and interpreting.* London: Sage Publications, 104–119.

Shih, C. Y. (2013). Translators' 'end-revision' processing patterns and maxims: a think-aloud protocol study. *Arab World English Journal* [on-line]. 4(3), 31–44. Available online at http://www.awej.org/ [Accessed 6 September 2014].

Bio-note

Dr Claudine Borg holds a PhD in Translation Studies from Aston University, Birmingham. She lectures French at the University of Malta Junior College and Translation Studies at the University of Malta. Borg has presented her work at various international conferences, co-authored *Théorie et pratique de la traduction littéraire français-maltais/It-Teorija u l-Prattika tat-Traduzzjoni Letterarja Franċiż-Malti* and authored various articles. She is also a practising translator. Her main research interests are translation process research, literary translation, research methodology and translator studies.

Pear Pressure – Transient Text as Territoriality

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Abstract

Place-oriented practice has gained a more prominent position within the remit of contemporary art in recent years. This paper discusses how the exploration and recording of something as seemingly transient as inscribed 'text' on prickly pear leaves (classification - *opuntia ficus-indica*) might reveal surprising insights into place. The work interrogates the strollers' tendency to inscribe words and symbols on the fleshy tissue of prickly pears growing abundantly in the Maltese countryside. Ingold (2007, p.43) asserts that when 'text' is formed by the removal of material, scored or etched, it can be described as reductive writing. This paper argues that 'soft graffiti' can further our understanding of fleeting territoriality and generate insight into the social and cultural aspects of place.[1]

Strollers succumb to the habit of their peers and with a pointed or sharp object and by applying some pressure they inscribe 'text' on fresh leaves. Hence the title: *Pear Pressure*. I photographed this habit over a number of years accumulating hundreds of photographs. Each photograph tells a story. The photographic archive emerging from such exploration developed into an artistic installation which was first exhibited at the University of Leeds in 2014 and at the newly established contemporary art space at the Junior college in 2018.

Keywords : Fine Art. Text, Place, Territory, Mapping

Mapping Place

I initiated this work by combining Fine Art practice with a longstanding interest in place, territory and textuality. The context of this work evolved from a consideration of place as a potential site for artistic practice. Certain places, more than others, appear condensed with myriad stories which can be unraveled, juxtaposed, manipulated and re-told. Art research entails a complex and poetic intertwining of real and imaginary contexts. 'The critical visual artist, in the enactment of his or her thinking, operates between the real and the semblance, able to mitigate against the disappearance of the real into virtualisation' (Neil 2006, pp.60-61). Macleod and Holdridge (2006, p.8) argue that 'art is always in translation, because it is matter: it is materially realised ideas'. Further possibilities for the exchange of new knowledge

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1   'Soft graffiti' refers to text inscribed on prickly pear leaves.

may occur when practice is combined with theory. Davy sustains that theory releases the potential of practice and its role 'is to uncover the possibilities that remain inherent within practices and thereby liberate them towards futures already latent within them' (2006, p.21).

Although there tends to be an alignment between practice-led research and qualitative research methods, practice-led research has its own distinctive research approach and strategies (Haseman 2010, pp.147-148). Sullivan (2005, p.115) argues that '[t]o create, the researcher has to enter into the realm of imagination, to take on the possible, as well as the plausible, and probable'. This paper aims to address the questions: What opportunities for art practice emerge from an investigation into the 'textuality' of place?; and How might 'text' contribute to an understanding of territoriality within the context of artistic practice? The term 'textuality' refers to traces of nature and culture inscribed on surfaces which might reveal bits and pieces of stories.

My artistic practice is often concerned with place. It explores the complex associations of matter and place, and identifies opportunities for contemporary Fine Art practice. The first step is to be in place; 'one's place is where one puts down one's feet' (Carlson 2009, p.83). Ingold (2013, p.1) maintains that '[i]t is, in short, by watching, listening and feeling – by paying attention to what the world has to tell us – that we learn.' Ingold describes this as 'correspondance', which means, setting up 'a relation with the world', allowing it to open up paths of deterritorialisation and potential lines of flight (2013, p.7).

I have been mapping places for a number of years but my focus is generally narrowed down to specific nuances of place. Casey (2005, p.xv) argues that mapping the land departs from notions of generic or cartographic mapping since it is a matter of moving and going through the land. I tend not to focus on the bigger picture since I am generally more interested in what is happening on the 'fringe'. Casey sustains that mapping represents movement in what Deleuze and Guattari call smooth space, drifting; it is opposed to movement in striated space like cartographic mapping, gridlike and homogeneous in character (Casey 2005, p.xvi). Mapping consists of a subtle scanning of the land at a tacit level as opposed to surveying (Casey 2005, p.12). Deleuze and Guattari (1987 p.13) assert that a rhizome is 'a *map and not a tracing*. Make a map, not a tracing' they utter [original emphasis]. Foster notes (1996, p.185) that different forms of mapping are now implicit in the work of many contemporary artists.

After repeat visits to a valley in the North West of Malta, out of a narrow passage emblazoned with a thick wall of prickly pears whose main function is to shield the fields on the other side, prospects for artistic practice started to emerge. The spiny succulent which is not indigenous to Malta thrives in the Mediterranean climate. It grows abundantly and forms dense and tangled structures often serving as boundaries between neighbouring fields.

Strollers initiated the habit of 'posting' messages on the prickly pear 'wall' much like they do on social media. (Figures 1 and 2) Whenever I visited the valley I could notice fresh inscriptions. This paper argues that soft graffiti can further our understanding of place and generate insight into the social and cultural aspects of place. The messages inscribed are mostly comprised of names and dates alluding to relationships, births, current dates ('I Was Here' type of message) and other personally significant memories. Nicknames, band names, politics and other vague symbols occasionally cropped up but these were far less common.

Figure 1 Soft graffiti 1

Figure 2 Soft graffiti 2

I mapped the valley when it is most quiet; often early in the morning. I photographed each and every message, over time amassing hundreds of images on my computer. The subject matter remains the prerogative of the 'authors' who unawares of my practice post 'text' on this organic 'wall'. I took close-up shots, filling the space within the photograph with 'text'. Benjamin (1968, p.236) argues that 'with the close-up, space expands'. The actual leaves are not disturbed; if detached from the shrub they will desiccate and die unless they are re-planted. Due to the ephemeral qualities of the matter the project is entirely based on photographic documentation. Thus, as Sontag (1977, p.16) asserts the 'photograph is both a pseudo-presence and a token of absence'.

Every message was photographed numerous times; from various angles and elevations and with different exposures and shutter speeds. This was necessary to capture the 'ideal' shot; the best moment. The 'text' was not always fully exposed due to the newer leaves obstructing the older ones. At times it was difficult to capture the message clearly.

Sontag (1977, p.70) describes photography as 'the inventory of mortality'. Messages are not erased as the leaf dies out because they are reterritorialised in the photographs. Most leaves rot due to the wounds (writing) inflicted on their skin, something I could witness upon repeat visits to the valley. Derrida (1976, p.25) maintains that '[w]hat writing itself, in its nonphonetic moment, betrays, is life'. In the context of *Pear Pressure* such a statement is both paradoxical and revelatory. Writing can be considered a remembrance of life; however, it is also a betrayal - writing as an act of violence.

The selection process is rigorous; hundreds of digital photographs waiting to be chosen. When I was selecting photographs I was taken back to the valley. Photographs evoke memories. Pearson and Shanks (2001, p.42) argue that 'memory is not an inventory, but is the act of memorizing [and] this is also the *work* of the photograph…' [original italics]. Images were digitally edited on computer and cropped to Polaroid size (approximately 7.9cm by 7.9cm); only one version of each message was printed, using photographic matte paper and including a white Polaroid border all around. It is hoped that the retro Polaroid aesthetic would further expose the transient nature of prickly pear 'text'.[2]

I am attracted to the valley when it is practically deserted. Reflecting on my collection of photographs I realised that what I have is a collection of re-collections.[3] The photographs show that '[e]ven when there are no people around their traces are everywhere' (Dyer 2005, p.223). These are people stories imbricated with the history of the place; an unfolding narrative that is both private and public. The dichotomous notions of private and public are inescapable throughout my investigation of place.

2   Polaroids tend to fade over time. I tried to achieve a non-saturated chromatic texture similar to the original Polaroid prints.

3   'Like the collector, the photographer is animated by a passion that, even when it appears to be for the present, is linked to a sense of the past' (Sontag 1977, p.77).

The photographs were arranged one next to the other separated by five centimeter intervals. Around one hundred and eighty-five photographs were used. There is no particular order to this work; it is reconfigured according to the space and decisions are taken on the spot. It is non-chronological and multidirectional. The aim is to produce a spatial, visual narrative that flows along walls, floors and ceilings, round the perimeter of windows, doors and other features found inside the gallery. The layout conveys the growth patterns of the shrub which is capable of spreading beyond its allocated space. (Figure 3)
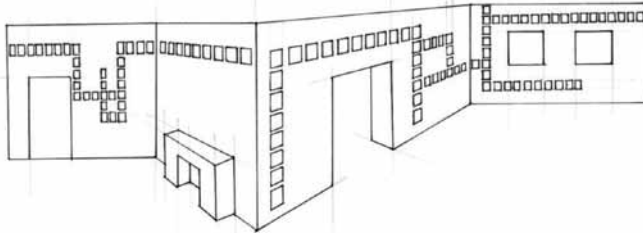
Figure 3 Sketch *Pear Pressure*

Pear Pressure was shown at Lifton Place, University of Leeds in 2014. Considered in the context of Deleuze's and Guattari's notion of mapping the proliferation of messages on prickly pears takes on a new significance. 'It [writing] has to do with surveying, mapping, even realms that are yet to come' Deleuze and Guattari (1987 p.5) maintain. The photographic installation took the form of a narrative, a 'textual' map of the valley, and the viewers could walk along the valley by engaging with the map. The narrative has neither beginning nor end; like the rhizome it is antigenealogy (Deleuze & Guattari 1987, p.12). (Figure 4)

Figure 4 *Pear Pressure* (2014) at Lifton Place, University of Leeds.

'A photograph could also be described as a quotation'; it decontextualises the subject (Sontag 1977, p.75). Benjamin (1968, p.151) maintains that '[t]o quote a text involves the interruption of its context'. These interruptions can be considered as lines of deterritorialisation. New contexts emerge; the reader 'invents in texts something different from what they [author] "intended"' (De Certeau 1984, p.169). Gibbons asserts that 'photographs have as much transformative potential as they have evidential powers, and the two can most often be said to work hand in hand with one another' (2007, p.37). Based on the photographic evidence viewers can conjure up narratives and join in the conversation as it unfolds.[4] The reader combines text 'fragments and creates something un-known in the space organized by their capacity for allowing an indefinite plurality of meanings' (De Certeau 1984, p.169).

The 'text' in *Pear Pressure* is made from a series of grooves. Brassaï (2002, p.42) notes that 'a groove is infinitely more powerful than a line. It slows the hand, it focuses concentration and requires effort, liberating the life-giving force that wells up from a child's inmost being'. Moreover, for Brassaï, 'the material plays an active, creative role in everything incised on it' (2002, p.42).

The 'groove' can be considered a kind of 'scarification' on the surface of the skin; a scar in soft tissue. Skin was one of the earliest means of expressing identity and life experiences in both a permanent and a temporary form (Keefer 2013, p.539). Instead of using one's own skin visitors to the valley are resorting to the soft succulents' skin to reveal snippets of their identity.

Keefer (2013, p.541) tells us of C.H. Armitage's classification of five purposes of scarification; one of them being identification with a tribe. The scars inflicted on prickly pears perhaps indicate the need to belong and to connect with others, and to temporarily appropriate place. Scarification can be one of the rites of passage denoting a move from one phase to another in a person's life (Moolla 2012, p.27). This shares parallels with the 'text' inscribed by strollers which frequently points to significant events in their lives. Keefer defines scarification as a silent but visible way of communication (2013, p.541).

The reductive process of scraping-off tissue from a leaf surface often encourages rot, decay and possibly death, depending on the 'wounds' being inflicted. Nature goes into auto-destruct mode as if it wants to have the last word. There are times when the leaf becomes too weak to hold its own and consequently succumbs to gravity. The leaf detaches from the plant, and if it manages to settle on a discrete layer of soil, it may take root and grow into a new plant. Through this cycle we can discern a natural process of reterritorialisation.

> When seeds and leaves drop to the ground, do they not continue the
> life stories of the trees from which they fell? Thus the ground, too, is
> no mere surface, upon which trees stand like an army of soldiers on
> parade (Ingold 2013, p.87).

4   Photographs in *Pear Pressure* work in relation to one another; they converse and create a continuum.

'The surface and that which takes place at the surface is what "renders possible" – in other words, the event as that which is expressed' (Deleuze 2004, p.214). *Pear Pressure* takes place on the surface. It reterritorialises surface 'text' onto architectural surfaces. It appropriates walls, floors, ceilings and corners; it moves in all directions. The surface makes the work possible.

The work tells us of social and cultural activity and people's engagement with the valley. Further layers of 'text' are continuously added and erased and the fluid configuration of *Pear Pressure* is an attempt at capturing this textual interplay. The viewer is implicated in the work as much as the original authors.

The room at Lifton Place was filled with 'text' and to read the 'text' one had to walk around the room; new possibilities emerged as one drifted in an unplanned manner. Like a map, the work 'is entirely oriented toward an experimentation in contact with the real'. The work is also a work-in-progress; it is always disposed to acquire more (Deleuze & Guattari 1987, p.13).

Over time my collection of prickly pear graffiti continued to grow and in 2018 the full series was installed in the contemporary art space at the University of Malta Junior College in Msida. (Figure 5). The configuration of this space is very different from the one in Leeds since it constitutes a partitioned wall within a much larger space. The white wooden panels forming the wall were not straight but indented at specific intervals thus disrupting the apparent linearity of the structure. In Leeds the narrative followed the layout of the gallery while this time round it appropriated a dedicated space as if it was a blank canvas. Here the work appeared less intrusive and unlike the haphazard growth characteristic of prickly pears it had to develop within a very restricted area. Local visitors could engage more directly with the 'text' inscribed on such a common succulent species and also due to the socially and culturally influenced messages posted on this organic wall. The work is aimed to reterritorialise place through a photographic open archive of textual fragments.

Figure 5 *Pear Pressure* (2018) at the University of Malta Junior College, Msida.

An experientially grounded notion of place has been favoured throughout this work mainly due to the underlying practice-led methodology. The work blurs the boundaries between different disciplines and it allows for multiple readings from unfamiliar perspectives. It is aimed to capture the often neglected textuality which in this specific work is considered as a form of territoriality albeit a fleeting one.

> A place owes its character to the experiences it affords to those who spend time there – to the sights, sounds and indeed smells that constitute its specific ambience. And these, in turn, depend on the kinds of activities in which its inhabitants engage. It is from this relational context of people's engagement with the world, in the business of dwelling, that each place draws its unique significance (Ingold 2011, p.192).

Place is 'something not merely characterisable but actually experienced in qualitative terms' Casey argues and thus, 'for example, color, texture, and depth, are known to us only in and by the body that enters and occupies a given place' (1997, p.204). Our body inhabits space and time, 'I cannot forget that it is through my body that I go toward the world', maintains Merleau-Ponty (2012, p.330). Casey is of the idea that being in place is not just a matter of fitting into place (1997, p.232). Furthermore, Casey echoing the words of Merleau-Ponty states that by virtue 'of the lived body, I can be said to know, at a preobjective and yet fully efficacious level, the places that populate my ongoing experience' (1997, p.232). This notion shares parallels with Heidegger's view of *Dasein*. Human presence is key to place, thus place cannot be established without the intervention of humans.

> Places do not occur naturally but are created by human beings through some mark or sign of human presence. A wilderness in itself is placeless, for it has no human center or point of convergence around which nature can gather and become bounded (Pogue Harrison 2002, p.350).

From a societal point of view, Lefebvre argues that every society creates its own space, and this has implications for appropriation and demarcation of territory. 'Space is social morphology: it is to lived experience what form itself is to the living organism, and just as intimately bound up with function and structure', according to Lefebvre (1991, p.94).

Deleuze and Guattari (1987) bring to our attention two particular types of space: striated and smooth space. They provide an intricate description of how both spaces should be envisioned. Striated space is constituted by parallel elements (for example horizontal and vertical), intertwining and intersecting, delimited and closed, whereas smooth space is solid; continuous, unlimited in direction and non homogeneous (Deleuze & Guattari 1987, p.525). As shown in the photographs the work is characterised by an apparent sequential and linear approach, however, the

photographic narrative, like prickly pears, appropriates the entire given space. The prickly pear is an invasive species since it grows rapidly and it is very resilient thus other plant species might find it difficult to survive alongside such a hard succulent. Prickly pears grow in all directions and their leaves tend to overlap to create thick walls, hence, their popularity with farmers.

The photographic narrative shown at the Junior College occupied the whole wall and although linear in character it does not have a beginning or end. Viewers may start at any point in time and go back and forth, look up and down in order to make their own place stories from prickly pear text. The work was shown alongside my *RTO* series of cabinets which also respond to 'textual' territoriality synonymous with the Maltese countryside. Territoriality can be fleeting and temporary but it still establishes some kind of appropriation in this case in the form of inscribed text.

Place is never fixed or static, and it responds to diverse ongoing fluctuations. The character of place, Massey (2004, p.98) explicates, is not only the result of what goes on within it, but is also an outcome of the juxtaposition of flows, relations and connections from outside. *Pear Pressure* can be considered an ethnographic documentary of people's memories that perhaps unknowingly leave a temporary delineation of their presence within a specific territory. The photographic archive that constitutes this body of work establishes a connection between the unapparent permanence of messages posted on social media (once posted such messages can never really be deleted) and the digital images of text that is destined to fade if not captured through a lens. While organic text is ephemeral in nature, photographed text acquires a more lasting existence.

Every time I installed *Pear Pressure* I became aware of the embodiment it entailed; installing the work becomes a pseudo-performance. Every single photograph I pick up is a re-collection. Every photograph stuck is a re-telling; a narrative in the (re-) making. The work gains more significance since the original fleeting messages will no longer exist in the valley and the only presence of such messages is through these images. The photographic installation becomes the only form of documentation of such inscriptions and here the significant contribution of place mapping becomes more evident.

References

Benjamin, W. (1968). *Illuminations*. Translated by H. Zohn. New York: Schocken Books.

Brassaï. (2002). *Brassaï graffiti*. Paris: Flammarion.

Carlson, A. (2009). *Nature and landscape: an introduction to environmental aesthetics*. New York: Columbia University Press.

Casey, E. S. (1997). *The fate of place: a philosophical history*. Berkeley: University of California Press.

Casey, E. S. (2005). *Earth-mapping: artists reshaping landscape*. Minneapolis: University of Minnesota Press.

Davy, N. (2006). Art and theoria. In K. Macleod & L. Holdridge, eds. *Thinking through art: reflections on art as research*, London: Routledge, 20-39.

De Certeau, M. (1984). *The practice of everyday life*. Translated by S. F. Rendall. Berkeley: University of California Press.

Deleuze, G. (2004). *The logic of sense*. Translated by M. Lester with C. Stivale. London: Continuum International Publishing Group.

Deleuze, G. & Guattari, F. (1987). *A thousand plateaus: capitalism and schizophrenia*. Translated by B. Massumi. London: Continuum International Publishing Group.

Derrida, J. (1976). *Of grammatology*. Translated by G. C. Spivak. Baltimore: The Johns Hopkins University Press.

Dyer, G. (2005). *The ongoing moment.* New York: Vintage Books.

Foster, H. (1996). *The return of the real.* Massachusetts: MIT Press Ltd.

Haseman, B. (2010). Rupture and recognition: identifying the performative research paradigm. In E. Barrett & B. Bolt, eds. *Practice as research: approaches to creative arts enquiry*, London: I.B. Tauris & Co. Ltd, 147-157.

Ingold, T. (2007). *Lines: a brief history.* London: Routledge.

Ingold, T. (2011). *The perception of the environment.* London: Routledge.

Ingold, T. (2013). *Making: anthropology, archaeology, art and architecture*. London: Routledge.

Keefer, K. (2013). Scarification and identity in the liberated Africans department register. *Canadian Journal of African Studies*, 47(3), 537-553.

Lefebvre, H. (1991). *The production of space*. Translaed by D. Nicholson-Smith. Malden: Blackwell Publishing.

Macleod, K. & Holdridge, L. (2006). Introduction. In K. Macleod & L. Holdridge, eds. *Thinking through art: reflections on art as research*, London: Routledge, 1-14.

Massey, D. (2004). The responsibilities of place. *Local Economy*, 19(2), 97-101.

Merleau-Ponty, M. (2012). *Phenomenology of perception*. Translated by D. A. Landes. London: Routledge.

Moolla, F. F. (2012). The body unbound: ritual scarification and autobiographical forms. *The Journal of Commonwealth Literature*, 47(1), 27-46.

Neil, K. (2006). Repeat: Entity and Ground. Visual Arts Practice as Critical Differentiation. In K. Macleod & L. Holdridge, eds. *Thinking through art: reflections on art as research*, London: Routledge, 60-72.

Pearson, M. & Shanks, M. (2001). *Theatre/Archaeology*. London: Taylor and Francis Ltd.

Pogue Harrison, R. (2002). Hic Jacet. In W. J. T. Mitchell, ed. *Landscape and power*, Chicago: The University of Chicago Press, 2002, 349-364.

Sontag, S. (1977). *On photography*. London: Penguin Books.

Sullivan, G. (2005). *Art practice as research*. California: SAGE Publications Inc.

Bio-note

Dr Trevor Borg is an artist, curator and academic based in Malta. His practice spans across different media including drawing, painting, sculpture, photography, video, and installations. Borg's work has been shown in various galleries and museums worldwide and in 2005 he was chosen to represent Malta as part of a major European Union exhibition and at La Biennale di Venezia Arte 2019. His work often juxtaposes the poetic with the political and the past with the present. Place, space, territory and temporality are among the more explored themes in his work. He also publishes and presents work about artistic practice internationally. Borg is a lecturer at the University of Malta at the Department of Digital Arts.

A Change in the Language Policy
for School Geography:
Breaking Barriers or Creating New Ones?

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Abstract

Geography as a core entitlement subject in senior schools, is one of three components that make up the umbrella subject Environmental Studies. The other two subjects are History and Social Studies. In 1999, the National Minimum Curriculum recommended that the language of instruction for a number of subjects, including Social Studies and History would be Maltese. This created an anomaly for the umbrella subject 'Environmental Studies' since the language of instruction of two of its components is Maltese whereas Geography was being taught in English. Logistics issues related to examination purposes raised the question whether Geography should be taught in Maltese. In 2012 there was a general shift to use Maltese as the language of instruction for Geography in State Schools. This change in policy took place in a period when the number of 'non-Maltese learners' in classes was on the increase, with the risk of creating an education barrier to them. This possibility was researched through a multi-method approach among teachers of geography in state schools. The pragmatic method includes a survey among 89 percent of geography teachers, interviews with 40 percent of the teachers and 2 focus group discussions. Geography teachers have different positions on the 'language issue'. Some teachers feel that teaching geography in Maltese is a sign of disregard towards non-Maltese learners, whereas others feel that shifting to Maltese as the language of instruction is facilitating those who find English more demanding. The teachers' position reflects the context in which they operate. Irrespective of their standpoint, the teachers' main concern is how this change in policy may in some circumstances create, rather than eliminate education barriers. The participating teachers feel that the lack of flexibility determined by a centralised system undermines their professionalism and the students' educational paths.

Keywords: school geography, language barrier, non-Maltese learners[1]

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1   'Non-Maltese' is the term used in official documents of the Ministry for Education and Employment to refer to new-comers who are not of local origin.

Introduction

Within the Maltese education system, geography is a core entitlement subject for students in secondary education under the Humanities as a Learning Area, meaning that all students from Year 7 to Year 11, have Geography in their timetable.

Within the state schools sector, in both Year 7 and Year 8 Geography is offered as an individual subject but in the upper secondary years, it is offered under the umbrella subject referred to as Environmental Studies, which include also History and Social Studies. Each component is taught separately by the respective subject teachers. Several attempts have been made to merge the disciplines and present them to students as one subject, but this was resisted by the teaching professional body of the three subjects, even since the University of Malta does not provide teachers' training for the subject merging the three components. In some Church Schools and Independent Schools, Environmental Studies is presented as a single subject with all components taught by one teacher.

The core entitlement of geography, which is currently presented under Environmental Studies is often referred to as Geography General, to distinguish it from the Geography Option that is offered as an elective in the upper secondary years of schooling. The programme of work of the Geography Option is much more detailed than that of Geography General, primarily because this is allocated four (4) lessons a week and it is meant to lead the student to a EQF Level 3 SEC certificate in the subject independently from other subjects as in the case of Geography General which is combined to History and Social Studies to sum up as Environmental Studies.

In 1999, the National Minimum Curriculum (1999) recommended that the language of instruction for Maltese, Social Studies, History, Religion and PSD would be Maltese and since then History and Social Studies have been taught in Maltese. This created an anomaly for the umbrella subject 'Environmental Studies' since the language of instruction of two of its components is Maltese whereas until 2012 Geography was being taught in English. This raised a logistics issue for examination purposes since students had to opt to express themselves in one language for the examination even if they were taught the subject content for that same examination in two different languages; Maltese for History and Social Studies, English for Geography. In view of this, and independently from the changing heterogeneous context of classes with an increase of 'non-Maltese learners' in schools, since 2012, there has been a shift to use Maltese as the language of instruction for Geography.

One questions how this change in policy, motivated by logistics matters, is contributing to the teaching-learning experience in Geography classes particularly to non-Maltese speaking learners: Is the change in the language of instruction from English to Maltese creating or breaking barriers for learners? This matter was discussed directly with teachers of Geography as part of a broader study focusing on the role of school geography in intercultural dialogue. This paper highlights the teachers' position with regards to the change in policy based on their professional

experience since they started teaching Geography in Maltese. This paper is divided in three main sections. The first part contextualises the issue since it provides an overview of the change in policy related to the language of instruction for Geography in view of the changing class room contexts with the increasing numbers of non-Maltese speaking learners. The following section explains the research methods adopted to generate the data that is discussed in the final section. This research is based on practices in the State Schools since it is the larger sector and since a number of church and independent schools debatably consider the three disciplines: Geography, History and Social Studies as one subject.

The Change in the Language of Instruction for Geography within a Changing Scenario

The Maltese Islands are described as bilingual since both Maltese and English are used in the same domain (Camilleri-Grima, 2000). Actually, Malta has two official languages: Maltese and English are both languages of instruction and compulsory throughout obligatory schooling, yet the increase in number of 'non-Maltese' nationals in the Maltese islands have increased the number of languages spoken in Malta (COE, 2014). Even, the Maltese education system is considered bilingual (COE, 2015) since the people of Malta are exposed to the English language from a very early age. Most textbooks and examinations of various subjects are in English at every level, due to the limited market for textbooks in Maltese (COE, 2014). The Language Education Policy Profile for Malta (COE, 2015), states that English-Maltese code switching is extensively used in the classroom of state schools, especially due to the growing numbers of migrant children.

As indicated above, the National Minimum Curriculum (1999) recommended that the language of instruction for Social Studies and History among other subjects would be Maltese. This created an inconsistency for 'Environmental Studies' as an umbrella subject since Geography was being taught in English. In view of this, since 2012, there has been a shift to teach Geography in Maltese. The policy has not been imposed on the schools. It is the prerogative of each individual school to choose the language of instruction depending on what teachers of the three subjects agree on as the common language of instruction. On paper the policy allows for flexibility but in practice it turns out to be complicated. Since two out of the three subjects are taught in Maltese, by default most Geography teachers ended up teaching the subject in Maltese even if the options of on-line audio-visual teaching resources in Maltese are very limited when compared with those available in English. Since the drive to shift to Geography in Maltese a glossary of geographical technical terms in Maltese has been made available to teachers and students. Moreover, a set of textbooks, in Maltese, has been published to use in General Classes.

In view of this reform, to adjust for examination logistics, the language of

instruction for geography throughout compulsory schooling in state schools is as listed in Table 1:

Year Groups	Language
Primary school Geography as a component of Social Studies	Maltese
Lower Secondary School Year 7 and Year 8	English but teachers areencouraged to switch to Maltese
Upper Secondary School General Year 9 to Year 11	Maltese
Upper Secondary School Option Year 9 to Year 11	English

Table 1: The language of instruction for Geography in State Schools

The change in policy took place in a period when the classes were becoming more heterogeneous with the increase in the number of non-Maltese learners who are more likely to know English rather than Maltese. This reform created an educational barrier to an increasing cohort of students, non-Maltese speaking who are usually the ones who need more assistance to settle in a system with which they may not be familiar.

When Malta signed the Framework Convention for the Protection of National Minorities in 1995, which was ratified in 1998, it declared that there were no national minorities on its territory (Euromosaic, 2004). However, since then demographic figures and the social context changed considerably particularly after Malta's accession in the European Union in 2004. It is now estimated that the approximate 'non-Maltese' residents add up to 6.7% of the population out of which 3.6% are from non-EU countries (Camilleri and Falzon, 2014). The numbers are expected to rise (NSO, 2017). The majority of the newcomers are between the 20 to 34 age cohort and hence the school population is more likely to be culturally heterogeneous.

Figures from the Ministry of Education and Employment (MEDE) show an increase in 'migrant learners' in secondary schools. The largest number of 'non-Maltese' students from EU countries is from the United Kingdom, Bulgaria and Italy. The origin of Third Country nationals is mainly from Egypt, Libya, Nigeria, Somalia and Syria (COE, 2014). The state sector requires payment of fees for non-nationals to attend, however, EU citizens, Third-Country Nationals with long terms residence status and beneficiaries of international protection and asylum seekers may ask to be exempted from the fee.

During scholastic year 2014-2015, the number of 'non-Maltese' students in state schools added up to 1109 (DQSE). This is considered a relatively high number considering the size of the Maltese Population. Yet the number of 'non-Maltese' students is greater in independent schools rather than the state sector even if the number of independent schools are fewer (DQSE). According to the Independent

Schools Association, one reason why this larger number of non-Maltese nationals opt to attend paying independent schools is the prevailing use of the English language as the language of instruction (COE, 2014). This contrasts with the change in policy related to the language of instruction for Geography. This 'reform' to address examinations logistics created a language barrier to a cohort of learners, limiting their access to quality education.

The Data Generation Framework

The data generation supporting this study is based on part of the multiple-methods of data collection employed in the broader research related to geography education, namely:

a. A survey among teachers of geography in state schools
b. Interviews with 22 geography teachers.
c. 2 focus groups discussion with a total participation of 11 teachers.

The pragmatic approach adopted for this study starts from a large population through a survey with all the teachers of geography in the state sector, then focuses on individual practices and positions of a sub-set of teachers through the interviews, and eventually corroborating these positions through the focus groups discussions.

A survey, in the form of a questionnaire, was conducted with all teachers of geography in the state secondary schools. The aim of this exercise was to obtain a baseline study on the state of school geography from the teachers' feedback. The survey was a means to trace any possible educational barriers students might be facing in geography classes. The targeted response rate was of 40% but eventually the survey was answered by 89% of the teachers of geography. Teachers may have responded willingly to the survey since it was distributed personally in all the schools once the necessary authorization was obtained from the Directorate for Quality and Standards in Education (DQSE) at the Ministry for Education and Employment (MEDE). This presented the opportunity to meet personally the respondents and hence facilitate communication. At the end of the questionnaire, teachers could fill in their contact details and indicate whether they were available to participate in the follow-up interview.

The interviews were held with 22 teachers of geography, equivalent to 33 percent of the whole population in state schools. The interviews were held in a venue convenient for the participants. The interviews were more of a conversation and the duration was generally of 1 hour, although occasionally, when the participants felt comfortable enough to talk on other points that they would have liked to raise, the interview took as long as 2 hours. It has been observed that most of the teachers who participated in the interview were working in isolation and this interview was

an occasion for them to voice their concerns related to the school structure and educational set-ups. In order to facilitate the data generation and the course of the interview, the meeting was audio recorded, subject to the respondent's consent.

The teachers participating in the interviews were invited to participate in a focus group discussion. The invitation to the focus group discussion was expressed with the same teachers who participated in the interviews in order to build up familiarity and facilitate more active participation in the focus group. This allowed a more profound discussion of points mentioned during their interviews and to cross-refer the interlocutors' position on the issues raised. Eleven participants agreed to take part in the focus group discussion. Two Focus groups were held independently, one with 6 and the other with 5 participants, and myself as the discussion moderator. The participants agreed that audio-visual recordings of the Focus Groups could be taken, for ease of reference and to transcribe the discussions. Each focus group discussion took approximately 2 hours.

All the focus group participants were relatively young graduated geography teachers with the maximum number of years of teaching experience of about 10 years; some of whom have a Masters degree in geography or in related areas of research. Extracts from literature were prepared before the meetings and read to the participants as a means to help them focus on the theme of the discussion: 'Understanding Geography Education' and 'The Curriculum' to address the objectives of the focus groups. However, the discussion occasionally drifted towards limitations in the system they are operating in that were repeatedly referred to in the interviews. This reflects the teachers' concerns and frustration that their role as educators is often hindered by situations beyond their control creating education barriers to the learners in their care.

Data Analysis

All the teachers participating in the interviews expressed independently their concern about the educational barriers they and their students have to address. They referred particularly to the dilemma regarding the language of instruction, the heavy loaded syllabus and the examination oriented system.

As evident from the response provided in the survey, illustrated in Figure 1, most teachers prefer to use English as the language of instruction, mainly because they are used to the technical terms in English. However, as reported in the graph, it is obvious that for the teachers the language issue is not a matter of personal preference but a matter of the students' access to education. Most of the teachers feel they should consider the best practices to accommodate the students' needs. One teacher wrote: *"Language should not be a barrier for this subject".*

From the interviews and the focus groups it was possible to have a more indepth consideration of the teachers' position. Various arguments were expressed in favour

and against the change in policy, each pointing out aspects for the best interest of the students.

Most of the teachers who participated in the interviews and the focus groups discussions commented that the decision related to the choice of language of instruction puts them in a moral dilemma since the change in policy took place in a period when the classes were becoming more heterogeneous creating an educational barrier to the increasing non-Maltese speaking learners. Teachers ask whether they should follow the policy and instructions provided by the administration or focus on the individual needs of the students. Whether they should take into account the needs of the majority or try to accomodate even the few in class who have a language barrier. Some teachers explained that before shifting to Maltese as the language of instruction they used to deliver the explanation in Maltese but any notes or reading was done in English. Through this strategy they used to accommodate both those who were more confident in Maltese and those who could not understand Maltese. The National Minimum Curriculum and the National Curriculum Framework stress the importance of flexibility and teacher autonomy (COE, 2014), but now that Maltese is officially the language of instruction in most schools even the notes and the readings are in Maltese. Teachers feel that even due to time limitations they cannot be flexible to choose the language of instruction they feel is more suitable for their students because they are bound with a policy that on paper allows for flexibility but in practice turns out to be complicated. Most participating teachers were concerned that due to this policy non-Maltese learners would be facing another education barrier. Some were ready to accomodate the students by providing notes in English, and code switching during the lesson.

Nevertheless, few teachers participating in the interviews and focus groups agreed with the change in policy even because they find it difficult to teach geography in Maltese, since they were used to the technical terms in English. Nevertheless they feel that this change eliminated the language barrier to the Maltese students who struggle in English. These teachers noted that they had students who knew the geographical content but were not able to express themselves in English and hence they prefer Maltese especially for examination purposes. Yet, other teachers explained that even Maltese students who prefer the lessons in Maltese have difficulty to learn the technical terms in Maltese as this is not part of their everyday language, whereas they might already be familiar with the terms in English as for example 'waterfall', as this is the term used in every-day communication. It was also pointed out that students would have already been exposed to certain technical terms in English through other subjects such as General Science; for example 'the hydrological cycle' or aspects related to ecological systems. Others argue that it is actually because Maltese students find English difficult because they are not familiar to it, that geography should be taught in English, as geography would indirectly expose these students to the English language. This would be another means to

improve the level of English among Maltese students, which has been described as 'of great concern' by the MATSEC examination board [2].

In view of these comments, one has to evaluate whether the shift to the Maltese language, with the use of archaic words as technical terms is actually eliminating or creating a language barrier to the Maltese students themselves.
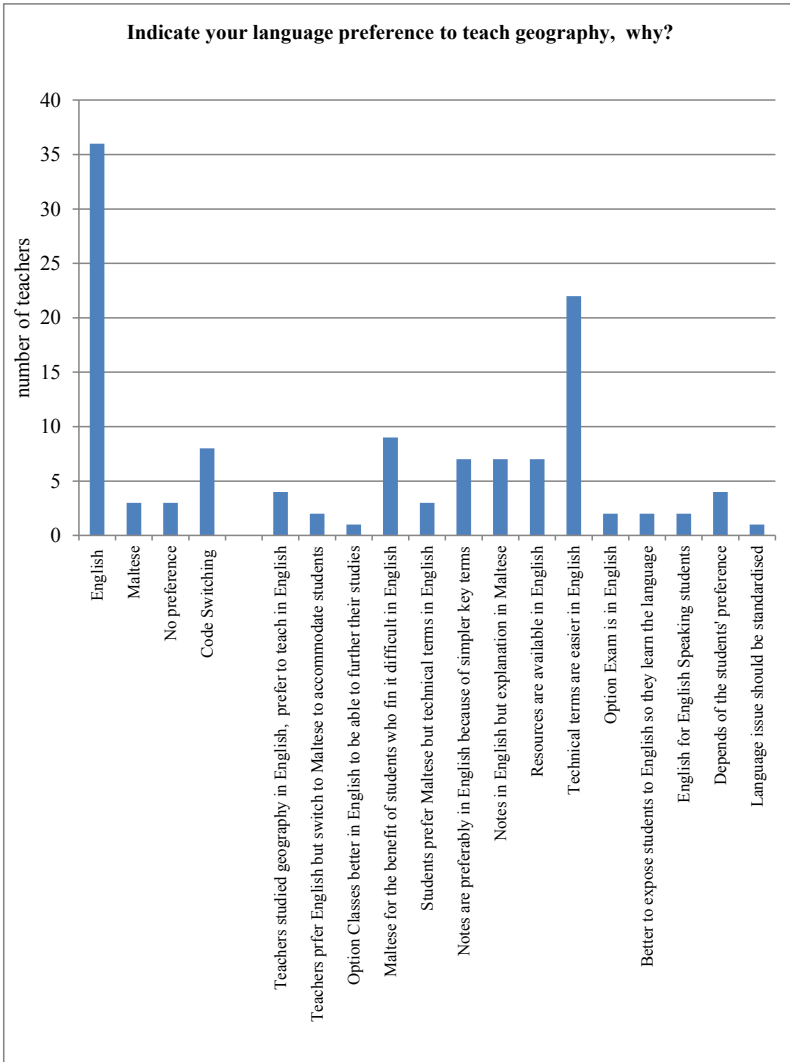

Figure 1. The teachers' language preference to teach geography.

Conclusions

The teachers' positions vary depending on the various context they are experiencing in different schools. The teachers in favour of the shift to Maltese are those who teach students who suffer with English as the language of instruction and hence want to eliminate the barrier for the Maltese students. However the teachers who are used to teach the subject to students who have no difficulty with English, find that this change has created a language barrier to the 'non-Maltese' learners. When considering both positions, the creation and elimination of an educational barrier is the main concern of the teachers. Notwithstanding the different positions, the fulcrum of the discourse is how to use the language of instruction to make it easier for the students to engage with geography and benefit from its broader educational value; yet the lack of flexibility imposed by the system is restricting the teachers' professional decisions.

Moreover, from the interviews and the focus group discussions, it turned out that most of the teachers do their utmost to accommodate the students of non-Maltese origin even if they admit that this leads to extra work for them. Most of the teachers are ready to prepare notes and worksheets in both Maltese and English and to code-switch between the two languages in the lesson to involve all students in class. In case of language barriers, they even try to explain with the use of images and sign language. It was evident from the interviews that teachers work more comfortably and are more willing to accommodate the students when their initiatives are appreciated by the school administration and the students themselves.

Throughout the interviews and Focus Group discussion, whilst talking about teaching strategies and contexts it becomes increasingly evident that the participating teachers' understanding of their role as educators does not stop at delivering the subject content. They negotiate through their conditions of work to accomodate the most vulnerable students; whether Maltese students with a problematic social background, or Maltese students who have diffficulty to cope in class with the use of English as the language of instruction, or non-Maltese learners who have language barriers or difficulties to adjust to the new system, notwithstanding their helplessness about the lack of flexibility determined by a centralised system, which they feel creates barriers and undermines their professionalism and the students' educational paths.

References

Borg Axisa, G., (2018), *Intercultural Education through School Geography in Malta*, Unpublished PhD Thesis, University College London, UK.

Camilleri, C. & Falzon, N., (2014). *A Way Forward for a National Integration Policy in Malta*, Malta: ADITUS.

Camilleri-Grima, A., (2000). *CARAP/FREPA - A Framework of Reference for Pluralistic Approaches,* s.l.: European Centre for Modern Languages Publications.

Council of Europe, (2014). *Language in Education Policy Profile, Country Report,* Malta: Ministry for Education and Employment.

Council of Europe, (2015). *Language Education Policy Profile,* Strasbourg: COE.

Research Centre on Mutilingualism at the KU Brussel, (2004). *Euromosaic III,* Brussels: Katholieke Universiteit.

Ministry For Education and Employment, (2012). *A National Curriculum Framework for All 2012,* Malta: MEDE.

Ministry For Education, (1999). *Creating the Future Together, National Minimum Curriculum,* Malta: Ministry for Education.

National Statistics Office, (2017). *Trends in Malta, 2016,* Malta: NSO.

Bio-note

Dr Glorianne Borg Axisa was awarded a B.A. (Hons) from the University of Malta, and holds a Post Graduate Certificate in Education and a Masters Degree in Geography (Melit). She completed her doctoral studies at the Institute of Education, University of London, in Intercultural Education and Geography Education. She is Subject Coordinator for Geography, History and Music at the University of Malta, Junior College and lectures Geography at the University of Malta, Junior College and Geography Education at the Faculty of Education, University of Malta. She contributed to the Learning Outcomes Framework at the Ministry for Education and Employment as a Local Curriculum Expert. Glorianne Borg Axisa is a founder member and currently president of MAPSSS (Maltese Association of Parents of State School Students). She has published a number of papers in international fora; her research interests include Landscape Ecology, Geography Education, Global Education and Intercultural Education.

La dimensione infantile e quella adulta: tra complicità, rivalità e interdipendenza
Between Childhood and Adulthood: Empathy, Rivalry or Interdependence?

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Abstract

Childhood and adulthood have always been perceived as rivals, two parallel paths that can never be intertwined. Yet Freud explains that they are interdependent because the child looks at the adult as the point of arrival; at the same time, every grown up experiences moments when he secretly wishes to return to childhood, the age of innocence and free spirit. We consider the child to be a passive agent as there is total dependence on the adult and society; each child longs for freedom and independence, yet as we grow older, life becomes more complex and the "real world" tends to be too overwhelming. This explains why adults sometimes suffer from the Peter Pan syndrome by "refusing" to grow up. At the same time we think of Pinocchio, forced to imitate adulthood and experience the hardships endured by grown-ups.

This paper aims to create a mirror-like effect forcing child and adult to look at each other and discover what they have in common and what sets them apart. The two seem to break the barriers between them in literature, a medium through which the adult comes to terms with his childhood experiences. In fact, Philippe Lejeune considers autobiography an approach of introspection through which the author processes his past life in a readable form. As Coe explains, the adult author reproduces the words uttered by the child (no longer perceived as a passive agent) and convinces the reader that even he has something to say.

As childhood is perceived as a lost paradise, the adult seeks solace in a world of fantasy such as Disneyland where dreams come true because it promises happy endings for children and adults alike. In such a context, we must seek to remove the obstacles hoping that childhood and adulthood might move towards a fuller understanding of each other.

Parole chiave: infanzia, Freud, psicanalisi, autobiografia, sindrome di Peter Pan

I bambini non camminano: balzano, corrono, danzano, piroettano. I bambini non parlano: gridano, schiamazzano, cantano filastrocche senza senso, ridono per un nonnulla fino al singhiozzo. E poi litigano e fanno subito la pace, intrecciano amicizie appassionatamente intense e le infrangono dopo cinque minuti. Ogni cosa li attrae, ogni oggetto colorato li conquista; vanno pazzi per i piccoli animali, li torturano e li vezzeggiano con rattenuta violenza. I bambini non pensano: giocano con le immagini della loro fantasia con limpida logica, con spietato razionalismo: logica e razionalismo infantili. [...]

Gli adulti, che hanno ormai perduto anche il ricordo di quella stagione favolosa di voli e di immaginazione, guardano, si commuovono, si divertono al gioco dei contrasti, delle personificazioni, agli accostamenti ingenui di ricordi e di idee che fanno i bambini, quasi gli abitanti di un mondo diverso (Lugli, 1982).

Inizio questo mio studio con una citazione di Antonio Lugli per sostenere che il periodo dell'infanzia rimane un universo avvincente per l'adulto, attratto dalla voglia di scoprire le sue radici, quindi se stesso. L'infanzia rappresenta meandri labirintici in cui l'adulto si perde, ed è per questo che lo affascina e ossessiona. Spesso, l'adulto considera l'infanzia come un pianeta a se stante, alieno, dimenticando che, fino ad alcuni anni prima, apparteneva a questa fascia d'età: "È un po' come se crescendo si bevesse l'acqua del Lete, tutti si dimenticano di quanto è stato difficile e doloroso attraversare la propria infanzia" (Gaglianone, 1996, p.12). Franco Cambi associa l'infanzia a un labirinto in cui si entra seguendo piste contraddittorie, intrecciandosi nel groviglio di esperienze reali e possibili, senza la certezza di uscirne e superarla visto che spesso continua ad ossessionare l'adulto. Non è un percorso lineare in quanto si affrontano traumi, ben lontani dall'idea tradizionale di infanzia spensierata e innocente. Essa si vela di misteri che l'adulto tenta inutilmente di capire: "i bimbi sono naturalmente buoni e misteriosamente cattivi: singolari, interessanti, attraenti piccoli tipi, in cui l'umanità assume le sue forme più leggiadre e più bizzarre" (Serao, 1883). Si tratta di un momento unico, passa in fretta perché si sogna di crescere, ma quando si diventa adulti si guarda con nostalgia verso questa fascia d'età che diventa un'oasi in cui rifugiarsi. Potrebbe apparire superiore in quanto si trova sempre fuori presa, sconvolgendo la logica adulta con la rapidità dei suoi spostamenti.

In questo studio vorrei mettere in risalto queste realtà rivali e contrastanti, che non sempre trovano un mezzo per abbattere gli ostacoli e riconciliarsi, se non nel medium letterario. La letteratura ha sempre presentato questo gioco di specchi rivali tra adulto e bambino perché per l'adulto, diventa quasi obbligatorio il bisogno di confrontarsi con questa fascia d'età, quando ricorda la propria infanzia, come conferma Sartre:

è l'infanzia che dà forma a pregiudizi insuperabili e fa provare, nelle violenze dell'addestramento e nello smarrimento dell'animale ammaestrato, l'appartenenza all'ambiente *come un avvenimento singolare*. Solo la psicanalisi oggi consente di studiare a fondo l'itinerario per cui un bambino nel buio, a tentoni, tenta di recitare senza capirlo il personaggio sociale che gli adulti gl'impongono, essa sola ci può rivelare se egli soffoca nella sua parte, se cerca di evaderne o se le si assimila interamente. Essa sola permette di ritrovare l'uomo interno nell'adulto, ossia non soltanto le sue determinazioni presenti ma anche il peso della sua storia (1976, p.125).

È interessante il quesito che si fa Paolo Valeri: "come il bambino è contenuto nell'uomo e come l'uomo è nel bambino? Vi è più bambino nell'uomo che uomo nel bambino" (1997, p.152). Eppure molte volte l'adulto dimentica di essere stato bambino perché, a quell'età, contava solo la fretta di crescere. Il rapporto adulto-bambino si basa sull'interdipendenza ma rimane ambiguo, vittima delle differenze che esistono tra le due fasce d'età. Eppure non si può pensare ad un bambino senza tenere in mente l'adulto, come è impossibile capire un adulto se prima non si comprende il bambino che è stato (Jenks, 1982, p.10). Ciò potrebbe considerarsi un paradosso, anche perché il bambino assume una connotazione negativa, definito da quel che ancora non è e che un giorno diventerà grazie al processo di socializzazione che lo trasformerà in un adulto (Alanen, 1988, p.56). Tale argomentazione purtroppo ritrae i bambini come agenti passivi, vittime di influenze esterne alle quali è impossibile sottrarsi. Molto dipende dall'adulto in quanto il bambino non è ancora autosufficiente, quindi è l'adulto che determina l'esito della fase infantile. L'infanzia diventa un'età morta paradossalmente sempreverde, "ad un tempo un 'grembo' e una 'bara' per l'io" (Cambi, 1985, p.21), un'età contraddittoria e complessa. Quando si nasce si inizia già a morire, quindi ci si aggrappa agli anni migliori della vita, perché senza la forza interiore che ci dà il ricordo dell'infanzia, la vita diventerebbe unicamente un cammino verso la morte.

In passato, lo studio dell'infanzia era ritenuto un processo in evoluzione di un piccolo essere che si avviava verso la vita adulta; pochi s'interessavano a questo processo in sé in quanto ciò che contava era il punto d'arrivo (Borg Farrugia, 2015, p.338). Solo nel Novecento, particolarmente dopo le teorie di Freud, gli studiosi iniziarono a distinguere il bambino dall'adulto, analizzando i due mondi separatamente pur essendo interconnessi. In passato si associavano le esperienze più dure della vita alla fase adulta, pensando che l'infanzia fosse un periodo di gioco e spensieratezza. Ma tanti studi meticolosi, tra cui quelli di Darwin che registrava ogni dettaglio sul figlio William Erasmus pubblicando *Mind* nel 1877, mostrarono che non era sempre così. A questa iniziativa ne seguirono altre, tra cui gli studi di Piaget e Chomsky nel tentativo di capire il processo della crescita.

Questo è interessante se si considera che in epoca classica i bimbi erano considerati figure insignificanti, tanto che Aristotele li definisce esseri umani che non si sono ancora sviluppati (Pattison, 1994, p.5). Nelle *Confessioni* di Sant'Agostino, l'infanzia è caratterizzata da debolezza fisica e disposizioni al vizio, una sineddoche della natura umana peccaminosa:

> avevo voglia di manifestare i miei desideri a chi avrebbe potuto soddisfarli, ma non mi riusciva perché i desideri erano dentro di me, le persone invece erano al di fuori di me, e in nessun modo esse avrebbero potuto penetrare nel mio animo. E così mi dimenavo e strillavo, indicando in qualche modo quei miei desideri, così come potevo, cioè in maniera inadeguata. Se poi non ero ascoltato, o perché non mi si capiva o perché ciò che chiedevo mi sarebbe stato di danno, mi sdegnavo con i più grandi di me che non mi obbedivano e non mi servivano, e mi vendicavo piangendo. Così sono i bambini, e l'ho imparato conoscendoli [...]. Dunque i bambini non sono innocenti nell'anima; lo sono, semmai, in quanto sono ancora in formazione. Ho visto e considerato bene un bambino che soffriva di gelosia: non parlava ancora, e già guardava, pallido e accigliato, un altro lattante. (1987, pp.39, 42)

Anni dopo, Ida Baccini echeggia: "i bambini non sono altro che piccoli uomini ed hanno per conseguenza, in proporzione relativa, tutta la somma dei vizi e delle virtù dei grandi" (1885, p.13).

A tale affermazione risponde con urlo di protesta Collodi sostenendo che nelle opere di Malot, Thouar, Baccini, il bambino non c'è: questi autori offuscano il bambino, lo mettono in penombra perché la loro opera è proiettata verso l'adulto in miniatura anziché il bambino. Invece Collodi fa il passo inverso: anche se adulto, si sente un bambino mai cresciuto e cerca di proiettare l'immagine infantile che ogni individuo ha dentro di sé. Già nel *Giannettino*, Collodi presenta se stesso, non solo bambino ma anche adulto, come un alunno pigro che odia la disciplina e trascura gli studi. E in *Pinocchio* crea quell'immagine di infanzia monella con un'infinità di buoni propositi per cambiare in meglio e il percorso difficile per diventare un ragazzo per bene. C'è un processo di colpa – pentimento – punizione che inizia sempre da capo creando un circo vizioso nonostante che, alla fine, lo spirito ribelle e anarchico dovrà cedere alle regole sociali, studiare e rispettare la famiglia.

In qualsiasi adulto c'è un istinto naturale di comportarsi da bambino e provare la stessa gioia e l'energia associata all'infanzia. Allo stesso tempo, ci si vergogna di questo, forse per paura che gli altri non ci rispettino più, anche se poi ci si chiede

> perché me ne dovrei vergognare? Gli uomini non sono che ragazzi invecchiati, che nascondono la loro fanciullaggine sotto un'apparenza di gravità, e che ogni qualvolta possono, di nascosto, ci si abbandonano con un piacere infinito (De Amicis, 1968, p.86).

In fondo, lo scrittore che rappresenta l'infanzia nelle sue opere letterarie non fa altro che cercare dentro il bambino che c'è in lui le risposte ai quesiti adulti. Effettivamente il bambino appartiene alla categoria dei "senza voce"; per lui parla l'adulto, dalle sue memorie, interpretando lo statuto di silenzio dell'infanzia. Vediamo il bambino che lotta per far arrivare la sua voce nell'universo adulto anche perché, come sostiene Vamba, i due mondi non sono poi così lontani: "Ho pensato, bambini, di farvi vedere molte cose grandi negli esseri piccoli. Più tardi, nel mondo, vedrete molte cose piccole nei grandi" (Bargellini, 1952, p.234). Gli scrittori ritengono fondamentale vivere con il bambino, ascoltare la sua voce, la sua storia, le sue emozioni, i suoi dolori.

Molti studiosi sostengono che la memoria dell'infanzia segnala i conflitti non risolti dell'adulto tanto che Freud studia questi ricordi incompleti e deformati, considerandoli degni di attenzione. Il conflitto tra il labirinto dell'inconscio nell'interpretazione psicanalitica e il paradiso dell'infanzia si risolve tramite l'autobiografia dove si stabiliscono dei legami tra il sé bambino e il personaggio inventato e filtrato dalle circostanze dell'autore. Secondo Philippe Lejeune, l'autobiografia diventa il racconto retrospettivo che un individuo reale fa della propria esistenza, quando mette l'accento sulla sua vita individuale, in particolare sulla storia della propria personalità (1986, p.12). La ricostruzione dell'io bambino spesso serve per capire e costruire l'io adulto, nell'illusione di prendere coscienza di sé. L'autobiografia è un atto di svelamento di se stessi, un'analisi critica del "self" che nella narrativa cerca il legame tra il "self" e il nostro senso degli altri (Pagliano, 2000, p.122). Tutto si concentra sul processo di scrittura che permea la memoria, scegliendo di porre l'attenzione su un avvenimento anziché un altro, di scartare quel che l'io adulto reputa banale con la scusa che il ricordo è scivoloso, tanto che il racconto autobiografico difficilmente può essere del tutto oggettivo.

Studiando l'autobiografia infantile, Coe spiega che l'adulto vuol rappresentare le parole dei bambini, e il ruolo dello scrittore è quello di convincere il lettore che anche il bambino ha qualcosa da dire. Quindi, il dilemma di un autore che rappresenta l'infanzia è quello di adoperare un linguaggio che sia genuinamente mimetico e rappresentativo del mondo minorile. Su quanto l'autobiografia sia un esercizio di autoanalisi si sofferma Freud in *Ricordi di copertura* (1899) dove presenta i ricordi come un gioco di specchi che modificano la realtà dell'infanzia vista, non più con occhi da bambino, ma dalla prospettiva adulta:

> Forse va perfino messo in dubbio se abbiamo ricordi coscienti provenienti *dall'*infanzia o non piuttosto ricordi costruiti *sull'*infanzia. I nostri ricordi infantili ci mostrano i primi anni di vita non come essi sono stati, ma come ci sono apparsi più tardi, in un'epoca di risveglio della memoria. In tale epoca i nostri ricordi infantili non *emergono*, come si è soliti dire, ma si *formano*, e una serie di motivi estranei al benché minimo proposti di fedeltà storica contribuisce a influenzare tanto la loro formazione, quanto la loro selezione. (1968, pp.452-453)

Va detto che il rapporto tra opera e vita dell'autore non nasce con Freud ma è lui che ne fa oggetto di studi, considerando la letteratura come terapia, "talking cure", in quanto l'autore scrive dando libero sfogo ai sentimenti o agli impulsi più nascosti per liberarsi tramite la parola (Stara, 2001, p.26). Questo processo rivela la complessità della narrazione autobiografica, nella sua altalena temporale tra passato e presente:

> Narrative, we have seen, must ever present itself as a repetition of events that have already happened, and within this postulate of a generalized repetition it must make use of specific, perceptible repetitions in order to create plot, that is, to show us a significant interconnection of events. An event gains meaning by its repetition, which is both the recall of an earlier moment and a variation of it: the concept of repetition hovers ambiguously between the idea of reproduction and that of change, forward and backward movement [...]. (Brooks, 1984, p.100)

Nella sua conferenza *Il poeta e la fantasia*, Freud mostra che lo scrittore trae godimento dall'attività fantastica come il bambino dal gioco e quando il gioco non soddisfa abbastanza il bambino, non rimane altra scelta tranne la fuga dalla realtà. In *Totem e tabù*, Freud rileva che quest'illusione artistica mira all'appagamento dei desideri più nascosti mentre Jung è dell'opinione che questa analisi psicanalitica è importante ma non è la quintessenza dell'arte letteraria. Anche se importante, l'interpretazione psicanalitica non può sostituire l'arte perché è solo un'interpretazione, visto che l'opera letteraria va analizzata soprattutto dal punto di vista estetico. Jung definisce l'adulto che fantastica una vita diversa, nella forma di un bambino, come il "puer aeternus" (Wickes, 1948, p.130); viviamo in un'epoca dove quel che è vecchio lo buttiamo e allora si vuol tornare fanciulli ad assumere un atteggiamento incredulo di fronte alle cose non percepibili tramite i sensi. Talvolta, l'adulto che fantastica ha paura di diventare grande e soffre di quel che definiamo sindrome di Peter Pan.

Lo stesso Barrie, autore dell'opera che suscitò tante polemiche, immaginava di essere Peter, il bambino che combatteva i pirati e il Coccodrillo, che saliva sugli alberi affinché nessuno lo catturasse. Capiva che la vita infantile non poteva prolungarsi all'infinito; si rendeva conto che avrebbe dovuto assumersi delle responsabilità e la sensazione della perdita dell'infanzia non era piacevole, lasciava un senso di smarrimento nei confronti della vita che di colpo si appannò dei problemi degli adulti. Infatti scrisse, "The horror of my boyhood was that I knew a time would come when I also must give up the games, and how it was to be done I saw not. [...] I felt that I must continue playing in secret" (1957, p.4). Peter Pan arriva agli inizi del Novecento con un'idea rivoluzionaria: un bambino che rifiuta di crescere. L'opera presenta un paradosso perché in realtà nessun bambino vuol rimanere piccolo, anzi, fa di tutto per sembrare grande. È l'adulto che sogna disperatamente di tornare indietro allo stato allegro e innocente, e Barrie presenta questa verità lampante di

un adulto stanco e disilluso, prigioniero della malinconia, dotato di un'ironia che un bambino, a cui l'opera sembra destinata, difficilmente riesce a capire. Se si rimane troppo attaccati alla dimensione fantasica, si finisce come Peter Pan, imprigionati nel mondo incantato della fanciullezza senza evolversi. L'individuo deve crescere per forza, diventare adulto, ma allo stesso tempo non deve dimenticare il bambino che giace dentro di sé.

In un suo studio, Bargellini tenta un confronto tra Pinocchio, il burattino diventato ragazzo e Peter Pan, entrambi simboli dell'infanzia. Nel caso di Pinocchio, è forte la volontà di diventare uomo per non essere più burattino di legno mentre Peter Pan vuol restare bambino e fuggire eternamente l'età adulta: "Un burattino che vuole mutarsi in uomo; un bambino che si vuole tener fuori della vita umana. La concezione dei due libri non è solo diversa, ma antagonistica" (1942, p.94). Mentre Peter Pan fa in modo di evitare la realtà e scappa dal mondo, Pinocchio le va incontro facendo esperienza di tutte le fatiche quotidiane.

Oggi più che mai l'adulto ha bisogno di rifugiarsi in questo mondo immaginario della fantasia e dell'avventura, come testimonia la popolarità dei cartoni animati, le fiabe e i fumetti, letti anche dagli adulti perché il loro valore trasversale va oltre la fascia d'età (Carosella, 2010). All'infanzia, la fuga nell'immaginario serve affinché il bimbo prenda coscienza di sé e del mondo, lo aiuta a allargare i confini della sua esistenza e abbracciare giorno dopo giorno il mondo. Secondo Corman,

> a causa della sua infanzia protetta il bambino piccolissimo vive in un mondo incantato dove i suoi desideri vengono soddisfatti non appena formulati. [...] per aquisire la maturità il bambino deve passare dal regno del principio di piacere a quello del principio di realtà. Vale a dire che una parte dei suoi desideri dovrà essere frustrata. (1975, p.35)

Si parte dalla realtà immediata, le esperienze vissute che fanno scattare la fantasia il cui scopo è modificarle e colorarle. Per il bambino, l'adulto è l'eroe da imitare, specialmente durante i giochi, l'universo adulto diventa "una terra promessa" (Lugli, 1963, p.21); allo stesso tempo, l'adulto si rende conto che il mondo infantile è ormai lontano e non tornerà, e acquista il valore di "un Paradiso perduto" (Ibid.)

Questo spiega perché l'adulto ha avuto la necessità di creare l'atmosfera di gioco a Disneyland, luogo magico che presenta in fondo al parco l'attrazione più amata: "It's a small world". Qui le teorie di globalizzazione dell'infanzia sono messe in atto in quanto i bimbi di tutto il mondo sono rappresentati da pupazzi sorridenti che si tengono per mano invitando l'adulto a far parte del mondo infantile. La canzoncina diventa un inno che celebra l'infanzia in un'atmosfera di gioia stereotipata che associamo a questa fascia d'età. In tale mondo di fiaba, l'uomo dimentica la sua condizione di adulto, gioca con i folletti, si mette il costume di Pippo Pluto, mangia enormi leccalecca, canta e balla con i bimbi trasferendosi con l'immaginazione nel moderno paese dei balocchi. Tali illusioni sono volutamente pensate a trascinarci

lontani dalla realtà, non si prova altro che il delirio dell'avventura, la rincorsa alle giostre senza renderci conto di essere pupazzi nelle mani di chi ha ideato il parco e che ogni nostra emozione segue un criterio prestabilito. Alla base di questa filosofia rimane il modello forzato del bambino "perbene", tanto che a Disneyland si celebra il lieto fine con bimbi smarriti che tornano felici a casa dalla famiglia (Wendy, Pinocchio, Alice) o altri che trovano l'amore iniziando a loro volta una famigliola (Bianca Neve, la Bella Addormentata, Cenerentola) (Hunt – Frankenberg, 2008, p.119).

Inevitabilmente, ormai si guarda l'infanzia con una prospettiva del ventunesimo secolo, con implicazioni educative, etiche e culturali, e l'adulto continua a corteggiare quel periodo di vita unico ma allo stesso tempo comune:

> L'infanzia è ad un tempo ciò che noi abbiamo di più personale e di più universale, di più infossato nelle profondità dell'essere, eppure, in potenza, di più comunicabile [...]. L'infanzia vissuta e ripensata è, al tempo stesso, conoscenza e nascita al mondo, chiave del destino e fonte di gioia e di estasi (Bosetti, 2004).

Nel mondo occidentale odierno, questa fascia di età domina l'agenda politica, sociale e accademica, forse perché la popolazione si fa sempre più anziana e l'infanzia diventa più "scarsa". Si nota che i bambini sono diventati attori sociali che non solo subiscono gli effetti delle circostanze, ma arrivano alla loro trasformazione, perché al centro di numerosi progetti che aspirano a tutelargli lo sviluppo e a promuovere la loro intelligenza, educazione e stabilità emotiva. Finalmente emerge l'infanzia con la sua forza prorompente, impegnata ad affermare la sua identità rispetto ad un mondo "adulto" che pone pregiudizi e barriere. Malgrado i tentativi di cercare di avvicinare questi due mondi intersecati, molti studiosi continuano a vederli come due fasce di vita contrastanti pur essendo interdipendenti, e la letteratura cerca, spesso senza riuscirci, di abbattere muri insormontabili per tessere un nesso dove le barriere tra le due fasce d'età non contano più.

References:

Alanen, L. (1988). Rethinking Childhood. *Acta Sociologica*. **31**(1), 53-67.

Baccini, I. (1885). *Quarte letture per le classi elementari maschili*. Firenze: Paggi.

Bargellini, P. (1952). *Tre toscani: Collodi, Fucini, Vamba*. Firenze: Vallecchi.

Bargellini, P. (1942). *La verità di Pinocchio.* Brescia: Morcelliana.

Barrie, J. M. (1957). *When Wendy grew up. An afterthought*. Blow S. (a c. di), Londra: Nelson.

Borg Farrugia, C. (2015). *La rappresentazione dell'infanzia nella narrativa italiana del secondo Ottocento*. Tesi a livello di dottorato presentata alla Facoltà di Lettere dell'Università di Malta.

Bosetti, G. (2004). *Il divino fanciullo e il poeta. Culto e poetiche dell'infanzia nel romanzo italiano del XX secolo*. Donati, C. (a c. di), Pesaro: Metauro.

Brooks, P. (1984). *Reading for the plot. Design and Intention in Narrative*. Oxford: Clarendon Press.

Cambi, F. (1985). *Collodi, De Amicis, Rodari. Tre immagini d'infanzia*. Bari: Dedalo.

Carosella, M. (2010). *Tra il colpo della strega e la sindrome di Peter Pan: fate, streghe e folletti nel linguaggio quotidiano*, in Brincat G. (a c. di), *Il lessico comune nella formazione degli antroponimi e dei toponimi. Malta, 28 – 29 luglio 2010.*

Corman, L. (1975). *L'educazione illuminata dalla psicoanalisi*. Roma: Astrolabia.

Corsi, A., Forli, C. e Valeri, M. (1997). *Infanzia narrata*. Ferrara: Corso.

De Amicis, E. (1968). *Ricordi d'infanzia e di scuola. La vita militare*. Cornacchia, G.A. (a c. di), Firenze: Sansoni.

De Nunzio Schilardi, W., Neiger, A. e Pagliano, G. (a c. di) (2000). *Tracce d'infanzia nella letteratura italiana fra Ottocento e Novecento*. Napoli: Liguori.

Freud, S. (1968). *Opere complete*, vol. VII. Torino: Boringhieri.

Gaglianone, P. (a c. di) (1996). *Il respiro quieto. Conversazioni con Susanna Tamaro*. Roma: Omicron.

Hunt, P. e Frankenberg, R. (2008). *It's a small world: Disneyland, the Family and the Multiple re-representations of American childhood*. In James, A. e Prout, A. (a c. di). *Constructing and Reconstructing childhood. Contemporary issues in the sociological study of childhood.* Londra e New York: Routledge Falmer.

Jenks, C. (1982), *The Sociology of Childhood. Essential Readings*. Londra: Batsford.

Lejeune, P. (1986). *Il patto autobiografico*. Bologna: Il Mulino.

Lugli, A. (1982). *Libri e figure. Storia della letteratura per l'infanzia e per la gioventù.* Bologna: Nuova Universale Cappelli.

Lugli, A. (1963). *Storia della letteratura per l'infanzia*. Firenze: Sansoni.

Pattison, R. (1967). *The Child Figure in English Literature*. Atene: University of Georgia Press. In Goodenough, E., Heberle, M.A. e Sokoloff, N. (a c. di) (1994). *Infant Tongues. The Voice of the Child in Literature*. Detroit: Wayne University Press.

Sant'Agostino D'Ippona, (1987). *Le Confessioni*, Landi, A. (a c. di). Milano: Edizioni Paoline.

Sartre, J. P. (1976). *Questioni di metodo*. Milano: Il Saggiatore.

Serao, M. (2010). *Piccole anime* (1883), Napoli: Avagliano.

Stara, A. (2001). *Letteratura e psicoanalisi*. Bari: Laterza.

Wickes, F. G. (1948). *Il mondo psichico dell'infanzia*. Roma: Astrolabio.

Bio-note

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An Educational Path on Optical Spectroscopy as a Bridge from Classical to Modern Physics to Overcome Conceptual Knots

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Abstract

Optical spectroscopy is a conceptual referent linking classical and modern physics which provides experiments on the atomic structure and light-matter interaction. Its disciplinary relevance, as well as its importance on the cultural and social levels is widely recognized but few efforts have been made to integrate those aspects in education. Our Physics Education Research Unit from Udine University (Italy) designed an educational method on optical spectroscopy for secondary school students to directly involve them in experimental and interpretative tasks which allow them to highlight the link between energy level in atoms and luminous emission. In the theoretical framework of the Model of Educational Reconstruction, the educational approach involves an analysis of the main conceptual knots on the basis of a significant - if not vast - literature concerning the interpretation of optical spectra. By means of design-based research methods, we designed several intervention modules in which interpretative issues related to the analysis of simple optical spectra from different sources are highlighted using inquiry-based learning strategies. Learning outcomes were monitored by means of empirical research using pre/post-tests and tutorials.

Keywords: Physics education research, optical spectroscopy, educational reconstruction, design-based research

Introduction and Research Perspective

Nowadays modern physics is recognized as indispensable in all European secondary school curricula, but there are still problems concerning which strategies to be employed (Michelini et al., 2014). Optical spectroscopy is a context that provides an experimental basis for the atomic structure of matter and modern quantum theory. Moreover it provides a significant methodological example of how physics makes use of indirect measures of energy in order to obtain information and validate models. Focused experimental activities that can be carried out with simple and

cheap spectroscopes allow us to highlight the link between atomic energy levels and corresponding luminous emissions.

The Physics Education Research Unit of Udine University is designing an educational path on optical spectroscopy for secondary school students, which directly involves them in experimental studies and interpretations related to microscopic phenomena involving light-matter interaction.

From a research perspective, the design of an educational path starts with the analysis of the known conceptual knots, and a study of Physics Education Research (PER) literature on optical spectroscopy, despite it not being very wide, has shown that the main learning difficulties concern the conceptual link between discrete emissions and energy levels in atoms and the experimental conditions under which a discrete spectrum rather than a continuous one can be observed. Secondary school and university students tend to associate the energy of a single emission line with the energy of a single energy level, rather than to the difference between couples of levels (Rebello et al., 1998; Zollman et al., 2002). In introductive astronomy courses, where spectroscopy plays a key role, difficulties emerge in describing the process of luminous emission from atoms (Bardar et al., 2006). The problem of the conceptual link between spectral emissions and energy levels has also emerged in studies conducted by university students (Korhasan & Wang, 2016; Ivanjek, 2012; Ivanjek et al., 2015).

The same research shows that students are not aware of the experimental conditions necessary to produce a spectrum. Other researches (Savall-Alemany et al., 2016) have also shown that secondary and tertiary level students, as well as secondary school teachers do not have a clear idea of the quantum model for atoms, nor of the quantum model for light, so they struggle to predict the way these models interact in emission and absorption processes. Evidence has emerged to prove the existence of spontaneous models concerning the formation of discrete spectra and of their links with the quantized structure of atoms. Those models have to be overcome in order to reach a scientific view of the topic (Gilbert et al., 1998).

In the theoretical framework of the Model of Educational Reconstruction (MER) (Duit et al., 2005; Duit et al., 2012) by means of Design-Based Research (DBR) methods (DBR Collective, 2003; Collins et al., 2004; Van der Akker et al., 2006; Anderson & Shattuck, 2012) the educational approach to optical spectroscopy necessitates a reconstruction of the contents from an educational point of view, an analysis of the main conceptual knots and the main interpretative problems that have emerged from the history of physics and the design of conceptual micro-steps, in which active learning strategies make it possible to overcome any conceptual knots.

An educational proposal for secondary school students on optical spectroscopy will be presented with the aim of overcoming the conceptual knots evidenced in literature with an organic path integrating experimental activities. The proposal has been put into practice in different contexts: masterclasses, CLOE (Conceptual Lab of Operative Exploration) and a summer school for gifted students. All experiments

occurred within the parameters establish by the IDIFO6 project[1] of the national project PLS (Progetto Lauree Scientifiche - Scientific Degree Project).

Learning outcomes and difficulties that resulted from the experiments will be discussed, in particular: i) which microscopic models spontaneously emerged; ii) the spontaneous ideas regarding the conceptual link between spectral lines and energy levels; iii) the operational difficulties.

The Educational Path

An educational approach concentrated on the common sense ideas of students as a necessary condition in order to activate the learning process (Viennot, 2003). We thus began the learning path with explorative activities and identifications of the different ways through which students correlate macroscopic observations (spectral emissions) and microscopic interpretations (matter energy structure). The first insight concerns the classification of optical phenomena in three big thematic areas: production, propagation and interaction of light with matter. An insight on the difference between refraction and transmission of light stimulates an analysis of the two points of view upon which those two apparently similar phenomena are viewed: while refraction is a macroscopic phenomenological description of the light path across the interface between two mediums with different indexes of refraction, a study of the transmission processes requires a deeper analysis, in particular from an energetic point of view. In our perspective, an energetic interpretation of the processes regarding the production of light and its interaction with matter becomes immediate: we thus choose to use energy, rather than wavelength or frequency as a conceptual referent for the interpretation of optical spectra. Recognize and classify light sources represent a valid context to reinforce the idea that production of light is an energetic process, in which light is recognized as an entity carrying energy, emitted as a result of an energetic transformation inside the source. Natural and
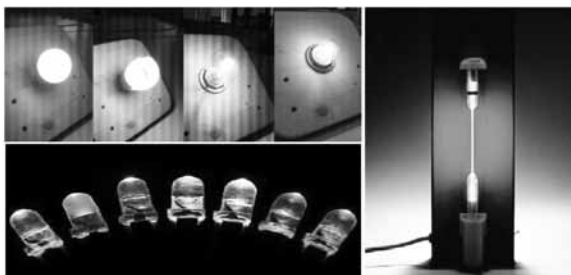

Figure 1. Different kinds of lamps are used in the path: incandescent, halogen, fluorescent, white and coloured LEDs, gas discharge.

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[1] http://www.fisica.uniud.it/URDF/laurea/idifo6.htm

artificial light sources are analyzed both from a structural and functional point of view (figure 1).

The presence of an energy exchange between a light emitting system and emitted light is at the basis of a first interpretation of the emission processes, in which the colour of the light is also analyzed, particularly in the specific case of an incandescent emission in which both the colour of the light and its intensity change with varying the power. The use of simple and cheap spectroscopes allows us to characterize a source according to the specific spectrum and continuous, discrete and band spectra can also be analyzed. The role of each spectroscope part is analyzed with the artefact method (Bartolini Bussi & Mariotti, 1999) in order to highlight each functional role of every spectroscope component (figure 2).

Figure 2. A simple spectroscope: the grating and slit are evidenced.

Monochromatic diffraction phenomena are experimentally analyzed with a digital acquisition of light intensity as a function of the position (Gervasio & Michelini, 2009) starting from single slit and ending with the analysis of the diffraction pattern produced by a grating. This analysis allows to assign to diffraction the role of a dispersive mechanism able to highlight the chromatic structure of light, as in the case of a prism (figure 3). In some experimentations, the analysis of the diffraction pattern took place with IBL strategy (Michelini & Stefanel, 2015).
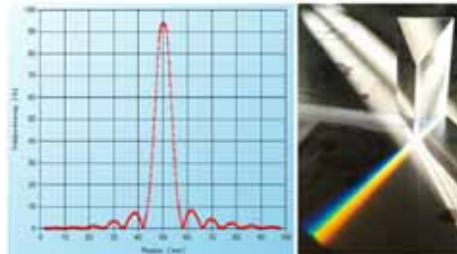

Figure 3. Different dispervive phenomena (diffraction, left and dispersion, right) are used to highlight the chromatic structure of light.

An analysis of the Balmer series for hydrogen is used to search for regularities in the observed spectrum (figure 4). Students are thus encouraged to think independently when reconstructing the historical development of ideas: the coefficients obtained by Balmer make it possible to read the experiment results in which the first four visible lines in the hydrogen spectrum can be obtained with the general empirical formula $\lambda_n = k \cdot \left(\frac{n^2}{n^2-4}\right)$ (Hindmarsh, 1967), that is can be modified to obtain a more general and interpretable reading, in terms of wave-numbers: $\frac{1}{\lambda_n} = k' \cdot \left(\frac{1}{4} - \frac{1}{n^2}\right)$, as Rydberg did (Hindmarsh, 1967).

Figure 4. The first four lines in the optical spectrum of hydrogen.

The reading in energy terms suggests how energy of a specific luminous emission is caused by an energy variation at a microscopic level in the emitting system. Using the energy level model, the key aspect of the negative binding energy can be addressed. The history of physics supporting the addressed concepts has an essential role here. The discrete nature of light is discussed interpreting Einstein's hypothesis for the photoelectric effect. The energy level model for atoms rather than the Bohr model - which makes use of orbits - guides students to face emission and absorption of radiation in terms of energy, which also allows students to make general reflections about light emissions from LEDs.

Context, Sample and Methodology

The path has been experimented with 208 students aged between 17 and 18 from scientific lyceums. There were three contexts in which the experiments were conducted:

- **Masterclass**: involved students participating in an 8-hour long activity at university. Classes are led by the teacher who follows the activity and coordinates with the university, integrating content, strategies and methods during lectures at school.
- **CLOE** (Conceptual Laboratory of Operative Exploration): this activity has the same nature and setting of a masterclass, the only difference being that students are engaged in an activity that only lasts for 4 hours.
- **Summer school on modern physics**: a national selection allows a number of students to participate in a 6-day intensive activity at university which includes lectures, experiments and a focused educational path on different aspects of modern physics i.e.quantum mechanics, superconductivity, Franck-Hertz experiment etc... The spectroscopy part requires a total of 8 hours.

Masterclasses and CLOE activities involved different secondary schools from Veneto, one of the biggest regions of Italy. In the path, depending on the availability of time, two or three laboratorial activities were performed in groups: the optical goniometer experiment, the LED-ruler experiment and on-line diffraction measures from a single slit.

- **The optical goniometer experiment**. Involves the observation of discrete spectra at various orders produced by the interaction of the light emitted by a discharge lamp with a diffraction grating. The goniometer (figure 5) allows for the measurement of angles corresponding to various emissions. It is thus possible to evaluate the wavelength of a specific emission, using the grating formula ($d \cdot \sin\theta = m \cdot \lambda$) and to convert this quantity in an associated energy ($E = \dfrac{h \cdot c}{\lambda}$)² according to Einstein's interpretations of the photoelectric effect.
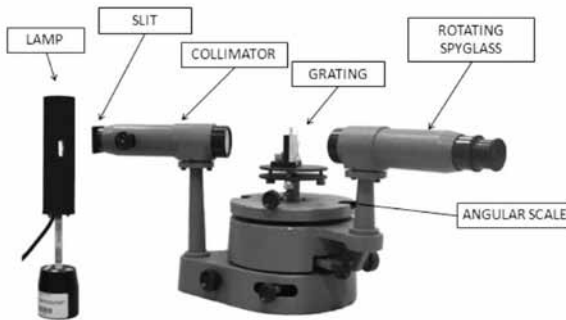
Figure 5. The optical goniometer experiment: emitted light from the lamp is collimated in order to make its direction of incidence perpendiculaly through the grating. Different chromatic components thus are angularly resolved and the rotating spyglass together with the angular scale allows to measure the corresponding angles.

- **The LED-ruler experiment**. It is assembled with low-cost materials and it allows one to observe the spectrum of the light emitted from a LED and to evaluate the energy corresponding to the dominant colour: observing the LED through diffraction toy glasses makes it possible to observe its spectrum projected along a ruler and, with a simple trigonometric calculus, its diffraction angle and thus, the corresponding colour energy can be is calculated (figure 6). This quantity is put into relation with the triggering voltage of the LED. Thanks to these two experiments, students can observe and analyze different kind of spectra: a discrete as well as a continuous peaked one.

2　In the relation $d \cdot \sin\theta = m \cdot \lambda$, d is grating's pitch, θ is the diffraction angle, with respect to the optical axis, of a particular wavelength λ in a particular order m. In the relation $E = \frac{h \cdot c}{\lambda}$, ¦ h is Planck's constant and c the speed of light.

Figure 6. Low-cost experimental setup for observing the spectra of the light emitted from a LED and measuring the diffraction angle corresponding to the peak emission (a). observing through the grating the spectrum appears projected along the ruler (b).

- **On-line diffraction measurements**. A single slit diffraction phenomenon is explored with the aid of a patented sensor (Gervasio & Michelini, 2009) allowing one to obtain a digitalized graph in which intensity is plotted against position along the screen. The analysis of the graph enables one to obtain the diffraction laws.

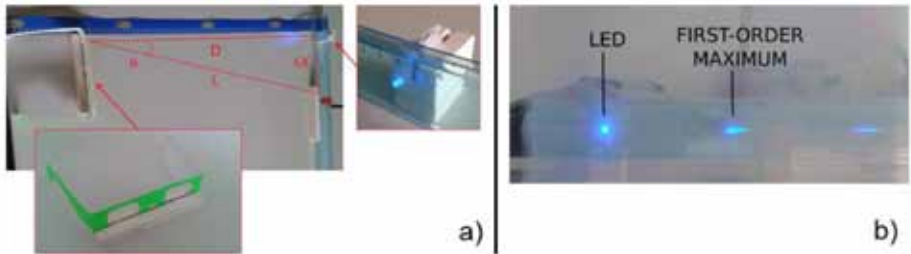The same conceptual core and rationale of the path characterized the different interventions; only the specific didactical trajectories revealed differences in the order of the stimuli problems submitted to students through Inquiry-Based Learning strategies (Abd-El Khalick et al., 2004; Mc Dermott et al., 2000). Contents addressed in all experiment, as well as their sequence, were revised every time, as recommended by a DBR approach (table 1).

Table 1. Structures of the different paths. Every column refers to a different experimentation (M: masterclass, C: CLOE, SS: summer school), while numbers refer to the sequence of the addressed contents in every path.

CONTENTS	M(a)	M(b)	M(c)	C(a)	C(b)	M(d)	SS
Light sources	1	1	1	1	2	2	1
Light emitted from sources	2	2	2	2	1	1	2
Diffraction	-	-	-	4	5	5	5
IBL path on diffraction	4	4	4	-	-	-	-
Exploration with spectroscopes	5	5	5	5	3	4	3
Structure of a spectroscope	6	6	6	6	4	5	4
Coloured light structure	3	3	3	3	-	3	7
Planck's hypothesis and Bohr's model	7	9	9	9	8	9	9
Total energy of an H atom	8	7	7	7	6	7	6
From coefficient to Balmer's formula	-	-	-	-	-	-	8
Balmer-Rydberg's formula ($1/\lambda$)	-	8	8	-	-	-	-
Balmer-Rydberg's formula (energy)	-	-	-	8	7	8	10
Black body emission formalism	-	-	-	-	-	-	9
Drawings of levels and prevision of emissions	-	10	10	10	9	10	11
From discrete spectra to levels	-	-	-	-	-	11	12

Table 2. The path has been experimented on different contexts, with different samples of students and using different monitoring instruments. In a DBR approach, the path underwent variations in the content and structure, as highlighted in the last column.

Date	Experimentation	N. students	Pre-test	Tutorial	Post-test	Path version
Jan, 1, 2017	M(a)	43	No	Yes	Yes	1
Feb, 1, 2017	M(b)	33	Yes	Yes	Yes	2
Feb, 2, 2017	M(c)	35	Yes	Yes	Yes	2
Feb, 13, 2017	C(a)	22	No	Yes	Yes	3
Feb, 14, 2017	C(b)	32	No	Yes	Yes	4
Mar, 10, 2017	M(d)	11	No	Yes	Yes	5
Jun, 28, 2017	SS	32	Yes	No	Yes	6

With regards to masterclasses and CLOE, different monitoring instruments were used:every student completed a guided tutorial (i.e. a worksheet with the same structure of the proposed path) with post-tests and, in some cases even pre-tests were conducted. The test-out was completed by students in their classes and the outcomes were discussed with the all teachers involved as a collaboration between school and University. The post-test was structured in 13 questions (table 3)

Table 3. Requests in the post-test.

Questions	Requests
D1	Point out similarities and differences among various observed spectra and justify.
D2	Explain the emission process causing the observed emission lines
D3-D5	Describe the role of the grating and the slit
D6-D7	Describe the light emission process from an atom comparing the energies of the emitted radiation and those of the levels
D8	Draw a spectrum knowing the energetic structure of the levels
D9-D12	Draw the energy level structure given a discrete spectrum
D13	Sketch the energy structure of a LED and a gas discharge lamp given their emission spectra

Concerning the summer school, the same test was used as a pre-test and a post-test and all were completed by students at the beginning and at the end of the activity.

Data Analysis

The analysis of students' written answers was conducted with qualitative methods: written answers and drawings were classified in categories which were chosen a-priori, based on the research questions and the aspects that emerged from the students' answers. Each category is operationally defined according to students' expressions. The identified categories allowed data qualitative interpretations based on the emergent frequencies. In order to interpret ambiguous answers or drawings, it was sometimes mandatory to rely on clues present in answers or drawings of different questions.

Here we report some results that emerged from data analysis concerning answers 47 students gave to the most significant questions of the post-test of the experiment "Masterclass(c)"and the answers 32 students gave to a significant question in the pre- and post-test of the experiment that was conducted in the summer school for gifted students.

Masterclass(c) experimentation: Post-test

With respect to the D1 question "Point out similarities and differences between light spectra from a incandescent lamp, a gas-discharge lamp and an LED, and justifying your answers" 38/47 answers were limited to describing spectra in terms of colours and/or present discontinuities, making analogies with the colours in a rainbow. 6/47 students interpreted a continuous spectrum as a consequence of thermal agitation (2/47) or to incandescence (2/47) and a discrete spectrum as a consequence of the nature of the emitting gas (1/47) or energetic jumps at atomic levels (1/47).

Question D2, referring to the experiment of the optical goniometer, asked to explain the process accounting for the observation of spectral lines, with the aid of a sketch. 23/47 students described the experiment in functional terms, eventually quoting diffraction as the mechanism responsible for the division of the colours. 8/47 students, on the other hand, interpreted the presence of different coloured lines in terms of the microscopic process causing the emission in terms of transitions between orbits (5/47) or levels (3/47). 6/47 students use both a microscopic interpretation of light emission and a macroscopic description of the measurements apparatus. It emerged that the Bohr orbit model, which is used to describe jumps between orbits and/or indirectly used to account for the idea that an electron is localizable, is a conceptual referent for many students.

Questions D3-D5 test for the functional role of the slit and of the grating in accounting for the formation of a spectrum: 21/47 students believe that the shape of the slit is responsible for the shape of the lines, while, on the other hand, 11/47 students believe that it is the engraving on the grating that is responsible for it. Only a single student referred to the sharpness of the lines as a fundamental conceptual

referent in a description of a discrete spectrum without taking into consideration that fact that lines can be differently shaped, according to the employed setup. A specific IBL explorative path was particularly useful in this case since it offered students the opportunity to gain awareness of the functional role of every part of a spectroscope.

Issue related to the representation of the energy structure of the emitting system and the relative spectrum was addressed in question D8: the values of the first five energy levels of an ionized helium atom were shown to students who were then asked to represent them graphically and to sketch out the spectrum they expected to observe. 8/47 students employed "orbits" as conceptual referents, while 18/47 employed stacked "levels" as a more general representation, avoiding the use of the spatial representation of an atom (figure 7).Three models emerged that accounted for the formation of spectral lines with respect to the energetic structure of the emitting system (figure 8): a) a 1:1 correspondence between a line and a level (25/47), b) n close lines associated with n^{th} level (4/47) and (c) all possible transitions (1/47).
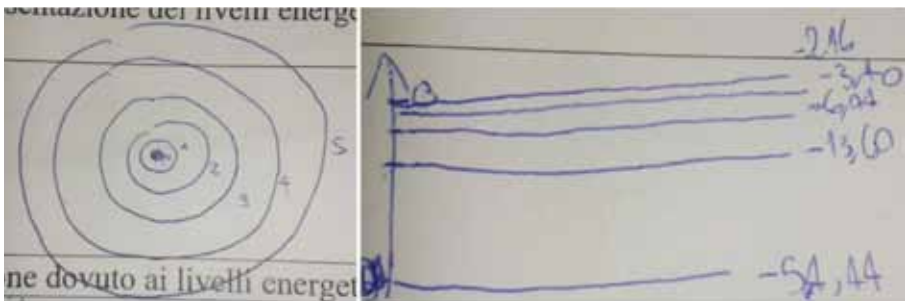

Figure 7. Models for atomic energy levels: orbits (left) and levels stacked with respect to an energy scale (right).

Figure 8. Given 5 levels, students expect 5 emissions in the spectrum (top), n close lines associated with n^{th} level (centre) or all possible transitions (bottom).

Summer school experimentation: Pre- and post-tests

Answers to two significant questions of pre- and post-tests are analyzed and discussed below. The two questions were:
D1 "What do single energy levels represent in an atomic model?"
D2 "Considering that the first six energy levels of the hydrogen atom (values provided) how many emissions are expected? Justify your answer and draw the spectrum."

Answers to question D1 in the pre-test were given prevalently in terms of spatial localization of electrons in atoms, using orbits as conceptual referents (12/32), space where electrons can be found (4/32), orbitals (2/32) or distances from the nucleus (1/32), rather than in energy terms, using as conceptual referents electron energies (3/5), their exciting state (3/32) or the energy of the orbital (2/32). A minority of students indirectly defined energy levels as the energy of emitted photons (1/32) or observed that the difference between the energy of two levels corresponds to the emitted energy (1/32). After the intervention, students' answers, monitored with the post-test, showed a general trend against describing the electron in spatial terms, using conceptual referents as the space where electrons can be found (4/31), distance from the nucleus (3/31), orbits (2/31) or orbitals (2/31), in favour of descriptions in terms of properties of electrons in excitation state (9/31), energy (5/31), the property of not being able to emit radiation (4/31) or the energy of the orbital (1/31). A definition of energy levels is given in terms of characteristic energy of the system (6/31), in terms of an indirect definition relating the energy of the emitted energy to a difference between a couple of energy levels (5/31) or in terms of the energy of the emitted photons (1/32). It emerged that the perspective regarding the descriptions of energy levels in terms of spatial description using orbits rather than in terms of characteristics energies of the emitting system (i.e. the energy levels) was probably conditioned by what students had been taught previously at school.

Answers to question D2 allowed students to investigate the model they employed to foresee emissions in a discrete spectrum with only information regarding the energy values of the energy levels. Before the intervention, the spontaneous idea that a single level corresponds to a single emission line was quite prevalent (13/32). Out of those students, not one of them considered the fundamental level as an energy level. The interpretation according to which a single emission line is the outcome of a transition between a couple of levels was shared by 12/32 students (8 of whom considered all the transitions, 3 students considered only the ones involving the fundamental level and 1 student considered only transitions involving adjacent levels). Those interpretative models, based upon an arbitrary basis, were overcome by the end of the intervention, since it emerged from the post-test that all students adopted the model according to which all transitions were taken into account to justify the discrete emission in a spectrum.

Conclusions

A proposal for an educational path on optical spectroscopy for secondary school students, experimented in different contexts, has been presented and described together with some learning outcomes. The educational path has been designed in a DBR context in the theoretical framework of the MER. Qualitative analysis of students' written answers allowed to assign significance to data collected in order to obtain indications concerning the usefulness of the propose activities. Questions posed to students turned out to be fertile in the spontaneous production of models describing the energetic structure of matter accounting for discrete spectra, stimulating students in moving from a descriptive to an interpretative level, developing their functional reasoning. The proposed experimental activities enriched the activities, and the employed strategies can be implemented in a conceptual path, since starting from observations it is possible to find the interpretative basis of microscopic processes described by modern physics.

Optical spectroscopy is a fertile context in different areas: regarding the new guidelines concerning modern physics topics in scholastic curriculum, as a disciplinary deepening from optics to modern physics (i.e. in a vertical perspective linking different grades of instructions), as a transversal topic, thanks to the numerous application in chemistry, biology, astrophysics and art, which have a motivational and orienting role, as a context in which energy is used to describe light-matter interaction, and as a methodological and epistemic basis of physics, since indirect measures based on energy are used to validate models.

The aforementioned activities represent a fertile context for a collaboration between school and University, and the experimented path turned out to be a basis for the overcoming of some conceptual knots i.e. the role of a spectroscope in generating and detecting spectra, the difference between a diffraction pattern (which is an intensity distribution) and a spectrum (which is an energy distribution), difficulties related to linking spectral lines and energy levels, that can be caused by erroneous models of how spectral emissions are generated. The conceptual link between energy levels of a physical system (its states) and the orbits of the electrons, whose existence is out of discussion remains an ongoing problem: the need for a clarifying step regarding the deep conceptual differences between the various representations and the various models emerged from the results. It is thus necessary, consider in the path not only the specific case of the hydrogen atom, in which the correspondence between orbits and levels is direct, and thus misleading, but also more general cases, as for example atoms with many electrons.

Thanks to a DBR approach, it is possible to point out the best strategies to design the setting up of effective educational interventions, in particular, a methodological approach in which qualitative and quantitative explorations of phenomena are performed seems to be fertile, as well as specific activities in which students are asked to interpret the involved processes.

References

Abd-El Khalick F. et al. (2004). Inquiry in science education: International perspectives. *Int. J. Sc. Ed.*, 88(3), 397-419.

Anderson, T. and Shattuck, J. (2012). Design-Based Research: A Decade of Progress in Education Research? *Educational Researcher*, 41(1), 16-25.

Bardar, E.M., Prather, E.E., Brecher, K., and Slater, T.S. (2006). The need for a light and spectroscopy concept inventory for assessing innovations in introductory astronomy survey courses. *Astronomy Ed. Rev.*, 4(2), 20.

Bartolini Bussi, M.G. and Mariotti, M.A. (1999). Semiotic mediation: from history to mathematics classroom. *For the Learning of Mathematics*, 19(2), 27-35.

Collins, A., Joseph, D., and Bielaczyc, K. (2004). Design research: Theoretical and methodological issues. *The Journal of the Learning Science*, 13(1), 15-42.

DBR Collective (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researchers*, 32(1), 5-8.

Duit, R., Gropengießer, H., and Kattmann, U. (2005). Towards science education research that is relevant for improving practice: The Model of Educational Reconstruction. In H.E. Fischer eds. *Developing Standards in Research on Science Education*, London: Taylor & Francis, pp. 1-9.

Duit, R., Gropengießer, H., Kattmann, U., Komorek, M., and Parchmann, I. (2012). The Model of Educational Reconstruction - a framework for improving teaching and learning science. In D. Jorde & J. Dillon eds. *Science Education Research and Practice in Europe*, Rotterdam: Sense Publishers, pp.13-37.

Gervasio, M. and Michelini, M. (2009). Lucegrafo. A USB Data Acquisition System. In Lamboune B. et al. eds. *MPTL14 Proc*eedings. http://www.fisica.uniud.it/URDF/ mptl14/ contents.htm.

Gilbert, J.K., Boulter, C., and Rutherford, M. (1998). Models in explanations, part 1: Horses for courses? *Int. J. of Sc. Ed.*, 20(1), 83–97.

Gilbert, J.K., Boulter, C., and Rutherford, M. (1998). Models in explanations, part 2: Whose voice, whose ears? *Int. J. of Sc. Ed.*, 20(2), 187–203.

Hindmarsh, W.R. and Ter Haar, D. (1967). *Atomic Spectra*, Pergamon Press.

Ivanjek, L., (2012). An investigation of conceptual understanding of atomic spectra among university students. Ph.D. dissertation, University of Zagreb.

Ivanjek, L., Shaffer, P.S., McDermott, L.C., Planinic, M., and Veza, D. (2015) (a). Research as a guide for curriculum development: An example from introductory spectroscopy. I. Identifying student difficulties with atomic emission spectra. *Am. J. of Phys.*, 83(1), 85.

Ivanjek, L., Shaffer, P.S., McDermott, L.C., Planinic, M., and Veza, D. (2015) (b). Research as a guide for curriculum development: An example from introductory spectroscopy. II. Addressing student difficulties with atomic emission spectra. *Am. J. of Phys.*, 83(2), 171.

Korhasan, N.D., and Wang, L. (2016). Students' mental models of atomic spectra. *Chem. Educ. Res. Pract.*

Lee, S. (2002). Students' understanding of spectra. Ph.D. dissertation, Kansas State University.

McDermott, L.C. et al. (2002). *Tutorials in introductory physics*, 1st ed.

McDermott, L.C., Shaffer, P.S. and Costantiniou, C.P. (2000). Preparing teachers to teach physics and physical science by inquiry. *Phys. Ed.*, 35(6).

Michelini, M., Santi, L., and Stefanel, A. (2014). Teaching modern physics in secondary school. *Proceedings of Science (FFP14)*, 231, 15-18 July 2014.

Michelini, M. and Stefanel, A. (2015). Upper secondary students face optical diffraction using simple experiments and on-line measurements. In Triay R. eds. *FFP14 Proc*eedings.

Rebello, N.S., Cumaranatunge, C., Escalada, L.T., Zollman, D.A., and Donnelly, D. (1998). Simulating the spectra of light source. *Computer in Physics*, 12(1), 28.

Savall-Alemany, F., Domènech-Blanco, J.L., Guisasola, J., and Martinez-Torregrosa, J. (2016). Identifying student and teacher difficulties in interpreting atomic spectra using a quantum model of emission and absorption of radiation. *Phys. Rev. ST Phys. Ed. Res.*, 12(1), 01013.

Van der Akker, J., Gravemeijer, K., and McKennedy, S. (2006). In Nieveen N. eds. *Educational Design Research*. London and New York: Routledge.

Viennot, L. (2003). Relating research in didactics and actual teaching practice: impact and virtues of critical details. In D. Psillos et al. eds. *Science Education Research in the Knowledge-Based Society*.

Zollman, D.A., Rebello, N.S., and Hoggs, K. (2002). Quantum mechanics for everyone: Hands-on activities integrated with technology. *Am. J. Phys.*, 70(3), 252.

Bio-notes

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The Spectrograph:
A Prototype for a Digital Spectrometer

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Abstract

Optical spectroscopy is a conceptual referent which links classical and modern Physics. This paper will consider how an educational path has to involve students in interpretative activities. Experiments can allow one to highlight the link between energy levels in atoms and discrete light emissions. After analysing several commercial devices and apps for mobile devices, our Physics Education Research Unit from Udine University (Italy) designed and created a digital spectrometer using a simple webcam and implemented the various functionalities which can be connected to PCs via USBs. Both hardware and software have been designed in order to obtain spectral images of various sources and the digitised spectrum. The hardware allows the use of different diffraction grating, coloured and optical filters and an optical goniometer, whilst the software is designed to allow calibration and qualitative and quantitative measures of wavelengths. We will describe this system in detail as well as some experimental activities which can be carried out by secondary school students and freshmen in biotechnology.

Keywords: Digital spectrometer, optical spectroscopy, physics education

Introduction

Modern physics is now integrated in all European secondary school curricula and its teaching requires an effective approach to create a culture that links new theories with instruments and methods related to physics. A thematic area which provides an experimental basis of modern atomic theory is optical spectroscopy. Both from a historical and conceptual point of view, it represents a bridge between classical and modern physics, offering an important disciplinary contribution to the epistemological plan of physics. Quantized emission and absorption of radiation are basilar concepts representing the main investigative tool for light-matter interaction, thus optical spectroscopy is a context in which the role of energy is indispensable when describing physical processes.

Optical spectroscopy is an experimental context to validate models through indirect measures - for example, in the case of atomic models highlighting the link

between luminous emissions and atomic energy levels. Students can therefore gain competence in specific inquiry modalities employed in physics.

Experiments and educational devices used to perform optical spectroscopic measurements are amongst the most significant and feasible; however, existing experimental proposals are quite limited and often implemented in expensive and complicated devices - such as the so-called "black box" - that do not allow students to understand the mechanisms and principles of functioning. Indeed, obtaining optical spectra of luminous sources is quite easy: a CD or a cheap diffraction grating are widely available and the produced spectra can be captured with a digital camera or a Smartphone and analyzed - quantitatively or qualitatively - with specific apps.

Different educational proposals (Luo & Gerritsen, 1993; Ouseph, 2007; Scheeline, 2010; Amrani, 2014; Onorato et al., 2015) including simple experiments of optical spectroscopy that allow qualitative and quantitative measures have been developed in order to stimulate students' functional understanding concerning spectra formation and measurement. These experiments represent important educational activities contributing to the learning process concerning both disciplinary and methodological aspects, but they have been designed and implemented in specific and limited contexts. Generally speaking, laboratorial educational proposals are offered in the form of commercial devices, and teachers have the task of integrating them in a coherent educational path.

The Physics Education Research Unit at Udine University (IT) aims to develop an educational path on optical spectroscopy in which students are directly involved in experimental and interpretative studies. Laboratory activity is essential and new technologies allow new opportunities to teach and learn physics, as already discussed in the case of the educational path on optical diffraction from a single slit (Gervasio & Michelini, 2009; Michelini & Stefanel, 2015). From this perspective we developed a prototype for a digital spectrometer implementing some proposals based on ICT (Information and Communication Technologies), making use of a webcam and specifically-designed software which allows qualitative and quantitative analysis of a digitised spectrum. After having analysed the main available commercial devices and apps performing spectroscopic analyses, we decided to develop a complete low-cost technical solution that will be illustrated below with examples of significant measures.

Some Existing Proposals

The *PASCO PS-2600* wireless spectrometer (figure 1, left) integrates a CCD sensor upon which the spectra of light, ranging between 380 and 980 nm, of a certain source is registered. Light is guided to the dispersive element that creates the spectrum by means of an optic fibre. With the use of either a USB or a Bluetooth connection, the software automatically shows the emission spectrum as a function

of the wavelength, with no need for calibration (figure 1, right). Obtained spectra, with a resolution of about 3 nm, can be compared with discrete reference spectra. The device also allows the analysis of absorption and fluorescence spectra as a test tube with the sample can be inserted in it. Absorption spectra are obtained by illuminating the sample with a reference white LED light while fluorescence spectra are obtained by illuminating the sample with light of 405 or 500 nm. The absorbance curve is automatically shown and the user has only to perform automatic actions.
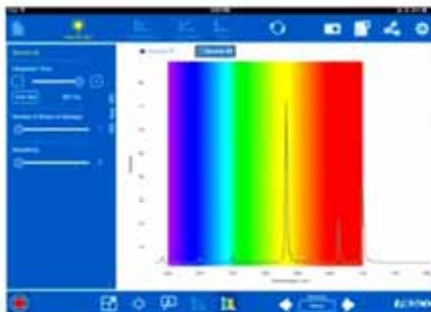
Figure 1. *PASCO PS-2600* **digital spectrometer (left) (https://www.pasco.com/prodCatalog/PS/PS-2600_wireless-spectrometer/index.cfm) and user interface (right).**

The *RSPEC EXPLORER SYSTEM* digital spectrometer (figure 2, left) is a spectrometer which uses a focusing element, rather than an optic fibre. A diffraction grating is placed in front of a webcam which is connected to a PC via a USB port. Once the webcam is pointed towards the source, the software allows for the registration of the whole image of the frame with a spectrum range between 390 and 700 nm. Users can select the portion of the frame where the spectrum is present. The software digitalises it and provides a graph in which the intensity - in arbitrary units
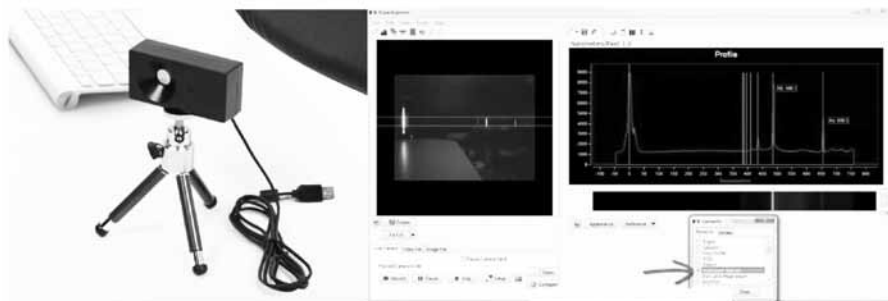
Figure 2. RSPEC EXPLORER SYSTEM digital spectrometer (left)
(https://www.fieldtestedsystems.com/) and user interface (right).

- is shown as a function of the wavelength. The pitch of the grating is fixed, as well as its distance from the CCD sensor: it is enough to line up the image of the source with a reference to automatically and uniquely associate a position along the pixel array with a specific wavelength (figure 2, right). The good quality of measurements, with a resolution of about 3 nm, makes it possible for one to compare the recorded spectra with reference ones.

Despite the good performances and the high quality of the two aforementioned devices, they are quite similar to "closed boxes" that do not allow the user to approach the physics of the measurement or to change the experimental condition as it is not possible to change the diffraction grating or use any kind of filters. Absorption measurements are automatically generated by the software as well as the calibration which is an important phase of the measuring process,

However, a digital analysis of recorded images obtained from a Smartphone is allowed by certain mobile apps namely *LEARNLIGHT SPECTROSCOPY*, *SPECTRA UPB*, *LIGHT SPECTRA LITE* and *ASPECTRA MINI*. A diffraction grating is enough to produce the image of an emission spectrum that can be analysed but a precise calibration is possible only in few cases. Those apps make it possible to obtain graphs of intensity as a function of the position along the spectrum, i.e. in different positions of the digital image (figure 3).

SPETTROGRAFO is a new system that combines the simplicity of use of existing commercial devices and the feasibility of the analysis algorithms with new functionalities that allow for a better control of the measuring process thereby ensuring more accurate readings.
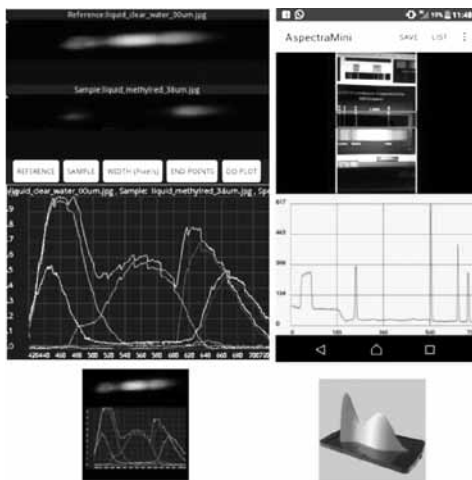
Figure 3. User interfaces and logos of two apps performing spectroscopic measurements. *LEARNLIGHT SPECTROSCOPY* (left) and *ASPECTRA MINI* (right).

The *Spettrografo* System

Both hardware and software components of the designed and produced prototype will be described below. It allows for measurements of optical spectra obtained by diffraction grating with different pitches. Our goal was to create a low-cost device allowing quantitative and accurate analysis of discrete, continuous and band spectra.

Hardware

The equipment is assembled in a very simple way: a commercial webcam is inserted inside an aluminum case (6cm x 6cm x 6cm) mounted on an adjustable tripod (figure 4). The webcam has a resolution of 640x480 pix interpolated by a 1.2 Mpix CCD and it focuses on images from 15 cm to infinity. The field of view is 60° and the frame-rate is 60 fps. A support allows the diffraction grating to be placed in front of the webcam. The digital image registered on the sensor is sent to a PC via a USB connection. Gratings with pitches of 1000 lines/mm and 500 lines/mm can be used, both allowing spectral analysis ranging between 380 nm and 700 nm. 1000 lines/mm grating allows one to see only the first diffraction order with a resolution of 1.3 nm/pix, while with 500 lines/mm the second order is visible, but the resolution decreases to 2.6 nm/pix. A couple of Polaroid filters can be inserted in front of the webcam to tune the intensity of the source, avoiding the saturation of the sensor. Coloured filters can also be also inserted to study selective absorption of colours (figure 4). The device can be used with extended light sources, making use of an external slit, working as a diaphragm.

Figure 4. *SPETTROGRAFO* system (left) and accessories: diffraction gratings, coloured and Polaroid filters (right).

Software

Software was developed through the use of Microsoft "*framework.NET* " using C# language. As shown in figure 5, it allows one to visualise the image captured by the webcam, containing both the source and its spectrum, and to select the area needed to be analysed (reproduced in the upper right of the user interface). Digitisation of the spectrum occurs making a sum of the digital information of each pixel (proportional to the incident intensity) along every column. The intensity as a function of the position along the spectrum in the graph in the lower right of the user interface is represented in arbitrary units and it is proportional to the mean intensity incident on the pixels of a same column.
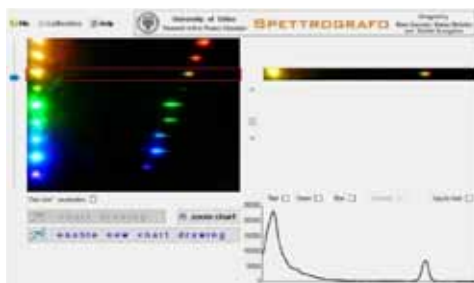
Figure 5. Main user intrface. Recorded image by the webcam (left) from which it is possible to select the area to be analyzed (source + spectrum) that is automatically digitalyzed in a graph (bottom right). In this example the source is a column of LEDs observed with a 1000 lines/mm grating.

It is possible to switch to a calibrated graph, in which the horizontal axis represents an energy or wavelength scale: it is enough to select the employed diffraction grating in the user panel (this information fixes the pixel-wavelength or energy relationship) and a calibration source can also be used. A secondary panel allows for these operations to be done. After having calibrated the system, quantitative measurements can be performed and a reference spectrum appears under the graph showing an eV energy scale. Two movable markers allow the user
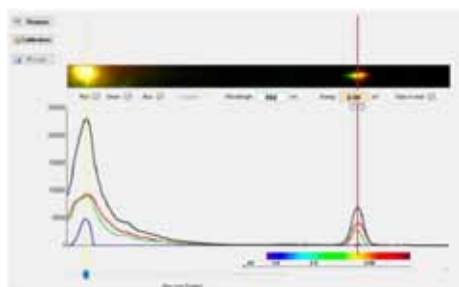
Figure 6. Calibrated yellow LED spectra.

to mark the position of the image (0th order) as well as a generic position along the spectrum of the 1st order, resulting in a univocal measure of wavelength (expressed in nm) or energy (expressed in eV) (figure 6). Data can be exported in tabular form allowing further analysis with a spreadsheet.

Examples Of Measures

The *SPETTROGRAFO* system allows qualitative and quantitative measurements of continuous spectra from incandescent lamps, discrete spectra from gas discharge or fluorescent lamps, band spectra from LEDS and absorption spectra. To perform a measurement, it is enough to target the source with the device (figure 7), eventually screening it through a panel with a slit. No optical bench is needed; it is enough to assure the alignment between source, grating and sensor in a way that the spectrum is horizontal with respect to the array of pixels. Here we describe some examples of measurements that can be performed with the device.

Figure 7. *SPETTROGRAFO* connected to PC, pointing the source.

Spectral lines

The shape of the slit shielding the light of a gas discharge lamp is reproduced in different colours and in different positions on the CCD sensor, showing the source spectrum. Once it has been digitised, is possible to observe and measure the position, width and relative intensity of the various emissions (figure 8). The spectral features can be recorded as a wavelength or energy value. As an example, some visible wavelengths in cadmium and helium spectra have been measured and they are reported in table 1, against standard values.
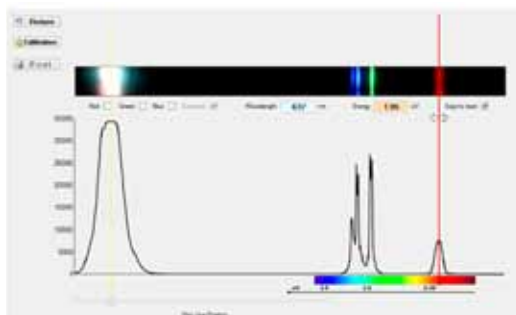
Figure 8. Spectra of a cadmium gas-discharge lamp.

Table 1. Measure of the main emission lines of Cd and He performed with *SPETTROGRAFO* compared with standard values (https://www.nist.gov/pml/atomic-spectra-database).

Cadmium			Helium		
λ_{meas} (nm)	λ_{std} (nm)	$\Delta\%$	λ_{meas} (nm)	λ_{std} (nm)	$\Delta\%$
639	643.85	0.75	656	667.82	1.77
506	508.58	0.51	577	587.56	1.80
480	480.00	0.00	496	501.57	1.11
469	467.81	-0.25	471	471.31	0.07
-	-	-	447	447.15	0.03

Spectral lines - optical goniometer

An alternative modality of performing measurements with a *LUCEGRAFO* system is to place it on a rotating base: the diffraction grating is no longer placed in front of the sensor, but it is fixed on a support at the center of the rotating base (figure 9). The system thus functions as an optical goniometer. Different spectral emissions are thus observed as a function of the diffraction angle α, represented by the angle of rotation of the sensor around the grating, which has pitch d. The angle is measured on a graduated scale with a sensibility of 1°. Wavelengths are evaluated with the formula to the various orders m:

$$d \cdot \sin \alpha = m \cdot \lambda$$

In this modality no calibration procedure is needed, except for the 0th angle that has to correspond to the position of the source. A movable marker, appearing on the image acquired by the sensor is used as a reference while the system rotates. In this way, apart from performing qualitative measures on different spectra, the angular and symmetrical features of diffraction grating phenomena are highlighted. In the following, measurements taken in optical goniometer modality on the spectrum of a blue LED with a 500 lines/mm grating are shown (table 2).

Figure 9. SPETTROGRAFO system used as an optical goniometer.

Table 2. Measure of the wavelength associated to the peak emission of a blue LED.

m=1		m=2		m=-1		m=-2	
α	λ (nm)	α	λ (nm)	A	λ (nm)	α	λ (nm)
13°	449.9	27°	454.0	13°	449.9	27°	454.0

Transmissivity curve

A white light source, as a LED, is used to obtain a reference spectrum (figure 10, left) which is modified if a coloured filter is placed in front of it (figure 10, right). Software allows to extract data in a tabular form that can be further analysed with a spreadsheet in order to quantitatively evaluate the absorbance in various zones of the spectrum. This way, the intensity of the reference spectrum as a function of the nth column of the pixel array ($I_0(n)$) and the intensity of the absorption spectrum ($I(n)$) as well as the quantity $T(n) = I(n)/I_0(n)$ can be calculated, representing the fraction of the transmitted light, i.e. the transmittance of the filter (figure 11).
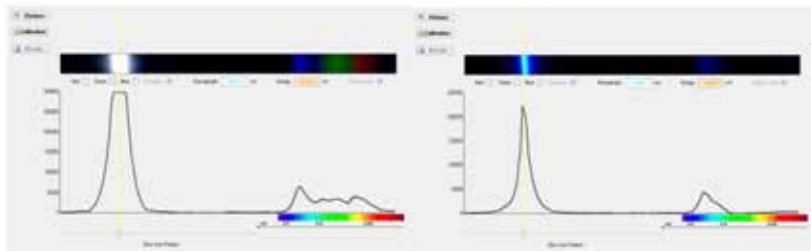
**Figure 10. White LED spectra, chosen as a reference (left)
and absorption spectrum having placed a blue filter in front of the source (right).**
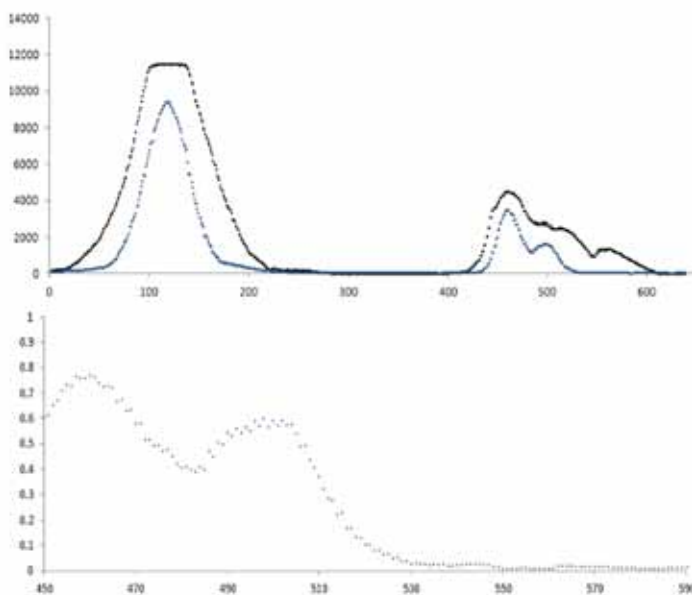
Figure 11. Elaboration with a spreadsheet: light spectrum from a white LED compared with the spectrum of the same light passing through a blue filter. Abscissa values refer to the column of pixel; on the left the peak due to the source is visible (top) and transmittance of a the blue filter (bottom).

Conclusions

After having analyzed potentialities and limits of some commercial digital spectrometers and mobile APPs, we highlighted the main needs for an effective educational laboratory apparatus for optical spectroscopy which also stress the importance of the calibration process, the insight into the physical processes accounting for the observations and the possibility to change the grating and data acquisition modality. A simple digital device, *SPETTROGRAFO*, has been designed and created; it allows real-time study of diffraction phenomena with subsequent analysis of optical spectra of different light sources. This system consists of a commercial webcam, to be connected via USB to a PC, inside an aluminum case. Different diffraction gratings can be placed in front of it, as well as Polaroid filters to dim the source luminosity, or coloured filters to study selective absorption of colours. Virtual images of spectra are recorded on the CCD sensor of the webcam and observed with the aid of a specifically designed software. It is therefore possible to perform qualitative observations concerning shape and main features of different kind of spectra: continuous, discrete and/or bands to various diffractive orders,

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according to the used grating. Real-time observations of the modification of a spectrum with the presence of a coloured filter can also be observed. Calibration occurs via software by selecting the used diffraction grating or with the aid of a calibration source with known wavelength (e.g. a laser). In this way a column of pixels is assigned to a specific wavelength, or energy, allowing quantitative measures with an error margin of less than 5%, depending mostly on the alignment between source and detector. Recorded spectra are digitalized in a graph representing luminous intensity as a function of the wavelength, or energy in arbitrary units proportional to the luminous intensity on a portion of the sensor. This device can be mounted on a rotating base allowing one to measure the diffraction angle and thus quantitatively evaluate the wavelength, as in the classical experiment of the optical goniometer, with an error margin of less than 5%.

The *SPETTROGRAFO* prototype for a digital spectrometer, offers itself to be used both in secondary school educational labs and in university introductive physics courses, thanks to its relative inexpensiveness, to its user-friendliness and to the possibility of exploring the functional role of every component of the measure setup. The device avoids the "closed box" problem: it allows students to develop a functional understanding, which is one of the main goal of an educational lab. Observations and measures of spectra allows one to characterize different kinds of luminous sources, elements and absorption mechanisms.

Up to now the device has been presented to a group of 10 secondary school teachers who used them in the context of "National School for Teachers on Modern Physics" within IDIFO6 project[1] held in Udine University (IT) in September 2017. In the same IDIFO6 project, the device was used in the educational lab for freshmen in biotechnology as a part of a wider didactical innovation project and it has also been implemented in Masterclass and CLOE (Conceptual Lab of Operative Explorations) activities held in Udine University between the period of January-March 2018 for secondary school students in the framework of a wider school-university collaboration project.

References

Amrani, D. (2014). Hydrogen Balmer series measurements and determination of Rydberg's constant using two different spectrometers. *Eur. J. of Phys.,* 35(4), 045001.

Gervasio, M. and Michelini, M. (2009). Lucegrafo. A USB Data Acquisition System. In Lamboune B. et al. eds. *MPTL14 Proceedings.* http://www.fisica.uniud.it/URDF/ mptl14/ contents.htm.

Luo, W.W. and Gerritsen, H.J. (1993). Seeing the Fraunhofer lines with only a diffraction grating and a slit. *Am. J. of Phys.,* 61(7), 632.

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[1]   http://www.fisica.uniud.it/URDF/laurea/idifo6.htm

Michelini, M. and Stefanel, A. (2015). Upper secondary students face optical diffraction using simple experiments and on-line measurements. In Triay R. eds. *FFP14 proceedings*.

Onorato, P., Malgieri, M. and De Ambrosis, A. (2015). Measuring the hydrogen Balmer series and Rydberg's constant with a homemade spectrophotometer. *Am. J. of Phys.,* 61(7), 632.

Oupseph, P.J. (2007). CD Rainbows. *The Phys. Teach.,* 45, 11.

Scheeline, A. (2010) Teaching, learning, and using spectroscopy with commercial, off-the-shelf technology. *Applied Spectroscopy,* 64(9), 256A.

Bio-notes

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Professor Marisa Michelini is Full Professor in Physics Education at Udine University, where she is rector delegate for Didactic Innovation. She manages the Research Unit in Physics Education. She is president of the International Research Group in Physics Education (GIREP), director of the Italian University Consortium on Education and Guidance, committee member of the Multimedia Physics Teaching and Learning, board member of the EPS-PED division and honorary member of the Italian Association for Physics Teaching. She founded the Centre for Research in Education, the Lab Centre for Physics Education, the Centre for Guidance, the Research Unit in Physics Education. She has published extensively in her field of expertise.

Mario Gervasio was awarded a degree in electronic engineering in 1975 and is also a qualified teacher of Physics. He is a professor of Physics for Civil Engineering and of Bio-engineering and Bio-mechanics for Motor Science at the University of Udine and is part of with the Physics Education Research Unit where he is involved in the development of three patented devices for software used in physical measurements applied to education.

A Vertical Path Proposal on Magnetic and Electromagnetic Phenomena and Superconductivity Based on Hands-on Experiments

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Abstract

Focusing on magnetic and electromagnetic phenomena offers a coherent teaching/learning path in a vertical curriculum perspective. Primary students start exploring the space around a magnet, and secondary school students analyze the concept of flux of a magnetic field and electromagnetic induction, ending with the analysis of superconductivity phenomena with exploration of the magnetic field in matter.

This learning environment at the workshop offers an experience of Conceptual Labs of Operative Exploration (CLOE Labs), engaging participants in working groups by means of semi-structured interviews and inquiry analyses to experience the way in which conceptual knots, known in literature, can be faced by means of inquiry-based learning (IBL) strategies. The IBL approach adopted in the workshop is based on a set of hands-on/minds-on explorative experiments designed with simple apparatus and multimedia tools.

Keywords: Physics education research, magnetism, electromagnetism, superconductivity, educational path, inquiry-based learning strategies

Introduction

Magnetic and electromagnetic topics have values on different levels since they are common phenomena allowing the construction of formal thinking. Moreover, they represent a context to step from observation to a description in terms of field. This paper aims at describing the structure of a hands-on and minds-on workshop in the form of a learning path on magnetism, electromagnetism and superconductivity.

Founding concepts (for example the distinction between field and force) can be addressed, finding out a spatial representation for the field and using the discovered representation to introduce the concept of flux that emerges to be constant from simple experimental explorations along a tube between two field lines. The concept of field is fundamental in physics to describing interactions (Vercellati, 2010a). It is useful in the static case, and it is of capital importance in dynamical situations,

because we do not provide any other concept to describe phenomena, so the double nature of magnetic sources (magnets and currents) involving also electromagnetic induction (EMI), can be addressed. EMI plays a crucial role in physics (Nussbaum, 1972; Zuza et al, 2012; Galili & Kaplan, 1997; Galili, 2001) in the passage from static to dynamic fields, in the definition of time-depending magnetic fields as sources of electric fields and in the construction of the concept of electromagnetic field (EMF). EMI represents a fundamental prerequisite to many domains of modern physics, for example, in technological applications daily used in the real world (Dori & Balchner, 2005; Eckert et al, 2009) and that are present in educational labs (Torzo et al, 1986; Priest & Wade, 1992; McNeil, 2004; Jodl & Eckert, 1998; Tanner et al, 2001; Dori & Balchner, 2005; Ruiz, 2006; Fodor & Peppard, 2012), superconductivity (Bouquet et al, 2009; Kedzierska et al, 2010) and special relativity (Galili & Kaplan, 1997; Galili, 2001; Galili et al, 2006).

Magnetic and electromagnetic phenomena are also relevant topics in the physics curriculum due to their epistemological contribution as a new interpretative framework for common phenomena, the importance of the various applications in different fields, the perspectives that such topics open for interpreting the micro-world and the contribution on the historical plan regarding the scientific development of ideas. The analysis of magnetic and electromagnetic phenomena offers many opportunities for the development of formal thinking and for gaining ownership of the scientific way of thinking. The involved learning processes influence the analysis of the magnetic properties of matter, of the meaning of sources of the field, the interpretation of new phenomena such as the presence of an electromotive force, as well as the dealing with a new formalism and its meaning on different interpretative plans (from interactions between systems to the concept of field). Moreover, the topic of superconductivity is significant since it is framed in the wider context of modern physics: it is the macroscopic evidence of quantum processes that can be faced with simple and motivating experiments, involving technological applications, such as magnetic levitation analyzing magnetic properties of matter (ferro-, para-, dia-magnetism).

Literature on learning processes highlighted the importance to build a functional understanding of key concepts (McDermott, 1991; Jelcic et al, 2017) that make possible to describe electromagnetic phenomena from the description and interpretation of basic phenomena, creating the basis for the construction of the fundamental concept of an electromagnetic field (Bagno & Eylon, 1997; Albe & Venturini, 2001; Zuza et al, 2012; Michelini & Vercellati, 2012). The problem of effective learning does not regard knowledge plan only, but it has to be faced in broader cultural terms: the opportunity to understand what science is and what science is not has to be offered in order to understand what and how science deals with the cognitive processes and how to be aware potentials and limits of the scientific approach. The way in which this can be done represents another problem, but we cannot solve it by simple storytelling and passive delivery of information: scientific instruments and

methods have to be known or re-known and meta-reflection plays an important role in this experience. Thinking on common experience is a good starting point: the exploration with mind, senses and sensors activate reasoning, explanations and the building of interpretative models. A vertical path in the curriculum builds the concepts in a step-by-step process starting from experience and does not provide a simple sequence of spiraling content views, which distracts from the conceptual development of scientific ideas.

The basic problem for scientific learning regards the fact that attention should be focused on setting up strategies to achieve an effective conceptual change from common sense to the scientific knowledge of the topic (Michelini, 2010). Reference situations, materials and methods are never neutral, but dynamic evolution of internal logic of reasoning (Gilbert, 1998), following problematic stimulus.

The building of formal thinking acts on three directions: (a) informal learning and the role of hands-on and minds-on activities to interpret phenomena, models (tools to bridge common sense to physics ideas) and representations in learning process; (b) Information and Communication Technologies (ICT), Real-Time Labs (RTL) and modeling activities contribution; (c) building a formal theoretical way of thinking.

In our Research Unit in Physics Education from University of Udine, the context of informal learning research comes from an operative proposal with simple materials, easy to reproduce and computer on-line sensors as sense extensions to explore phenomena: in the Games, Experiments and Ideas (GEI) exhibit (Michelini et al 2003; Michelini, 2005), which consists of 650 hands-on experiments, a structured environment allows pupils, students and teachers to play and do experiments, exploring ideas and use such ideas to explore phenomena. This context of playing offers a great opportunity for subject's development and learning providing the transition from the concrete context of action and the abstract thinking. Moreover, the de-contextualization of play, stimulates and activates personal learning processes and achieves a connection with ludic-symbolical abilities. Thus, using play, the learner amplifies the vision of the world and learns the way in which thought is structured with relation to the experience. In other words, the place of experimentation becomes the place of learning.

Conceptual Labs of Operative Exploration (CLOE) represent a bridge between research and school praxis and are carried out providing an open work environment in which problem-solving situations on specific different topic are proposed to students using semi-structured interviews and tasks following an Inquiry-Based Learning (IBL) approach (McDermott, 1996). During a CLOE activity, discussions of ideas in working group, interactive explorations and discussions and maps production take place under the guide of the researcher (or teacher) that follows a semi-structured protocol providing stimuli key questions. Working sheets in which students are guided to make a prevision on a phenomenon, the exploration of it and the comparison with the prevision (PEC - Prevision, Exploration, Comparison cycle) are frequently used.

Conceptual knots on magnetism and electromagnetism

Conceptual learning difficulties, known also as "conceptual knots" are to be taken into consideration in structuring an educational path (Vercellati, 2010b). Research literature in Physics Education Research (PER) highlights several conceptual knots related to magnetic field (i.e. static field) and to electromagnetic induction (i.e. dynamic field). In the latter case, the difficulties include magnetic flux and its time variation, Lenz's law (i.e. the sign of induced electromotive force), the motion of conductors in a magnetic field and the mathematical description of the phenomenology.

In the static case, the conceptual knots include: (a) the reciprocity of the interaction (i.e. the third law of dynamics) (Guisasola et al, 1999), (b) the field representation (Guisasola et al, 1999; Michelini & Vercellati, 2012) and nature (Michelini & Vercellati, 2012): related to the following questions: is the field material or is it a state of space? If it is a material entity, how it is possible to create or destroy it by means of current or the motion of something else? Which exact properties has this entity? (c) the recognition of magnetic fields generated by currents (sources and geometry of the field), (d) the concept of field superimposition (Rainson & Viennot, 1992), (e) the relation between field lines and the trajectory followed by objects interacting with magnetic field (Tornkwist et al, 1993): difference between field lines and forces, and (f) the relation between magnetic field and currents, and the nature of the field itself (Thong & Gunstone, 2008).

If we move from the static case, where electrostatics and magnetostatics are different phenomenological areas, to the dynamic case (where the electric and magnetic field are the components of the electromagnetic field) we amplify the panorama of the recalled problems about field concept. General conceptual knots regard the sources of the field and the role of relative motion (Maloney et al, 2001), the Lorenz force (its nature and identification of the effects related to charges in motion) (Maloney et al, 2001) and the Lenz's law with particular regard to the direction of the induced field (Bagno & Eylon, 1997).

Conceptual knots related to magnetic flux and its time variation regards the facts that magnetic flux is usually confused with magnetic field (Saarrelainen et al, 2007; Thong & Gunstone, 2008) and the concept of magnetic flux is not distinguished from its time variation (consequently most of students do not recognize the role of magnetic field flux time variation) (Kesonen et al, 2011; Sanchez & Loverdue, 2012; Salvesberg et al, 2011; Secrest & Novodvorsky, 2005). Time-depending magnetic field is not identified as a source of electric field (Kesonen et al, 2011) while induced current is associated mainly to relative motion between magnets and coils and there is little awareness that there is no EMI in the case in which no flux variation is observed even when a relative motion occurs between a magnet and a coil (Maloney et al, 2001; Secrest & Novodvorsky, 2005; Guisasola et al, 2013). It is not recognized that EMI can be observed also when an electric circuit is warped

in presence of a magnet (Maloney et al, 2001), when it is rotated near a magnet (Maloney et al, 2001), or in the case of two coupled circuits without any kind of relative motion (Peters, 1984; Thong & Gunstone, 2008).

Despite its educational and social relevance, recent researches in PER highlighted various difficulties in the comprehension of Faraday-Neumann-Lenz (FNL) law, demonstrating that the involved concepts and models are particularly problematic for students. There is a general agreement on the fact that the concepts related to FNL law are "highly abstract and their understanding is model-dependent" (Guisasola et al, 2007; Venturini & Albe, 2002; Huang et al, 2008; Sanchez & Loverdue, 2012). In particular Lenz's contribution to FNL law is fundamental for an in-depth comprehension of electromagnetic interactions, since it represents an expression of the energy conservation. It represents another conceptual knot for students in the comprehension of EMI phenomena (Secrest & Novodvorsky, 2005; Jones, 2003; Kesonen et al, 2011): students have difficulty in determining the versus of the induced magnetic field (Bagno & Eylon 1997). The major source of difficulty could be related to a fuzzy encoding, probably due to an incorrect interpretation, of textbook sentences like ''The induced current resists its cause'' or "it opposes the changes", that could be interpreted as being "in the opposite direction". This implies that the induced magnetic field is always in the opposite direction of the inductor magnetic field.

Conceptual knots concerning the motion of conductors in a magnetic field, arise due to difficulties emerging in interpreting magnetic flux changes when it is not evident/explicit which kind of flux-changes happens (Bringuer, 2003; Maloney et al, 2001; Feynman et al, 1964; Duit, 1985; Galili & Kaplan, 1997; 2006; Zuza et al, 2012).

Also the needed formalism to deal the aforementioned concepts is linked to some difficulties: students reach partial knowledge of the basic concepts of electromagnetism (fields, flux, induction) while they are not able to associate the mathematical formalism (vectors, integrals) to the physical description of such key concepts, so the comprehension of the relationships between these concepts as well as the construction of formal models become very difficult for learners, even though the recurring use of mathematical procedures is observed (Albe et al, 2001; Venturini & Albe, 2002; Salvesberg et al, 2002).

From a general point of view, most researches related the difficulties about FNL with students' partial and local vision of observed phenomena (Jelecic et al, 2017; Salvesberg et al, 2002; Sanchez & Loverdue, 2012). Some research results (Bagno & Eylon, 1997; Duit, 1985; Guisasola et al, 2004) demonstrate that some student difficulties regarding EMI arise from incoherent conceptualization of magnetic field and its representation through field lines, magnetic flux and divergence. The vision of field lines as concrete objects (real entities) accordingly to Faraday who "seemed to attributed more reality to the field lines than we nowadays find acceptable" (Tornkvist, 1993; Guisasola et al, 2004) affect the comprehension of EMI phenomena: students believe that it is necessary to have contact between magnetic

field lines and coils to get EMI (Thong & Gunstone, 2008; Michelini & Viola, 2008; Loftus, 1996).

The learning environment and the strategies designed to overcome those conceptual knots are presented in a workshop described hereafter.

Structure of the workshop

The workshop on magnetism, electromagnetism and superconductivity is organized in three main sections: a first explorative section focuses on the presentation of a path on magnetic phenomena, based on magnetic field lines as conceptual referent to identify magnetic field, to distinguish between magnetic field and magnetic force. Inquiry interviews based on Observe-Do-Understand (ODU) strategy will encourage the personal involvement of the participants in exploring the experimental situations on interactions between magnets and between magnets and other objects made of ferromagnetic, diamagnetic, paramagnetic matter. The compass, as a magnet itself, becomes the explorer of the properties of the space around a magnet, gives the opportunity to investigate the interactions between magnets and build a sort of map of the space in terms of flux (Vercellati, 2012).

In the second section, electric current will become the source of magnetic field: through the Oersted experiment and by using a platform of compasses, participants explore the new characteristics of field lines and individuate the analogy between a magnet and a solenoid. This gives the opportunity to measure a magnetic field in fundamental units and to explore the electromagnetic induction with relative applications (Michelini & Vercellati, 2010; Michelini & Viola, 2010).

The final section of the workshop focuses on the phenomenology of superconductivity which offers many opportunities to explore a relevant phenomenology perceived as a challenge stimulating the construction of models, activating a critical re-analysis of magnetic and electrical properties of materials. The changes in the electric and magnetic properties of a YBCO (yttrium barium copper oxide) sample, a material showing superconductive properties, at phase transition emerge, employing probes designed to explore resistivity versus temperature of solids with on-line measurements. The problematized analysis of the phenomenology aims at constructing models for the Meissner effect, using the field line representation.

Characterizing magnetic field by experimental explorations

The typical starting situation provides a cluster of different objects of different materials and shapes and a magnet. The forecast regards the interactions between

the magnet and the objects that are classified according to the different magnetic behaviour after trails. Performing the explorations, it is possible to stress out that not all metallic materials are attracted by the magnet but only the ones containing iron (ferromagnetic attraction), the modalities in which a magnet can be recognized out of other materials, due to its characteristic properties of attracting iron, and the properties of the reciprocal interactions between a magnet and an iron object (it is not simply that magnet attracts the object, but the vice-versa is also true, since forces appear always in pairs).

Interactions between magnets are subsequently explored: magnets have two different poles and the interaction can be attractive or repulsive only in the case of bonded systems. If the magnets are free (or floating), the interactions are of two types: attraction and rotation followed by attraction: no repulsion occurs, and this is at the basis of the fact that magnetic field is not a field of forces, but rather a field of torques, which is deeply linked to the fact that in a magnet it is not possible to break apart the two single poles (Fig. 1).

Fig. 1. Magnets do not attract or repeal each other according to the poles: this is true only if they are constrained. If the magnets are free, only attraction or rotation followed by attraction occur.

The idea of field as an entity permeating the space can be addressed since magnets feel each other at a distance apart with no physical contact, that can be demonstrated by the pattern assumed by iron filing placed around a magnet. The observation that a magnet can influence the needle of a compass is the starting point of using the compass as an explorer of the magnetic field around a magnet in different positions and at different distances, drawing down the field lines. From the description of field lines, the evidence that there is no intersection between lines emerges as well as the fact that they appear to be closed and that the distance between two lines is not constant (Fig. 2).
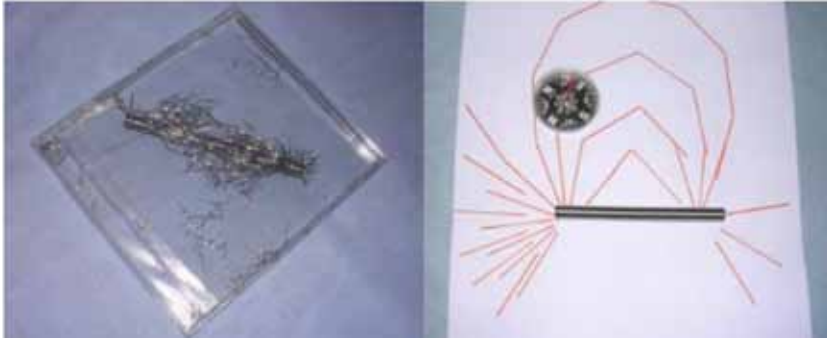
Fig. 2. Field lines are visible thanks to iron filing around a magnet or using a compass as an explorer, according to the direction of its needle in different points.

If the magnet is rotating by 90 degrees, the field lines pattern changes due to the composition of its magnet field with the terrestrial one, creating the first idea of a vectorial - not scalar - composition. Moreover, the situation proposed in Fig. 3 (left) enables us to answer the question "how will the orientation of the compass' needle change from point 5 to a point near a pole of one of the two identical magnet?". From 45 degrees in the starting position, the angle changes due not only to the fact that the magnetic field is not only a versor, but is has also an intensity, and the composition rules are the ones of the vector sum. The other evidence is provided by the experiment in which a compass approaches the pole of a magnet and noticing that the orientation of its needle changes with distance, due to the changing of the transversal component of the field. This behaviour can be explored by means of a magnetic field sensor: the intensity of the magnetic field increases approaching the magnet along a field line, demonstrating that it is not constant along one of them (Fig. 3, right).
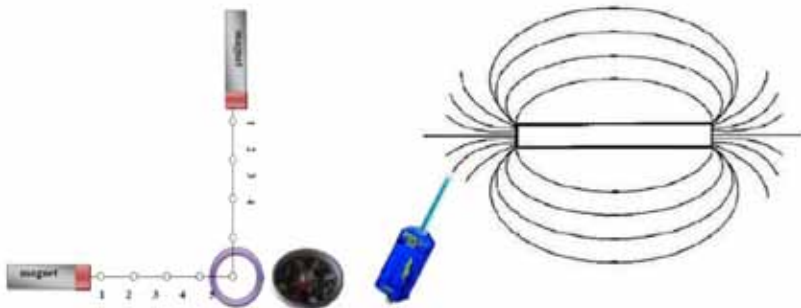
Fig. 3. A simple exploration proving the vector nature of the magnetic field (left) and the use of a magnetic field sensor to measure the intensity of the field along a previously sketched line (right).

The vector represents a magnetic property of space, orienting the needle of a compass. Magnetic field lines thus assume both the roles of representation and model, a conceptual tool to interpret magnetic interactions, to distinguish magnetic field and magnetic force (which have the same direction only for electrostatic interactions): it is enough to put a small metallic ball in proximity of a field line and noticing that the direction of the starting motion is different from the field line in that point: magnetic field and the acting force in a given point are different quantities (Fig. 4).
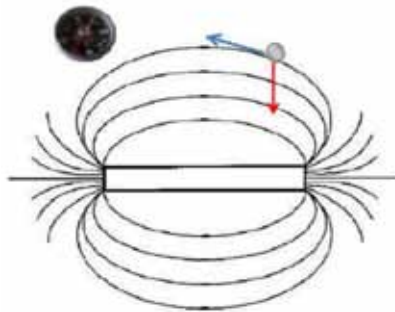
Fig.4. The force acing on an iron sphere (red) is different from the direction of the magnetic field in the same point (blue).

The magnetic field sensor also allows to measure the intensity of the magnetic field B between two field lines with respect to the relative distance D between the two lines, discovering that field lines are more distant as the field along one of them decreases. It is thus suggested to correlate the intensity of B with the area D^2 of the tube between two lines. The linear relationship between B and D^2 produces a reasoning in terms of flux, since the evidence that the product BD^2 is constant and representative of the field itself, and it is called "flux" (Fig. 5).
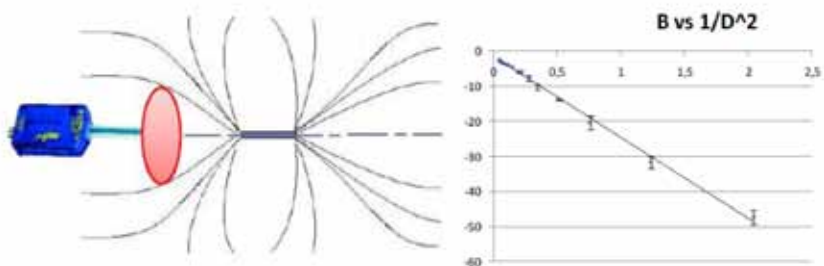
Fig. 5. The correlation between the intensity of the magnetic field (B) between two lines and the area between them (D^2) turns out to be linear. The flux of the magnetic field (proportional to B times D^2) is thus a constant.

Exploring the magnetic effects of currents and the electromagnetic induction

The second part of the workshop analyzes the sources of the magnetic field (Michelini & Vercellati, 2010; Michelini & Viola, 2010). The Oersted experiment provides the evidence that a current flowing in a rectilinear wire produce the same effects on a compass' needle that the ones produced by a magnet. In this way it is possible to explore and draw down the magnetic field lines produced by a current flowing in a rectilinear wire. The prevision of the pattern of field lines around a current loop can be foreseen and visualized both via simulation and with the tangent compass, allowing also to visualize the field pattern produced by a solenoid with the aid of a compass inside the solenoid itself (Fig. 6).
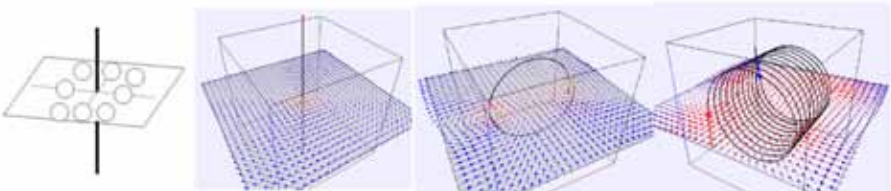
Fig. 6. An ensemble of compasses or a computer simulation allow to visualize the geometry of the magnetic field around a rectilinear wire, inside a loop or a solenoid.

This representation guides to find out a very important similarity between the magnetic field lines pattern of a magnet of the one produced by a solenoid: the two objects behave similarly from a magnetic point of view.

Since this similarity is pointed out, interactions between the new source of magnetic field, are explored: solenoid carrying current attract or repel each other according to the direction of the flowing current, a solenoid carrying current is able to attract ferromagnetic objects, and magnets are attracted by current flowing in solenoids. Interactions between different sources of magnetic field are explored by semi-structured questions as "two magnets are sources of magnetic field and interact with each other, do you think that two wires/coils/solenoids will do the same (being also them sources of magnetic field)? Perform the experiment and describe the observed phenomena".

Fig. 7. EMI can be explored analyzing the behavior of a current loop inside a magnetic field: the direction of the force acting or the balance's arm depends on the versus of the current.

The next step is the experimental exploration of EMI: a coil connected to one of the two arms of a balance is placed between two magnets; the wire is connected to a voltage supply and the current flows first in one sense and then in the other (Fig. 7). The arm of the balance curves towards or far away from the magnets according to the versus of the current. This experimental exploration is performed having in mind flux tubes in order to interpret the observed behavior.

The next point is to explore the vice-versa: if a current produces a magnetic field, can a magnetic field produce a current? The role of magnetic flux and its time variation is explored considering the role of the different parameters (magnetic field, area and orientation) placing different coils with different number of loops and different areas between two magnets. The coils are connected to a galvanometer, measuring the current flowing, and the relationships between the induced current and the parameters comes after qualitative and quantitative exploration by means of on-line sensors (Fig. 8).
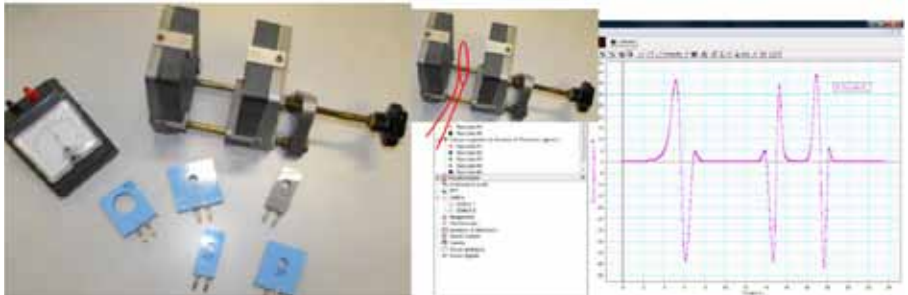
Fig. 8. Quantitative and qualitative analysis of EMI. The former can be performed using a galvanometer connected to different loops moving inside a magnetic field (left) while the latter can be performed using an on-line sensor measuring the voltage to the heads of the loops (right).

A simple experiment clarifying the phenomenology of EMI is illustrated in Fig. 9: a cart moves under the weight of a magnet falling into a coil. The voltage across the coil and the cart's velocity are measured with sensors connected to a PC. Two peaks of voltage are measured: the former corresponding to the magnet entering the coil, and the latter corresponding to the magnet exiting the coil. Peaks are different, but they are linearly correlated with the velocity (the second peak is, in absolute value, greater than the first one, since the motion is an accelerated one). The areas of the two peaks are equal since the total variation of flux is zero (magnet first enters the coil, and then the same magnet comes out of the coil).
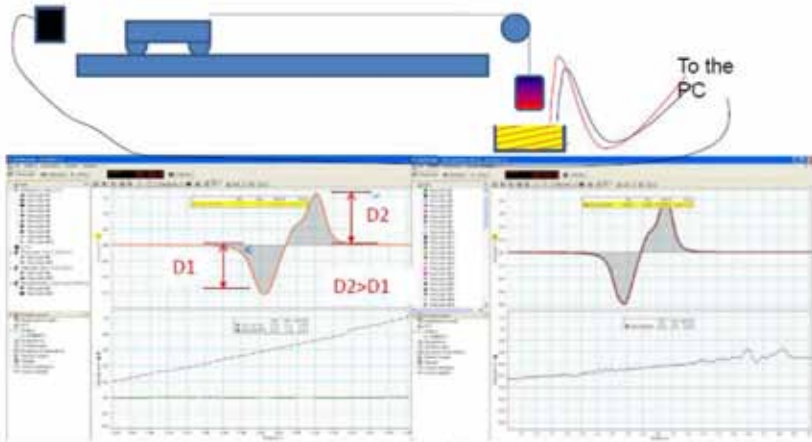
Fig. 9. Experimental setup to measure the induced electromotive force (emf) induced by the free falling of a magnet inside a solenoid. Graphs allows to observe that the net flux variation is zero and that the emf is linearly correlated with the speed of the falling magnet.

A research-based path on superconductivity

The last session of the workshop explores phenomena related to superconductive behavior of certain materials in the light of magnetic interactions and EMI phenomena previously analyzed.

By means of simple torsion balances is possible to explore the interaction of a magnet with different kind of materials (aluminum, copper, water, wood, graphite) hanging to the balances and see if they are attracted, repulsed or not affected by the magnet. This exploration allows to demonstrate the different behavior of the materials in the proximity of a magnet: ferro-, para- and diamagnetic properties are explored, noticing that some materials (for example pirolitic graphite) are repelled. It is thus shown that diamagnetic materials show repulsive magnetic properties only in the presence of a magnet. The usage of a torsion balance is needed since diamagnetic effects are very weak.

The next step is the analysis of three phenomena apparently different from each other: (a) the free fall of a flat magnet on a diamagnetic metal, for example copper, ground, (b) the motion of a flat magnet on an inclined diamagnetic metal and (c) the free fall of a flat magnet inside a tube of the same material. In all the cases, the magnet slows down till reaching a constant velocity, despite in static conditions it interacts very weakly with the material used. Tubes of different materials can be

used and the velocity reached by the magnet depends from the material. It turns out that the lower is the resistivity of the material, the lower is the velocity of the magnet. The phenomenon is interpreted in the light of the EMI phenomenology and eddy (induced) currents: the conceptual tools used are the operative definition of field lines, the flux of the magnetic field and the FNL law: Induced currents interact with the magnetic field of the magnet producing a force, i.e. a lifting (braking) effect (Fig. 10).
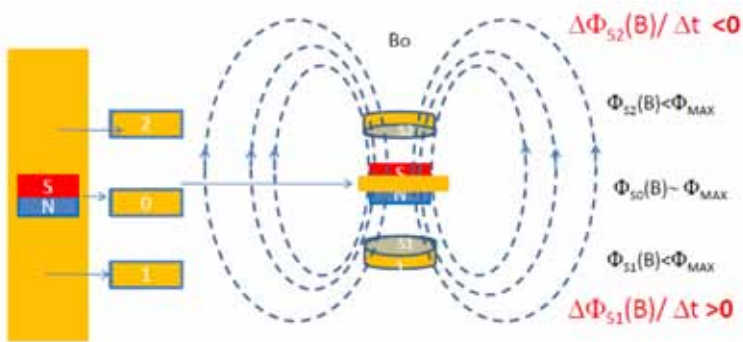
Fig. 10. A round magnet falling inside a metallic tube creates eddy currents, due to the variation of flux, resulting in a force that slows down the magnet. The lower the resistivity of the material, the higher the eddy currents and the braking effect is more evident. This effect does not depend on the magnetic properties of the tube, that can be either a para- or diamagnetic material.

The exploration of a peculiar behavior of a YBCO (Yttrium-Barium-Copper-Oxide) tablet allows to explore the Meissner effect: preliminary exploration with magnets or compasses show that the YBCO does not interact with any magnets nor it shows any magnetic properties at room temperature, but when the tablet is in thermal equilibrium in a bath of liquid nitrogen at a temperature of T_{LN} = 77K, it strongly interacts with the magnet and levitation occurs: the magnet is repelled by the cooled YBCO and it oscillates around its equilibrium position (Fig. 11).

Fig. 11. A cooled tablet of YBCO interacts in a new way with a magnet.
How can be this behavior interpreted?

Only the magnetic property of the YBCO are changed, since both at room temperature and at T_{LN} the magnet interactions with other objects (not YBCO) are essentially unchanged, and the magnetic field measured around the magnet with a probe has the same intensity and direction. Hypotheses concerning the changing in the magnetic properties of the YBCO are discussed: has the YBCO become a ferromagnetic object? If the magnet is reversed (undergoing a 180 degrees rotation), levitation occurs in the same way: there always is a repulsive effect. The YBCO does not become a ferromagnetic object since when a magnet interacts with a ferromagnetic object there is an attractive effect. Maybe the YBCO becomes a magnet and it interacts with the other magnet as they are facing with the same polarity (i.e. the levitation a case of suspended magnets)? The answer is no, the YBCO tablet does not become a magnet since two magnets repeal each other only when they are constrained to be faced with the same polarity. Two free magnets facing the same polarity rotate to attract each other. In levitation the magnet and YBCO are free and repulsion occur with no rotation (Fig. 12).
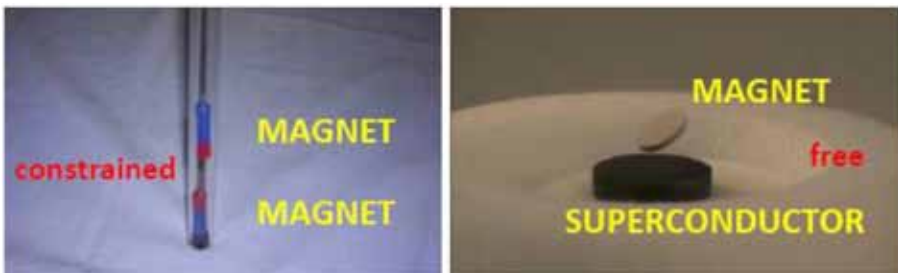
Fig. 12. The phenomenology of a free magnet repelled by a YBCO tablet is not amenable to the situation in which two constrained magnets interacts repelling each other.

The next question is: does the YBCO at T_{LN} act magnetically with no magnet close to it, i.e. can we expect an interaction between an iron clip and the YBCO tablet? An experimental test will be in any case dramatically negative: nothing happens in any case, so the YBCO does not "act magnetically" with no magnet close to it. Does thus the YBCO become diamagnetic at T_{NL} since diamagnetic material repeals magnets? Analyzing the levitation phenomenon characteristics emerges that if the magnet is changed, the height of that it is very weak or negligible through the YBCO.

The magnetic behavior of the YBCO appears to be induced; an analogy can be used in order to interpret the phenomenon, recalling the situation of a falling magnet on a copper bar or inside a copper tube that gradually decreases its velocity till reaching a constant velocity. EMI and eddy currents are used for interpretative analogies in order to discuss about the Meissner effect: the analogy between the "braking" of the magnet in presence of a conductor and the levitation, appears to work if the conductor is "perfect" (i.e. with zero resistance), so the current initially

induced by the magnet never stops. A superconductor turns out to be a system with zero resistance and zero magnetic field inside it. A match between the braking of the magnet in the presence of a conductor and levitation has been built!

It is possible to see if a change in the electrical properties of the superconductor with respect to its temperature occurs using an on-line system (Gervasio & Michelini, 2009), allowing the study of the relationship between resistivity and temperature in a superconductor (Fig. 13, left). A sample of superconductor is cooled down to TNL and the transition to the superconductive state (i.e. with zero resistivity) is observed in real time below a certain critical temperature (Fig. 13, right).
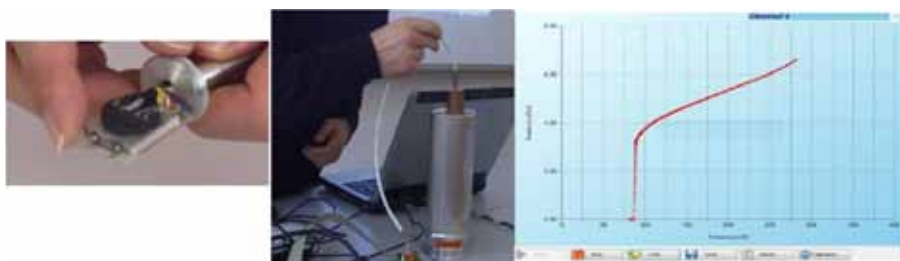
Fig. 13. The on-line system used to measure in real time the dependence of the resistivity of a superconductor (left) with respect to its temperature (right). The sample is put in a case and immersed in liquid nitrogen to gradually decrease the temperature (middle). The system is constituted by an interface card for USB connection with PC.

Conclusions

Literature presented several student difficulties on magnetic phenomena quoting specific learning knots, and evidences of the way to overcome them, as for example offering field lines as conceptual referent for the field and monitoring dynamical evolution of reasoning.

Concerning magnetic phenomena, starting from the analysis of the interactions of a magnet approaching objects made out of different materials it is possible to recognize the different kinds of interactions, and explore the idea of a magnetic property in the space around a magnet.

Experiments used as anchor referents for building interpretative models, are proposed and performed: the interaction between floating magnets, the pattern assumed by iron filing placed around a magnet, the use of the compass as an explorer of the magnetic properties and the experiment of the broken magnet become pivotal conceptual referents upon which explanatory model coming out from hypotheses, testing and comparisons can be built. The compass is used to draw down the field lines, used as a conceptual referent, and it is understood both as an explorer of the magnetic properties of space and as a magnet itself. The concept of flux spontaneously emerges from the qualitative analysis of the mathematical relation

between the intensity of the field and the area of a flux tube. The learning path provides also a set of experiences and observations that allows to experimentally explore the phenomenology of the EMI, starting from the previous explanatory model based on the idea that magnetic field is thought as the region of space in which the presence of the magnet is felt and that could be represented using field lines. Even if only in a qualitative way, the main phenomenological characteristic of the process of EMI highlighting the dependence from the different parameters are explored. The presence of a main direction in the magnetic propriety that influences the production of current into a coil is highlighted as well as the relation between the sign of the inducted current and the way in which it interacts the field lines.

The phenomenology of superconductivity is analyzed in the light of the addressed concepts and the Meissner effect is interpreted as a phase transition to the superconductive state of an YBCO tablet, after having analyzed its magnetic and electrical properties.

References

Albe V., Venturini P. and Lascourse J. (2001). Electromagnetic concepts in mathematical representation of physics. J. Sci. Ed. Tech. 10, 197.

Bagno E. & Eylon B.S. (1997). From problem solving to a knowledge structure: an example from the domain of electromagnetism. Am. J. Phys. 65(8), 726.

Bouquet F., Engstrom V., Greczylo T., Ireson G. and Michelini M. (2009). High-tech kit – the set of advanced activities from the Mosem Project, MPTL14 Proceedings.

Bringuer E. (2003). Electrostatic charges in v x B fields and the phenomenon of induction. Eur. J. Phys., 24, 21-29.

Dori Y.J. & Balchner J. (2005). How does technology-enabled active learning affect undergraduate students' understanding of electromagnetic concepts? The J. Learn. Sc., 14(2), 243-279.

Duit R. (1985). In search of an energy concept. In R. Driver & R. Millar Eds., Energy matters–Proceedings of an invited conference: Teaching about energy within the secondary science curriculum (pp. 67–101). Fairbairn House: The University of Leeds.

Eckert B., Gröber S. and Jodl H.J. (2009). Distance Education in Physics via the Internet. Am. J. Dist. Educ. 23(3), 125-138.

Feynman R., Leighton R.B. and Sands M. (1964). The lecture on Physics. Menlo-Pak: Addison-Wesley, vol.2, 17-2.

Fodor P.S. *and* Peppard T. (2012). Lenz's law demonstration using an ultrasound position sensor. The Phys. Teach. 50, 344.

Galili I. (2001). Conceptual problems in teaching electromagnetism within an introductory physics course. In R. Pinto & S. Surinach Eds., Physics teacher education beyond 2000 (Phyteb2000), GIREP book – selected contribution of the Phyteb2000 international conference, Elseiver, Paris, 213-216.

Galili I. & Kaplan D. (1997). Changing approach to teaching electromagnetism in a conceptually-oriented introductory physics course. Am. J. Phys. 65(7), 657-667.

Galili I., Kaplan D. and Lehavi Y. (2006). Teaching Faraday's law of electromagnetic induction in an introductory physics course. Am. J. Phys. 74(4), 337-342.

Gervasio M. & Michelini M. (2009). A USB Probe for Resistivity versus Temperature and Hall Coefficient measurements, MPTL14 Proceedings.

Gilbert J. K., Boulter C.J. and Rutherford M. (1998). Models in explanations, part 1: horses of courses? IJSE, 20 (1), 83-97.

Guisasola J., Almudì J.M. and Cerberio M. (1999). Students' ideas about the source of magnetic field. PoS1-5.

Guisasola J., Almudì J.M. and Zubimendi J.L. (2004). Difficulties in learning the introductory magnetic field theory in the first years of university. Sc. Ed., 88(3), 443-464.

Guisasola J., Michelini M., Mossenta A. and Viola R (2007). Teaching electromagnetism: issues and changes. R. Jurdana-Sepic et al. Eds., Frontiers of Physics education, GIREP – EPEC Conference 2007, selected contributions.

Guisasola J., Zuza K. and Almudì J.M. (2013). An analysis of how electromagnetic induction and Faraday's law are presented in general physics textbooks focusing in learning difficulties. Eur. J. Phys. 34, 1015.

Huang Y., Yang B.W. and Adams R. (2008). Proceedings of the 2008 IAJC-IJME international conference.

Jelcic K., Planinic M., and Planinsic G. (2017). Analyzing high school students' reasoning about electromagnetic induction. Phys. Rev. Phys. Ed. Res. 13, 010112, 1-18.

Jodl H.J. & Eckert B. (1998). Low-cost, high-tech experiemnts for educational physics. Phys. Educ. 33(4), 226-235.

Jones C. (2003). Understanding and using the minus sign in Faraday's law. Phys. Ed. 38(6), 526-530.

Kedzierska E. Esquembre F., Konicek L., Peeters W., Stefanel A. and Farstad V.S. (2010). MOSEM2 Project: integration of data acquisition, modelling, simulation and animation for learning electromagnetism and superconductivity, in MPTL Proceedings, Michelini M., Lambourne R and Mathelish L. Eds.

Kesonen M.H.P., Asikainen M.A. and Hirvonen P.E. (2011). University students' conception of the electric and magnetic fields and their interrelashionships. Eur. J. Phys. 32, 521-534.

Loftus M. (1996). Stidents' ideas about electromagnetism, SSR, 77, 280.

Maloney D.P. et al (2001). Surveying students' conceptual knowledge of electricity and magnetism. Am. J. Phys. 69(S1), S12.

McDermott L.C. (199) Physics by inquiry Volume II, John Wiley & Sons, Inc, New York.

McDermott L.C. (1991). What we teach and what is learned: closing the gap. Am. J. Phys., 59, 301-315.

McDermott L.C., Shaffer P.A., and the PER group, (1998) Tutorials in introductory physics, Upper Saddle River: Prentice Hall.

McNeil J.A. (2004). The metal detector and Faraday's law. The Phys. Teach. 42, 8-12.

Michelini M. (2005). The Learning Challenge: A Bridge between Everyday Experience and Scientific Knowledge, GIREP book of selected contributions, Ljubljana.

Michelini M. (2010). Building bridges between common sense ideas and a physics description of phenomena to develop formal thinking, New Trends in Science and Technology Education. Selected Paper, vol. 1, Menabue L. & Santoro G. Eds., CLUEB, Bologna, 257-274

Michelini M. & Vercellati S. (2012). Pupils explore magnetic and electromagnetic phenomena in CLOE labs. Latin-american J. Phys. Ed. 6(1), 10-15.

Michelini M. & Vercellati, S. (2010). Primary pupils explore the relationship between magnetic field and electricity, in Raine D., Hurkett C. and Rogers L. Eds. Physics Ed. Community and Cooperation: Selected Contributions from the GIREP-EPEC & PHEC 2009 International Conference, Lulu/ The Centre for Interdisciplinary Science, Leicester, vol. 2, 162-170.

Michelini M. & Viola R. (2008). Conceptual knots, learning questions and curricular path in MOSEM project teacher seminars. In GIREP proceedings, Nicosia, Cyprus.

Michelini M. & Viola R. (2010). A research based teaching/learning path experimented in secondary school on electromagnetic induction, in New Trends in Science and Technology Education. Selected Paper, vol. 1, Menabue L. and Santoro G. Eds., CLUEB, Bologna.

Michelini M., Mossenta A. and Stefanel A. (2003). L'operatività per l'apprendimento nel contesto informale della mostra GEI, Museologia scientifica, 18/1-2, 94-99.

Nussbaum A. (1972). Faraday's law paradoxes. Phys. Ed. 7, 231.

Peters (1984). The role of induced emf's in simple circuits. Am. J . Phys. 52(3), 208-211.

Priest J. & Wade B. (1992). A Lenz law experiment. Phys. Teach. 30, 106-108.

Rainson S. & Viennot L. (1992). Int. J. Sci. Educ. 14(4), 475-487.

Ruiz M.J. (2006). Lenz's law magic trick. The Phys. Teach., 44, 96.

Saarrelainen M. Laaksonen A. and Hirvonen P.E. (2007). Students' initial knowledge of electric and magnetic field – more profound explanation and reasoning models for undesired conceptions. Eur. J. Phys., 28, 51.

Salvesberg E.R., Ferguson-Hessler, M.G.M., and De Jong T. (2002). Situational knowledge in physics: The case of electrodynamics. J. of Res. in Sc. Teach. 39(10), 928-951.

Sanchez C.W. & Loverdue M.E. (2012). Further investigation of examining students understanding of Lenz's law and Faraday's law. AIP conference proceedings 1413, 335.

Savelsberg E.R., De Jong T. and Monica G.M. Ferguson-Hessler (2011). Choosing the right solution approach: the crucial role of situational knowledge in Electricity and Magnetism. Phys. Rev. ST- Phys. Ed. Res., 7, 010103.

Secrest S.& Novodvorsky I. (2005). Identifying student difficulties with understanding induced EMF. arXiv:physics/0501093.

Tanner P., Loebach, Cook J. and Hallen H.D. (2001). A pulsed jumping ring apparatus for demonstration of Lenz's law. Am. J. Phys. 69(8), 911-916.

Thong W.M. & Gunstone R. (2008). Some students conception of electromagnetic induction. Res. in Sc. Ed. 38(1), 31-44.

Tornkvist S., Pettersson K.A. and Transtromer G. (1993). Confusion by representation: On student's comprehension of the electric field concept. Am. J. Phys. 61, 335.

Torzo G., Sconza A. and Storti R. (1986). A low-cost digital traslameter. J. Phys. E. Sci. Instrum., 20, 260-262.

Venturini P. & Albe V. (2002). Interpretation des similitudes et defferences dans la maitrise conceptualle d'etudiants en electromagnetisme a partir de leur(e) rapport(s) au(x) savoir(s). Aster, 35, 165.

Vercellati S. (2010 a). Construction of the concept of field seen as a process starting from an historical based rational reconstruction, New Trends in Science and Technology Education. Selected Paper, vol. 1, Menabue L. and Santoro G. Eds., CLUEB, Bologna.

Vercellati S. (2010 b). A discussion on disciplinary knots concerning electromagnetism and superconductivity using a Web environment in the context of an EU Project (MOSEM) for research-based in service teacher training, Selected Paper Book MPTL14, Il Nuovo Cimento C, Year 2010 Issue 03 - May/June, 189-193.

Vercellati S. (2012). PhD dissertation, University of Udine.

Zuza K., Guisasola J., Michelini M. and Santi L. (2012). Rethinking Faraday's law for teaching motional electromotive force. Eur. J. Phys., 33, 397-406.

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Access for Disabled Students to Further and Higher Education: an Intersubjective and Dialogic Process

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Abstract

Inclusive education is a right for all students at all levels of education, including further and higher education. In this paper, I present an overview of key developments in inclusive education and its underlying principles, as they relate to disabled students. I then discuss the complexities involved in implementing these principles in practice, a discussion that leads to an argument for looking at inclusion through the lens of intersubjectivity. Using this concept, I then argue that educators and students (as key stakeholders) need to work together and with others to remove these barriers, taking into account each other's different perspectives and understanding inclusive education as an ongoing relational process based on firm principles which are at the same time practised flexibly in order to attend to the peculiarities of each individual situation. I next focus on research that sheds light on the practice of inclusion, especially the barriers that still exist in further and higher education. Finally, I refer to Freirean dialogic pedagogy as a potential guiding light to the practice of inclusive education.

Keywords: Inclusive education, disabled students, intersubjectivity, Freirean dialogic pedagogy

Key Developments in Inclusive Education

On an international level, inclusive education as a right for all students at all levels of education, was established in the Salamanca Statement in 1994 (UNESCO 1994) and subsequently also in the United Nations Convention on the Rights of Persons with Disabilities (CRPD), which was adopted by the UN General Assembly in 2006 (United Nations 2006). Malta is one of the many countries that have both signed the Salamanca Statement and ratified the CRPD, thus committing itself to implementing an inclusive education policy. In fact, it was in 1994 that the first learning support educators (LSEs), who were called facilitators at the time, were employed to support disabled children in mainstream schools (Spiteri, Borg, Callus, Cauchi and Sciberras 2005).

There were, of course, disabled students in mainstream education before that date, in Malta and elsewhere. For example, the late Gordon Cardona (2011), who was a disabled activist, describes how he attended mainstream schools – well before 1994. Regardless how welcome Gordon (and other disabled children) were made to feel in his school, what he was benefitting from, was integration, rather than inclusion. As Bartolo (2001) points out, while integration relates to fitting the student into the existing school system, inclusion is about adapting that system according to the needs of the student and attending to their individual educational needs. It is therefore important to note that the Salamanca Statement, the CRPD, and various national anti-discrimination disability laws such as our Equal Opportunities (Persons with Disability) Act (Laws of Malta 2000), do not simply re-state the right to education of students with disability, but affirm the right to *inclusive* education.

Article 24 of the CRPD states the following:

> *States Parties recognize the right of persons with disabilities to education. With a view to realizing this right without discrimination and on the basis of equal opportunity, States Parties shall ensure an inclusive education system at all levels and lifelong learning*
>
> (United Nations 2006).

What ensues in this, the longest article of the CRPD, is a detailed framework of how education systems need to adapt to meet the individual educational needs of disabled students. There is a shift from placing responsibility on the disabled student to fit into the mainstream education system, to placing the onus on the education system to adapt itself to meet the student's individual educational needs. The question we therefore need to ask does not revolve around 'whether student A may be placed in mainstream education?' but rather, 'what does mainstream education need to do to accommodate student A's individual educational needs?' This shift in focus from the individual to the education system, reflects the shift discussed by Oliver (1996), from the medical model to the social model of disability; that is, from equating disability with impairment – and therefore seeking remedies only in terms of fixing that impairment – to recognising the part that society plays in creating disability.

To return to the CRPD, the Preamble recognizes:

> *that disability is an evolving concept and that disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others.*
>
> (United Nations 2006; Preamble (e)).

It is worth noting that this is also the definition of disability in our Equal Opportunities (Persons with Disability) Act.

> As the CRPD and anti-discrimination legislation hold, disabling barriers are removed through providing reasonable accommodation, returned to below. To a large extent, inclusive education concerns establishing the individual educational needs of disabled students

and identifying and implementing measures to meet those needs, without compromising the educational institution's ability to fulfil its aims in delivering a quality education to all its students.

A complex process

Inclusion is a complex process. It is not a one-time measure which, when implemented correctly, ensures that all students are fully included regardless of their individual educational needs. This is precisely because those needs are *individual*. There are of course generic measures that contribute to the inclusion process – ensuring step-free access into a building, and lifts and accessible toilets within it; providing large-print versions of teaching and assessment material; allowing for extra time in exams; making arrangements for sign language interpreting and personal assistants and so on. However, there will often remain issues that cannot be addressed except through putting into place individualised arrangements. Unless we address these issues, what we purport to be inclusive education, will simply be enhanced integration. This is where reasonable accommodation comes in. Article 2 of the CRPD defines reasonable accommodation as

> *necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms*

> (United Nations 2006).

There are two perspectives that are taken into account here: the disabled person and the one who is obliged to make modifications and adjustments. In an educational context, this would be the disabled student and the educational institution (which includes lecturers, teaching assistants, members of the senior management team and education authorities – I am using 'educators' as a catch-all term for these different roles). For disabled students, the focus is on eliminating obstacles, breaking barriers, that stop them from enjoying and exercising their rights on an equal basis with other students. For educators, the focus is on finding a way of removing these obstacles and barriers without putting 'a disproportionate or undue burden' on them. It is educators that need to make changes and ultimately, it is disabled students' rights that must be upheld. Yet there is also room for discussion and negotiation to find a way of making changes and upholding rights that are reasonable. In fact, there

is a *need* for discussion and negotiation, not least because – as the definition of reasonable accommodation states – modifications and adjustments may be needed 'in a particular case.'

Inclusion is also a complex process because of the many layers of interpretation involved. Regardless of the existing legislation and other policy documents, and of the progress registered in many countries in the implementation of an inclusive education policy (Academic Network of European Disability Experts 2018), what happens when a disabled student enters a mainstream educational institution is still affected by the attitudes of the educators in that institution and of policy makers, and by their subjective interpretation of how inclusion should take place. As Lindsay (2003) states, 'Inclusion is the policy framework. What is at issue is the interpretation and implementation of inclusion in practice.' (p.9)

More recently, de Beco (2017) has discussed how the subject of inclusive education is still a matter of debate and even controversy and resistance. On the basis that inclusive education is a right that the CRPD expects governments to progressively realise (as per Article 4(2)), he argues that,

> only by redesigning the general education system step by step, and by improving social attitudes continuously but steadily, will the right to inclusive education finally be implemented. Inasmuch as education engenders a greater appreciation by all future adults of the richness of human diversity, establishing an 'inclusive education system' in such a step-wise manner will be the best way of overcoming the current opposition to its implementation.
>
> <div align="right">(de Beco 2017, 16).</div>

Inclusive education therefore calls for discussion and dialogue about what it means, who it is that is to be included, and how to include them. It also calls for this dialogue to be an ongoing process in order to ensure reflection on and evaluation of the steps that are taken. It also calls for dialogue amongst the different stakeholders – especially disabled students, parents, educators and policy makers. Since these are persons with their own perspective and subjectivity, the concept of intersubjectivity can provide a way forward for this dialogue to be effective.

Intersubjectivity

Intersubjectivity as a notion has been used in different ways in philosophy, psychology, sociology, and literary criticism. In philosophy, whether it is Husserl, or Levinas, or Merleau-Ponty, among others, who are dealing with the topic, however much they may disagree amongst each other on the concept, one of the areas of common agreement seems to be that we can never really know the other as well

as we know ourselves (Moran, 2000; Sanders 2014), to which Judith Butler (2005) would add that we are opaque even to our own selves.

Levin (1998) describes intersubjectivity as 'the subject's encounter with another subject' (p.359). For the purpose of my argument, this is a very fitting description of the concept, because it makes us aware that the other is as much a subject as we are, and moves us as far away as possible from the dangers of solipsism to which, as Merleau-Ponty (2000) warns, we are all prey. The subject is capable of acting, of having an impact on their world, of exercising agency in their life. Each subject of course has their own perspectives and their own way of experiencing and interpreting the objective world around them. A solipsistic worldview stops there – what is important is only one's subjectivity and perspective. Intersubjectivity, on the other hand, acknowledges that each person's sense of self is formed relationally.

Wetherell and Maybin (1996) describe the relational view of the self, in terms of a Venn diagram. They argue that we tend to see ourselves and others as billiard balls – momentarily coming into contact with each other, influencing each other's direction but not impinging on each other's selves which are seen as 'already constituted and contained entities' (p.221). In a relational view of the self, the subject's boundaries are permeable and are affected by the selves of the people one comes into contact with. Each self is represented by a circle which overlaps with others. Significantly, in these particular Venn diagrams, the circles representing the selves of others remain on the outer edges of the main circle, the one representing the person interacting with others. This is because a relational view of the self, obliterates neither the subject's agency nor its constancy across time. It simply acknowledges that how the self and the subject develop and evolve, is partly contingent on the contact made with other selves and subjects.

But intersubjectivity requires us to go further. It requires us to acknowledge the Venn diagrams of other people as well, and our impact on them, while cautioning us not to assume that we know what those diagrams look like. Closely linked to intersubjectivity is empathy, as Husserl and Edith Stein (1998) tell us. Within inclusive education, being empathic towards fellow educators may be easier than being empathic towards disabled students. With the former, we have shared experiences, knowledge and perspectives that we may not easily share with the latter. Consequently, it is on the intersubjectivity between the educator and the disabled student that I will focus, in order to explain my argument that inclusive education is best seen as an ongoing relational process based on firm principles which are at the same time practised flexibly in order to attend to the peculiarities of each individual situation.

For the relational process between educators and students to be an effective and fruitful one, as educators we need to understand the perspectives of disabled students as fully as possible, and to present our own perspectives to them. We also need to keep in mind that this exchange of views happens in a context with

an inevitable imbalance in favour of educators. It is therefore incumbent on the latter to attend to the peculiarities of each individual disabled student's situation. Listening to what they have to say for themselves is crucial. Listening to disabled students also means upholding their participation rights, that is their right to make their voice heard and to be involved in decisions affecting them.

Although I am here focusing on young people in further and higher education, I want to turn for a while to younger students, the ones who are still in primary and secondary schools. In our book *The Disabled Child's Participation Rights*, Ruth Farrugia and I set out what these rights entail (Callus and Farrugia, 2016). We write that the disabled child's participation rights need to start by acknowledging them as subjects who can have an impact on their own lives through the exercise of their agency. Furthermore, recognizing the ability of the disabled child to participate in decision-making processes does not simply mean being aware of their capacity to do so. Ability to participate is not equivalent to innate capacity to do so, but arises from opportunities afforded to children. For the disabled student, it also entails being provided with the support they require to meet their impairment-related needs. Very importantly, upholding the disabled child's participation rights also involves appreciating the intrinsic worth of their perspectives and the insights that we can gain from them. Finally, the ability – and even the capacity – to participate in making decisions is one that needs to evolve. It is not just students' abilities that evolve, but also those of educators, who can become increasingly more adept at facilitating students' voices to be heard and at listening and acting upon what they have to say. The disabled student's competence to participate in decision-making processes is therefore something that needs to be discovered. It is not a static characteristic that can be measured or pre-established according to the age of the student. Participation in decision-making is dependent not only on the disabled student's competence, but on the competence and skills of educators and other adults to support the student in expressing their views.

When we do listen to a disabled student's voice, the knowledge we – as educators – gain, can help us support that student better. It can also help us become better and more inclusive educators. Insights obtained from one situation are used in others, as we absorb those insights and make them part of our practices, informing the approach to our work, and how we see the world.

Disabled students' voices

In this context, I will focus on some research which solicits the views of disabled students. As Miskovic and Gabel (2012) point out, research about inclusive education adopts a social model understanding of disability, in that it investigates the barriers within the education system encountered by disabled students. To these of course

we should add the investigation of enabling factors – that is, when inclusion works well, what factors contribute to this achievement?

I start with two studies carried out in Malta with primary and secondary schoolchildren respectively. When it is young children who are speaking, what they say is particularly worthy of attention – it is all too easy to underestimate how aware young disabled children are of what is going on in their life and how valid their opinions about that are.

In the presentation of her research with a young boy with physical disability – whom she calls Alexander – Psaila starts by quoting him. While she was playing with him, when carrying out the fieldwork for her research, Alexander pretended to be Psaila's teacher and told her,

> We are going to do some classwork and for homework we are going to
> have the same as classwork. And you only have 29 minutes to finish it!
> OK? So you better get to work! (Alexander, age 7) (p.171).

This quotation is contrasted with one from his teacher and learning support assistant who say:

> He is very laid back. He is dependent on having an adult prompt him
> all the time, and in group work, he allows others to take control.
> (Alexander's Teacher & Learning Support Assistant) (p.171)

As Psaila remarks, it is hard to believe that the teacher and learning support assistant are speaking about the boy who is so much in control in the teacher-student game that he had himself initiated.

Additionally, as Psaila reports in her article, one of the wishes that Alexander expressed to her, is that he would not use the lift at school on his own. When his class needs to go upstairs for some of the lessons, he wishes that some of his classmates would ride in the lift with him. That is a wish that cannot be hard to grant. It would place Alexander on a more equal level with the others – some students go up and down the stairs, others use the lift. However, no one would have thought it was an issue for Alexander. For most adults, the fact that the school has a lift and that Alexander is not missing out on lessons that take place upstairs is enough. It took Alexander to make us realise that using the lift on his own may include him academically but not socially.

Furthermore, Alexander could help us realise the importance of the social aspect of inclusive education once someone took the time to listen to what he had to say for himself. Psaila (2017) also makes the point that listening to what the disabled student has to say about their life can be time consuming.

The first step in making the disabled student's participation rights a reality, then, is for us to take time out of our busy schedule and our usual way of doing things, and stopping to listen to and learn from our students. When we do that, the results

yielded can be extremely insightful, even if sometimes challenging. Take for example this quotation by Gordon, a student with ADHD interviewed by Maria Camilleri:

> *if you are ADHD, you are always fidgeting with your uniform... the amount of times I got in trouble because of the uniform ... I got after schools, I got break in... I got in trouble because my shirt was not tucked in, my tie was not tight enough, and my buttons were not buttoned up correctly according to the great god of buttons* (p.65).

It may be deceptively easy to dismiss Gordon's viewpoint – of course our teacherly instincts tell us that it is important for students to be smartly dressed and perhaps Gordon needs to understand why following the same dress code as his schoolmates is important. However, he cannot be expected to understand that, unless he is listened to, unless he is himself understood. If it is fidgeting that Gordon needs to pay attention to the teacher, a simple solution can be found by giving him alternatives that don't involve him ending up looking disheveled. As with Alexander, the issue cannot be sorted until someone takes the time out to listen to Gordon and dialogue with him.

To return to inclusion at a further and higher education level, research carried out in the United States, Hong (2015) identifies various contributing factors to effective inclusion, among them: the perceptions of the lecturers, the quality of the support services, the commitment of the student and their adjustment to a more independent learning style at this level and the extent to which they are included in both the academic as well as the social life of the educational institution. Other factors, identified by Moriña (2017) in her review of the research literature from various countries, are: support from the family and from peers and friends; support and encouragement from lecturers and other educational staff, as well as from specific disability support officials; having the necessary adjustments in place, including the provision of technology and software where applicable; and identifying the strategies that the students themselves develop throughout their years in formal education.

Atkins (2016) warns about the danger of assuming that our practices are fully inclusive and overlooking the more covert types of discrimination. In her article, she presents research conducted with Ollie and Tom, two British university students with severe physical disabilities. These two young men's experiences were positive on the whole. They did pinpoint, however, how they felt excluded from the social life on campus. Their remarks serve as important reminders that, in the same way that education is not only about gaining academic credentials, so too, inclusive education is not only about ensuring access to the curriculum, but also about creating an inclusive and welcoming ethos in different activities, facilities, and aspects of educational life. Nonetheless, even if we were to focus on the academic aspect only, there is still much to be done. As Hadjikakou and Hartas (2008) argue in their research on inclusion in higher education in Cyprus, it is not just a question

of installing ramps and allowing for extra time in examinations. Inclusive education also involves adapting teaching methodologies and proactively seeking to meet individual educational needs.

Reflecting on quotations from students in research about inclusion in further and higher education can yield very interesting results. There are responses where we can quite easily identify with what the disabled students say. For example, in Magnus and Tøssebro's study (2014), Elisabeth reports how a professor accepted to give her the lecture notes because she has cerebral palsy, but refused them to her course-mate who has dyslexia. We can sympathise with the students who, for instance, are refused what we would consider to be perfectly reasonable arrangements because, they are told, it would be too expensive to accommodate them. We can also see the reason why some students with hidden disabilities prefer not to disclose their conditions. When speaking about her friends, Eli, another student in Magnus and Tøssebro's research, feared these friends would redefine her if she told them about her impairment, '*I want them to know me as ME, and not ADHD-me*' (Magnus & Tøssebro 2014, p.322).

We can perhaps even empathise with Eli and understand why she did not want to be identified by her label. She adds,

> *After many years of struggling and tears, I finally have managed to keep friends. I have friends who do not know that I have ADHD, who look upon me as a normal person. It was so important for me*
>
> (Magnus & Tøssebro 2014, p.322).

In order for us as educators to truly empathise, we need to understand that when disabled students present themselves to us in a calm manner, they may be hiding many struggles and conflicts, with themselves and with others. Appreciating that this may be the case can go a long way towards our ability to understand their subjective positions.

Research carried out in Malta by Liliana Marić (2017) with disabled students in Further and Higher Education, emphasises just how important it is for educators to try and put themselves in their disabled students' shoes and appreciate how they experience their lives. Here are two very relevant quotations:

> *Sometimes it is lack of thought as when you are a normal person in inverted commas, certain thoughts won't cross your mind* (Alessia)
>
> (Marić 2017, p.266);
>
> *The word disability doesn't have to be a negative. People make it a negative. The person becomes defined by society. Basically, your status is according to how society decides it, not according to how you are as a person. A lot of progress is going on, but we still have a lot to achieve. We are different, but our differences should not result into discrimination* (Marie)
>
> (Marić 2017, pp.266-267).

Discrimination can thus occur without our even realizing it, as can practices which are exclusionary. The fact that awareness of disability and disabling practices are constructed by society is therefore also very important (Barnes & Mercer 2010). It is these practices that Alessia and Marie are referring to – from their own experience, they are aware that the problems that they face in education, as well as in wider society, do not arise directly and inevitably from their disability, but from the negativity that society itself attaches to disability.

Furthermore, as Hong (2015) observes, while educators can accept to provide the reasonable accommodation being requested, 'one can never force empathy on another person' (p.216). She then quotes one of the students who participated in her research:

> *Understanding is not something you can demand of someone with a piece of paper or even an explanation. The school may mandate to allow the students to be in their class and cater to their needs, but it is up to the individual teacher how it is interpreted. You can't force someone to be okay with giving accommodations. They'll still give them, but they may be snippy about it, look down on the student. This is the last thing I want. I'd rather deal with the repercussions of being a 'lazy' pupil than if the other option is being resentfully given help.* (p.216)

We may read that quotation and mentally give ourselves a pat on the back, reassuring ourselves that we are not that type of lecturer, we are not condescending towards students with individual educational needs. Yet, what if we do come across as 'snippy', as this student puts it? On the other hand, what if our behaviour and attitude is misinterpreted by a student who, after years of various educators being condescending or even dismissive, assumes that these are the attitudes she may expect, and identify them as being the ones that she has learnt to read in the behaviour of educators? Her conclusion may be wrong, but we must appreciate the factors that led her to come to these conclusions.

From these, and many other studies about inclusion in further and higher education, we can conclude that inclusion is not an all or nothing affair. An educational institution is not completely inclusionary or completely exclusionary. It is rather a question of having varying degrees of inclusion in different aspects of education. Inclusion is therefore a process, and one in which we need to be continually attentive as to how we can make institutional and individual practices more inclusive. Furthermore, inclusive education is a complex affair. It entails attending to various factors within both the academic and the social side of things.

Most importantly, if our understanding of disability remains a medicalised one, and therefore one that seeks to, so to speak, fix the student's impairment, then we cannot claim to be working within an inclusive education framework. In fact, we

would run the risk – as Graham and Slee (2008) argue – that we simply reinforce existing structures by tweaking the education system here and there, rather than really making it adapt to the individual educational needs of disabled students.

Conclusion: a Freirean approach to inclusion

It is to Freire's conception of education as dialogic, that I turn as a way for educators and students to work together towards creating an education system that is more effectively inclusive. Freirean pedagogy is useful not only in the lecture room, but within the educational institution as a whole, in terms of what we can learn from each other - in the context of my paper, what educators and disabled students can learn from each other. If this dialogue takes place within a framework of intersubjectivity, it means that we are also attentive to how we influence each other, how our actions impinge on others, and that we are alert to the need to be empathic with others on the one hand, and explain ourselves to them on the other.

Freire (1970) talks about the oppressor and the oppressed. Such language may be too harsh for the context I am considering here. It can most probably be safely assumed that most educators at any level of education do not go about oppressing disabled students with intent. Yet, if the opposite of oppression is liberation, and if the purpose of education is ultimately that of humanisation, we have most probably all been responsible at some point or other in our teaching careers for practices which, even if unintentionally, have been far from liberating and humanising, and therefore also far from being inclusive. We must also keep in mind that, regardless of how inclusive our educational practices may be, the balance of power in the educator-student dyad remains in favour of the former, as pointed out earlier. It is therefore up to us educators to ensure that power relations with disabled students are more equitable - without that equity there cannot really be a dialogue; without equity, a conversation is more likely to be mere exchange of information, with the educator determining what information to impart to the student and which pieces of information offered by the student can be considered as valid.

Roberts (2013: 20) identifies the dispositions that need to be adopted for a Freirean dialogue which, he argues, are 'inseparable from human virtues. These include humility, commitment, openness, hope, tolerance, and love.' They are also the dispositions needed for one to be empathic - having the humility to acknowledge that ours is not the only valid viewpoint, the commitment to doing our work well, having the openness to views and actions that challenge our way of doing things, hoping in being able to change things for the better, showing tolerance towards those whose actions and perspectives we find difficult to accept, and showing love, which should not need to be qualified or explained. Since this is a dialogue we are talking about, and therefore a two-way affair, we need to add the willingness to

discuss with students - why certain decisions have been taken, how they are taken, identify factors that are extraneous to their particular situation but which impinge on it, while evaluating what has worked in the past, what has not, and so on.

Freire (1970) tells us that, when there is oppression, it is not only the oppressed that are missing out on being able to affirm their human dignity. Even if we move away from the heavy language of oppression, and flip Freire's message, it still holds. Where there is inclusion, it is not only disabled students who benefit, but educators and anyone with a stake in the education system – which is just about everybody.

How can an intersubjective and dialogic approach help us achieve successful inclusion? First of all, if we see the borders of our selves are permeable, we realize how, as educators, our encounters with disabled students have an impact on us and change us, not only as professionals but also as human beings. These encounters shape our world view, impinge on our subjectivity and are eventually absorbed into our own sense of self.

Secondly, it is achieved by appreciating how those encounters have an impact on our students, and not only in our colleges and lecture rooms, but also in their lives, and on them as human beings, their subjectivity, their sense of self.

Thirdly, it is as Levin tells us – acknowledging that it is other subjects who are interacting with us, impinging on our sense of self and our subjectivity, thus avoiding slipping into the error of solipsism. We need to talk to each other because we can never know the other fully – especially to hear what students have to say about themselves and their situation, to explain our actions and discuss our decisions with them. An intersubjective and dialogic approach to inclusive education can help us avoid the mistake of thinking there are barriers where none exist, of unwittingly creating barriers ourselves, and identify the barriers that do exist and finding ways to break them.

References

Academic Network of European Experts on Disability. (2018) DOTCOM: The online disability tool of the Commission. Available from https://www.disability-europe.net/dotcom.

Atkins, L. (2016) Dis(en)abled: Legitimating discriminatory practice in the name of inclusion? *British Journal of Special Education*, 43 (1), 6-21.

Barnes, C. and G. Mercer. (2010) *Exploring Disability* (Cambridge: Polity).

Bartolo, P.A. (2001) Recent developments in inclusive education in Malta. *Mediterranean Journal of Educational Studies*, **6** (2), 65-91. Available from: https://www.um.edu.mt/library/oar/bitstream/handle/123456789/18977/Recent%20developments%20in%20inclusive%20education%20in%20Malta.pdf?sequence=1&isAllowed=y.

Butler, J. (2005) *Giving an account of oneself*. New York, NY: Fordham Press.

Callus, A.M. & R. Farrugia. (2016) *The disabled child's participation rights*. London: Routledge.

Camilleri, M. (2015) *Must I sit down? A study of the experiences of secondary school male ADHD students with regards to their inclusion within the inclusive education system in Malta*. Unpublished dissertation. University of Malta.

Cardona, G. (2011) Inclusive education: a special right? *Commonwealth Education Partnerships 2011*, 34-36. Available from: http://www.cedol.org/wp-content/uploads/2012/02/Gordon-Cardona-article.pdf.

de Beco, G. (2017) The right to inclusive education: why is there so much opposition to its implementation? *International Journal of Law in Context 2017*, (1-20) doi:10.1017/S1744552317000532.

Freire, P. (1970) *Pedagogy of the oppressed*, translated by Myra Bergman Ramos. New York, NY: Continuum.

Graham, L. and R. Slee. (2008) An illusory interiority: Interrogating the discourse/s of inclusion. *Educational Philosophy and Theory*, **40** (2), 277–293.

Hadjikakou, K. and D. Hartas. (2008) Higher education provision for students with disabilities in Cyprus. *Higher Education*, **55**,103–119.

Hong, B. S. S. (2015) Qualitative analysis of the barriers college students with disabilities experience in higher education. *Journal of College Student Development,* **56** (3), 209-226.

Laws of Malta (2000) Equal Opportunities (Persons with Disability) Act. Available from: http://justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=8879&l=1.

Levin, D. M. (1998) Tracework: Myself and others in the moral phenomenology of Merleau-Ponty and Levinas. *International Journal of Philosophical Studies*, **6** (3), 345-392.

Magnus, E, and J. Tøssebro. (2014) Negotiating individual accommodation in higher education. *Scandinavian Journal Of Disability Research*, **16** (4), 316-332.

Marić, L. (2017) The values of inclusive education: A political debate. *Malta Review of Educational Research*, **11** (2), 261-275. Available from http://www.mreronline.org/wp-content/uploads/2017/12/7-Liliana-Maric.pdf.

Merleau-Ponty, M. (2002) *Phenomenology of Perception*, Second edition. London: Routledge.

Miskovic, M. & S.L. Gabel. (2012) When numbers don't add up and words can't explain: Challenges in defining disability in higher education. *International Journal of Multiple Research Approaches,* **6** (3), 233-244.

Moran, D. (2000) *Introduction to Phenomenology*. Abingdon, UK: Routledge.

Moriña, A. (2017) Inclusive education in higher education: challenges and opportunities. *European Journal of Special Needs Education*, **32** (1), 3-17.

Oliver, M. 1996. *Understanding disability: from theory to practice*. Second edition. Basingstoke: Palgrave.

Psaila. 2017. Voices in the classroom. *Malta Review of Educational Research*, **11** (2), 171-186. Available from http://www.mreronline.org/wp-content/uploads/2017/12/3-Elvira-Psaila.pdf.

Roberts, P. (2013) *Paulo Freire in the 21st Century: Education, dialogue, and transformation*. Boulder, CO: Paradigm Publishers.

Sanders, M. (2014) Intersubjectivity and alterity. In R. Diprose and J. Reynolds, *Merleau-Ponty: Key concepts*. Abingdon, UK: Routledge, 142-151.

Stein, E. (1998) *On the problem of empathy*. Translated by Waltraut Stein. Trivandrum, Kerala, India: Carmel Publishing Centre.

Spiteri, L., Borg, G., Callus, A.M., Cauchi J. and M. Sciberras. (2005) *Inclusive and special education review*. Floriana, Malta: Ministry of Education, Youth and Employment.

United Nations. (2006) *Convention on the rights of persons with disabilities and optional protocol*. Available from https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities/convention-on-the-rights-of-persons-with-disabilities-2.html.

UNESCO. (1994) *The Salamanca statement and framework for action on special needs education*. Available from http://www.unesco.org/education/pdf/SALAMA_E.PDF.

Wetherell, M. & J. Maybin. (1996) The distributed self: A social constructionist perspective. In R. Stevens, ed. *Understanding the Self*. London: Sage and the Open University, pp. 219-265.

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Breaking Barriers in Assessment: Peer-based Assessment in (Higher) Education

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Abstract

Assessment is arguably one of the key issues in any educational setting. Within the context of assessment, an area that has been the subject of various debates is that of peer-based forms of assessment. Information and Communication Technologies (ICT) together with social networks have provided teachers and learners with a myriad of opportunities to facilitate peer-based assessment initiatives.

This study looks at an ongoing research exercise being carried out at undergraduate level and explores the challenges that both academic educators and learners face when endeavouring in such an exercise. Various factors come into play. If engaging in an ICT-based setup, the ICT skills of both teachers and learners need to be looked into. However, the attitudes of both academic educators and learners need to be examined carefully. As the research participants pointed out, assessment is hard work and requires focus.

The question both academics and learners ask is: 'How trustworthy is peer-based assessment?'

Keywords: assessment, information and communication technologies (ICT), peer-based, higher education (HE).

Introduction - Assessment in Higher Education (HE)

The creation of meaningful assessment procedures in higher education is no easy task. Flint and Johnson (2011) look at assessment procedures taking place at universities and argue that while there is the notion of treating as 'clients' whose views on their university experience are important, little work has been done on having mechanisms whereby the students can determine whether they have been treated fairly or not. By means of comparing assessment practices in various 'Western' universities, Flint and Johnson identify several poor assessment practices.

1. Lack of authenticity and relevance to 'real-world' tasks
2. Make unreasonable demands on students
3. Are narrow in scope

4. Have little long-term benefits
5. Fail to reward genuine effort
6. Have unclear expectations and assessment criteria
7. Fail to provide adequate feedback to students
8. Rely heavily on factual recall rather than on higher-order thinking and problem solving skills
   (Flint and Johnson, 2011)

"Assessment is the 'core business' of universities. Despite this, many assessment practices are ineffectual, limiting, irrelevant and blatantly unfair" (F&J, 2011, p.12) Biggs and Tang (2011) also look at the situation in higher education. They point out that the increasing number of students attending and the diversity of the students' background together with the progressive decrease in resources available (financial and otherwise), is placing great strain on the academic institutions. Middaugh (2010) makes similar arguments when examining the American higher education system.

The Potential of Information and Communication Technologies (ICT) in Assessment

Herrington *et al*. (2010) look towards having 'authentic' e-learning, as quite often e-learning/ICT-based technologies are being portrayed as a possible solution to some, if not all of the problems faced by HEI outlined previously. However, while ICT-based technologies may do facilitate higher education access to individuals and groups who may otherwise be unable to have them, evidence suggests that it is less successful in improving the quality and outcomes of higher education. As argued earlier by Flint and Johnson (2011), Herrington *et al*. (2010) argue that same mistakes that were done in face-to-face learning environments are being repeated in e-learning environments whereby assessment tasks given have little, if any resemblance to the tasks and activities people would face in their daily (working) lives.

In response, Redecker and Johhanessen (2013) look at the developments taking place and attempt to indicate the path that will be taken in assessment based upon these developments.

They argue that whilst many forms of e-assessment appear to be grounded in a 'traditional' assessment paradigm, the latest technological developments together constant change in skill requirements in today's socio-economic scenario, there is a drive to create new assessment methodologies that cater for 21st century skill assessment and evaluation. However, this would be possible only if a more formative type of assessment is included and a competence-based learning approach is given the due consideration. (Redecker & Johhanessen, 2013)
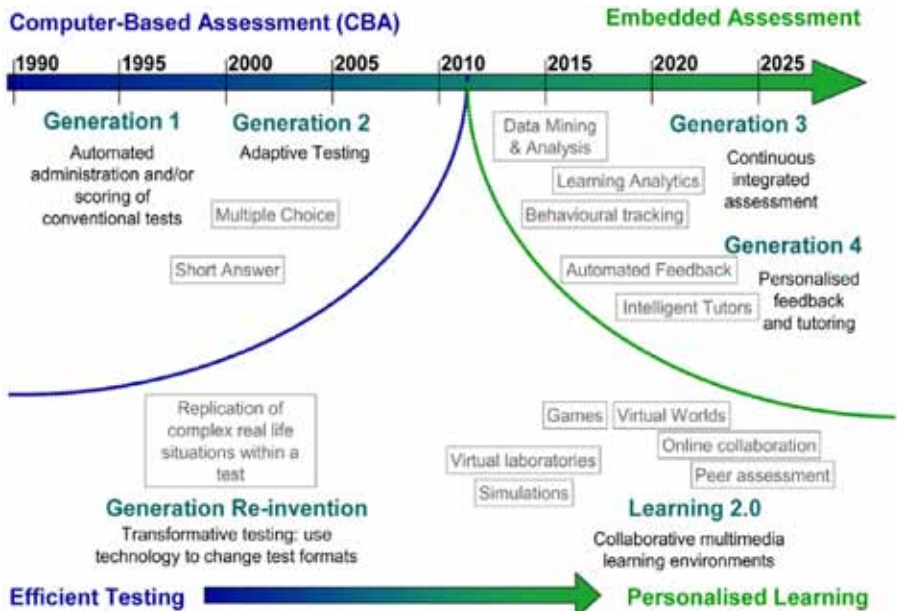
Figure 1: Current and Future Assessment Strategies (Redecker & Johhanessen, 2013, p.82)

The Research Study

The aim of this study was to investigate as to whether ICT's may be employed to facilitate the acquisition and assessment of a specific soft skill in HE, namely Intercultural Competence. The choice for selecting this skill came as a result of the current globalised socio-economic scenario whereby it has become common to interact with persons upholding diverse cultural backgrounds at the workplace. This may be seen as a result of one of the European Union's cardinal principles which is that of worker freedom of movement across the member states (EHEA, 2015).

Given the local economy's reliance on tourism, such a skill becomes even more significant.

Implementation

In order to be able to investigate in detail the aims of this study, a qualitative approach as adopted. A call for student research participants was made to the students attending the BA Tourism studies at the University of Malta (UoM). This resulted in a group of nine students who volunteered to take part.

A brief introductory meeting was set in order to explain the entity of the study and the duration in order for the participants to be aware of the commitment required in order to take part in a blended learning experience. That is, parts of the learning experience would be in a face-to-face mode whereas others will be done over an online environment.

After that, the first part of the research was carried where all the student participants were asked to participate to a rather intensive, preparatory face-to-face workshop. The workshop was subdivided in 5 sections:

1. Brief overview of the study and the aims behind it and its significance (in Maltese HE scenario)
2. Hands-on exercise – students determine in groups what they consider to be the key criteria that students' work should be assessed against (in Higher Education
3. Link with 'Disabled tourist' – a person with limited mobility offered to discuss with the participants what he thinks are the important issues to consider from a tourist with accessibility-related challenges found during travel/visiting heritage sites, etc.
4. Brief discussion of the main principles of Intercultural Competence
5. Tasks to be carried out by students during the learning intervention (via the proposed ICT platform)

The students' exercise led to the identification of the following 4 criteria were used upon which the students themselves would then assess the work of their peers. These were:

- Presentation
- Evidence of Research
- Clarity of Arguments/Flow
- Relevance/Critical Thinking

The Challenges Posed by Assessment

The key challenge was to take the criteria that were identified by the students and devise an assessment rubric that is easily understood by the students to be able to use it.

It must be noted that assessment at the UoM falls under the jurisdiction of the University of Malta Academic Programmes Quality and Resources Unit (APQRU) that answers to the university's Senate Programme Validation Committee (UoM, 2017a.) It has also issued a series of guidelines for the marking and grading of students' work. The guidelines are based upon a series of governmental legal notices which in fact give the guidelines a legal footing (UoM, 2017b) as summarised in Table 1.

Descriptor	Mark Range	Grade
Work of exceptional quality Exceptional performance showing comprehensive understanding and application of the subject matter. Evidence of extensive additional reading/research/work.	95%-100%	A+
Work of excellent quality Superior performance showing a comprehensive understanding of the subject matter. Evidence of considerable additional reading/research/work.	80% - 94%	A
Work of very good quality Performance is typified by a very good working knowledge of subject matter. Evidence of a fair amount of reading/research/work.	75% - 79%	B+
Work of good quality Above average performance, with a working knowledge of subject matter. Evidence of some reading/research/work.	70% - 74%	B
Work of average quality Considerable but incomplete understanding of the subject matter. Evidence of little reading/research/work.	65% - 69%	C+
Work of fair quality Basic understanding of the subject matter. No evidence of additional reading/research/work.	55% - 64%	C
Work of rather low quality Minimal understanding of the subject matter, with no evidence of additional reading/research/work.	50% - 54%	D+
Marginal Pass Marginal performance, barely sufficient preparation for subsequent courses in the same area.	45% - 49%	D
Pass - when assessment is based on a Pass/Fail basis only for study-units that are used for establishing eligibility to progress or for the award but are not taken in consideration for calculating the student's progress and for award classification purposes.	Not Applicable	P
Unsatisfactory, failing work in any study-unit.	0% - 44%	F
Unjustified absence for an assessment, or failure to hand in assigned work on time, or ineligibility to take assessment due to unapproved absence from lectures.	0%	F

Table 1: University of Malta's undergraduate assessment template (UoM 2017b, p.12)

When discussing the grading of assessment tasks Biggs and Tang (2011) propose a relatively simplified structure. This is based on what they refer to as a qualitative approach to grading and it is illustrated in the example provided in Table 2.

One of the advantages is its relative simplicity and clarity. This should make it somewhat easy for persons to award a particular grade for a specific assessment task. On the other hand, it may difficult to implement a similar mode of grading without awarding a mark within a formal higher education environment. Some critics may point out to a lack of transparency. Therefore, another assessment framework is being proposed in an attempt to find a workable model that encourages a peer assessment.

Criteria/Competence Level Achieved	Grade
Able to Reflect, self-evaluate realistically, able to formulate and apply theory to problematic situations. Clear mastery of course content	A
Can apply theory to practice, a holistic understanding of course and components. Barely failed A	B
Can explain the more important theories, can describe other topics acceptably, barely failed B	C
Can only explain some theories, barely failed C	D
Less than D, can explain little if any theories, plagiarism	F

Table 2: Biggs and Tang's (2011) proposed grading scheme (p.104)

The above frameworks are blended in a way that it is possible to award a mark yet retain the clarity and simplicity in Biggs and Tang's model that should make it relatively easier to convert the grade into a mark. This is illustrated in Table 3.

Criteria/Competence Level Achieved	Grade	Mark/100
Able to Reflect, self-evaluate realistically, able to formulate and apply theory to problematic (tourism-related) situations. Clear mastery of course content	A	80-100
Can apply theory to practice, a holistic understanding of course and components. Barely failed A	B	70-79
Can explain the more important theories, can describe other topics acceptably, barely failed B	C	55-69
Can only explain some theories, barely failed C	D	45-54
Less than D, can explain little if any theories, plagiarism	F	0-44

**Table 3: Extended grading and marking scheme. Adapted from Biggs and Tang (2011)
& University of Malta harmonised regulations (2016)**

However, for the 'inexperienced' student who having a go at assessing the work of peers, even a range from where to choose a particular mark can be a daunting prospect. An easier-to-use rubric was required. This was done by referring to other competence level frameworks such as the Skills Framework for Information Age (SFIA) in the UK (SFIA, 2013), and the European Union's E-skills competence framework (2013). The result was as shown in Table 4.

This was then adapted for each of the four criteria identified earlier in order to provide the student participants with clear guidelines to use when carrying out the assessment during the subsequent online phase.

Criteria/Competence Level Achieved	Grade	Mark
Able to Reflect, self-evaluate realistically, able to formulate and apply theory to problematic (tourism-related) situations. Clear mastery of course content	A	5
Can apply theory to practice, a holistic understanding of course and components. Barely failed A	B	4
Can explain the more important theories, can describe other topics acceptably, barely failed B	C	3
Can only explain some theories, barely failed C	D	2
Less than D, can explain little if any theories, plagiarism	F	1

Table 4: Grading scheme used in the learning intervention by research participants.

Working in the Online Phase

After the workshop was successfully completed, the study moved to the 'online phase'. The online learning was devised around the use of a particular set of applications found within Moodle e-learning platform, often referred to as the virtual learning environment (VLE). The main tool adopted was Workshop (Moodle, n.d.).

The main feature was that Workshop has the possibility to enable students to assess their own work but also that of other students. Peer-assessment may be done in diverse ways. Student participants may be assigned randomly other student (from the participant list). Alternatively, they may be assigned 'manually' by the administrator. In this particular scenario, the latter option was selected.

As outlined earlier, each of the criteria was graded on a scale from 1 to 5 with 1 being the lowest mark and 5 being the highest.

Moodle's Workshop has a variety of options available for the academic educator. One is that s/he may set the number of persons reviewing a particular work. Then an average is calculated for each criterion. Another aspect is that different criteria may be given different weightings. Thus, the administrator/academic in charge, can actually give different weighting to each of the criterion listed which will determine final mark for the entire exercise. Other settings may also permit the academic to flag out 'outlier' marks awarded based upon different criteria that the academic may set *a priori*.

For this particular exercise, each item to be assessed was reviewed by three persons, two students and 1 academic. Each were given equal weighting and the mark for each item assessed was an average based on the three marks given. Following the completion, a focus group exercise was carried out to gather the views of the student participants.

Analysis

The data collected was analysed using a thematic analysis approach. The main challenge was to determine any significant patterns across the entire conversation that would lead to the identification of any key themes (Braun & Clarke, 2013). Two main themes were identified. One related to the ICT setup and the 'balance' required between the face-to-face and online situations that make up the 'blend'. The other was about the peer-based assessment and its reliability – that is, how trustworthy is peer-based assessment?

Theme 1: ICT/blended learning environment in use (Getting the blend right)

It appeared that the main concern was always related to the 'blend' required between the face-to-face mode and the e-learning mode as re-affirmed by Hew and Chung (2014) earlier on. Further reflection suggested to subdivide this theme into two sub-themes. The ease of use of the system and related training, and one that looks more at the actual Moodle-based e-learning environment that has been adopted by the University of Malta.

Sub-theme1: Ease of use

The importance of preparatory workshop (face-to-face) was outlined by practically all the participants.

"Yes I did feel it was useful. We did tackle what were supposed to do in our second task for writing the short assignment." (SP1)

This seems to echo Herrington *et. al.'s* (2010*)* list of elements that learning designers should bear in mind in order to create what they define as an authentic learning experience (Herrington *et al*, 2010, p.18).

However, there were different views as to the entity of face-to-face contact. Some participants who hailed from a more vocational background thought that more face-to-face contact would have been more beneficial, especially if similar blended learning courses would be offered to persons who hail from the industry that may have been away from schooling for some time.

The lecture. I always agree it should be there because as I said, I like the interaction. (SP4)

Bath and Burke (2010) refer to the potential of blended learning as a means of improving student-teacher interaction. On the other hand, Hartfield (2013) refers to rather superficial pedagogical approach which is occasionally taken when setting the 'blend'. Indeed, Hew and Chung (2014) point out that one has to get the right 'blend' for each learning situation distinctly from other learning situations or programs.

This aspect of 'ease of use' was particular pointed out by student participants who had a more of a vocational background who lamented that their exposure to IT/e-learning systems was less than others who came from a more academic

background (e.g. junior college where Moodle is used) and therefore they found it more difficult to work with these systems. Even after 2-3 years at university as they were never really given any specific training by anyone (other than this exercise) on how to use Moodle in a more efficient way.

Since we were second years, we had some experience on assignments. … From what I experienced during first year surely when compared to the assignments we do now there is stuff missing. We did not know what was requested out of us. We had to learn by trial and error what was expected. (SP4)

Subtheme 2: The UoM IT/elearning setup (Moodle)

In general, the participants found the e-learning platform, at best, boring! Participants tedious, requiring too many clicks to get to somewhere, too many steps required. Summarily labelled old fashioned!

If I had to use it again I will use the manual. There are too much steps – click here, then here, then here. (SP4)

Although one did remark that use by academics does little to change that perception – unaware of the tools (workshop) that are available. The main use seems to be that of an online repository.

Download notes and maybe send an email every now and then (SP5) pg22
I don't know what it does (SP5) pg21

This may have put off participants in going over some of the material provided. Although the majority were happy to consult briefly and then look up their own material for the completion of the assignment. Again, because it is actually easier to search through a search engine. Participants find that using social networks (even for communication and for sharing of information) is more convenient – anytime, anywhere and through the use of portable devices that are always available at hand (REF).

The following seems to corroborate Barry *et al's* (2015) findings. Given the rate at which new ICT-based applications are being tried within the field of higher education, professional development for academic educators has become a necessity. With the right training, educators would be able to exploit the potential of technology and align it within higher education programmes (Rogerson-Revell, 2015). Porter *et al*. (2014) make the case for technical and pedagogical training for both academics and learners if blended learning initiatives are to be successful. Similarly, Biggs and Tang (2011), Herrington *et al*. (2010) and Flint and Johnson (2011) all make reference for the need to involve both the teaching staff and the learners in order to create an effective learning environment in general.

Theme 2: Assessment (A question of trust)

The use of Moodle was focused on the tools that were used to carry out the peer-based assessment exercise.

Subtheme 1: Inexperience in everything

Many of the participants (REF) lamented the lack of experience in using Moodle for other than downloading notes and occasionally uploading an assignment! None of them had ever done a peer-assessment exercise with Moodle prior to this exercise. As a result, quite a few referred to the researcher-made manual to get going. Though once they tried it, many did say that they would be able to use the system.

A more important issue was related to the lack of peer-based activities in general. The majority of the participants had never done any for form of peer-assessment activities. Some of the participants voiced concern that inexperience in assessing (other students') work may lead to students opting for the middle-of-the-road mark/grade with the hope of keeping everyone happy. Familiarity with peers may put participants on the defensive. This was also raised as the exercise was not anonymous in format and many lamented that this would put people in an uncomfortable position. Anonymity (for markers and marked) was put forward as one way of getting over the aspect of familiarity.

Subtheme2: Assessing is hard work!

Lack of experience was also indicated when a number of participants implied that assessing others' work was hard work! It required focus and concentration. And some did comment that too much assessment would alienate students rather than empower them – again leading to students not doing their job properly.

Assessing is a very time consuming thing. All of this… I don't think… any student is going to enjoy grading every other student (SP5)

This brought up the aspect of the degree of weighting that should be given to the students' assessment exercise and the academic's may well serve as a form of control.

Students needed to trust each other. The academic is more trusted in this respect as a 'super-partes' authority, objective whereas the same could not be same for students (by students).

And you have to be very trusting. If someone told me others (students) are going to grade mine. Because you don't know in what state of mind they are – they are in a hurry as they have to go to work…just do it quickly… you know what I mean? 4, 5, 3, 2, 5 and its done. The system will not detect any bad (marks) – they just do it at random (SP5)

That said, anonymity may help in establishing a degree of trust in the peer-assessment process. Hence, the blended learning environment must be able to provide participants with the appropriate safeguards (Foo, 2014).

Concluding Reflections

This work looked at establishing peer-based assessment at an undergraduate level. Moodle provides tools that enable it. The aspect of ensuring a fair and authentic form of assessment, for the learner in question should remain as the key aim. Other e-learning platforms would have similar tools without doubt. The research participant was keen to take part. But they also discovered that 'Assessment is hard work'! It requires preparation. It also requires a degree of trust in your peers. With these phrases in mind, we can attempt to reflect and respond to the following queries.

1. Is technology able to assist in assessment?
2. Are teachers being trained in the use of technology to facilitate assessment?
3. Can technology make assessment a more transparent process?
4. Are students ready and willing to take part in the assessment process?
5. Is peer-based assessment feasible with 'all' student groups?
6. Are academic educators ready to 'give up' some of their assessment 'power'?
7. Are there the right quality assurance mechanisms in place to ensure that assessment may be carried out in a robust yet transparent manner?

References

Barry, S., Murphy, K. and Drew, S. (2015). From deconstructive misalignment to constructive alignment. Exploring student uses of mobile technologies in university classrooms. *Computers and Education*, 81, 202–210.

Bath, D. & Burke, J. (2010). Getting with blended learning. Griffith Institute for Higher Education. Griffith University. Available at https://www.griffith.edu.au/__data/assets/pdf_file/0004/267178/Getting_started_with_blended_learning_guide.pdf [Accessed 16 April 2017].

Biggs, J. & Tang, C. (2011). *Teaching for Quality Learning at University*. 4th Edition. Maidenhead: Open University Press.

Braun, V. & Clarke, V. (2013). *Successful Qualitative Research. A practical guide for beginners*. London: Sage Publications Ltd.

European e-Competence Framework. (2013). Available at http://www.ecompetences.eu [Accessed 4 May 2016].

European Higher Education Area, (EHEA). (2015). The Bologna Process revisited - The Future of the European Higher Education Area, 2015. *Part 1 - Looking back: 15 years of convergence*. EHEA website, history webpage. Available at http://media.ehea.info/file/2015_Yerevan/71/1/Bologna_Process_Revisited_Future_of_the_EHEA_Final_613711.pdf [Accessed 8 January 2018].

Flint, N., & Johnson, B. (2011). *Towards Fairer University Assessment: Recognising the Concerns of Students*. Abingdon: Routledge.

Foo, K.L. (2014). Exploratory study on blended learning. Unpublished master thesis. Nanyang Technological University, Singapore. In Hew, F.K. & Cheung, W.S., *Using Blended Learning: Evidence-Based Practices*, London: Springer.

Hartfield, P. (2013). Blended Learning as an Effective Pedagogical Paradigm for Biomedical Science. *Higher Learning Research Communications*, 3(4), 59–67.

Hew, F.K. & Cheung, W.S. (2014). *Using Blended Learning: Evidence-Based Practices*. London: Springer.

Herrington, J., Reeves, T.C. and Oliver, R. (2010). *A Guide to Authentic e-learning*. New York: Routledge.

Middaugh, M.F. (2010). *Planning and Assessment in Higher Education*, San Francisco: Jossey-Bass.

Moodle. *Moodle Workshop*. Moodle Official Website. Available at http://docs.moodle.org/26/en/Workshop_module [Accessed 23 October 2014].

Porter, W.W., Graham, C.R., Spring, K.A. and Welch, K.R. (2014). Blended learning in higher education: Institutional adoption and implementation. *Computers & Education*, 75, 185–195.

Redecker, C. & Johannessen, Ø. (2013). Changing assessment - Towards a new assessment paradigm using ICT. *European Journal of Education*, 48(1), 79–96.

Rogerson-Revell, P. (2015). Constructively aligning technologies with learning and assessment in a distance education master's programme, *Distance Education*, 36(1), 129–147.

Skills Framework for Information Age (SFIA) Foundation. Available at http://www.sfia.org.uk/ [Accessed 23 April 2013].

University of Malta (UoM). (2017a). *Assessment at the University of Malta.* Academic Programmes Quality and Resources Unit (AQPRU), University of Malta Website. Available at https://www.um.edu.mt/__data/assets/pdf_file/0005/47390/harmonisedregs-09.pdf [Accessed 30 July 2017].

University of Malta (UoM). (2017b). *About AQPRU.* Academic Programmes Quality and Resources Unit (AQPRU), University of Malta Website. Available at https://www.um.edu.mt/apqru/about [Accessed 19 March 2018].

Bio-note

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Quantitative Enhanced Raman Scattering of Dye-Labeled Phosphorothioate Oligonucleotides

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Abstract

For the diagnosis and treatment of genetic diseases and infections the detection of specific DNA sequences is important. New techniques are continually being designed to improve selectivity, sensitivity reliability and multiplexing of current DNA detection methodologies.

One of these methods is surface-enhanced resonance Raman spectroscopy (SERRS) which has been used successfully as an ultrasensitive technique for the direct analysis of dye-labelled oligonucleotides using aggregated silver and gold nanoparticles. Key to the sensitivity and reproducibility is the affinity of the DNA towards the enhancing surface. This paper investigates the detection of phosphorothioate modified dye-labelled oligonucleotides whereby a non-bridging oxygen atom in the phosphodiester backbone is replaced by sulfur. TAMRA-labelled phosphorothioate oligonucleotides with the same base pair sequence but different number of modified phosphate units were compared to un-modified TAMRA-labelled oligonucleotides using silver nanoparticles as SERRS substrates using a 532 nm excitation wavelengths and different aggregation agents. This study demonstrates the importance of choosing the right experimental setup for DNA SERRS analysis to maximise sensitivity and reproducibility when oligonucleotides are modified for greater surface affinity.

Introduction

Molecular biodiagnostics are evermore relying on nanotechnology to improve sensitivity capabilities and the ability to multiplex *i.e.* to identify more than one analyte at a go. For example, gold nanoparticles have become a general tool for such biodiagnostic techniques whether monitoring their colorimetric (Han et al., 2006), scattering (Storhoff et al., 2004) or electrical properties (Park et al., 2002). These diagnostic tools can potentially have a huge impact in medical diagnosis, whereby results for various diseases and infection can be immediately determined at the point-of-care or at home. These diagnostic tools would have an added advantage of being non-invasive hence the person seeking medical attention can do so in a less stressful environment.

A case in point of improvement in diagnostics by nanomaterials is the detection of DNA. Routinely this is done by fluorescence labelling of DNA whereby the common disadvantage encountered apart from photostability issues is having a broad spectral response making it an inefficient multiplexing technique. Photostability and sensitivity for the detection of DNA was greatly increased with the use of quantum dots (Alivisatos, 1996, Nirmal and Brus, 1998) whereby the excitation occurs at a single wavelength however the emissions from such systems are still broad (25 nm). The solution for multiplexing lies in the use of spectroscopical techniques, especially in conjunction with metal nanoparticles in surface enhanced Raman scattering (SERS) as it gives narrow spectral lines (Vo-Dinh et al., 1984). The sensitivity is further enhanced by labeling the DNA with chromophores (the same used in fluorescence) to have resonance Raman scattering (Cunningham et al., 2006), which reportedly can go down to single-molecule detection (Nie and Emory, 1997; Kneipp et al., 1997). Surface enhanced resonance Raman scattering (SERRS) has been effectively used as a quantitative technique for the direct analysis of dye-labelled oligonucleotides (Graham et al., 1997; Graham et al., 2000; Brown et al., 2001; Fruk et al., 2002; Graham et al., 2003; Faulds et al., 2004a; Faulds et al., 2004b; Faulds et al., 2005b; Faulds et al., 2005a). It has been shown that SERRS can have limits of detection of at least three orders of magnitudes lower than those obtained by a fluorescent technique (Faulds et al., 2004a). For SERRS analysis of dye-labelled oligonucleotides it is important not only for the biomolecule to adsorb onto a suitable metal surface (Rodger et al., 1996), but also that the chromophore attached coincides with the laser excitation wavelength. The metal substrate used was a silver colloidal solution, which gives high electromagnetic enhancement in the visible region. In direct SERRS analysis of dye-labelled oligonucleotides using negatively charged silver nanoparticles, spermine a tetramine molecule, is used which reduces the negative charge of the DNA backbone and induces formation of silver nanoparticle aggregates creating appropriate SERRS conditions in solution. Furthermore, if a dye that has a net negative charge in solution is used the oligonucleotide can be modified using propargylamine (Faulds et al., 2007) which will provide a positive charge facilitating adsorption to the silver surface. Backbone and sugar modifications of DNA are becoming cheaper and easier to make. A modification that is gaining interest due to its properties are phosphorothioate linkages whereby a non-bridging oxygen atom of a phosphodiester is replaced by a sulfur atom (Eckstein, 1979). Phosphorothioate oligonucleotides can be easily prepared through solid phase phosphoramidite synthesis where the oxidation step is replaced with a sulfurization step. Phosphorothioates modified oligonucleotides have been used in antisense applications (Kurreck, 2003) as the backbone modification infers strand resistance to both exo- and endonucleases. This is particularly useful for clinical applications whereby the enhanced stability is ideal when used in cells and sera. Another useful

property that such modification brings about is its affinity towards silver and gold surfaces. As thiol modified molecules (Brust et al., 1994; Brust et al., 1995; Brust and Kiely, 2002) and thioctic acid modified DNA (Dougan et al., 2007), phosphorothioate modified DNA are being used to functionalise quantum dots (Ma et al., 2009), gold nanoparticles (Lee et al., 2007), as a cross-linking agent for gold nanoparticles to form rigid structures (Kumar et al., 2003) and fabrication of bimetallic core-satellite nanoclusters (Pal et al., 2009). In this paper the limit of detection of phosphorothioate modified dye-labeled oligonucleotides are compared to an unmodified dye-labeled oligonucleotide using SERRS with different aggregating agents and the mechanism by which the DNA attaches to the nanoparticle surface using poly-adenine oligonucleotides is determined.

Experimental

Materials

Oligonucleotides were purchased from Eurofins (Germany) and purified by HPLC. All other materials were purchased from Sigma-Aldrich and used without further purification. All water used was doubly distilled (18.2 mΩ cm).

Nanoparticle preparation

The citrate reduced silver colloid was prepared using a modified version of the Lee and Meisel method (Lee & Meisel, 1982). Water (500 mL) was heated up to 45 ºC in a three parallel-necked round bottom flask (1 L) and silver nitrate (90 mg in 10 mL H_2O) was added. The solution was heated up to 98 ºC and 1% w/v sodium citrate solution (10 mL) was added. The temperature (98 ºC) was maintained stable for 90 minutes with continuous stirring throughout the flask. The necks were covered with aluminium foil to prevent excessive water evaporation.

Instrumentation

Spectra were recorded at 532 nm excitation wavelength using an Avalon Instrument Ramanstation R3. The laser power was 100 mW and the spectra were recorded with an exposure time of 5 x 1s in a Poly(methyl methacrylate) (PMMA) cuvette.

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Aggregation Study

Aggregation studies were carried out on the modified and unmodified carboxytetramethylrhodamine (TAMRA)-labelled oligonucleotides. The samples were prepared for SERRS analysis using 7 µL of TAMRA-labelled oligonucleotide, 10 µL of spermine, 175 µL of water and 175 µL of silver nanoparticles. The following initial concentration of spermine tetrahydrochloride diluted in water were used: 0.1, 0.01, 0.001, 0.0001, and 0.00001 mol dm^{-3}, followed by an analysis with no spermine present. The aggregation was monitored by taking a spectrum of the dye every 30 s for 30min. It is to note that he addition of analyte, spermine, water and nanoparticles in this particular order gave the highest peak counts.

Limit of Detection Studies

Concentration studies were carried out on the modified and unmodified oligonucleotides by diluting them with water to various concentrations. The samples were prepared for SERRS analysis as before by adding 7 µL of TAMRA-labelled oligonucleotide, 10 µL of 0.1 mol dm^{-3} spermine, 175 µL of water and 175 µL of silver colloid. The samples were analysed 10 min after the addition of the silver colloid. Each concentration was analysed 5 times, with a 2 s exposure and 5 accumulations. The average peak height of the strongest peak in the spectrum was plotted against the concentration of the dye-labelled oligonucleotide. This was repeated with 0.01 M initial spermine concentration and 2M initial concentrations of NaCl, KNO_3 and $MgSO_4$ as aggregating agents.

Poly-adenine study

SERS spectra were obtained for modified and unmodified poly-adenine oligonucleotides (PO1, PO2 & PO3). The DNA was prepared for SERS analysis by heating them up to 95 ºC for 15 minutes after which they were immediately cooled down in an ice bath. Following this 7 µL of the oligonucleotide was added to 10 µL of 0.1 M spermine, 175 µL of water and 175 µL of AgNP solution, giving a final DNA concentration of 100 nM. The same procedure was used when 1% (w/v) NaCl solution was used as aggregating agent, however a final DNA concentration of 1.9 µM was used.

Results and Discussion

Phosphorothioate modified oligonucleotides are known to have a greater affinity towards silver surface due to the sulfur atoms availability for coordination with the metal surface. This is the first report to the best of our knowledge of phosphorothioate dye-labelled oligonucleotides used in direct DNA SERRS analysis. Increasing the affinity of the oligonucleotide towards the nanoparticle should in practice increase the Raman enhancement and give lower detection limits of detection if affinity was the only the key factor and not considering the mechanism by which the aggregating agent work. To examine such hypothesis three oligonucleotides with an identical 20 base pair sequence but with different backbone linkages were used as listed in Table 1.

	5'-dye label	oligonucleotide sequence
O1	TAMRA	5'GGTTCATATAGTTATAATAA3'
O2	TAMRA	5'*G*G*T*T*C*A*T*A*T*A*G*T*T*A*T*A*A*T*A*A3'
O3	TAMRA	5'*G*G*T*T*C*A*T*A*T*AGTTATAATAA3'
* is a phosphorothioate linkage		

Table 1 Dye-labeled oligonucleotide sequence used in the study

The first oligonucleotide (O1) has normal phosphodiester linkages, the second one (O2) has all phosphorothioate linkages and the last sequence (O3) was a chimeric DNA whereby the first ten linkages starting from the 3' are normal phosphodiester bonds, while the other half, the remainder ten linkages are phosphorothioate bonds. The dye-label attached at the 5' end of the oligonucleotide used is TAMRA which has an overall positive charge, facilitating the adsorption to the substrate. The absorption of the dye is at 544 nm which makes it in resonance with the laser excitation wavelength used (532 nm).

Initial experiments were conducted using spermine as to understand if the phosphorothioate modifications change the interaction of the oligonucleotide with the spermine. Spermine has the advantage over inorganic ions or acids as aggregating agents in DNA analysis since apart from causing the aggregation of colloid by the reduction of the nanoparticle surface charge, it also interacts with the DNA to modify its charge (Graham et al., 1997). This was found to give a controlled aggregation of the nanoparticles. For our study, varying the concentration of spermine for the three different oligonucleotides show a decrease in SERRS intensity of the TAMRA dye peaks (see Figure 1).
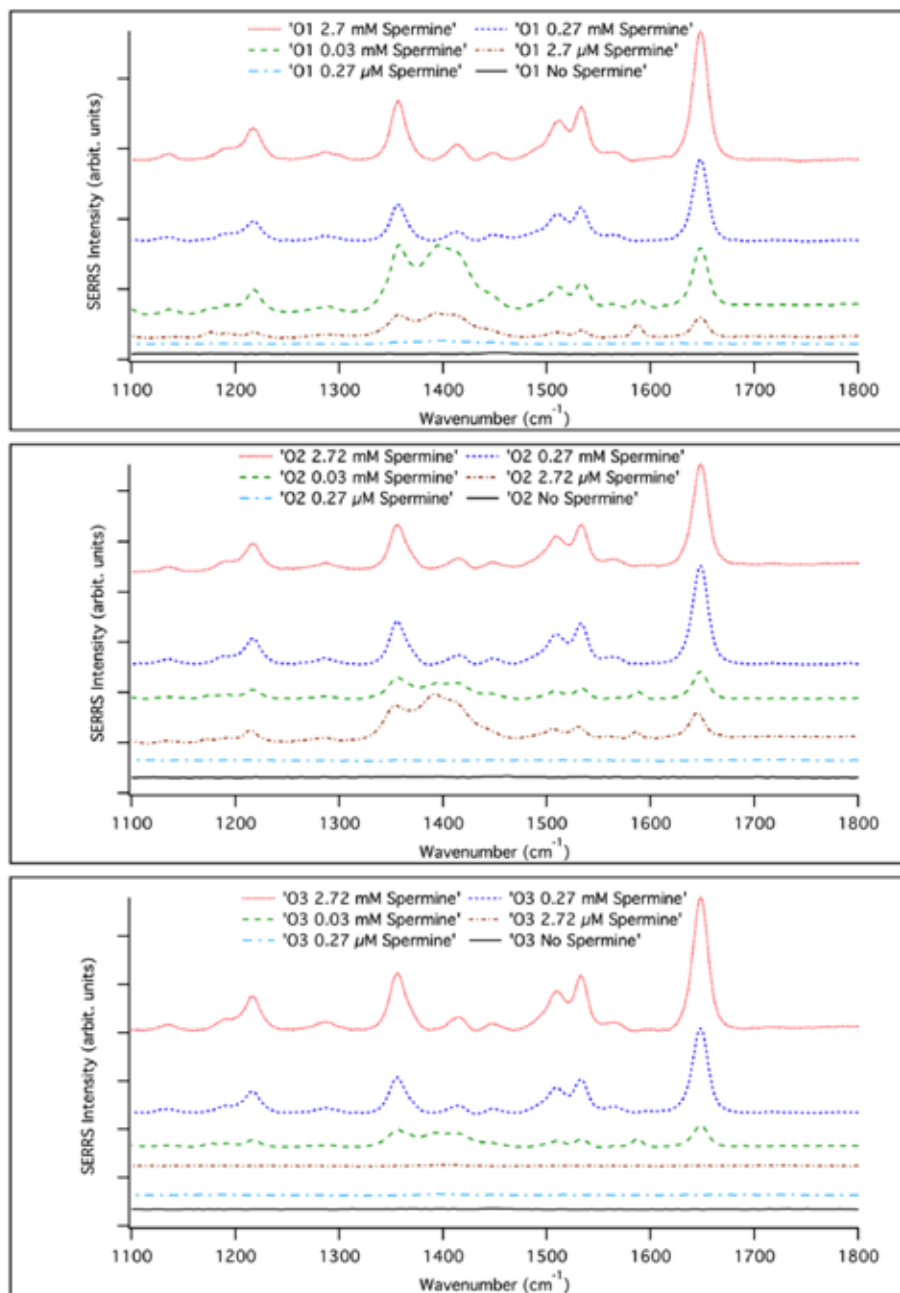
Figure 1 Comparison of SERRS spectra containing 1 nM TAMRA-labeled oligonucleotide (O1, O2, & O3) at different spermine concentration and no spermine with excitation at 532 nm.

No dye peaks could be observed at very low spermine concentrations. When no aggregation agent was added, no dye spectrum could be obtained, however when the oligonucleotides were left to incubate with the colloid for 24 hours the TAMRA peak at 1650 cm^{-1} could be seen for O2 (see Figure 2).
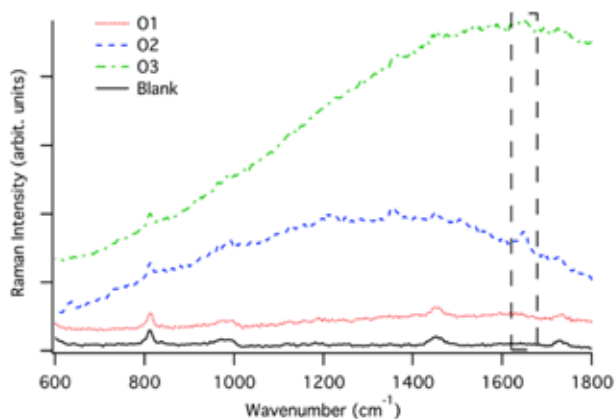
Figure 2 Monitoring the 1650 cm^{-1} peak of the three TAMRA-labelled oligonucleotides at 1 nM concentration against time after 24hrs of incubation with AgNP using a 532 nm excitation wavelength.

This shows that the phosphorothioate is actually seeking and interacting with the silver nanoparticle surface. To confirm that the phosphorothioate modified oligonucleotides are attaching to the surface through the sulfur on the DNA backbone when spermine is used as an aggregating agent, poly-adenine oligonucleotides modified analogously as the TAMRA-labelled oligonucleotides but without dye were used (Table 2).

oligonucleotide sequence	
PA1	5'AAAAAAAAAAAAAAAAAAAAA3'
PA2	5'A*A*A*A*A*A*A*A*A*A*A*A*A*A*A*A*A*A*A*A*A3'
PA3	5'A*A*A*A*A*A*A*A*A*A*AAAAAAAAAAA3'
* is a phosphorothioate linkage	

Table 2 Poly-adenine oligonucleotides

Poly-adenine oligonucleotides were used as to facilitate the assignment of peaks. No dye was used, as its enhanced Raman spectra would overshadow the weaker peaks coming from the actual DNA. From the spectra obtained a 620 cm^{-1} peak which corresponds to the P-S vibration on to a metal surface (Jiang et al., 2005) can be seen for the modified DNA (O2 & O3) (see Figure 3).

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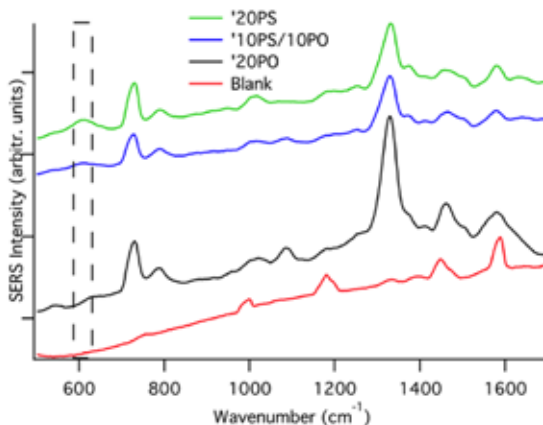
Figure 3 SERS spectra of 100nM poly-A oligonucleotides at 633 nm excitation wavelength using 2.72 mM spermine as aggregating agent. Peaks at 620 cm^{-1} are present for poly-A phosphorothioate modified oligonucleotides (10PO/10PS & 20PS).

These preliminary results show that phosphorothioate oligonucleotides have an affinity to the silver nanoparticle surface therefore in theory an increase in the enhancement from the dyes is expected as more DNA particles would be found in SERRS hot spots. From the limit of detection studies carried out it is shown that oligonucleotide affinity when using spermine as aggregating agent is not the only factor that contributes to the detection. When using a 2.72 mM final spermine concentration the unmodified TAMRA-labelled oligonucleotide (O1) gives a limit-of-detection (LOD) of 1.1×10^{-12} mol dm^{-3} a whole order of magnitude lower to the modified ones (O2 & O3) (see Figure 4 & Table 3).

Figure 4 Concentration dependence of the signal (1650 cm^{-1}) graph obtained for the three different TAMRA-labelled oligonucleotides (O1, O2, & O3) using a final concentration of 2.72 mM spermine at 532 nm excitation wavelength. Each point is the average of five repeat samples and the error bars are their corresponding standard deviation.

Oligonucleotide	2.72 mM Spermine LOD/mol dm^{-3}	0.27 mM Spermine LOD/mol dm^{-3}
O1	1.1×10^{-12}	6.2×10^{-12}
O2	3.7×10^{-11}	4.1×10^{-11}
O3	3.0×10^{-11}	3.5×10^{-12}

Table 3 Limit of detection of the 3 labelled oligonucleotides with different spermine concentration

This suggests that spermine interacts with the DNA to give a better detection limit when phosphodiester linkages are present since O2 gave a high LOD and the peak intensity at 1650 cm^{-1} did not increase as concentration of DNA is increased as seen in Figure 4.

When the final spermine concentration is lowered to 0.27 mM the chimeric DNA (O3) now gives a better LOD than the normal oligonucleotide showing that an appropriate balance between the affinity of the sulfur towards the surface and the spermine interaction with the DNA is found (Figure 5).
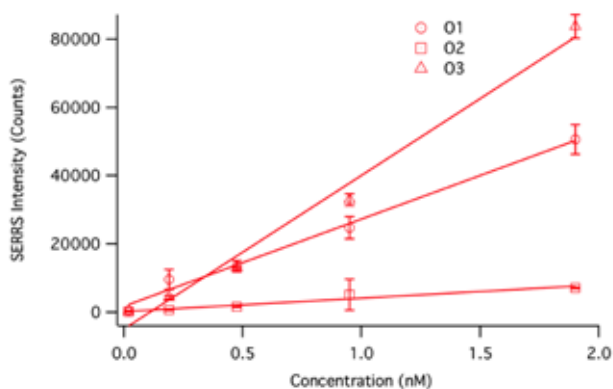
Figure 5 Concentration dependence of the signal (1650 cm^{-1}) graph obtained for the three different TAMRA-labelled oligonucleotides (O1, O2, & O3) using an initial concentration of 0.27 mM spermine at 532 nm excitation wavelength. Each point is the average of five repeat samples and the error bars are their corresponding standard deviation.

The fully modified DNA (O2) however still shows a high LOD hence establishing that phosphorodiester linkages need to be present when spermine is used as an aggregating agent (Figure 5). Also, the results show that when using spermine, modification of the DNA backbone does not give a better LOD unless spermine final concentrations is lower than 2.72 mM.

Further experiments were carried out to show that the results obtained are due to the interaction of spermine with the modified phosphorothioate. The LOD for the three different oligonucleotides were repeated using the same procedure but instead using NaCl, KNO$_3$ and MgSO$_4$ as aggregating agents. Although these inorganic

ions give a high LOD when compared to spermine (see table 4) they do not cause aggregation through the attachment of DNA to the silver surface but only act by reducing the surface charge on the colloid (Munro et al., 1995).

Oligonucleotide	NaCl LOD/mol dm^{-3}	KNO$_3$ LOD/mol dm^{-3}	MgSO$_4$ LOD/mol dm^{-3}
O1	1.3×10^{-10}	8.9×10^{-10}	4.6×10^{-10}
O2	6.1×10^{-11}	4.9×10^{-10}	2.4×10^{-10}
O3	3.1×10^{-11}	4.4×10^{-10}	1.9×10^{-10}

Table 4 Limit of detection of the 3 labelled oligonucleotides with different inorganic salts

Any difference in LOD between the oligonucleotides could then be attributed to the modification on the DNA. From the results obtained in Figure 6 it shows that the modified DNA gives a lower LOD when compared to the unmodified DNA, showing that the affinity of phosphorothioate DNA in this case helps in the limit of detection.
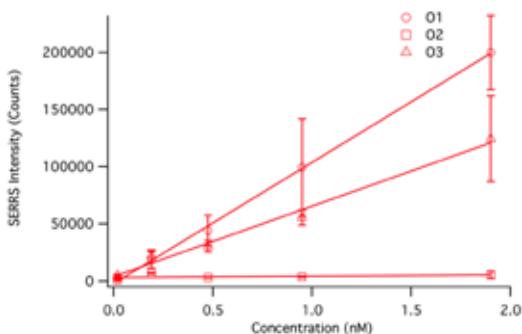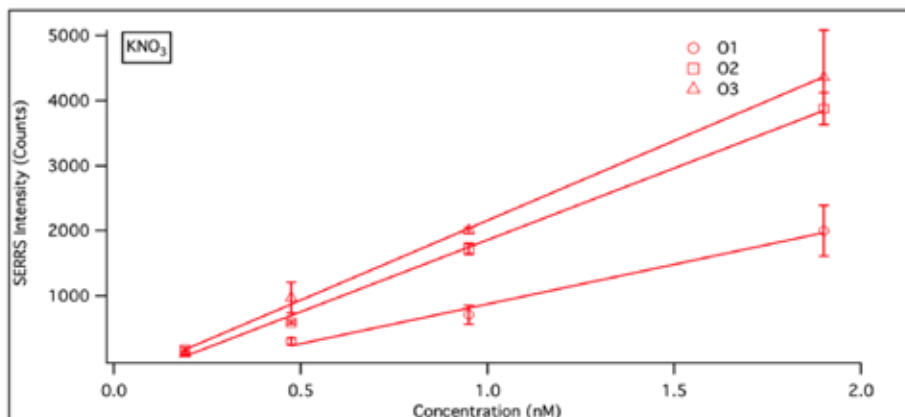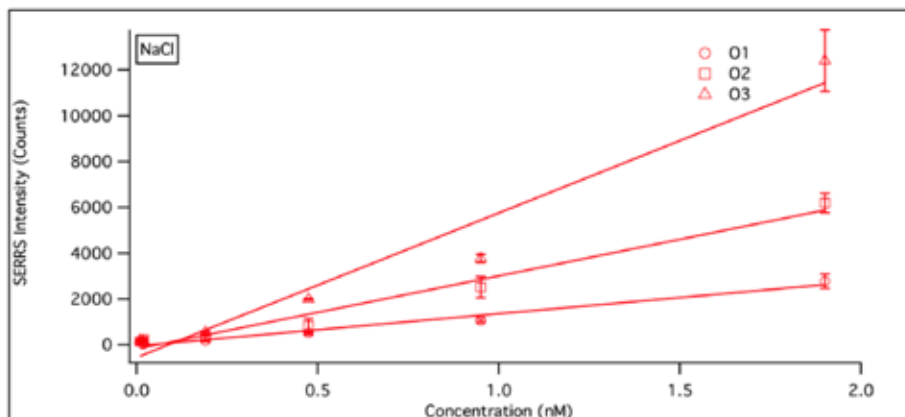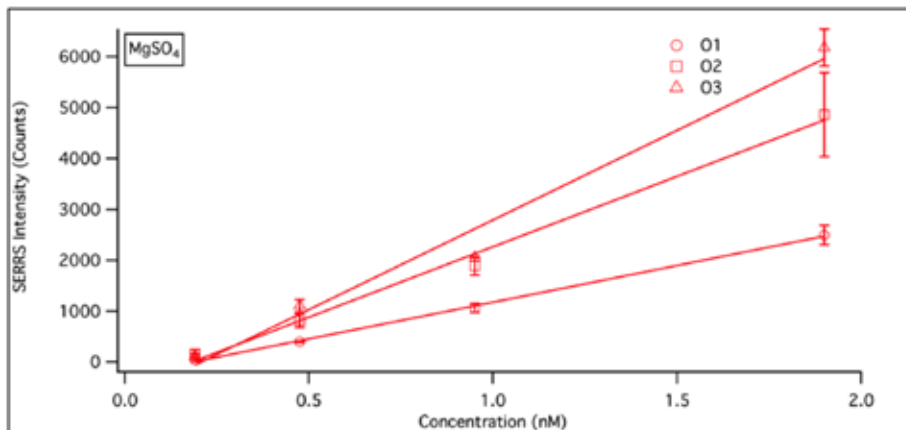
Figure 6 Concentration dependence of the signal (1650 cm^{-1}) graphs obtained for the three different TAMRA-labelled oligonucleotides (O1, O2, & O3) using a final concentration of 54.5 mM inorganic salts (NaCl, KNO$_3$, & MgSO$_4$) as aggregating agent and a 532 nm excitation wavelength. Each point is the average of five repeat samples and the error bars are their corresponding standard deviation.

The chimeric DNA O3 gives a better LOD over all the three different inorganic salts. This can be attributed to the fact that its affinity (due to the presence of the phosphorothioate linkages) towards the silver surface is greater toward the 5' terminal half where the dye is. For O2 however there is no preference for the 5' or 3' terminal, unless the dye itself is directed away from the surface due to steric hindrance and/or better packing. It was also shown using poly-adenine oligonucleotides that the phosphorothioate DNA attaches to the silver nanoparticle via the sulfur (see Figure 7) when using NaCl as the aggregation agent.
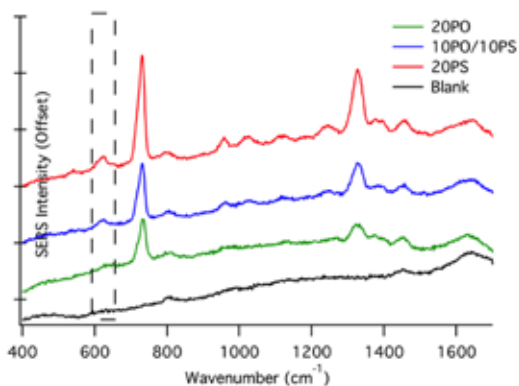
Figure 7 SERS spectra of 1.9μM poly-A oligonucleotides at 633 nm excitation wavelength using 1% (w/v) NaCl as aggregating agent. Peaks at 620 cm^{-1} are present for poly-A phosphorothioate modified oligonucleotides (10PO/10PS & 20PS).

Conclusion

Direct SERRS analysis of dye-labelled phosphorothioate oligonucleotides on aggregated silver nanoparticles is possible as the DNA is coordinated to the nanoparticle surface through the sulfur on its backbone. The LOD for these modified oligonucleotides is higher than that of un-modified counterparts when using spermine. This can be attributed to the reduction in the negative charge on the backbone when oxygen is substituted with sulfur which causes a weaker interaction of the DNA with spermine, hence bringing less DNA to the nanoparticle hotspots. However inorganic salts which do not interact with modified and unmodified DNA but reduce only the negative nanoparticle surface charge give a better LOD for modified DNA. This gives an insight on the factors that affect modified oligonucleotides and that the choice of aggregation agent is as important as the modification. Such studies help out in devising medical diagnostic kits that are more reliable, more efficient, and more sensitive, so that time between diagnosis and treatment is reduced.

References

Alivisatos, A. P. (1996). Semiconductor Clusters, Nanocrystals, and Quantum Dots. *Science,* 271**,** 933-937.

Brown, R., Smith, W. E. and Graham, D. (2001). Synthesis of a benzotriazole phosphoramidite for attachment of oligonucleotides to metal surfaces. *Tetrahedron Letters,* 42**,** 2197-2200.

Brust, M., Fink, J., Bethell, D., Schiffrin, D. J. and Kiely, C. (1995). Synthesis and reactions of functionalised gold nanoparticles. *Journal of the Chemical Society, Chemical Communications***,** 1655-1656.

Brust, M. and Kiely, C. J. (2002). Some recent advances in nanostructure preparation from gold and silver particles: a short topical review. *Colloids and Surfaces A: Physicochemical and Engineering Aspects,* 202**,** 175-186.

Brust, M., Walker, M., Bethell, D., Schiffrin, D. J. and Whyman, R. (1994). Synthesis of thiol-derivatised gold nanoparticles in a two-phase Liquid-Liquid system. *Journal of the Chemical Society, Chemical Communications***,** 801-802.

Cunningham, D., Littleford, R. E., Smith, W. E., Lundahl, P. J., Khan, I., McComb, D. W., Graham, D. and Laforest, N. (2006). Practical control of SERRS enhancement. *Faraday Discussions,* 132**,** 135-145.

Dougan, J. A., Karlsson, C., Smith, W. E. and Graham, D. (2007). Enhanced oligonucleotide-nanoparticle conjugate stability using thioctic acid modified oligonucleotides. *Nucleic Acids Research,* 35**,** 3668-3675.

Eckstein, F. (1979). Phosphorothioate analogs of nucleotides. *Accounts of Chemical Research,* 12**,** 204-210.

Faulds, K., Barbagallo, R. P., Keer, J. T., Smith, W. E. and Graham, D. (2004a). SERRS as a more sensitive technique for the detection of labelled oligonucleotides compared to fluorescence. *Analyst,* 129**,** 567-568.

Faulds, K., McKenzie, F. and Graham, D. (2007). Evaluation of the number of modified bases required for quantitative SERRS from labelled DNA. *Analyst,* 132**,** 1100-1102.

Faulds, K., Smith, W. E. and Graham, D. (2004b). Evaluation of surface-enhanced resonance Raman scattering for quantitative DNA analysis. *Analytical Chemistry,* 76**,** 412-417.

Faulds, K., Smith, W. E. and Graham, D. (2005a). DNA detection by surface enhanced resonance Raman scattering (SERRS). *Analyst,* 130**,** 1125-1131.

Faulds, K., Stewart, L., Smith, W. E. and Graham, D. (2005b). Quantitative detection of dye labelled DNA using surface enhanced resonance Raman scattering (SERRS) from silver nanoparticles. *Talanta,* 67**,** 667-671.

Fruk, L., Grondin, A., Smith, W. E. and Graham, D. (2002). A new approach to oligonucleotide labelling using Diels-Alder cycloadditions and detection by SERRS. *Chemical Communications***,** 2100-2101.

Graham, D., Fruk, L. and Ewen Smith, W. (2003). Detection of DNA probes using Diels Alder cycloaddition and SERRS. *Analyst,* 128**,** 692-699.

Graham, D., Mallinder, B. J. and Smith, W. E. (2000). Surface-enhanced resonance Raman scattering as a novel method of DNA discrimination. *Angewandte Chemie-International Edition,* 39**,** 1061.

Graham, D., Smith, W. E., Linacre, A. M. T., Munro, C. H., Watson, N. D. and White, P. C. (1997). Selective detection of deoxyribonucleic acid at ultralow concentrations by SERRS. *Analytical Chemistry,* 69**,** 4703-4707.

Han, M. S., Lytton-Jean, A. K. R., Oh, B.-K., Heo, J. and Mirkin, C. A. (2006). Colorimetric Screening of DNA-Binding Molecules with Gold Nanoparticle Probes. *Angewandte Chemie International Edition,* 45**,** 1807-1810.

Jiang, L., Zhang, H., Zhuang, J., Yang, B., Yang, W., Li, T. and Sun, C. (2005). Sterically Mediated Two-Dimensional Architectures in Aggregates of Au Nanoparticles Directed by Phosphorothioate Oligonucleotide-DNA. *Advanced Materials,* 17**,** 2066-2070.

Kneipp, K., Wang, Y., Kneipp, H., Perelman, L. T., Itzkan, I., Dasari, R. R. and Feld, M. S. (1997). Single Molecule Detection Using Surface-Enhanced Raman Scattering (SERS). *Physical Review Letters,* 78**,** 1667.

Kumar, A., Phadtare, S., Pasricha, R., Guga, P., Ganesh, K. N. and Sastry, M. (2003). Assembling gold nanoparticles in solution using phosphorothioate DNA as structural interconnects. *Current Science,* 84**,** 71-74.

Kurreck, J. (2003). Antisense technologies. *European Journal of Biochemistry,* 270**,** 1628-1644.

Lee, J. H., Wernette, D. P., Yigit, M. V., Liu, J., Wang, Z. and Lu, Y. 2007. Site-Specific Control of Distances between Gold Nanoparticles Using Phosphorothioate Anchors on DNA and a Short Bifunctional Molecular Fastener. *Angewandte Chemie International Edition,* 46**,** 9006-9010.

Lee, P. C. and Meisel, D. (1982). Adsorption and Surface-enhanced Raman of dyes on silver and gold sols. *Journal of Physical Chemistry,* 86**,** 3391-3395.

Ma, N., Sargent, E. H. and Kelley, S. O. (2009). One-step DNA-programmed growth of luminescent and biofunctionalized nanocrystals. *Nature Nanotechnology,* 4**,** 121-125.

Munro, C. H., Smith, W. E., Garner, M., Clarkson, J. and White, P. C. (1995). Characterization of the surface of a citrate-reduced colloid optimized for use as a substrate for surface-enhanced resonance Raman-scattering. *Langmuir,* 11**,** 3712-3720.

Nie, S. and Emory, S. R. (1997). Probing Single Molecules and Single Nanoparticles by Surface-Enhanced Raman Scattering. *Science,* 275**,** 1102-1106.

Nirmal, M. and Brus, L. (1998). Luminescence Photophysics in Semiconductor Nanocrystals. *Accounts of Chemical Research,* 32**,** 407-414.

Pal, S., Sharma, J., Yan, H. and Liu, Y. (2009). Stable silver nanoparticle-DNA conjugates for directed self-assembly of core-satellite silver-gold nanoclusters. *Chem Commun (Camb)***,** 6059-61.

Park, S.-J., Taton, T. A. and Mirkin, C. A. (2002). Array-Based Electrical Detection of DNA with Nanoparticle Probes. *Science,* 295**,** 1503-1506.

Rodger, C., Smith, W. E., Dent, G. and Edmondson, M. (1996). Surface-enhanced resonance-Raman scattering: an informative probe of surfaces. *Journal of the Chemical Society, Dalton Transactions***,** 791-799.

Storhoff, J. J., Lucas, A. D., Garimella, V., Bao, Y. P. and Muller, U. R. (2004). Homogeneous detection of unamplified genomic DNA sequences based on colorimetric scatter of gold nanoparticle probes. *Nat Biotech,* 22**,** 883-887.

Vo-Dinh, T., Hiromoto, M. Y. K., Begun, G. M. and Moody, R. L. (1984). Surface-enhanced Raman spectrometry for trace organic analysis. *Analytical Chemistry,* 56**,** 1667-1670.

Bio-note

Dr Richard Nicholas Cassar graduated from the University of Malta in 2006 with a B.Sc. (Hons) in Chemistry and Biology. He started a research internship on nanotechnology at the EPFL in Switzerland. He then commenced an M.Sc. on novel materials at the University of Malta which he obtained in 2009. He was awarded a scholarship to pursue a Ph.D. in Chemistry at the University of Strathclyde where he focused on nano-biodiagnostic applications. After graduating in July 2014, Dr Cassar worked as a consultant in the industrial and environmental sectors, whilst lecturing in various institution. In 2017, Dr Cassar joined the Chemistry Department at the Junior College as assistant lecturer. His research interests are nanotechnology for biodiagnostics and bioimaging purposes.

Prof Duncan Graham is based at the University of Strathclyde, Glasgow and is currently Head of Department for Pure and Applied Chemistry. He has a research group of around 35, and over 200 publications to date. Duncan Graham is also a co-founder of the Centre for Molecular Nanometrology and is a co-founder and director of Renishaw Diagnostics Ltd. He serves as Chair of the Editorial Board for Analyst, is president of the Analytical Division of the Royal Society of Chemistry, is on the advisory editorial board for Chemical Science and Chemical Society Reviews, the editorial advisory board for the Journal of Raman Spectroscopy, the editorial board for Biomedical Spectroscopy and Imaging, the advisory board for Analytical Methods, and the advisory board for the new Cell Press journal, Chem.

Prof Karen Faulds is based at the Department of Pure and Applied Chemistry of the University of Strathclyde. Prof Faulds is an expert in the development of surface enhanced Raman scattering (SERS) and other spectroscopic techniques

for novel analytical detection strategies. She has published over 100 peer reviewed publications and has filed 5 patents. In 2013 she was awarded the RSC Joseph Black Award, then in 2016 the Craver Award from the Coblentz Society and was also recently named as one of the Top 50 Women in Analytical Science by The Analytical Scientist. She is the Strathclyde Director of the Centre for Doctoral Training in Optical Medical Imaging, serves on the editorial board of RSC Advances and the editorial advisory board for Analyst and Chemical Society Reviews.

Same Roots Different Branches: The Study of Personality by Researchers from Different Disciplines

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Abstract

Increasing specialisation in most academic fields has led to the compartmentalisation of knowledge into highly specific fields of enquiry. As a result, researchers working in different but related fields rarely get the opportunity to collaborate and pool their knowledge. This situation is particularly problematic in the social sciences, given that the complexity of human experience usually necessitates the approach of a situation from multiple complementary angles. The current study is the result of a collaborative exercise between an organisational psychologist, specialising in the study of human behaviour at the workplace, and a clinical psychologist, specialising in the diagnosis and treatment of psychological disorders and behavioural and emotional difficulties. This paper addresses the common underlying epistemological and ontological frameworks that both authors subscribe to, which give rise to similar viewpoints on phenomena. It subsequently describes how these two researchers approach the study of personality by adopting a methodology that embraces both idiographic and nomothetic approaches. It also explores how the authors have examined the perceptions of specific professionals, namely clinical and counselling psychologists, from the perspectives of organisational and clinical psychology. The instrument used as a means of data-collection for this study, the repertory grid, is also described. Subsequently findings emerging from the data collected using this technique are presented and discussed in the light of the theories reviewed. The data collected using this technique, based on a social constructivist philosophy, also lends itself to quantitative analysis, bridging the divide between idiographic and nomothetic research methods.

Keywords: Interdisciplinarity, repertory grid, personality, unconscious motives, clinical and counselling psychologists.

Interdisciplinarity and specialisation

The relative merits of specialisation and interdisciplinarity have been the subject of much academic debate in recent years. On the one hand, the increase in knowledge in most fields has led to increasing levels of specialisation. Siow (1998), for example, claimed that researchers cannot remain abreast of all the new advances in their respective disciplines, and therefore are required to specialise in order to keep up with just one particular area within their specific discipline. On the other hand, Moghaddam (1997) claimed that the idea that increased specialisation leads to greater efficiency is a myth.

More recently, authors have taken somewhat more moderate positions on the issue. Utzerath and Fernandez (2017), for example, pointed out that because of the increasing complexity of issues being studied by researchers, examining an issue from the viewpoint of one specialisation is inefficient and may lead to incomplete findings. Jacobs (2014), on the other hand, purported that maintaining boundaries between the different disciplines is necessary, although he conceded that interdisciplinary research does have its benefits when carried out rigorously. Bursztyn (2008), writing a decade ago, claimed that while the 20th century could be seen as an era of specialisation, interdisciplinarity would be the focus of the 21st century.

Our position as researchers is that examining an issue from the points of view of different specialists results in a richer and more complete understanding of the issue in question. This paper discusses the above in the light of a specific research question, namely clinical and counselling psychologists' perceptions regarding the personality traits prevalent in their fellow professionals.

Ontological and epistemological considerations

Crotty (1998) claimed that researchers have a tendency to approach chosen methodologies with a number of assumptions and abstract principles that consist of their beliefs about the world. Guba and Lincoln (1994) regarded these worldviews as paradigms which guide researchers. They explained that paradigms include questions regarding the nature of reality (ontology), questions about that which can be known (epistemology) and questions regarding the methods used to uncover the desired knowledge (methodology). These assumptions influence the manner in which researchers approach their research as well as the ways in which they collect and interpret their data.

Broadly speaking, ontological perspectives may be placed on a continuum, ranging from naïve realism, to critical realism, to relativism (Guba & Lincoln, 2005). Positivist paradigms derive from realist ontologies which emphasise the existence of an external reality, an objective truth which is identifiable and measurable, if the right methods are employed (Crotty, 1998; Ponterotto, 2005). Constructivists-

interpretivists, on the other hand, do not believe in a single, true reality but hold that there are multiple, constructed realities (Ponterotto, 2005). Constructionism assumes a relativist ontology which is rooted in a symbolic interactionist perspective that rests on the assumption that human interaction creates meaning (Denzin, 2007), and that objectivity and truth are borne of community traditions, and not "by-products of individual minds" (Gergen, 2000, p.14). Between these two poles lies a form of middle-ground that can be considered to be a less extreme form of objectivism, and which also considers the importance of multiple and constructed realities. Both authors of this work subscribe to this post-positivist paradigm which espouses a critical, rather than a naïve realist ontology. Critical realism, in line with positivism, asserts that there is an objective version of reality (Bhaskar, 1975; 1989), however it contends that this reality is only partially apprehendible (Gorski, 2013; Guba & Lincoln, 2005; Modell, 2009). The implications of critical realism as an epistemology allow for the use of both quantitative and qualitative methods in some situations (Guba & Lincoln, 1994; Venkatesh et al., 2013; Zachariadis et al., 2013). The repertory grid is therefore an ideal instrument of choice, since its theoretical underpinnings emerge from both quantitative and qualitative traditions (see below).

There are also some implications regarding the construct of personality when this is viewed under the lens of critical realism. Psychological theorists do not agree on the relative importance of personality, compared to other factors, in determining attitudes and behaviour. Indeed, the social constructionist view of reality (e.g. Gergen, 1985) claims that since reality does not exist objectively, personality is not an objective phenomenon and attitudes and behaviours are determined by social interactions, rather than by pre-existing traits. However, most psychologists agree that the construct of personality is useful in at least partly predicting attitudes and behaviour.

These latter concepts are more in line with our view that inner structures and a relational approach to personality, which views structures as emerging from significant relationships, are not mutually exclusive. In our view, an equilibrium or middle-ground between realism and relativism is achievable. This can be done if one considers personality as a matrix of fixed inner structures or traits that can be considered to be somewhat stable (realism), yet at the same time idiosyncratic, and to a certain extent influenced by context and relationships (relativism). This emerges from our common belief in an intertwining co-creation of meaning, a world where subject and object cannot be separated.

Personality and job performance

While various theorists define personality in different ways (Eaves, 1989), most agree that the term refers to a complex pattern of deeply embedded, long-lasting psychological characteristics. These characteristics are largely non-conscious and not

easily altered, and express themselves in most aspects of functioning. Taken as a whole, they comprise the individual's distinctive pattern of feeling, thinking, coping and behaving (Millon & Davis, 1996)**.** Most authors concur that personality is a stable construct. However, there is also consensus that some traits can be flexible over the lifespan.

The Big Five model of personality (e.g. McCrae & Costa, 1988) is the model most highly supported by empirical evidence. This model posits that personality can be measured on five continua, namely extraversion, emotional stability, conscientiousness, agreeableness, and openness to experience. Organisational psychologists have a long tradition of trying to use measurable personality traits to predict aspects of job performance. A meta-analysis conducted by Barrick and Mount (1991) found links between some personality traits and performance in specific types of jobs. More specifically, conscientiousness was found to be important for performance across all jobs (see also Judge et al., 1999). Extraversion was important for jobs requiring social interaction, such as salespersons and managers, and openness to experience was important for jobs requiring frequent training and change. The links between one's personality and one's future career have also been widely recognised by the career counselling literature. In fact, Holland's theory of career types (e.g. Holland, 1973; 1997) together with an associated tool (the Vocational Preference Inventory – Holland, 1985) is one of the most widely used in this context.

Theoretical perspectives on the traits of clinical and counselling psychologists

Clinical and counselling psychologists have traditionally been perceived as being helpful to others, empathic, caring, kind, trustworthy, good at listening, good at communicating, independent, insightful, and introspective (Hill et al., 2013). In the middle of the last century, Rogers (1951) laid down the ideal characteristics of psychotherapists (i.e. non-judgmental, genuine, and able to view their clients with unconditional positive regard) as being the necessary conditions of psychotherapy and the key movers of change within the client.

Wampold et al. (2011) summarised qualities and actions of effective therapists as consisting of verbal fluency, interpersonal perception, affective modulation and expressiveness, warmth and acceptance, empathy, and focus on others. In a similar vein, the United States Bureau of Labor Statistics' Occupational Outlook Handbook outlined seven traits and skill sets which are considered necessary for an aspiring psychologist. These are analytical skills, communication skills, integrity, interpersonal skills, observational skills, patience, and problem-solving skills (Bureau of Labor Statistics, 2018). McCaulley (1981) has indicated that the most frequent combination of personality traits for clinical and counselling psychologists on the Myers Briggs test is Extraverted-Intuitive-Feeling-Perceiving. Other authors, however, have pointed out that this emphasis on the positive aspects of psychologists, which

they often do possess, has led to a neglect of the darker aspects of their personality constellations. This has probably led to what Maroda (as cited in Sussman, 2007) referred to as the common perception of psychologists as intellectually, spiritually and morally superior.

Although psychologists regularly claim that their primary motivation in choosing their profession was "to help people", there is a body of knowledge which evidences that the choice of career as a helping professional is determined by multiple factors. These are complex, intertwined, only partially conscious, and often not well-understood until late in the psychologist's career (Di Caccavo, 2002; Holt & Luborsky, 1958; Maroda, 2005; Nikcevic et al., 2007; Norcross & Farber, 2005; Sussman, 2007). Sussman (2007) referred to unconscious motives and to Trivers' (as cited in Sussman, 2007) assertion that self-deception is also a personality trait which is deeply rooted in human nature. This leads to psychologists' tendencies to delude themselves regarding their motivations for the choice of profession (Maroda, as cited in Sussman, 2007). Norcross and Farber (2005) and Nikcevic, Kramolisova-Advani and Spada (2007) claimed that the motivation for choosing a career in mental health may arise from a need to resolve personal psychological issues and childhood struggles by means of their profession. Di Caccavo (2006) also referred to parentification that arises from professionals' histories of childhood caregiving in situations where their parents were emotionally unavailable. This, according to the author, would lead to an internalisation of a caretaking role that would allow carers to care for themselves by caring for others. Sussman (2007) identified three types of unconscious motives in psychotherapists, namely 1) motives stemming from instinctual aims, i.e. psychological needs related to sexual and aggressive instincts; 2) motives related to narcissism and the development of the self, i.e. the need to feel affirmed by others; and 3) motives involving object relations, i.e. the need to feel intimately connected to others. It is important to note, however, that these authors concur that unconscious motives can be kept in check and can even be helpful to psychologists as long as they have been made conscious via their own personal psychotherapy. Norcross and Farber (2005) also asserted that the neurotic motive for healing the self is usually balanced by the less-neurotic motive of altruism. The personality of the psychologist is considered to be fundamentally important, since the treatment outcome depends largely on the person who is providing the psychotherapy. In a number of studies, the differences between types of treatment were found to be negligible when compared to the differences amongst therapists in determining the effectiveness of psychotherapy (Kim et al., 2006; Lutz et al., 2007; Wampold, 2006; Wampold & Brown, 2005). It appears, therefore, that psychologists, unlike other professions, depend on their personhood to provide a good service to clients. It was noted by the authors of the current study that the research in this area is relatively dated, and mostly focused on strengths and values. Although theories regarding the negative traits of psychologists abound, few researchers have attempted to validate them empirically, especially in the local context.

Rationale for the research method – the repertory grid technique

Individual psychologists may have different views on the personalities of clinical and counselling psychologists. The repertory grid technique, with its idiographic emphasis, is the ideal method for this study, as it is designed to help understand these nuanced differences. This technique has also been shown to be useful in eliciting tacit knowledge (Polanyi, 1958), such as the knowledge professionals have about their own profession, which they are not necessarily immediately aware (or conscious) of. Clinical and counselling psychologists' perceptions about their colleagues could shed light on what they believe to be ideal qualities that they possibly aspire to themselves. Traits which are perceived to be negative or undesirable to participants, and consequently repressed or denied in themselves, can also be elicited with ease by attributing them to others. This method bypasses the censorship of conscious thought through projection, which was defined by Freud as the denial of the existence of unpleasant thoughts, impulses, and aspects of the self by attributing them to others or to inanimate objects. In sum, this method allows for the possibility of participants to refer unconsciously to their own traits, whilst consciously talking about their fellow professionals.

The underlying theoretical basis for the research method used in our study is George Kelly's Personal Construct Theory (1955). Kelly argued that individuals understand their world according to their own frame of reference, which is derived from their upbringing and experiences. This knowledge is stored in what are called *personal constructs*. Kelly (1955) posits that: "A construct is a way in which some things are being construed as being alike and yet different from others" (p.105). A distinctive feature of personal constructs is that they are dichotomous – e.g. an individual may perceive others as being good or bad, friendly or hostile, strong or weak, etc. (Kelly 1955; 1969). Although essentially cognitive, constructs also have motivational and emotional qualities.

The repertory grid technique was developed by Kelly (1961) as a method of eliciting personal constructs. Originally used primarily as a research tool in clinical psychology (Bjorklund, 2008), it has subsequently been used in a variety of research areas, including education (e.g. Pill, 2005), and management and business (e.g. Rogers & Ryals, 2007). A further advantage of this method is that it combines the strengths of both idiographic and nomothetic approaches, and results in data which can be analysed both qualitatively and quantitatively (Catania & Darmanin Kissaun, 2016), thus falling perfectly in line with our critical realist paradigm described above.

Method

Ethical approval for the study was granted by the University Research Ethics Committee in December 2017. Five clinical/counselling psychologists were recruited by means of convenience sampling. Information letters were sent via email and participants who were interested came forward of their own accord. Their informed consent was obtained before the interview and permission to write down their responses in the grid was also sought. Participants were fully aware of their rights to remain anonymous and to withdraw from the study without providing justification. Participants assigned pseudonyms to the psychologists they mentioned in order to safeguard their identities. The duration of the interviews was between 60 and 90 minutes each.

The repertory grid interview can be regarded as a particular form of structured interview (Fransella et al., 2004). The process involves 4 consecutive steps: 1) agreement on the topic under consideration; 2) identification of a series of related examples or *elements*; 3) eliciting *constructs* from the elements chosen by the participant, using probing questions to clarify the construct where necessary; 4) the *ranking* or *rating* of each element on each construct. (For a more detailed description of this process, see Catania & Darmanin Kissaun, 2016.)

Participants were asked to compare examples of possible behaviour shown by different exemplars of psychologists (e.g. "the most empathic psychologist you are aware of", "the psychologist who has the best communication skills", etc.) and indicate how different and similar they are to each other. The two opposites thus elicited formed the opposite poles of a *construct.* Each exemplar was then rated on this construct using a seven point scale (1: person very like the emergent pole of the construct - 7: person very like the opposite pole of the construct) and the result recorded in the first row of a repertory grid. This procedure was repeated using various combinations of exemplars until no further new constructs were generated. Preliminary analysis gave rise to 41 unique constructs.

Summary of the findings and discussion

The constructs elicited included some which have been traditionally ascribed to psychologists. These are presented on the left hand side on the table below. The right hand side of the table portrays traits which are less likely to be ascribed to psychologists, as they tend to be perceived as less desirable. In keeping with the tenets underpinning Personal Construct theory, the traits lie on a continuum, with the elicited traits presented below on opposite poles.

Self-confident/self-assured	…	Self-doubting
Fair/just	…	Biased
Authentic	…	Shady/shifty
Ethical	…	Breaks confidentiality/boundaries
Congruent	…	Incongruent
Genuine	…	Scheming
Humane	…	Strategic
Skilled	…	Relatively unskilled
Intuitive	…	Work by the book
Able to work with clients from diverse social backgrounds	…	Works best with one type of client/socially selective/snobbish
Flexible	…	Rigid
Family oriented	…	Career oriented
Other oriented	…	Self-absorbed
Knowledgeable/academically strong/well read	…	Not as well read/ academically incompetent
Valuing of others' opinions	…	Narcissistic
Caring towards clients	…	Narcissistic
Self-disclosing re own flaws and imperfections	…	Guarded
Humble	…	Likes to show off/inappropriately self-assured/boastful
Genuinely interested in helping	…	Driven by power/status/prestige
Giving priority to relationships	…	Gives priority to self-interest
Able to experience awe/joy in the presence of their clients	…	Muted
Warm	…	Aloof
Identity based on various roles	…	Identity solely tied to being a psychologist

Some of the traits and characteristics mentioned by participants are in line with psychoanalytic interpretations regarding psychologists' unconscious motives, which address narcissistic needs and the wish for affirmation by others (Sussman, 2007). Narcissism involves an inflated ego ideal that fuels perfectionistic aspirations of omniscience and omnipotence. The danger lies in the psychologists' unconscious need to use the patient as a *mirroring self-object* (Kohut, 1986), in an attempt to regulate their own self-esteem. Narcissism has also been considered as the underside of shame by Morrison (1989) and as a defence against inferiority in some of the psychoanalytic literature. In her study on shame in psychotherapy, Darmanin Kissaun

(2017) reported that her participants were aware that one means by which they attenuated shame and feelings of inferiority was to obtain professional qualifications.

Of particular interest was the construct referring to the therapist's identity as being exclusively tied to their profession. The "god complex" is referred to by Kirmayer (2003) who cautions psychotherapists not to over-identify with their healing powers. In a study by Weber and Gans (2003), personal self-esteem appeared to be inextricably linked to professional self-esteem. Psychologists have their own idealised image of the perfect professional, which is further perpetuated by patients and the public. However, failure to be effective in "healing" patients gives way to increased awareness of the psychologist's limitations and leads to a more realistic and accepting professional ego. Vella (2017) remarks that warranting bodies and psychological associations may perpetuate this view of the 'perfect professional', causing aspects of the real therapist to be repressed and masked by the false therapist. This, in turn, may be exacerbated by the small size of the island, which gives rise to the probability of professionals occupying multiple roles (Abela & Sammut Scerri, 2010). This augments the sense of exposure and social visibility (Clark, 2012) experienced by Maltese psychologists. Darmanin Kissaun (2017) further reported that her participants often felt shame in supervision and the fear of appearing incompetent before their supervisors, with whom they have relationships in a number of different contexts. Many a time, this fear of exposure prevented psychologists from being honest about their own struggles with patients and often led to them seeing patients without supervisory assistance or support. This might necessitate further thinking regarding the training of psychologists in Malta who might be particularly prone to fall prey to their unacknowledged personal struggles with shame and inadequacy.

Conclusion and implications of this study

The organisational psychological literature shows that congruence between personality traits and career choice results in a greater possibility of individuals experiencing job satisfaction (Holland, 1973; Judge et al., 2002; Lounsbury et al., 2003). Furthermore, job satisfaction is linked with other positive organisational outcomes, such as engagement (e.g. Warr & Inceoglu, 2012), resistance to burnout (e.g. Huebner, 1992), and better performance (Iaffaldano & Muchinsky, 1985). Clearly, better performance is desirable in the case of clinical and counselling psychologists, as the quality of their work has a significant direct impact on the quality of life of their clients. The results of this study help us understand better the complexity underlying the reasons why clinical and counselling psychologists choose these respective professions. These results, possibly augmented by further findings from more data collection and other studies, can be used to design a self-assessment tool exploring the personality traits underlying psychologists' choice of profession. Such

a tool can be extremely useful, both when prospective psychologists are exploring whether or not to enter the profession and as a tool for existing psychologists to discuss during their personal psychotherapy and supervision. The results of this study also have implications for the training of psychologists in Malta, given the difficulties they experience that arise from the multiple roles they occupy. These implications underscore the many advantages of examining an issue from multiple viewpoints, confirming that interdisciplinarity results in a richer and more complete understanding of the issue in question.

References

Abela, A., & Sammut Scerri, C. (2010). Managing multiple relationships in supervision: In C. Burke & G. Daniel, eds. *Mirrors and reflections: Processes of systemic supervision*, London: Karnac, pp.289-308.

Barrick, M. R. & Mount, M. K. (1991). The big five personality dimensions and job performance: A meta-analysis. *Personnel Psychology,* 44(1), 1-26.

Bhaskar, R. (1975). *A realist theory of science*. Leeds, UK: Leeds Books.

Bhaskar, R. (1989). *Reclaiming reality.* London: Verso.

Bjorklund. L. (2008). The repertory grid technique. In H. Middleton, ed. *Researching technology education,* Rotterdam/Taipei: Sense Publishers, pp.46-69.

Bureau of Labor Statistics, U.S. Department of Labor. *Occupational Outlook Handbook*, Psychologists (Amended April 2018). Available at www.bls.gov/ooh/life-physical-and-social-science/psychologists.htm [Accessed 6 August 2018].

Bursztyn, M. (2008). Sustainability science and the university: Towards interdisciplinarity. *CID Working Papers 24, Center for International Development at Harvard University.*

Catania, G. & Darmanin Kissaun, G. (2016). The Repertory Grid Technique – an idiographic technique used to elicit tacit knowledge in Subject Matter Experts. In G. Sammut & S. Salvatore, eds. *The yearbook of idiographic science: Methods of psychological intervention,* Charlotte, NC: Information Age Publishing.

Clark, M. (2012). Shaming and community reactions to offending in a Mediterranean society: a Maltese case study. *Journal of Mediterranean Studies*, 21(1), 127-152.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process.* London: Sage Publications.

Darmanin Kissaun, G. (2017). *Shame in psychotherapy: Maltese psychotherapists' lived experience of shame in the therapeutic encounter.* Unpublished Doctoral dissertation: Regent's University, London.

Denzin, N. K. (2007). Symbolic interactionism. In U. Flick, E. von Kardorff & I. Steinke, eds. *A companion to qualitative research,* London: Sage Publications, pp.81-87.

Di Caccavo, A. (2002). Investigating individuals' motivations to become counselling psychologists: The influence of early caretaking roles within the family. *Psychology and Psychotherapy: Theory, Research and Practice,* 75(4), 463-472.

Di Caccavo, A. (2006). Working with parentification: Implications for clients and counselling psychologists. *Psychology and Psychotherapy: Theory, Research and Practice,* 79(3), 469-478.

Eaves, J. L., (1989). *Factor theory of personality with particular emphasis on Cattell's 16PF-A literature review* (No. PSRU-RN-2/89). Australian Military Forces, Canberra Psychological Research Unit.

Fransella, F., Bell, R. and Bannister, D. (2004). *A manual for repertory grid technique* (2nd ed.). West Sussex, UK: John Wiley and Sons.

Gergen, K. J. (1985). Social constructionist inquiry: Context and implications. In K, J. Gergen & K. E. Davis, eds. *The social construction of the person*. Springer, New York: Springer, pp.3-18.

Gergen, K. J. (2000). *An invitation to social construction.* London: Sage Publications.

Gorski, P. S. (2013). What is critical realism? And why should you care? *Contemporary Sociology: A Journal of Reviews,* 42(5), 658-670.

Guba, E. G. & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research,* 2, 163-194.

Guba, E. G. & Lincoln, Y. S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In N.K. Denzin & Y.S. Lincoln eds. *The Sage Handbook of Qualitative Research,* UK: Sage Publications, pp.191-215.

Hill, C. E., Lystrup, A., Kline, K., Gebru, N. M., Birchler, J., Palmer, G., and Knox, S. (2013). Aspiring to become a therapist: Personal strengths and challenges, influences, motivations, and expectations of future psychotherapists. *Counselling Psychology Quarterly*, 26(3-4), 267-293.

Holland, J. L. (1973). *Making vocational choices: A theory of careers.* London: Prentice Hall.

Holland, J. L. (1985). *The self-directed search.* Psychological Assessment Resources.

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments.* Psychological Assessment Resources.

Holt, R. R., & Luborsky, L. (1958). *Personality patterns of psychiatrists.* New York: Basic Books.

Huebner, E. S. (1992). Burnout among school psychologists: An exploratory investigation into its nature, extent, and correlates. *School Psychology Quarterly,* 7(2), 129-136.

Iaffaldano, M. T. & Muchinsky, P. M. (1985). Job satisfaction and job performance: A meta-analysis. *Psychological Bulletin*, 97(2), 251-273.

Jacobs, J. A. (2014). *In defense of disciplines: Interdisciplinarity and specialization in the research university.* Chicago: University of Chicago Press.

Judge, T. A., Higgins, C. A., Thoresen, C. J. and Barrick, M. R., (1999). The Big Five personality traits, general mental ability, and career success across the life span. *Personnel Psychology,* 52(3), 621-652.

Kelly, G. A. (1955). *The psychology of personal constructs.* New York: Norton.

Kelly, G. A. (1961). *A mathematical approach to psychology.* Paper presented at the invitation of the Moscow Psychological Society (USSR) and read at Moscow on April 10, 1961.

Kelly, G. A. (1969). *A theory of personality: The psychology of personal constructs.* New York: Norton.

Kim, D. M., Wampold, B. E. and Bolt, D. M. (2006). Therapist effects in psychotherapy; A random effects modeling of the NIMH TDCRP data. *Psychotherapy Research,* 16, 161-172.

Kirmayer, L. J. (2003). Asklepian dreams: The ethos of the wounded-healer in the clinical encounter. *Transcultural Psychiatry,* 40(2), 248-277.

Kohut, H. (1986). Forms and transformations of narcissism. *Essential papers on narcissism,* 61-87.

Lounsbury, J. W., Loveland, J. M., Sundstrom, E. D., Gibson, L. W., Drost, A. W. and Hamrick, F. L. (2003). An investigation of personality traits in relation to career satisfaction. *Journal of Career Assessment*, 11(3), 287-307.

Lutz, W., Leon, S. C., Martinovich, Z., Lyons, J. S., and Stiles, W. B. (2007). Therapist effects in outpatient psychotherapy: A three-level growth curve approach. *Journal of Counseling Psychology,* 54, 32-39.

Maroda, K. J. (2005). Legitimate gratification of the analysts' needs. *Contemporary Psychoanalysis*, 41, 371-387.

McCaulley, M. H. (1981). *Application of the Myers-Briggs Type Indicator to Medicine and Other Health Professions.* Monograph I. Final Report. Available at https://eric.ed.gov/?id=ED211596 [Accessed 6 August 2018].

McCrae, R. R. & Costa Jr, P. T. (1999). A five-factor theory of personality. *Handbook of personality: Theory and research,* 2, 139-153.

Millon, T. & Davis, R. O. (1996). *Disorders of personality: DSM-IV and beyond.* New York: John Wiley & Sons.

Modell, S. (2009). In defence of triangulation: a critical realist approach to mixed methods research in management accounting. *Management Accounting Research*, 20(3), 208-221.

Moghaddam, F. M. (1997). *The specialized society: The plight of the individual in an age of individualism.* Westport, US: Praeger Publishers/Greenwood Publishing Group.

Morrison, A. P. (1989). *Shame – The underside of narcissism.* Hillsdale, NJ: Analytic Press

Nikcevic, A. V., Kramolisova-Advani, J., and Spada, M. M. (2007). Early childhood experiences and current emotional distress: What do they tell us about aspiring psychologists? *The Journal of Psychology,* 141(1), 25-34.

Norcross, J. C., & Farber, B. A. (2005). Choosing psychotherapy as a career: Beyond "I want to help people". *Journal of Clinical Psychology/In Session*, 61(8), 1009-1031.

Pill, A. (2005). Models of professional development in the education and practice of new teachers in higher education. *Teaching in Higher Education,* 10(2), 175-188.

Polanyi, M. (1958). *Personal knowledge: Towards a post-critical philosophy.* Chicago: University of Chicago Press.

Ponterotto, J. G. (2005). Qualitative research in counseling psychology: A primer on research paradigms and philosophy of science. *Journal of Counseling Psychology,* 52(2), 126-136.

Rogers, B., and Ryals, L. (2007). Using the repertory grid to access the underlying realities in key account relationships. *International Journal of Market Research,* 49(5), 595-612.

Rogers, C. R. (1951). *Client-centered therapy: Its current practice, implications, and theory.* London: Constable.

Siow, A. (1998). Tenure and other unusual personnel practices in academia. *Journal of Law, Economics, & Organization,* 14(1), 152-173.

Sussman, M. B. (2007). *A curious calling: Unconscious motivations for practicing psychotherapy.* Northvale, NJ: J. Aronson.

Utzerath, C. & Fernández, G. (2017). Shaping science for increasing interdependence and specialization. *Trends in Neurosciences,* 40(3), 121-124.

Vella, J. (2017). *Riding the wave of the shadow: how do Maltese psychotherapists experience shadow in their practice and in their lives?* Unpublished Doctoral dissertation, Regent's University, London.

Venkatesh, V., Brown, S. A. and Bala, H. (2013). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. *MIS Quarterly*, 37(1), 21-54.

Wampold, B. E. (2006). What should be validated? The psychotherapist. In J.C. Norcross, L. E. Beutler & R. F. Levant, eds. *Evidence-based practices in mental Health: Debate and dialogue on the fundamental questions*, Washington, DC: American Psychological Association, pp. 200-208.

Wampold, B. E., & Brown, G. S. (2005). Estimating therapist variability: A naturalistic study of outcomes in managed care. *Journal of Consulting and Clinical Psychology,* 73, 914-923.

Wampold, B. E. (2011). *Qualities and actions of effective therapists.* DVD video hosted by Jon Carlson. Washington: American Psychological Association.

Warr, P. & Inceoglu, I. (2012). Job engagement, job satisfaction, and contrasting associations with person–job fit. *Journal of Occupational Health Psychology*, 17(2), 129-138.

Weber, R. L. & Gans, J. S. (2003). The group therapist's shame: A much undiscussed topic. *International Journal of Group Psychotherapy,* 53(4), 395-416.

Zachariadis, M., Scott, S. V. and Barrett, M. I. (2013). Methodological implications of critical realism for mixed-methods research. *MIS Quarterly*, 37(3), 855-879.

Bio-notes

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Violare i limiti imposti dal genere:
Ulysses di James Joyce
Breaking the Barriers of the Genre:
James Joyce's *Ulysses*

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Abstract

When James Joyce's novel *Ulysses* was published in 1922, it breached irrevocably the traditional barriers of narration that had previously contained the novel. It shattered the parameters of traditional mimesis of both the late Nineteenth Century Victorian novel, as well as the Naturalistic one. Joyce's writing disarticulated and collided directly with the pretention that a novel could provide an objective representation of personal or collective narratives of reality. Joyce thus revisited the unified collocation of narrative space and time in traditional mimesis, and he simultaneously demonstrated their intrinsic instabilities. To exemplify these tendencies in Joyce's writing, I shall be looking at two eloquent episodes of *Ulysses* that highlight this paradigm shift in narration: the transitioning from the objective spaces of narration to the mental ones of Joyce's characters. I am particularly interested in the four possibilities of narration in the mental activity of Leopold Bloom in *Calypso* (Ch.4 of *Ulysses*), and in the mental space of Molly Bloom's stream of consciousness in *Penelope* (Ch.18 of *Ulysses*).

Parole chiave: James Joyce, Ulysses, Leopold Bloom, Molly Bloom

NB
Nel corso di questo saggio tutti i riferimenti al romanzo *Ulysses* di James Joyce si faranno con la seguente abbreviazione (come di consueto per tutti gli studiosi joyciani): **U** per Joyce, J. (1989). *Ulysses*, Gabler H.W. con Steppe W. e Melchior C. (a c. di). Londra: Bodley Head. Per l'opera joyciana la cifra prima dei due punti indica il capitolo mentre quella dopo indica le righe del capitolo di *Ulysses*, secondo l'edizione ufficiale di Gabler-Steppe-Melchior.

La scrittura di James Joyce sconvolge e disarticola le caratteristiche della mimesi romanzesca tradizionale, in maniera particolare quella del romanzo vittoriano di fine Ottocento. Decostruisce infatti le barriere della riproduttività oggettiva della storia

collettiva e individuale. Tramite il suo romanzo, *Ulysses*, Joyce rivisita la sistemazione unitaria e mimetica dello spazio narrativo del romanzo vittoriano, e ne dimostra l'incerta stabilità. In questa relazione, cercherò di osservare questa violazione dello spazio del romanzo tramite due brani di *Ulysses* che ho scelto di analizzare. Vedremo infatti come Joyce attua uno spostamento della narazione: si lascia alle proprie spalle lo spazio oggettivo del romanzo (che consuetamente comportava uno spazio fisico, come per esempio un salotto arredato di fine Ottocento), e si tuffa nell'attività mentale di un personaggio.

Per capire meglio come avviene questa violazione delle barriere narrative, ci conviene partire concretamente dalla lettura di un brano tratto dal capitolo *Calypso* di *Ulysses*. Mi riferisco al brano in cui Leopold Bloom, di prima mattina, si ritrova in cucina a preparare la sua disgustante colazione nella compagnia del suo gatto. Questo brano, che al lettore distratto potrebbe sembrare un ordinario spazio 'da cornice' per il capitolo, si rivela invece un esempio sottile della transizione dallo spazio fisico della cucina di Bloom in Eccles Street, alle possibilità narrative dell'attività mentale di Bloom.

Mr Leopold Bloom ate with relish the inner organs of beasts and fowls. He liked thick giblet soup, nutty gizzards, a stuffed roast heart, liverslices fried with crustcrumbs, fried hencods' roes. Most of all he liked grilled mutton kidneys which gave to his palate a fine tang of faintly scented urine.

Kidneys were in his mind as he moved about the kitchen softly, righting her breakfast things on the humpy tray. Gelid light and air were in the kitchen but out of doors gentle summer morning everywhere. Made him feel a bit peckish.

The coals were reddening.

Another slice of bread and butter: three, four: right. She didn't like her plate full. Right. He turned from the tray, lifted the kettle off the hob and set it sideways on the fire. It sat there, dull and squat, its spout stuck out. Cup of tea soon. Good. Mouth dry. The cat walked stiffly round a leg of the table with tail on high.

--Mkgnao!

--O, there you are, Mr Bloom said, turning from the fire.

The cat mewed in answer and stalked again stiffly round a leg of the table, mewing. Just how she stalks over my writingtable. Prr. Scratch my head. Prr.

Mr Bloom watched curiously, kindly the lithe black form. Clean to see: the gloss of her sleek hide, the white button under the butt of her tail, the green flashing eyes. He bent down to her, his hands on his knees.

--Milk for the pussens, he said.

--Mrkgnao! the cat cried.

They call them stupid. They understand what we say better than we understand them. She understands all she wants to. Vindictive too. Cruel. Her nature. Curious mice never squeal. Seem to like it. Wonder what I look like to her. Height of a tower? No, she can jump me.

--Afraid of the chickens she is, he said mockingly. Afraid of the chookchooks. I never saw such a stupid pussens as the pussens.

--Mrkrgnao! the cat said loudly. (U4:1-32)

Questo brano tratto dal capitolo 4 *Calypso* di *Ulysses* è importante per osservare lo stile della narrazione perché offre al lettore quattro possibilità narrative diverse dell'attività mentale del personaggio. In *Joyce's Voices*, Hugh Kenner esprime il parere che in *Ulysses* c'è una "sort of duet for two narrators, or perhaps a conspiracy between them" (1978, p.67). Infatti quando viene presentato Bloom in cucina sembra che ci sia una specie di cospirazione tra la voce narrante e il pensiero di Bloom. Nel brano citato sopra - come anche in tutto il resto del capitolo - ci sono enunciazioni che possono essere attribuite sia al narratore – che in questo caso cerca di dare un'immagine di Bloom e dei suoi gusti culinari in cucina – sia al monologo interiore di Bloom, che è come una seconda voce narrante nel testo. Però c'è addirittura una frase di questo brano che non sembra appartenere unicamente ad una di queste due voci narranti, ma ad entrambe: "Gelid light and air were in the kitchen but out of doors gentle summer morning everywhere" (U4:7-8). Questa combinazione di voci fuse insieme, oppure alternate nel testo, creano un movimento continuo dallo spazio esterno della narrazione a quello interno e viceversa, una tecnica narrativa che è molto lontana dall'organizzazione del discorso diretto dei romanzi tradizionali.

La parodia di Bloom in cucina, tramite lo stile indiretto libero, la descrizione dei pensieri di Bloom da parte del narratore e lo stream of consciousness, è una narrazione che prima facie sembra offrire solo tre possibilità di rappresentazione dell'attività mentale del personaggio: i. il narratore; ii. il monologo interiore di Bloom; iii. la frase con ambedue le voci fuse insieme. Però l'attività mentale di Bloom non si limita a questa tripartizione della voce narrante perché nello stesso capitolo effettua persino un'estensione della coscienza del personaggio al suo gatto.

Il fenomeno dell'estensione della coscienza ad altre creature era già accaduto in *Telemachus* quando Stephen immagina la pronuncia di parole da parte di un cadavere che è salito alla superficie del mare: "The man that was drowned. A sail veering about the blank bay waiting for a swollen bundle to bob up, roll over to the sun a puffy face, saltwhite. Here I am" (U1:675-7). Bloom avrà anche altre occasioni in cui includere nello spazio mentale i pensieri di altre persone e creature – come quando aiuta un ragazzo non vedente ad attraversare la strada mentre cerca di assaporare i suoi pensieri e sentimenti nel capitolo 8 *Lestrygonians*: "Queer idea of Dublin he must have, tapping his way round by the stones. Could he walk in a beeline if he hadn't that cane?" (U8:1107-1113).

Nel brano che stiamo esaminando, Joyce va oltre lo spazio concesso alla coscienza di Bloom e proietta le riflessioni del personaggio sullo spazio mentale del gatto (U4:15-33). I pensieri di Bloom non si soffermano soltanto sulla natura e sulle aspettative del gatto ("Wonder what I look to her", U4:28-29), ma includono persino alcune riflessioni autonome nel linguaggio del gatto stesso ("Prr. Scratch my head. Prr.", U4:19-20). Il gatto poi nel suo inconsueto miagolio improvvisa addirittura tre forme distinte del consueto 'miao' di un gatto ("Mkgnao", "Mrkgnao" e "Mrkrgnao", U4:16,25,32). Fritz Senn, commentando questo brano, afferma che il gatto rifiuta di conformarsi al lessema standard associato al miagolio ed esprime una "individual, variable utterance" (1984, p. 126).

Tale estensione della coscienza dalla mente di un personaggio ad un animale o un oggetto crea delle percezioni e dei punti di vista della realtà che saranno variati ed unici in *Ulysses*. Infatti, la prospettiva umile del gatto sembra completare la descrizione di Bloom nella cucina del n. 7 di Eccles Street, dando un'atmosfera unica al capitolo che apre all'ispezione del lettore non solo la mente di Bloom e quella del gatto ma anche il modo in cui entrambi concepiscono autonomamente il mondo. La presentazione parodica di Bloom in *Calypso*, dunque, presenta al lettore ben quattro punti di vista differenti: i. quello del gatto; ii. quello di Bloom; iii. quello del narratore-autore; iv. quello ibrido di queste ultime due voci fuse insieme. Questi movimenti nello spazio mentale di Bloom ci offrono sempre varie prospettive da considerare, infatti è nel capitolo 8, *Lestrygonians*, che Bloom, un personaggio che rimane sempre meravigliato dalle nozioni scientifiche, riflette sul "parallax" – le mutazioni che avvengono nella sfera visibile e che sono a loro volta causate dal cambiare la propria ottica di osservazione: "Parallax. I never exactly understood. There's a priest. Could ask him. Par it's Greek: parallel, parallax" (U8:110-12).

Un altro esempio sublime del tentativo di Joyce di rappresentare i piani differenti dell'attività mentale dei personaggi è indubbiamente il monologo semicosciente e quasi onirico di Molly Bloom nel capitolo 18 *Penelope* che si trova proprio all'epilogo del romanzo. L'autore del romanzo vittoriano tradizionale cercava elementi che dessero stabilità e una forma di risoluzione individuale oppure sociale al personaggio che finiva sempre con il tradizionale matrimonio o la morte tragica per amore. Joyce agisce diversamente: non conclude *Ulysses* ma lo termina con un brano che lancia un'apertura verso tutte le possibilità e le incertezze che l'esperienza presente e passata possono offrire a Molly. Con tale chiusura, *Ulysses* va oltre i limiti storici e naturalistici del romanzo e offre la visione mentale delle relazioni intime di Molly e del suo matrimonio che potrebbe anche essere fallito ma che potrebbe offrirle visioni estatiche tramite le scie della memoria. Qui abbiamo uno squarcio delle ultime cinquanta righe dello spazio mentale della moglie di Bloom:

> […] the day I got him to propose to me yes first I gave him the bit of
> seedcake out of my mouth and it was leapyear like now yes 16 years
> ago my God after that long kiss I near lost my breath yes he said I was

a flower of the mountain yes so we are flowers all a womans body yes that was one true thing he said in his life and the sun shines for you today yes that was why I liked him because I saw he understood or felt what a woman is and I knew I could always get round him and I gave him all the pleasure I could leading him on till he asked me to say yes and I wouldnt answer first only looked out over the sea and the sky I was thinking of so many things he didnt know of Mulvey and Mr Stanhope and Hester and father and old captain Groves and the sailors playing all birds fly and I say stoop and washing up dishes they called it on the pier and the sentry in front of the governors house with the thing round his white helmet poor devil half roasted and the Spanish girls laughing in their shawls and their tall combs and the auctions in the morning the Greeks and the jews and the Arabs and the devil knows who else from all the ends of Europe and Duke street and the fowl market all clucking outside Larby Sharons and the poor donkeys slipping half asleep and the vague fellows in the cloaks asleep in the shade on the steps and the big wheels of the carts of the bulls and the old castle thousands of years old yes and those handsome Moors all in white and turbans like kings asking you to sit down in their little bit of a shop and Ronda with the old windows of the posadas 2 glancing eyes a lattice hid for her lover to kiss the iron and the wineshops half open at night and the castanets and the night we missed the boat at Algeciras the watchman going about serene with his lamp and O that awful deepdown torrent O and the sea the sea crimson sometimes like fire and the glorious sunsets and the figtrees in the Alameda gardens yes and all the queer little streets and the pink and blue and yellow houses and the rosegardens and the jessamine and geraniums and cactuses and Gibraltar as a girl where I was a Flower of the mountain yes when I put the rose in my hair like the Andalusian girls used or shall I wear a red yes and how he kissed me under the Moorish wall and I thought well as well him as another and then I asked him with my eyes to ask again yes and then he asked me would I yes to say yes my mountain flower and first I put my arms around him yes and drew him down to me so he could feel my breasts all perfume yes and his heart was going like mad and yes I said yes I will Yes. (U18:1573-1609)

In questo brano, la mente di Molly ritorna inizialmente al 1888 quando Bloom le propose di sposarlo ("16 years ago my God", U18:1575) e al modo in cui lei non riusciva a rispondergli ("wouldn't answer first only looked out over the sea and the sky I was thinking of so many things he didn't know of", U18:1581-2). Queste memorie dei "so many things he didn't know of" appartengono all'adolescenza di Molly passata a Gibilterra, un periodo precedente al suo fidanzamento con Bloom, in

cui ebbe un amante. Le memorie legate al "Yes" di Molly alla proposta di matrimonio di Bloom nel 1888 interagiscono con gli altri "Yes" della sua concessione all'amante a Gibilterra nella sua adolescenza e con lo stato attuale della sua relazione con Bloom, nel 1904. Con questo viaggio mentale indietro nel tempo dal 1904 al 1888 e anche prima, Molly chiude il romanzo positivamente con un "Yes" universale che trascende il suo spazio e il suo tempo. Nella loro attività mentale, i personaggi di *Ulysses* fanno riferimenti costanti alle esperienze passate, dimostrando così di avere una singolare capacità di distaccarsi dal presente per immergersi nell'immaginario intriso di fantasie e rimembranze.

Bisogna segnalare che anche lo stream of consciousness di Bloom recupera continuamente eventi dal suo passato che sono associati oppure sovrapposti all'esperienza del presente. Nel capitolo 6 *Hades*, Bloom si ricorda del suicidio del padre avvenuto molti anni prima ("Death by misadventure. The letter. For my son Leopold", U6: 364), del sotterramento di suo figlio Rudy che era morto dieci anni prima ("Our. Little. Beggar. Baby. Meant nothing. Mistake of nature", U6:328) come anche delle sue esperienze con Molly a Lombard Street West ("Molly wanting to do it at the window", U6:761).

Il flusso di dettagli del passato nella mente di un personaggio sono elementi facilmente rintracciabili anche in un qualsiasi romanzo vittoriano, ma la differenza in *Ulysses* è che i dettagli vengono evocati costantemente dalla mente, e senza nessun preavviso, durante tutto il giorno passato a Dublino. *Ulysses* può essere percepito come una liturgia anateologica delle ore dove, a ciascun capitolo, viene assegnata un'ora particolare della giornata. L'arco di tempo è condensato in una singola giornata e il concetto del tempo cronologico viene trasposto al tempo mentale del personaggio con la stasi tipica del monologo interiore o dello stream of consciousness. Ciò non vuol dire che Joyce esclude il tempo cronologico da tutto il romanzo. Nel capitolo 4 *Calypso* il tempo che passa viene segnalato con il rintocco del campanile di St. George's Church ("The bells of George's church. They tolled the hour: loud dark iron. Heigho! Heigho! Heigho! Heigho! Heigho! Heigho!", U4:544-8) e anche nel capitolo 17 *Ithaca* ("The sound of the peal of the hour of the night by the chime of the bells in the church of Saint George", U17:1226-7).

Tutti i sì di Molly rappresentano la necessità umana di aprirsi a tutte le esperienze e a tutte le relazioni umane possibili. Vale la pena ricordare che questo è l'unico capitolo di *Ulysses* di cui Joyce non abbia dato l'ora esatta, fatta eccezione del simbolo dell'eternità (∞) nello schema Linati. Con il rifiuto di concludere il romanzo, Joyce lascia un'apertura che può scavalcare i limiti del tempo e dello spazio. Infatti si libera del controllo meccanico che attua il tempo e si concentra sul flusso del tempo soggettivo della mente, cioè kairotico, come lo chiamerebbe Frank Kermode (1968, p.47). La punteggiatura e la morfologia di questo testo sono quasi assenti e danno l'impressione di una mente assorbita in un volo di associazioni arbitrarie, passando da un pensiero all'altro mentre Molly cerca di prendere sonno.

In questa sede vale la pena ricordare come, nel capitolo intitolato *Molly's Flow* nel suo saggio *Joyce Effects*, Derek Attridge (2000) descrive lo stile di scrittura di *Penelope* e tocca la questione problematica dell'interpretazione del linguaggio femminile. A dispetto di tutta la critica che vedeva nel monologo di Molly un'apoteosi di fluidità e inaccessibilità, Attridge ha dimostrato che il linguaggio e la sintassi dei monologhi interiori di Stephen e Bloom risultano più difficili e frammentari. Stephen e Bloom infrangono le convenzioni morfologiche in maniera più marcata di Molly in *Penelope*, il cui linguaggio e sintassi sono assai più leggibili e convenzionali. Attridge sottolinea che l'idea della fluidità attribuita da tanti critici al monologo di Molly è causata dall'atteggiamento di Joyce o dei critici di progettare sul testo preconcetti sul mondo e sul comportamento femminile. Attridge infatti si chiede se giudicheremmo nella stessa maniera il flusso liquido di questo monologo senza punteggiatura se fosse appartenuto ad una figura maschile come Boylan, l'amante di Molly. L'assenza di punteggiatura per Attridge è dunque una conferma che non è il personaggio di Molly e il suo linguaggio che conferiscono quell'effetto di fluidità nella narrazione ma il narratore con la sua presentazione.

Il romanzo di Joyce si conclude nel momento in cui predominano la stanchezza e il sonno che hanno assillato Molly per tutto il capitolo. Ma le attività mentali di questo soliloquio straordinario di Molly, si accomunano alle riflessioni di Bloom e il suo gatto in cucina, scatenando una profonda crisi nella letteratura mondiale. Joyce non mette solo in crisi lo spazio oggettivo della rappresentazione, ma supera infatti un'altra enorme barriera letteraria: decostruisce l'autore tradizionale onnisciente che aveva sempre cercato di controllare la propria narrazione e di mantenere un equilibrio costante degli eventi narrati. È per questo che svariati critici hanno considerato lecito percepire lo sviluppo del romanzo entro le coordinate del pre- o del post-joyciano.

References

Attridge, D. (2000). *Joyce Effects: on Language, Theory and History*. Cambridge: Cambridge University Press.

Joyce, J. (1989). *Ulysses*, Gabler H.W., Steppe W. e Melchior C. (a.c. di). London: Bodley Head.

Kenner, H. (1978). *Joyce's Voices.* Berkeley: University of California Press.

Kermode, F. (1968). *The Sense of an Ending*. Oxford: Oxford University Press.

Melchiori, G. (1994). *Joyce: il mestiere dello scrittore*. Torino: Einaudi.

Senn, F. (1984). *Book of many turns*, in Senn F., *Joyce's Dislocutions: Essays on Reading as Translation*, Riquelme J.P. (a.c. di). Baltimore- London: The John Hopkins University Press.

Bio-note

Dr Karl Chircop is senior lecturer of Italian language and literature at the University of Malta Junior College. In 2010 he has read a PhD in co-tutelle with the universities of Malta and Tor Vergata (Rome). In 2015 he published his monograph *Maschere della Modernità: Joyce e Pirandello* (Franco Cesati, Firenze). He is active in the editorial board of the *Mediterraneità Europea* section in the periodical *Sinestesieonline*. He is also co-editor of a new series of critical studies on the literature of migration entitled *In between spaces: le scritture migranti e la scrittura come migrazione*. His research interests are Dante, Cervantes, Pirandello, Joyce, Kafka, Tabucchi and Modernism.

Speed Aware – a Mobile App Prototype for the Promotion of Responsible Driving

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Abstract

This paper addresses the promotion and awareness of responsible driving and road safety through the development of a very simple to use mobile application prototype, *Speed Aware.* This application provides users with speed limit information on roads they are travelling on, together with a journey logging feature that allows off-line self-review of driving behaviour. Tracked journeys can be displayed on a map and the trace shown as a heatmap, comparing the vehicle speed to the road speed limit. Furthermore, an audible alarm is emitted whenever the vehicle is travelling at a speed higher than the legal limit. At the heart of this app is a map matching algorithm, which matches raw Global Positioning System (GPS) data to the road network. Five map matching algorithms are implemented and compared on the basis of real-time performance and accuracy. A ground truth dataset of GPS traces in dense, urban, and sub-urban environments, together with *TraceView*, a trace visualisation and management tool, were developed. A modified version of a weight-based topological algorithm achieved accuracy of 94.9% at a GPS sampling frequency of 1Hz. This algorithm, together with three of the reviewed map matching algorithms, were implemented on a mobile device and subjectively tested for real-time performance.

Keywords: Map-matching, GPS, Vehicle speed monitor, Safe driving, Mobile app

Introduction

Car owners' choice to drive at illegal speeds is the leading cause of grievous and fatal accidents, (Hoel & Garber, 2008). Less safe road conditions lead to people preferring to use their own vehicle instead of taking greener modes of transport, resulting in less cycling and walking (Road Safety Strategy Malta, 2014). The use of personal vehicles is increasing without bounds, with an average of 71 vehicles per day registered in the third quarter of 2017 (National Statistics Office, n.d.). This paper describes the development of a mobile app designed specifically to address irresponsible driving, by discouraging speeding over the legal limits and raising awareness on safer roads among the general public.

Real time navigational aids that include road network data and speed limit information are available on the Android Google Play Store, for example Speed Cameras & Traffic Sygic (Sygic, n.d.) and Velociraptor - Speed Limits & Speedometer (Ciao, n.d.). However, these features are either not simple to use (because the main application is navigation), not freely available (since they may be in-app purchase premium add-ons), make use of information that is incomplete for local maps, or have to be overlaid on another host app. On the other hand, *Speed Aware*, the app described in this paper, is independent of any other navigational app, very simple to use, does not require any configuration and is tailor-made for the local scene. Speed Aware makes use of Open Street Maps (OSM), Global Positioning System (GPS) technology and map matching algorithms to display speed information, as well as audible and visual alerts when the driver exceeds speed limits. Additionally, the app provides a data logging option.

GPS receivers determine their position by measuring distance to multiple satellites, using triangulation to find the position of the receiver. This position determination has multiple sources of errors, mainly due to clock synchronisation issues, atmosphere phenomena and multipath effects (Langley, 1997). The latter is of particular interest in this paper and is the main source of error in matching GPS points to maps. Therefore, the app makes use of a map matching algorithm (Bernstein & Kornhauser, 1996; Quddus et al., 2007) which greatly reduces the number of errors, especially in dense urban areas. To develop and finetune the algorithm, a ground truth dataset of GPS traces in dense, urban, and sub-urban environments, together with *TraceView*, a trace visualisation and management tool, were developed.

This section introduced the topic of this paper and explained its position in the literature. The rest of the paper is organised as follows. First, map matching algorithms are reviewed, followed with a description of the implementation and experimental setup used to study a selection of map-matching algorithms. The results are then discussed, followed with an account on the development of the app, *Speed Aware*, at which point the paper is concluded.

Map matching algorithms

The mobile app *Speed Aware* makes use of GPS and road network data to retrieve road information. In addition, map-matching algorithms are used to mitigate noise in GPS data, (Quddus et al., 2007; Bernstein & Kornhauser, 1996; Velaga et al., 2009). Once coordinates are obtained, the algorithms are used to identify the correct road segment on which a vehicle is travelling on (Greenfeld, 2002; Quddus et al., 2003) and provide a more accurate vehicle location estimate by supplementing the GPS data with spatial road network data. This section reviews various map-matching algorithms, including a comparison of their performance and complexity.

The earliest map matching algorithm for car navigation in real time was based on a simple geometry-based method (Kim et al., 1996). This was not accurate at intersections and parallel roads as it was dependent on the shape of the road segment (Hashemi & Karimi, 2014). Different techniques were subsequently developed, taking advantage of topological analysis of spatial road network data and comparing GPS bearing and position readings to road direction and position. Additionally, more advanced techniques based on probabilistic theory (Zhao, 1997), Kalman filters (Li et al., 2013), fuzzy logic (Quddus et al., 2006) and belief theory (Najjar & Bonnifait, 2005) were implemented. These vary in complexity, computational efficiency and matching accuracy. Hashemi and Karimi (2014) categorise map-matching algorithms as simple, weight-based and advanced, while Quddus, Ochieng and Noland (2007) group the algorithms into geometrical, topological, probabilistic and other advanced methods.

Map matching can be carried out on-line (real time) or off-line (post-processing) (Hashemi & Karimi, 2014). In real-time map matching algorithms, also known as online, GPS points are mapped on the go (Bernstein & Kornhauser, 1996; Velaga et al., 2009; Li et al., 2013). This means that as the mobile app receives the new updated location, it is immediately processed and set to a road segment. Off-line algorithms operate by first collecting GPS data over a journey, then passing all the points and vehicle movement information as a batch through the algorithm, outputting the solution (Newson & Krumm, 2009). This obviously brings advantages over a real time system in terms of accuracy, since all points preceding and following a certain point are known, making it easier to predict the point on the road where it was located (Marchal et al., 2004). On the other hand, a real-time system has only previous points to help in predicting the correct position, thus resulting in a less accurate but a potentially more responsive experience, enabling features such as real time over-speeding checks. Therefore, this paper considers real time algorithms. A review of the algorithms follow, taking into account the classification proposed by Quddus, Ochieng and Noland (2007).

Geometric

A geometry-based map-matching algorithm makes use of geometric information of the spatial road network data, considering only the shape of roads and does not consider the way roads are connected to each other (Greenfeld, 2002; Quddus et al., 2007).

Point-to-Point Map Matching (Bernstein & Kornhauser, 1996) is the simplest of such algorithms and matches the point to the closest node or shape point of a road segment. Its implementation is fast and easy, but has the drawback of being sensitive to the way the road network data is structured, as well as inaccuracies in urban environments. Curved roads with more than a start and end node are much more

likely to be chosen as the road on which the vehicle is travelling. Therefore, these multiple shape node roads produce errors (Quddus et al., 2007). The closest point is found by selecting the node with the least Euclidean distance from the GPS point, P_t. In practice, it is not necessary to determine the distance between the GPS point and every node in the network. Instead, one can first identify those nodes that are within a certain radius using a range query and then calculate the distance to them. Range queries are carried out by pre-processing N points in k-space and storing the points in an ordered tree. This leads to faster query times but has the drawback of higher storage use (Bernstein & Kornhauser, 1996; Bentley & Maurer, 1980).

Point-to-Curve Map Matching (Bernstein & Kornhauser, 1996) is an upgrade to the point-to-point technique and attempts to find the closest link to P_t instead of the nodes. To find the closest road, the minimum distance is found from the GPS point to all the road segments forming part of each road. This is because the roads are stored as piecewise linear curves made up of nodes and links. The shortest distance is taken as the perpendicular distance from the point to the road. If the perpendicular line does not intersect with the line segment, the shortest distance between the GPS point and the two end-point nodes of the road is taken. The road segment with the smallest distance is selected as the road. This, however, gives unstable results with increased road densities, and the closest link may not always be the correct link in dense areas.

Curve-to-Curve Map Matching (Bernstein & Kornhauser, 1996; White et al., 2000) constructs a linear piecewise curve using n previous GPS points, where $n=3$. The distance between the constructed curve and the surrounding road curves is measured and the closest curve is then selected as the road on which the vehicle is travelling. There are multiple ways of evaluating distances between curves. One way of doing this is to find the average of the closest Euclidean distances between the GPS points and the curve. Another curve to curve approach proposed by White et al. (2000) is to make use of the distance travelled between GPS points. This consists of finding the distance between equal lengths of the two curves. The last 3 GPS points are used to create a curve. The road is segmented into three segments with equal lengths as the GPS curve. Curve to curve distance is determined by the distance between the respective nodes of the curves.

Topological Topological map matching algorithms make use of spatial and historical data to aid in the matching of GPS points. Previously matched roads, road connectivity, and directional and turn restriction information are all parameters that have been used to supplement geometric algorithms (Quddus et al., 2007).

Weight-based topological map matching (Velaga et al., 2009) splits the matching problem into three parts and defines procedures that are used in each of these different situations. These are: (a) matching the first GPS point, (b) matching when traversing a road, and (c) matching at a junction. Weights are given to candidate roads depending on heading difference and distance from the GPS reading. At an intersection, a positive or negative weight is given to roads, whether or not they are

connected to the previous road, depending on whether there is a legal restriction to cross from the previous road to the candidate road. In urban environments, heading difference is prioritised over distance, which adds heavy weighting to connected roads and is not restricted to the previous road. Suburban environments have more accurate GPS readings, therefore heading difference and distance have similar weightings due to the point being closer to the correct road. Rural areas result in accurate GPS readings so that distance is given the greatest weight. Following is a description of the three procedures.

Matching the first GPS point:

a) Determine the candidate road segments: An error region is used to determine candidate segments. All segments that are present or passing through the region are chosen as candidates.

b) Determine the correct segment by giving a weight depending on heading weight, W_h, and proximity weight, W_p, where W_h is taken to be the cosine function of the difference between the road and vehicle bearings:

$$W_h = H_W\, f(\vartheta_r, \vartheta_v), \qquad where \qquad f(\vartheta_r, \vartheta_v) = cos(\vartheta_r - \vartheta_v).$$

Here, H_W is the weight coefficient for the heading information's importance, ϑ_r and ϑ_v are the road and vehicle's bearings, respectively, and W_p is the weight based on the perpendicular distance from the road segments and is computed as,

$$W_p = D_w\, f(D), \qquad where\, f(D) = [(80-D)/80],$$

D_W is the weight coefficient for the road's proximity and D is the perpendicular distance from the point to the road. The total weight score (TWS) determines which candidate segment will be chosen and consists of the addition of the two heading and direction weights.

Matching when traversing a road:

a) If the vehicle's speed is 0, the same road segment as before is assumed.

b) If the vehicle is moving, the algorithm checks whether or not there is an intersection ahead. Two checks are put in place: (i) whether the current point is within 20m of an upcoming intersection, and (ii) whether the heading difference between the vehicle and the road is greater than the root mean square of all the previous errors on the same road. If one of these is found to be positive, then it is deduced that the vehicle is at an intersection. Otherwise, the GPS point is perpendicularly projected onto the previous road.

Matching at a junction:

This process is the same as the matching for the first GPS point using the total weight score to select a road. However, two additional weights are used: (i) If a vehicle approaches a junction and is not legally permitted to turn to one of the road segments, directional knowledge is used to then give the candidate road less turn restriction weight. The weight is positive for a legal turn, and negative for an illegal turn. (ii) A road segment is given more weight if it is directly connected to the previous road segment, known as the link connectivity weight. The weight is positive for a connected road and is negative for a road that is not connected to the previous road.

In the Hashemi and Karimi (2014) review of real-time map-matching algorithms, it was concluded, after taking into account its accuracy, simplicity and performance, that the Velaga algorithm (Velaga et al., 2009) was better than all the other examined geometric, topological and weight-based algorithms, having outputs which compete with the results obtained from advanced algorithms. The Velaga algorithm achieved a 96.71% matching accuracy when tested. Nevertheless, some drawbacks were identified. Firstly, the direction difference between consecutive GPS points is not considered. Secondly, skewed results are provided if a vehicle passes a short segment between consecutive GPS points, when illegal turns are made and in off road conditions. Lastly, the weights were derived empirically, which is less desirable than if they were derived analytically.

Advanced map matching algorithms

Advanced map matching algorithms are more complex processes that make use of concepts such as Kalman Filters (Kim et al., 2000), Fuzzy Logic (Quddus et al., 2006) and Hidden Markov Models (Newson & Krumm, 2009). Goh Dauwels, Mitrovic, Asif, Oran, and Jaillet (2012) use an HMM with a variable sliding window to compute transition probabilities on a real time basis or delay by one output if the probability calculated is below a threshold. The sliding window works by eliminating nodes in the calculation that were received before a certain timestamp, thus being able to efficiently compute probabilities with just the latest points. These advanced algorithms add a level of computational complexity and resource usage to the process, causing more battery consumption and heating up of devices when used as a mobile app.

Algorithm comparative Study

This section describes the comparative study carried out to determine which

algorithm is implemented in the app. Factors considered were accuracy of data and delay in alerting the user. Point-to-point, point-to-curve, curve-to-curve and the weight-based topological map matching algorithms were implemented. Output accuracies were examined with respect to different GPS sampling rate and urban density. In theory, geometric map-matching algorithms' accuracy is not affected by different GPS sampling rates, since only the most recent point is used. On the other hand, the accuracy of Topological map-matching algorithms is dependent on the GPS sampling rate.

Road network data

Map matching algorithms require a map data source to be able to relate GPS retrieved data to the road network. Google Maps (GM), (Google Maps Platform, n.d.), and Open Street Maps (OSM), (Open Street Map, n.d.) were considered for selecting the most suitable map data provider. Open Street Maps was chosen, since it is a crowd sourced, open source map database with the possibility of adding speed limit information. Two files were created from the OSM data. One w a s c r e a t e d for the querying of road network data by the algorithms via a SQL Spatialite database, and another in '.map' format which was used to display the map on screen. This enables the mobile app to function without the need of an internet connection.

Firstly, the algorithm queries all OSM nodes that are marked as highway or road nodes within a radius of 290m, so that it retrieves a list of all the candidate roads. This radius was determined by finding the longest single road segment within the OSM data. The radius used accommodates for the vehicle being in the middle of the longest road, at around 283m equidistant from the start and end nodes of the road. Roads are then filtered to only those within a radius of 160m, as determined by Velaga, Quddus and Bristow (2009). The algorithms were implemented in Java and SQL with the Spatialite plugin, which is an environment compatible with the Android platform.

Implementation of Map matching algorithms

1) *Point-to-Point:* An SQL Spatialite query is executed to sort road nodes around the GPS point in descending order by distance from the current point, and the shortest one is chosen. The OSM way in which the node is part of is chosen as the road on which the vehicle is travelling. Since intersection nodes have more than one way associated with them, priority is given to roads that have names over those that don't, otherwise, the way is chosen randomly. A curve is constructed using all the nodes within the way, and the GPS point is then projected onto the closest point on the road.

2) *Point-to-Curve:* A curve is constructed for each road within the 160m radius and the shortest distance from the point to the curve is calculated for each road. The distances are then ordered in ascending order and the road with the shortest distance is chosen. The GPS point is then projected to the closest point on the curve.

3) *Curve-to-Curve:* Two approaches are used to calculate the distance between two curves. The first point is matched using a point to curve technique while the second point is matched by finding the average minimum distance from the 2 points to the roads.

   a) The first approach to curve-to-curve matching is to find the minimum distance from the last 3 points to each road, and the average of these 3 values is found. The road with the shortest average distance is chosen, and the GPS point is projected to the closest point on the road.

   b) The second approach to curve-to-curve matching was implemented by finding the average of the distances between equal lengths of the curves formed from the road and the GPS trace. The line constructed from 3 GPS points is made up of two segments. A point on the line is perpendicularly projected from the oldest GPS point, and a curve is constructed starting from that point, with an equal length of the GPS trace. The distance between each respective node of the two lines is calculated and the average taken. The road with the lowest average distance is chosen.

4) *Weight-based topological map matching:* In this algorithm the heading difference weighting is calculated differently for one-way and two-way roads. The heading weighting's cosine function is only used as described when a road is one-way. When a road is two-way, the absolute value of the cosine function between the heading difference of the road and vehicle is used, due to such roads having two bearings, the one calculated and its supplementary angle. The heading differences for each matched point is saved in order to calculate the root mean square for each road. Once a point is matched to a new road, this list is cleared. In some cases, the point is matched to roads which have no intersections. In these cases, it is assumed that the point is always near a junction, since if this precaution isn't taken, then the point would remain on the road, since it is impossible for it to ever be near a junction and would therefore be continuously matched to the same road.

Visualisation Tool and Dataset

TraceView was created to visualise GPS traces. All nodes that form part of the road network are displayed as red nodes on the map. This serves as a visual aid when

comparing different map matching algorithms and the relationship between the GPS points and the surrounding road nodes. Fig.1 shows TraceView's main interface.
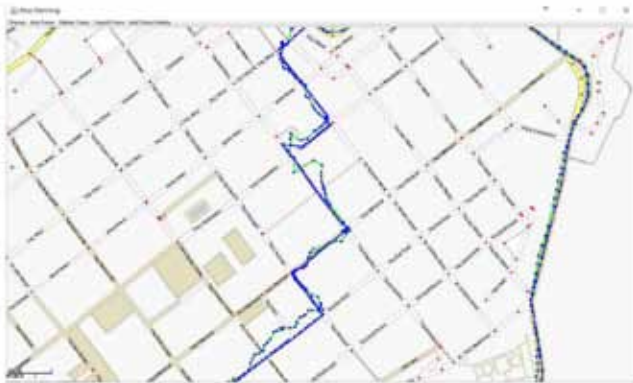
Figure 1. TraceView tool displaying traces and road nodes

An SQL table is used to store details on the GPS points and traces, with the related fields describing the trace they belong to; predicted road, expected road, latitude, longitude, time, speed, bearing, binary variable indicating if the match is correct, binary variable indicating if the point should be shown and road density around the point. TraceView also provides the option to add or export traces from/to CSV files and to annotate traces and their related GPS points. Ground truth road annotations allow for an accuracy statistic to be calculated; this is derived by comparing the ground truth road to the road predicted by the map matching algorithms. Each GPS point is manually labeled with the density of the area it is situated in, facilitating testing of the map matching algorithm in different environments. Densities are grouped in four categories; open spaces, low density rural roads, medium density residential roads and high density roads with 4+ floor buildings.

Figure 2. Example traces from the dataset

A dataset of GPS traces was developed for the comparative analysis study, where the performances of the various algorithms are compared in different urban environments. An Android app was developed to collect the GPS traces at a frequency of 1Hz. The collected 13993 GPS points were spread out across the different densities, distributed as follows: 32% in open areas, 24% in low, 27% in medium and 17% in high density areas. Using TraceView, the GPS traces were manually labeled with the ground truth road name and area density. Fig.2 depicts part of the dataset.

Results and Analysis

This section includes the testing of the implemented map matching algorithms and the comparison of their results at different sampling intervals and environments. TraceView was used to evaluate the algorithms' performance. The frequency was down sampled to time intervals of 2s, 4s and 8s by skipping GPS readings at random intervals, with interval ranges that average the required interval.

Point-to-point is the simplest algorithm, providing the lowest performance. Table 1(a) shows the accuracies of point to point at different intervals and densities. Since this algorithm, makes use of only one reading, intervals don't have a large effect on accuracy. Open areas provide the highest performance for this algorithm due to the presence of less neighbouring nodes. Low and medium density reduce the accuracy further due to increased road nodes. Denser areas result in higher GPS errors. However, in such areas, there may be shorter roads and more nodes/distance, resulting in better overall scores than Low and Medium density areas. Table 1(b) shows an example from TraceView, where the blue trace consists of the raw GPS points while the green trace is the map matched trace.

Point-to-curve, like point-to-point, makes use of the most recent GPS point, therefore the interval between readings has little effect on accuracy. Results are tabulated in Table 1(c). In an open area, the result has the highest accuracy due to better GPS accuracy combined with less roads in the area. As the density increases, both the GPS error and the number of roads in the region increase, resulting in an accuracy of 79.5% in urban areas, which is significantly better than point-to-point. Table 1(d) depicts the improvement over point-to-point matching along the road, only for point-to-curve to fail at the junction.

Curve-to-curve has reduced performance as intervals increase, Tables 1(a, b), since the vehicle could have travelled between roads while readings are being processed. The algorithm is similar to the point-to-curve algorithm, but with an error smoothing effect achieved by using multiple points. Once a vehicle has passed an intersection, the three points used to calculate the distances may be spread across different roads. This is especially the case at higher intervals. The two approaches to calculate distances in curve-to-curve matching have similar accuracies.

Table 1: (a) Point to Point, and (b) Point to curve results (% accuracy)

Int	Open	Low	Medium	High	Overall
1s	75.3	68.6	62.1	64.2	68.2
2s	75.6	67.0	62.1	64.2	68.0
4s	74.5	65.0	62.7	65.8	67.5
8s	74.5	66.3	66.9	61.4	68.2

(a)
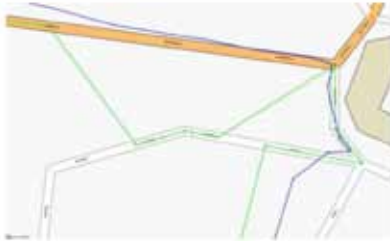
Int	Open	Low	Medium	High	Overall
1s	94.3	93.4	89.2	79.5	90.0
2s	94.3	90.5	89.1	80.1	89.4
4s	93.8	91.7	88.9	78.8	89.3
8s	93.9	92.2	90.3	77.0	89.3

(c)

(b)

(d)

Table 2. (a) Curve to Curve (Distance between equal segments, % accuracy), (b) Curve to Curve (Closest distance, % accuracy)

Int	Open	Low	Medium	High	Overall
1s	95.1	93.7	90.2	82.8	91.2
2s	93.6	89.3	88.8	85.8	89.8
4s	90.2	84.3	83.4	81.2	85.3
8s	84.1	71.0	77.9	76.3	77.7

(a)

Int	Open	Low	Medium	High	Overall
1s	94.9	93.7	89.5	81.5	90.7
2s	94.0	89.7	88.9	84.7	89.9
4s	91.0	86.2	84.0	83.3	86.5
8s	85.7	81.4	73.1	77.1	79.7

(b)

Weight-based Topological Algorithm proposed by Velaga, Quddus and Bristow (2009) provides different weightings for urban and suburban environments. On the local dataset and in open areas, the urban weighting resulted in a 94.8% score, but accuracy degrades in dense areas, 75.2%. This is due to the number of roads in the area and the variation in road curvature. This means that at an intersection, if there is an error in the GPS heading information, then it is likely that the matching jumps to a nearby road with a similar heading. The algorithm checks if a junction is within 20m distance. As the interval between readings increases, the chance of missing a junction increases. This means that the point is projected onto the previous road. With urban weights at 1s interval the overall score is 85.3%. Suburban weighting results in a better overall score, 93.5%. Intervals have less of an effect on the accuracy, with an overall 90.7% correct matches compared to the urban weighting's 78.3% at an interval of 8s. This algorithm is the most accurate, having an overall accuracy of over 90.7% for all intervals.

In some situations where the vehicle is travelling at a relatively high speed, junctions are not detected. Therefore, when the conjunction condition (vehicle is assumed to be traversing a road, not close to a junction and the projected point is more than 160m away) is detected, it is assumed that a junction has just been passed. This change brought about a noticeable improvement in accuracy at higher intervals, shown in Tables 3(c, d), since junctions are more likely to be missed at these frequencies. Additionally, the overall frequency at 1Hz also improved from 93.5% to 94.4% for the suburban weights, and from 85.3% to 85.6% for the urban weights.

Table 3. Percentage accuracy for the Velaga Algorithm with (a) Urban weights, (b) Suburban weights, (c) Suburban weights and 160m check, (d) Urban weights and 160m check.

Int	Open	Low	Medium	High	Overall
1s	94.8	82.9	82.9	75.2	85.3
2s	94.0	81.3	86.1	79.3	86.3
4s	90.9	78.8	78.9	73.2	81.7
8s	88.1	76.5	72.4	71.8	78.3

(a)

Int	Open	Low	Medium	High	Overall
1s	91.9	97.5	94.9	89.6	93.5
2s	92.0	93.7	95.5	89.3	92.8
4s	90.6	93.1	94.7	86.1	91.4
8s	89.2	93.0	96.2	85.9	90.7

(b)

Int	Open	Low	Medium	High	Overall
1s	96.8	94.7	94.8	89.6	94.4
2s	96.5	93.9	94.3	88.9	93.9
4s	96.1	92.9	94.8	87.1	93.3
8s	95.4	93.6	94.7	88.2	93.4

(c)

Int	Open	Low	Medium	High	Overall
1s	95.6	81.3	82.5	77.9	85.6
2s	94.1	83.7	83.8	76.9	85.8
4s	93.3	80.3	85.1	77.4	85.1
8s	87.5	73.6	80.4	68.5	79.0

(d)

Modified Weight-based Topological Algorithm: The Velaga algorithm was modified to lower its computational complexity. The routine is executed as if it was always at an intersection instead of checking for a nearby intersection. The turn restriction check is removed, as this data on OSM is lacking and adds computational time for little effect. If the speed is 0, then the point is still matched to the previous road. The Suburban weights provided a higher accuracy than the Urban weights. The Urban weight gives the heading a higher weight, while the Suburban gives an equal weighting to distance and heading. For this modified algorithm, the heading weight was therefore reduced to achieve the weights given in Table 4(a). Additionally, the modified algorithm provided the best results out of all the algorithms, having negligible 1.3% accuracy loss when changing the interval from 1s to 8s.

Table 4. Modified Velaga Algorithm (a) Modified weights, (b) Percentage accuracy

Parameter	Weighting
H'w	36.24
D'w	44.99
C'w	4.46
T'w	4.31

Int	Open	Low	Medium	High	Overall
1s	96.9	94.1	95.5	91.9	94.9
2s	96.5	91.0	95.9	91.9	94.1
4s	95.5	90.9	95.6	89.1	93.3
8s	95.1	94.4	94.9	88.4	93.6

(a)   (b)

Summary: Table 5 displays the overall accuracies of all the algorithms studied. The accuracies are displayed for each frequency tested.

Design Consideration for the Mobile App

The prototype mobile app, *Speed Aware*, assists drivers in observing speed limits whilst driving. The app informs users on whether they are under-speeding, over-speeding or driving at the right speed, which arbitrarily is defined as the 10% range below the speed limit. The map matching algorithm is to be used to match the GPS point to the road network, from which the speed limit information is obtained. Fig.3 depicts the system in a flow-diagram.

Table 5: Percentage accuracies for all the algorithms

Algorithm	1s	2s	4s	8s
Point to Point	68.2	68.0	67.5	68.2
Point to Curve	90.0	89.4	89.3	89.3
Curve to Curve 1	91.2	89.8	85.3	77.7
Curve to Curve 2	90.7	89.9	86.5	79.7
Suburban weighted	94.4	93.9	93.3	93.4
Urban weighted	85.6	85.8	85.1	79.0
Modified weighted	94.9	94.1	93.3	93.6

The choice of the optimal map matching algorithm is based on accuracy and delay, which depend on sampling rate and computational complexity. The average time taken from when a GPS point is collected to the point being matched to the road network was measured (Table 6). The processing time, t_{proc}, is a function of the number of roads sampled. If the modified Velaga algorithm was to be selected as the algorithm, then the GPS interval would have to be set at 2s, since the average t_{proc} is 1504ms. The total delay is then $2s + t_{proc}$. A delay of 3.5s is not suitable for the app and therefore the point-to-curve algorithm is chosen for the app, which has the lowest t_{proc}=951ms. The time interval between GPS points is set to the processing

time of the previous GPS point, adding an extra 5% margin to prevent stalling of the app. If 105% of t_{proc} is 1000ms or lower, then the interval is set at 1000ms.
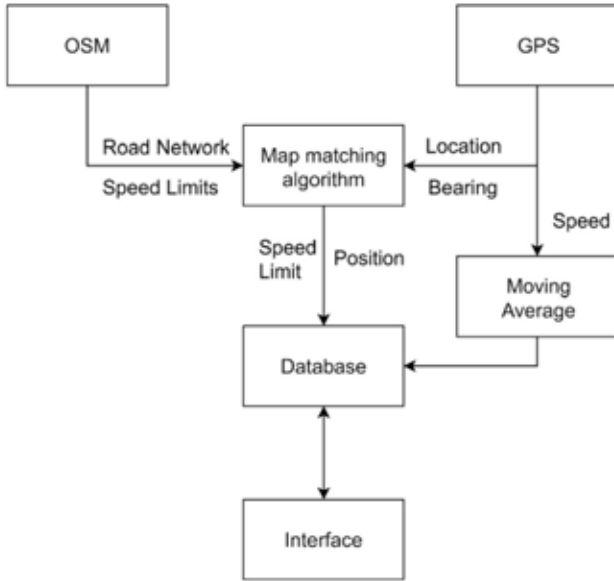
Fig 3. The system diagram for the prototype mobile app, speed aware.

Table 6: Map Matching Algorithm delay

Algorithm	Processing delay t_{proc} (ms)
Velaga *et al.* (2009) with Suburban weights	2365
Modified Velaga *et al.* (2009)	1504
Point to curve	951
Curve to curve	2236

The mobile interface was designed to be as simple as possible, and usable by anyone. The application was split up into 3 pages; (a) Home: The home page displays speed, speed limit, a start and stop button, and the correct speed or over/under-speeding ranges. When over-speeding, a beeping alarm is sounded; (b) Journeys: The page in which the users can access their past journeys. Traces are coloured depending on driving performance compared to the speed limit, being clickable to view more detailed information on the speed and limit; (c) About: Displays terms of service, use, privacy policy and contact information. Figure 4 gives examples of the pages.

Speed limits are obtained from Open Street Maps. If the value is not found, the speed limit defaults to 50km/hr and the user is notified. Short term variations in GPS speed readings are smoothed out and, after comparing different window sizes, a steady change in speed is achieved with a 4 second window. All GPS points from the last 4 seconds are used, adapting to algorithm delay.

Fig.4. The mobile app display, (a) Home interface, (b) Notification shown when speed limit defaults to 50km/hr , (c) Saved journey viewer

Conclusion and Future Work

In this project, a review of map matching algorithms was carried out to compare various proposed geometric and topological algorithms. Geometric and topological algorithms map matching algorithms were implemented, together with a modified version of the Velaga et al. (2009) algorithm. The highest accuracy of 94.9% was obtained from the modified weight-based topological algorithm.

A visualisation and annotation tool, *TraceView*, was developed and used to assemble a labelled dataset of GPS traces obtained from different urban environments. Advanced algorithms that use Hidden Markov Models, for example, could be considered as they provide better results in terms of accuracy, at the cost of having larger computational and implementational complexity. The feasibility of running such algorithms on phones could be tested.

An Android app, *Speed Aware*, was developed, giving users road speed information in real time. Additionally, saved journeys are displayed on a map and the trace is shown as a heatmap, indicating under-speeding or over-speeding and neutral, and a beeping alarm alerts the driver when speeds exceed the limit for that

particular road. The map matching algorithms were tested in the app to determine which is the most suitable algorithm to use, that is, the one having accurate speed information with the least delay. The most accurate algorithm was found to have an average processing time of 1504ms. On the other hand, the point-to-curve algorithm has a processing time of 951ms, which translates into more timely road updates. The GPS reading interval adapts to 105% of the time taken for the previous point to be matched to the road network, to prevent the app from stalling. A smoothing filter was used to smooth out short term sharp changes in the speed reading. This filter was set to a moving window of 4s, which, at a 1Hz GPS frequency, takes 4 readings, but when the intervals increase, the number of readings decrease so that a 4 second window is never exceeded.

In the testing of the accuracy of correct road identification, the original GPS traces were manually labelled with the road name on which the vehicle was actually driving on. At intersections, there is some ambiguity on which road should the point be matched, by matching a GPS point which is in the middle of an intersection to the road which wasn't labelled. As an improvement, the road annotation feature could be changed to multi-label, so as to provide two road names at intersections, and if the matched road is one of the two, the matching is set as correct.

The algorithms were tested using a mix of Java and SQLite queries with the functionality of the Spatialite SQL plugin for geometric functions. It should be examined whether better data structures and schemas could be used to reduce the computational complexity of the algorithms.

Speed limits are derived from OSM data which are updated in a crowdsourced manner. During testing, it was determined that some road speed limits are not up to date or missing. For the app to provide more accurate information and be more reliable, complete speed limit information should be uploaded to the open source OSM database. Currently, the speed limit defaults to 50km/hr when no data is available for the road, which may be high for residential roads.

References

Bentley, J. and Maurer, H. (1980). Efficient worst-case data structures for range searching. *Departments of Computer Science and Mathematics, Carnegie-Mellon University*.

Bernstein, D. and Kornhauser, A. (1996). An introduction to map matching for personal navigation assistants. *New Jersey TIDE Center Technical Report*.

Ciao, D. (n.d.). Velociraptor - Speed Limits Speedometer. Available at https://play.google.com/store/apps/details?id=com.pluscubed.velociraptor [Accessed 25 April 2018].

Goh, C., Dauwels, J., Mitrovic, N., Asif, M., Oran, A. and Jaillet, P. (2012). Online map-matching based on hidden markov model for real-time traffic sensing applications. *Intelligent Transportation Systems (ITSC), 2012 15th International IEEE Conference on*, 776-781.

Google Maps Platform *(n.d.).* Maps SDK for Android. Available at https://developers.google.com/maps/documentation/android-sdk/intro [Accessed 15 February 2018].

Greenfeld, J. S. (2002). Matching GPS observations to locations on a digital map.

Hashemi, M. and Karimi, H. A. (2014). A critical review of real-time map-matching algorithms: Current issues and future directions. *Computers, Environment and Urban Systems,* 48, 153–165.

Hoel, L. A. and Garber, N. J. (2008). Traffic and highway engineering, course technology. *Cengage Learning*.

Kim, J. S., Lee, J., Kang, T. H., Lee, W. Y. and Kim, Y. G. (1996). Node based map-matching algorithm for car navigation system. *Proceedings of 29th international symposium on automative technology and automation (ISATA),* 121–126.

Kim, W., Jee, G. and Lee, J. (2000). Efficient use of digital road map in various positioning for its. *IEEE Symposium on Position Location and Navigation*.

Langley, R. B. (1997). The GPS error budget. *GPS World*, 8, 51–56.

Li, L., Quddus, M. and Zhao, L. (2013). High accuracy tightly-coupled integrity monitoring algorithm for map-matching. *Transportation Research Part C: Emerging Technologies,* 36, 13–26.

Marchal, F., Hackney, J. and Axhausen, K. W. (2004). Efficient map-matching of large GPS data sets - tests on a speed monitoring experiment in Zurich. *Technical Report,* 244.

Najjar, M. E. E. and Bonnifait, P. (2005). A road-matching method for precise vehicle localization using belief theory and kalman filtering. *Journal of Intelligent Transportation Systems*, 19(2), 173-191.

National Statistics Office (n.d.). News release: Motor vehicles: Q3/2017. Available at https://nso.gov.mt/en/News_Releases/View_by_Unit/Unit_B3/Environment_Energy_ Transport_and_Agriculture_Statistics/Documents/2017/News2017_168.pdf [Accessed 19 November 2017].

Newson, P. and Krumm, J. (2009). Hidden Markov map matching through noise and sparseness. *GIS '09 Proceedings of the 17th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems,* 336–343.

Open Street Map (n.d.). Available at https://www.openstreetmap.org/ [Accessed 15 February 2018].

Quddus, M. A., Noland, R. B. and Ochieng, W. Y. (2006). A high accuracy fuzzy logic based map matching algorithm for road transport. *Journal of Intelligent Transportation Systems,* 10(3), 103–115.

Quddus, M. A., Ochieng, W. Y. and Noland, R. B. (2007). Current map-matching algorithms for transport applications: State-of-the art and future research directions. *Transportation Research Part C: Emerging Technologies,* 15(5), 312–328.

Road Safety Strategy Malta (2014), *Ministry for Transport and Infrastructure*.

Sygic (n. d). Speed cameras traffic sygic. Available at https://play.google.com/store/apps/ details?id=com.sygic.speedcamapp [Accessed 25 April 2018].

Velaga, N. R., Quddus, M. A. and Bristow, A. L. (2009). Developing an enhanced weight-based topological map-matching algorithm for intelligent transport systems. *Transportation Research Part C: Emerging Technologies,* 17(6), 672–683.

White, C., Bernstein, D. and Kornhauser, A. L. (2000). Some map matching algorithms for personal navigation assistants. *Transportation Research Part C Emerging Technologies,* 8(1-6), 91-108.

Zhao, Y. (1997). Vehicle location and navigation system. *Artech House, Inc., MA.*

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Breaking Barriers Through Managing Change: An Empirical Holistic Change Management Model to Promote Competitive Capabilities, Through a Triple Bottom-line Sustainable Perspective Across the Supply Chain

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Abstract

The research derives a **change management model** for SMEs and large businesses within the Maltese context to build and refine on the current change management literature, with its models and best practices, based on a qualitative multiple case study approach. The research has the following **list of objectives**, so as to establish: the strategic management of change within the overall business strategic management approach; the need and the drivers for change management; the context required to enable an effective and efficient change management approach; the barriers/resistance to change; the readiness to change to avoid failures and/or conflicts at all management levels; the role of technology as an enabler to change; a comprehensive change management model based on a process management approach to cater for the change and its lifecycle; and the key competitive capabilities. The research also includes a comprehensive but concise review of the literature related to change management key seminal and current innovative techniques and furthermore situates the emerged theory with its framework with the current key models within the literature, so as to derive the research significance and its contribution.

Keywords: Strategic change management, leadership, triple bottom-line sustainability, case study with grounded theory analysis.

Introduction

Change management, within various organisations, needs to break various barriers to remain in business, in both public, since they are expected to function as competitive businesses, and private sector. Such challenges may be as a result of the organisations' strategic intent to become leading players within the competitive environment or else to produce state of the art or innovative products/services to compete with other

similar or complementary products in the market. Further sources of challenges may be attributed to how management or leaders need to transform people to accept the needed changes so as to provide a seamless implementation approach between all management levels and staff themselves as a team, by eliminating any roots embedded within the resistance to change culture. Psychological challenges associated with coping and survival anxieties of the change, so as to accept both personal and organisational benefits, need to be addressed ongoingly. Finally, an organisation needs to adopt a high level of collaborative initiatives and dynamic capabilities, both within the organisation and across the supply chain (SC), based on commitment and trust to meet each other's targets, in line with the 3BL approach, to achieve a win-win situation.

Various scholars advocate that change takes place through people (Kotter, 1996; Carnall, 2007; Miller, 2011; Hiatt, 2006; Hiatt & Creasey, 2012); and thus an **effective leadership approach** should focus on the needs of people throughout the whole process of change to get the commitment of all. Change is normally driven by top management but the current literature established that it consists of a balance between a **planned** and an **emergent approach** with the participation of different levels of management, including the bottom-line (Deming, 1986; Carson et al., 2007; Olivares et al., 2007; O'Reilly et al., 2010). Effective change management as a result needs the involvement of all relevant people so that the workforce has an informed mind-set from the very start. Such an approach to change will generate no surprises or conflicts, since all the new set-up is to be fit for purpose to the firm and meets all customers' requirements. People need to be managed effectively to meet the standards and procedures required, but it is then up to the effective leadership approach, exercised by various people across all management levels, that creates the inspiration, commitment and innovation to all the processes of change, by facing all challenges with the right passion, loyalty, entrepreneurship and respect in unity.

Furthermore, the use of technology is an effective enabler of all the change, although some manual operations may still remain. Technology is pivotal in today's competitive environment, through its digital transformational capabilities, since it is giving the enabling force of all processes, both in automation (e.g. smart manufacturing systems) and in information management and visibility (e.g. service and manufacturing sectors use data analytics and business intelligence such as IoT, Artificial Intelligence and ERP). Having the right technology not only gives real-time information to achieve all responsive actions, but also gives the possibility to be effective and efficient and also to take all the necessary informed decisions at any moment in time through the right involvement of all relevant management levels and business units. Such business-IT alignment is not only needed within the business but also across the supply chain (SC) through a streamlined approach, including the customers, so as to promote all the necessary collaborations and synergies inside and outside the business boundaries (Gunasekaran et al., 2008; Flynn et al., 2010), since the business performance is strong as its weakest link.

Change management is in-built within the strategic management approach (i.e. to compete, one needs to establish a strategy that is sensitive to the changes needed as planned or as they emerge from time to time. Hence change management provides the tools to put the new strategy into effect). Hence both concepts (i.e. strategy and change) need a level of creativity; innovation and adaptability (Soderholm, 1989; Mintzberg, 1994; Cetron & Davies, 2005), which shows that management discipline is not only a science but also an art (Watson, 1986).

Research question, research significance and literature gap

The research is informed by the following research question: What is the current change management holistic model, within SMEs and large firms, to promote competitive capabilities, through a 3BL sustainable perspective across the supply chain? The research significance is based on the contemporary challenge that businesses, within this turbulent and volatile market, need to change to survive and remain competitive (Mintzberg, 1979; Kanter, 1989; Peters & Waterman, 1982; Kotter, 1996; Beer & Nohria, 2000). Beer and Nohria (2000, p.1) further stated that "change remains difficult to pull off", since "about 70% of all change initiatives fail". Burnes and Jackson (2011, p.135) advocate that change is a challenging and a complex phenomenon to manage effectively, since the failure of change initiatives may be attributed due to various reasons other than poor planning or lack commitment, such as due to "clash of values between the organization and the approach to the type of change it has adopted". The literature gap is based on the fact that there is no consensus on one common valid framework for organisational change (By, 2005; Rafferty et al., 2013).

Literature Review

The key seminal work on management and change management outlines that the functions of administration or management are classified into five elements: planning, organising, commanding, coordinating and controlling (Fayol, 1950). Taylor, way back in 1911, also believed that there is one best working method by which people should undertake their jobs to promote efficiency and achieve productivity (Fitzsimmons and Sullivan, 1982). Management is a process and needs to use the management by objectives approach (i.e. SMART objectives) to manage effectively (Ducker, 1974, 1986). Lewin (1946) considered change, from a sociological perspective of action research and organisational development, as a tool to understand the people behaviour through a three-step change process (i.e. unfreeze; move/implement and refreeze). Lewin's further work focused on incremental change and failed to incorporate radical or transformational change (Dunphy and Stace, 1993; Miller and Friesen, 1984; Burnes, 2004).

Contemporary theories, such as Bate (1994), Johnson and Scholes (1999) and Kadar et al. (2014) advocated that change may be defined through its magnitude or scale as either incremental or transformational. Kanter et al. (1992) outlined that change is a process-driven activity. Communication and strong leadership are pivotal in preparing the organisation for change as it guides the organisation through turbulent phases (Handy, 1996; Cutler, 2005). Leadership is defined as a process where a person influences and directs others (i.e. followers) to achieve a common goal (Bennis, 2007; Northouse, 2007; Ardichvili & Manderscheid, 2008). The effective leadership approach needs to fit its leadership style to the situation, since change is not a one size fits all approach, but is contingent to the situation in hand, which needs to have the right leaders at all management levels to serve as role models and to inspire all people to adopt creative ideas and an entrepreneurial approach to change, referred as situational leadership (Fiedler, 1967; Lawrence & Lorsch, 1967; Thompson, 1967). The effective leadership needs to be engaged depending on the situation but the key approach of leadership style adopted by various scholars is the transformational leadership (Bass & Avolio, 2000; Wang & Zhu, 2011), since it inspires people and promotes a level of innovation and at the same time enables a learning organisation approach (Argyris, 1960; Senge, 1990). Other forms of leadership used, are the transactional leadership (Burns, 1978; Bass & Avolio 1994), which focuses on the performance-reward approach, and the action-centred leadership (Adair, 1979), which focuses on the leader's action which is balanced between the task, the team and the individual. It cannot be excluded that an effective management approach is also needed, since procedures and standards has to be in place to promote unity of command of all staff with their responsibilities, based on a high level of synergies but still guided with common values for all to follow effectively and efficiently, but may still adopt a high level of flexibility with full ownership of all commitments, to meet the scheduled performance measures (Drucker, 1977; Crainer, 1998).

Nickols (2004, p. 1) defined "managing change" as both "the making of changes in a planned and managed or systematic fashion" and "the response to changes over which the organisation exercises little or no control". Change cannot be always treated as a strategic planning approach with a set of planned events a priori of the project, since businesses needs to adapt to all situations as they emerge, which refers to a continuous and open-ended process of adaptation to change where the planned strategic approach takes a secondary role (Mintzberg, 1994; Burnes 1996a, 1996b, 2001).

The change management method has various key milestones to meet, independent whether it is a planned or emergent approach. Holt et al. (2007) advocate that the readiness for change is the degree to which employees are prepared for the change, which is also influenced by their beliefs that change is a need both for themselves and the organisation. Any approach to change also needs to manage the people's coping cycle and learning/survival anxiety. In fact, they derived a 'Change Readiness Framework' for a business to address, based on;

self-efficacy, personal and organisational valence, senior leadership support, and discrepancy.

The McKinsey 7-S Model (Waterman et al. 1980) is a tool designed to manage change through a set of hard and soft elements. The strategy, structure, and systems as the hard elements and the more challenging soft elements are shared values, style, staff and skills. Furthermore, the process of change needs to involve and service effectively all stakeholders according to their position within the stakeholder matrix (Mitchell et al. 1997). Such a change management approach in the current challenging environment needs a shift from a mechanistic to an organic holistic organisational approach, where it needs the primary contribution of all staff, and also the secondary contribution of the business consultants, incubators programmes and all SC actors.

Kotter (1996) advocates that an effective change management approach needs an effective level of urgency; build the guiding coalition/team; right vision (i.e. strategy based on innovation); communicate the buy-in; empower actions; include short term wins (i.e. breakdown the change into milestones/phases); momentum (i.e. persistence); make change stick (i.e. internalise a new culture). Hiatt's (2006) Prosci ADKAR model advocates that there is the need of a people centred implementation to change, through awareness, desire, knowledge, ability and reinforcement.

Furthermore, Carnall (2007) had also derived a comprehensive change management framework together with its effectiveness matrix. Kotnour et al. (1998, p.19) advocate that organisational alignment requires the business to align itself to both the internal operations and processes of the firm and also the external market requirements vis a vis its products/services.

Nowadays, the current management principles, which are deeply rooted within the managing change approach, refer to: leadership, managing culture, people management, lean management, business processes re-engineering/management, total-quality-management, six sigma, and excellence models. It is also required that change requires a dynamic approach to be sensitive to all emerging issues, based on adaptive capability, absorptive capability and innovative capabilities (Teece et al., 1997).

Change outcomes are needed to measure the change level of success. The key assessment tools used is the balanced scorecard, based on four criteria: financial, customer, internal business (process), and innovation and learning (Kaplan & Norton, 1992). Within the extant literature, outcomes of all businesses are also referred to have 3BL sustainable measures, which complement the balanced scorecard, by adding the environmental measure (Elkington, 2002; Manderson, 2006; Bojarski et al., 2009). Typical 3BL measures refer to the: social sustainability through a teamwork-based motivated workforce with less duplication; economical sustainability through cost efficiencies with less operating costs; and environmental sustainability through the use of green resources and to generate less waste and deploy the 3Rs in all processes.

In summary, from the current literature on change management, including the seminal works, one may advocate that all scholarly works are applicable with the contemporary literature and models except with the refinement of the Taylor's approach, since most of the works nowadays, tend to shift from a productive approach to a more flexible and organic approach. From a change management perspective, Lewin's model, with its limitations, triggered various other managing change frameworks. Kotter's (1996) 8-stage linear model and Hiatt's (2006) Prosci ADKAR model are to-date building and refining on more comprehensive and inclusive models of change, to guide both academics and practitioners, on how to deploy change methods and to treat change management as a complex strategy with various concepts with their properties and dimensions.

Research Methodology

The research strategy is based on a qualitative multiple case study using grounded theory analysis. The three case study approach was used to explore and delve deeply in these firms, located in both manufacturing and service sectors, through a set of interviews to gain rich data and establish in depth what is happening, using both primary and secondary data (Creswell, 1998). Each case, as the unit of analysis, is studied through a grounded theory analytic approach, using a constructivist philosophical stance, so as to interpret and construct the data, through the constant comparison method (Strauss & Corbin, 1998; Charmaz, 2006). This approach was used to establish the key themes, with their properties and dimensions, based on the coding paradigm, defined by input, process and output within a context (Strauss & Corbin, 1998; Suddaby, 2006; Easterby-Smith et al., 2008; Yin, 2009). The computer assisted qualitative analysis software was used to organise the emerged themes vis a vis the data.

The research technique is conversation with the participants to generate data that outlines the theory under the practitioners' actions. The research design is sense-making by the on-going memos with constant comparison of the transcribed data, to derive the substantive theory.

Findings

The data show that all organisations had undertaken a transformational change in the last three years, which were mainly attributed either to the introduction of new technology, as an information management tool (e.g. ERP) within the service/manufacturing sector or as an automation investment to serve as a process improvement and optimisation within the manufacturing sector. It was also referred that incremental changes were the norm of the day. All participants agreed that the

success of change needed: a sense of urgency; a teamwork approach; a strategic management which varied between both a planned and emergent continuum; to meet all stakeholders' requirements, such as through communication and training of all involved staff to cope with acceptance of change and to minimise resistance to change; a level of appreciation and recognition to all stakeholders for the commitment and efforts; and to build the new culture as the result of the change. The research originality was extracted from the referred quotes:

> 'We do not inform staff except in the last minute when we cannot do otherwise, to ensure that the newly engaged staff do not leave the business from day one' (Firm X); '… people are informed well in advance before the change' (Firm W); 'we never fire employees after the change, just deploy them in another section' (Firm Y); and 'we had to change and downsize to remain competitive and fire people…., although we assist them in finding another job' (Firm X).

Discussion: Comparison of the emerged theory within the literature

The data shows that the change management is a strategic approach and that it incorporates all management levels from the top to the bottom line, independent if it is an incremental or transformational type of change. Change mainly originates through a planned approach, but in view that businesses are situated within this turbulent competitive environment, need to adapt to the external or internal business requirements, by deploying an emergent strategic approach to remain in business. The involvement of all relevant people remains pivotal to an effective change management approach. Change management is a process, with various phases to follow, so that all stakeholders are involved according to each phase. Such a process approach creates a streamlined and effective and efficient approach to change, with no surprises and with minimal conflicts and resistance to change. Such a process management approach needs an effective leadership style to adapt to the business culture and above all to inspire all people with a high level of commitment and entrepreneurship. The change outcomes need to employ a performance measurement mentality, based on multiple criteria, such as the 3BL, since such a change to be effective and efficient needs to adopt a broad level of sustainable measures to compare its performance with its sector benchmarks. Table 1 shows the emerged holistic change management model, which fits very well with the current established models within the literature and those used by practitioners.

Change Elements	Description of change elements
Drivers of change	Competitive environment; downsizing; new technology; information visibility improvements in the service/ manufacturing sector; optimisation of processes within manufacturing sector.
Strategic management approach	Emergent to a planned strategic change management continuum.
Change management phases	Preparatory measures to the change [planning]; actions to achieve the change [execution]; change close-out review [change completion]).
Change management actions	Communication/learning; good governance through effective leadership approach, such as transformational, transactional, action-centred and situational leadership styles, and effective management approach based on quality based procedures, value-added operations, decentralised approach, and standards compliance; teamwork, commitment, and empowerment (to build on readiness to change, achieve targets effectively, and overcome resistance to change); monitor and review all change processes; performance management (reward system); building close relationships between all staff; employing an entrepreneurial and an innovative approach to work; alignment of all operations to the new process at all management levels; sustainable change practises within the process based on the 3BL approach: financial; social; and environmental 3Rs measures.
Change management Outcomes	Balanced Scorecard (performance measures based on financial, customer, internal business (process), and innovation and learning) and Effectiveness matrix (efficient and effective best practices) and 3BL (economic, social and environmental 3Rs aspect).
Change management context	Readiness to change (coping cycle, anxieties, acceptance of change); cultural values; internal staff and external SC actors level of collaboration, knowledge sharing, and trust; resistance to change; conflicts between different management levels; motivation of staff; small economies of scale; funds/grants provisions for investment.

Table 1: Holistic change management model (Author)

Conclusion

The change management strategy is based on a planned to an emergent continuum and with a process that needs to apply entrepreneurship, creativity and innovation within its leadership style, both within the business and outside with all SC actors, as derived in the holistic change management model, as referred in Table 1.

The research contribution builds on three main themes. Firstly, within the change readiness theme, it was identified from the data, that its dimensional property outlines that there exists a continuum that people are ideally informed to be prepared and accept the change a priori, but there exists situations where people need to be left in the dark without being informed, since the business cannot operate without its current workforce. Such an approach refers that change sometimes leads to downsizing and firing of employees for the firm to retain its competitiveness. If such people to be fired are made aware before the change is launched, they would find an alternative employment from day one they are aware, leaving negative repercussions on the firm, since the firm cannot operate without these people. Secondly, within the teamwork theme, since its dimensional property outlines that there exists a continuum between the nature of the teamwork relationship of staff at different management levels. Ideally people at all management levels adopt synergies and trust to build a strong relationship, but there are instances when new recruits are engaged as seniors to existing staff, the latter create friction and conflicts and make their new peers life difficult due to lack of acceptance, since they are considered as naïve and less competent, although they are assigned to a higher post. Thirdly, from the literature, the change management outcome element already includes several measures of assessment, such as those referred by the Balanced Scorecard among others, though a business needs to include also the environmental aspect in its performance, as referred in the 3 BL theme within the extant literature, which as a result is lacking within the change management literature, in particular within both the change management process and measures of outcomes.

Research Limitations

The findings derived from the data cannot be generalized to the whole population of the industry due to the limited cases under study, but further research may be undertaken to validate such findings on a larger representative sample. For ethical reasons no data was referred to the cases under study, since if such skeleton data were to be included, one may easily disclose the organisation, due to the unique product/service being produced/offered.

Recommendation for future research

A quantitative research approach shall be undertaken to establish and refine the 'change readiness' and the 'teamwork' themes properties and dimensions, together with the derived holistic change management model to change, as referred in Table 1, so as to build on the change management literature together with its models. Furthermore, more comprehensive literature reviews shall be undertaken so as to establish whether the 'change management outcome' vis a vis its environmental aspect is being included in the change management strategy, process and outcomes, to promote green sustainability within change management.

References

Adair, J. (1979). *Action-Centred Leadership.* Gower Press.

Ardichvili, A. & Manderscheid, S.V. (2008). Emerging Practices in Leadership Development. (Special issue). *Advances in Developing Human Resources*, 10(5), 619-631.

Argyris, C. (1960). *Understanding Organizational Behaviour.* Tavistock publications; P.M.

Bass, B.M. & Avolio, B. (2000). *Multifactor leadership questionnaire.* Redwood City, CA: Mind Garden;

Bass, B.M. & Avolio, B.J. (1994). I*mproving Organizational Performance Through Transformational Leadership.* Sage Publications.

Bate, P. (1994). *Strategies for cultural change*. Oxford: Butterworth-Heinemann Ltd.

Beer, M & Nohria, N. (2000). Cracking the code of change. *Harvard Business Review*, May-June, 1-8.

Bennis, W. (2007). The challenges of leadership in the modern world: Introduction to the special issue. *American Psychologist*, 62(1), 2-5;

Bojarski, A.D., Laínez, J.M., Espuna, A. & Puigjaner, L. (2009). Incorporating environmental impacts and regulations in a holistic supply chains modeling: An LCA approach. *Computers and Chemical Engineering*, 33, 1747–1759.

Burnes, B. & Jackson, P. (2011). "uccess and failure in organizational change: an exploration of the role of values. *Journal of Change Management*, 11(2), 133-162.

Burnes, B. (1996a). Managing change: A strategic approach to organizational dynamics. London: Pitman Publishing.

Burnes, B. (1996b). 'No such thing as … a "one best way" to manage organizational change'. *Management Decision*, 34(10), 11-18.

Burnes, B. (2001). *Managing change: A strategic approach to organizational dynamics.* London: Prentice Hall.

Burnes, B. (2004). Kurt Lewin and complexity theories: Back to the future? *Journal of Change Management*, 4(4), 309-326.

Burns, J.M. (1978). *Leadership.* New York: Harper & Row, 1978;

By, R.T. (2005). Organisational change management: a critical review. *Journal of Change Management*, Vol. 5 (4), 369-380.

Carnall, C.A. (2007). *Managing change in Organisations.* 5th Ed. Pearson Education Limited.

Carson, J.B., Tesluk, P.E. & Marrone, J.A. (2007). Shared leadership in teams: An investigation of antecedent conditions and performance. *Academy of Management Journal*, 50, 1217–1234.

Cetron, M.J. & Davies, O. (2005). Trends now shaping the future: Economic, societal and environmental trends. *The Futurist*, 39(2), 27-42.

Charmaz, K. (2006). *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. London: Sage.

Crainer, S. (1998). *Key Management Ideas: Thinkers that Changed the Management World* (3rd ed.). Financial Times: Prentice Hall.

Creswell, J.W. (1998). *Qualitative inquiry and research design: Choosing among five traditions.* Thousand Oaks, CA: Sage.

Cutler, A. (2005). A Good Fit Is Essential. *Professional Manager.* 15(3), 38-57.

Deming, W.E. (1986). *Out of the crisis.,* Massachusetts Inst. of Technology: Center for Advanced Eng. Study.

Drucker, P.F. (1974). *Management: Tasks, Responsibilities, Practices.* 1st ed., Harper & Row, New York, NY.

Drucker, P.F. (1977). *People and Performance.* Heinemann.

Drucker, P.F. (1986). The Practice of Management, 1st ed., Perennial Library, New York, NY.

Dunphy, D.C. & Stace, D.A. (1993). The strategic management of corporate change. *Human Relations*, 46(8), 905-918;

Easterby-Smith, M., Thorpe, R. & Jackson, P.R. (2008). *Management Research* (3rd ed.). London: Sage.

Elkington, J. (2002). *Cannibals with forks: the triple bottom line of 21st century business*. Oxford: Capstone.

Fayol, H. (1950). *General and Industrial Management.* London: Pirman.

Fiedler, F.E. (1967). *A theory of leadership effectiveness*. New York: McGraw-Hill;

Fitzsimmons, J.A. & Sullivan, R.S. (1982). *Service Operations Management.* McGraw-Hill.

Flynn, B.B., Huo, B. & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, 28, 58–71.

Gunasekaran, A., Lai, K. & Cheng, T. C. E. (2008). Responsive supply chain: A competitive strategy in a networked economy. *Omega*, 36, 549 – 564.

Handy, C. (1996). The gods of management. *Executive Book Summaries*, 18(2), 1-8.

Hiatt, J. M. (2006). *ADKAR: A Model for Change in Business, Government and our Community.* Publisher: Prosci Learning Center Publications.

Hiatt, J. M. & Creasey, T. (2012) *Change Management: The People Side of Change*. Prosci Learning Center Publications.

Holt, D., Armenakis, A., Field., H & Harris, S. (2007). Readiness for organizational change: the systematic development of a scale. *Journal of Applied Behavioral Science*, 43 (2), 232–55.

Johnson, G. & Scholes, K. (1999). *Exploring corporate strategy. Text and Cases*. Prentice Hall Europe.

Kadar, M. Moise, L.A. & Colomba, C. (2014). *Innovation* Management in the Globalized Digital Society. *Procedia - Social and Behavioral Sciences*, 143, 1083 – 1089.

Kanter, R.M. (1989). *When giants learn to dance: Mastering the challenges of strategy management and careers in the 1990s*. London: Unwin;

Kanter, R.M., Stein, B. & Jick, T. (1992). *The Challenge of Organizational Change: How Companies Experience it and Leaders Guide it.* New York: Free Press.

Kaplan, R.S. & Norton, D.P. (1992) The Balanced Scorecard: measures that drive performance. *Harvard Business Review*, 70 (1), 71–9.

Kotnour, T., Barton, S., Jennings, J. & Bridges, R. (1998), Understanding and leading large-scale change at the Kennedy Space Center. *Engineering Management Journal,* Vol. 10 (2), 17.

Kotter, J.P. (1996*). Leading Change*. Cambridge MA: Harvard Business School Press.

Lawrence, P.R. & Lorsch, J.W. (1967). Differentiation and integration in complex organizations. *Administrative Science Quarterly*, 12(1), 1-47;

Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues*, Vol. 2 (4), 34-46.

Manderson, A.K. (2006). A systems based framework to examine the multi-contextual application of the sustainability concept. *Environment Development Sustainability*, 8, 85–97;

Miller, D. & Friesen. P.H. (1984). *Organizations: A quantum view.* Englewood Cliffs, NJ: Prentice Hall;

Miller, D. (2011). *Successful Change: How to implement change through people*. ChangeFirst Ltd.

Mintzberg, H. (1979). Patterns in strategy formation. *International Studies of Management & Organization*, Vol. 9(3), 67-86;

Mintzberg, H. (1994). *The rise and fall of strategic planning: Reconceiving roles for planning, plans, planners*. New York: Free Press;

Mitchell, R.K., Agle, B.R. & Wood, D.J. (1997). *Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts*. The Academy of Management Review, Vol. 22, 4 (Oct.), 853-886.

Nickols, F. (2004). *Change management 101: A primer*. Retrieved from http://home.att. net/~nickols/change.htm (Accessed 11 April 2018).

Northouse, P.G. (2007), *Leadership Theory and Practice.*, Sage Publications Inc., Thousand Oaks, CA.

O'Reilly, C.A., Cladwell, D.F., Chatman, J.A., Lapiz, M. & Self, W. (2010). How leadership matters: The effects of leaders' alignment on strategy implementation. *Leadership Quarterly*, 21, 104-113.

Olivares, O.J., Peterson, G. & Hess, K.P. (2007). An existential-phenomenological framework for understanding leadership development experiences. *Leadership and Organization Development Journal*, 28, 76-91.

Peters, T.J. & Waterman, R.H. *In Search of Excellence: Lessons From America's Best Run Companies.* Harper & Row (1982).

Rafferty, A.E., Jimmieson, N.L. & Armenakis, A.A. (2013). Change readiness: a multilevel review, *Journal of Management*, 39 (1), 110-135.

Senge, P.M. (1990). *The Fifth Discipline: The Art of Practice of the Learning Organization.* Doubleday.

Soderholm, L.G. (1989). Needed: engineering leadership. *Design News,* 45(13), 13-13.

Strauss, A.L. & Corbin, J. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (2nd ed.). Sage Publications.

Suddaby, R. (2006). What grounded theory is Not. *Academy of Management Journal*, 49(4), 633-642.

Teece, D.J., Pisano, G. & Sheun, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal,* 18(7), 509-533.

Thompson, J.D. (1967). *Organizations in Action*. New York: McGraw-Hill.

Wang, P. & Zhu, W. (2011). Mediating role of creative identity in the influence of transformational leadership on creativity: Is there a multilevel effect? *Journal of Leadership & Organizational Studies*, 18, 25-39

Waterman, R.H., Peters, T.J. & Phillips, J.R. (1980*)*. Structure is not organization. *Business Horizons*, 23(3), 14-26.

Watson, T.J. (1986). *Management, Organisation and Employment Strategy*. Routledge & Kegan Paul.

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Reconstructing a Fragmented Self: How LGBT Catholics Negotiate a Coherent Sense of Identity

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Abstract

This paper explores how lesbian, gay, bisexual and trans (LGBT) Catholics deal with the intra-personal conflict that emerges from the incongurence between their faith and their sexuality. When they start experiencing sexual desires for persons of the same sex, their inner state of being is shattered as they are engulfed with feelings of guilt, fear, anger, doubt and anxiety. They have to deal with their apparently irreconcilable sexuality and faith as they feel judged by God and by his Church.

The LGBT Catholics in my study are spiritually profound, introspective, faithful beings. Yet they are not afraid to engage with the Church's teachings to develop their own individual morality. Drawing upon the Catholic tradition itself, they seek to develop an alternative, LGBT-affirming moral heremeutic, a process aided by therapy, reflection, prayer, priestly advice and other techniques which enable them not only to find themselves but to relocate themselves within Catholicism. Through what Foucault calls "practices of the self" such as self-reflection, self-knowledge and self-examination, individuals engage with the established and prescribed moral code in a process of "moral subjectivation". Such processes enable them to reconstruct their fragmented self and to 'reclaim' their rightful place in religious texts which was denied them through heteronormative theological interpretations.

Keywords: homosexuality, Catholic, identity reconstruction, narrative

Introduction

That most LGBT individuals who are brought up as Christians have to deal with the dilemma of their apparently irreconcilable sexuality and faith is well documented (*inter alia* Dillon, 1999; Gross & Yip, 2010; Grubbs & Exline, 2014; Lapinski & McKirnan, 2013; Levy & Edmiston, 2014; Levy & Reeves, 2011; Mahaffy, 1996; Rodriguez, 2010; Schuck & Liddle, 2001; Subhi & Geelan, 2012; Subhi et al, 2011; Thumma, 1991; Toft, 2014; Trammell, 2015; Wilcox, 2002b, 2003; Wolkomir, 2001; Yip, 1997a; Yip 1997b). While their religious identity becomes an integral part of

who they are since childhood, their sexual self is by comparison rather unfamiliar. Their same-sex desire is even more confusing because it is seen as 'bad' or 'deviant'. They think that they are the only ones having these feelings. This 'newness' is not meant only in the sense of newly discovered but also in terms of acknowledging a gay or lesbian identity which is, in itself, a relatively new concept which was not written about before the 1970s (Epstein, 1978). Their emerging self is incongruent with Catholic morality and with the heteronormative ideals which they internalised and which they learn to idealise. Internalised homophobia creates disharmony within the self, causing conflict and pain. In LGBT informants, this internal conflict is extremely profound because it concerns issues related to their sense of being. Conflict is not just about lifestyle choices and behaviour that is condemned by the Catholic Church. It is primarily about accepting themselves as non-conforming *beings,* not only as non-conforming *actors*.

Informants eventually learn to cope with their feelings and find ways of reconciling their conflicts, although they never completely resolve them. They may even perceive their homosexuality as a source of pride and their experiences as an opportunity for personal and spiritual growth. Dealing with this contradiction often presents an opportunity for the emergence of an empowered sense of self (Taylor & Snowdon, 2014).

Methodology

This research is based on two years of ethnography with Drachma LGBTI (henceforth Drachma) in Malta and one week of intense participant observation with Ali d'Aquila in Palermo. Both groups are concerned with enabling LGBT believers to reconcile their spirituality with their sexuality. I also conducted nine in-depth interviews with LGBT Catholics from Drachma (eight men, including one transman, and two women), nine interviews (five men and four women) with LGBT Catholics from Ali D'Aquila and six interviews with LGB persons (two women and four men) who do not frequent either group. Most of my informants were well-educated individuals in their thirties. All the names of my informants are pseudonyms except for those of a few individuals who gave me permission to use their real name.

Reconciling faith and sexuality

This paper accompanies my LGBT informants along their 'journey' towards self-acceptance and self-affirmation. LGBT informants live the conflict as modern selves who are also spiritually profound, introspective beings who critically engage with the Church's teachings to develop their own individual morality. Drawing upon the Catholic tradition itself, they seek to develop an alternative, LGBT-affirming moral

hermeneutic, a process aided by therapy, reflection, prayer, priestly advice and other techniques that enable them not only to find themselves but to relocate themselves within Catholicism. Through what Foucault (1984, p. 29) calls "practices of the self" such as self-reflection, self-knowledge and self-examination, individuals engage with the established and prescribed moral code in a process of "moral subjectivation". Such processes enable them to reconstruct their fragmented self and to 'reclaim' their rightful place in religious texts, which was denied to them through heteronormative theological interpretations (Yip, 2005).

The negotiation of an integrated identity is a 'journey' filled with hurdles and disappointments. Some experiences are less painful, as informants manage to cope with their dilemmas more successfully and in a shorter amount of time than others. Others go through a great deal of stress and suffering, at times risking death (Wilcox, 2003). LGBT people of faith deal with their conflicts in different ways. They may reject either their sexual or their religious identity; they may succeed in reconciling both identities; they may compartmentalise the two aspects of their identity or they may continue to live with the conflict (Levy & Reeves, 2011, Rodriguez & Ouelette, 2000; Wilcox, 2009). They may choose their religion over their sexuality, struggling to conform to social expectations, praying that their sexual desires will go away (Wilcox, 2003). Others choose their LGBT identity and reject their offending Church while others try to find a middle ground. According to Rodriguez and Ouelette (2000), rejection of one's homosexual identity may involve seeking reparative therapy, something which hardly featured among the participants in my study and which has since become illegal in Malta. Among my LGBT Catholic informants, the initial reaction was often to deny or to fight against their sexuality, to make it go away rather than to abandon their religion. Although a few kept away from God or from religious rituals for a time, giving up this aspect of one's identity was not generally an option. Most informants sought ways of reconciling the two seemingly incompatible elements as they eventually recognised the importance of retaining both.

I approach identity reconstruction as a process of synthesis where individuals seek to reconcile their different identities into an integrated sense of self (Epstein, 1978) through a hermeneutic process in which they are both subjects and objects of interpretation. Based on his ethnographic fieldwork among gay Muslims in Indonesia, anthropologist Tom Boellstorff (2007, pp.141-3) describes his interlocutors as having to deal with their being "ungrammatical". Within Islamic Indonesian society, homosexuality is not only considered false but also incommensurable, as if it does not exist. Dealing with their faith and sexual desires as Muslim gay men is like having to make sense of a phrase which reads "earth happy twelve the". Therefore, interpretation is of utmost importance, especially in the absence of an Islamic discursive framework concerning homosexuality. Most of my informants were brought up in a social and moral environment which also did not offer them much in terms of self-understanding except the interpretation of the Roman Catholic Church.

However, nowadays contemporary society provides them with "new mechanisms" (Giddens, 1991, p.2) which enable them to take an active role in the construction of their own identity. The reconstruction of self-identity is not simply shaped by outside forces in a passive way but is acted upon by LGBT Catholics, who frequently seek the help of others such as therapists, priests, theologians and LGBT faith groups. Rather than passively accepting their stigma, LGBT Christians develop an affirmative self-identity which counters that of the Church but is simultaneously embedded within Catholicism and enables them to remain within the Catholic fold.

Means of narrativisation

A self-affirming narrative emerges out of a process of negotiation and growth through which LGBT Catholics strive to achieve some degree of balance between their incongruent sexual and religious identities. It is a continuous process, rather than a "two-dimensional or bipolar construct" (Rodriguez, 2010, p.17; Rodriguez & Ouelette, 2000). It is not a dichotomous experience of switching from one state to another or a linear, progressive sequence of events. It is a transitional process during which LGBT Catholics make use of what in the literature are referred to as strategies (Mahaffy, 1996; Pietkiewicz & Kołodziejczyk-Skrzypek, 2016; Rodriguez, 2010; Rodriguez & Ouelette, 2000; Wilcox, 2003; Wilcox, 2009; Yip, 1997a; Yip, 1997b, Yip, 2005; Yip & Page, 2013) in their efforts to understand and accept the possibility that they can be both LGBT and Catholic. This process of identity negotiation is characterised by ups and downs, by progress, satisfaction and reassurance as much as by anxiety, depression and nagging questions.

LGBT Catholic informants sought to engage with their conflicts in different ways. Especially in the beginning, some joined religious orders or sought spiritual direction, often combined with psychological help. They tried to repress their sexuality while seeking to learn more about their feelings and about the experiences of others in a similar situation. They sought help from friends, knowledge from books and websites. They may have joined faith-based groups such as Drachma and Ali d'Aquila. Such endeavours equipped them with the necessary tools and skills to be able to reconstruct a more coherent sense of self and to develop an alternative moral hermeneutic which embraces both their faith and their sexuality.

Therapy and spiritual direction

Only a minority of my informants did not consult a psychotherapist, a psychologist or even a psychiatrist, to help them come to terms with their incongruent sense of self. For some, therapy is an integral part of their life. Others seek therapy only during a temporary turbulent period in their life, while a few others keep returning to their

therapist whenever they feel the need. This is not surprising in our 'therapeutic culture' where therapy has become an institution carrying a great deal of legitimacy (Illouz, 2008). Giddens (1991, p.34) contends that therapy has become the "secular version of the confessional".

As a result of the medicalisation of social life, what was once considered a moral issue has now become a disease which needs to be healed; moreover, the individual who goes to therapy is a "diseased self" whose self-development was, according to Illouz (2008, p.173), obstructed or hindered in some way. However, it is moral dilemmas which often push my informants towards therapy. In fact, while some manage to deal with their fears and doubts through therapy alone, others feel the need to combine their therapy with guidance from a spiritual director, sometimes by consulting a therapist who would himself be a priest or a theologian. Adriana, a Sicilian lawyer who was brought up within the Focolare Movement, claimed that psychology helped her deal with her guilt and to reluctantly learn to accept her homosexuality. However, it could only help her "accept things from a human point of view" because "regardless of what the psychologist said, I could not reconcile the human dimension with what God wanted from me". She only started to address these aspects of her conflict through Ali d'Aquila, although she still continued visiting her therapist.

Illouz (2008, p.173) refers to the "therapeutic narrative" of the self which is embedded in a sense of victimhood and suffering. It enables individuals to speak about themselves and to understand themselves through their own narrative using therapeutic language. This is helped by the diffusion of psychological knowledge and its broader accessibility.

This fusion between therapy and spiritual direction was experienced most strongly by some of those who were in religious formation. While hardly any of my informants considered the issue of their homosexuality to have featured as a motive to join a religious order, in some cases, conventual life might have unconsciously served as a safe alternative to having to deal with their homosexuality or as a means of proving that they are not 'bad' persons. Yet for some, it was the experience of religious life itself which enabled them to effectively reconcile their spirituality with their homosexuality.

It was through therapy that Joseph could finally face his homosexuality which he had denied and repressed for many years. During his religious formation of six years, he had been seeing a psychologist priest:

> I woke up and went in front of the mirror in my room. I looked into my eyes and said, "Joseph, you are gay and there's nothing wrong with that". And that's where I liberated myself. I cried a lot. There was a big lump in my throat, and a huge burden. I arrived there because of the therapy I was doing with that Father.

Reflective deliberation

It is common for LGBT informants to engage in self-reflection, another means of narrative development. This is usually a rational, introspective process of deep pondering in which informants reflect upon themselves and their life as they try to make sense of who they are and where they are heading.

The combination of educational capital which my informants possess, together with the acquired therapeutic discourse, serves to enrich this contemplative self-analytic process and to equip my informants with the required explanatory vocabulary. It enables them to develop their personal narrative, which serves as a way of bringing together the pieces of their life in a more coherent manner, not in a chronological sense but as a discerning interpretation of their story in terms of analytical categories and processes, "as parts of a plot" (Polkinghorne, 1991, p.136).

Bauman (2004) argues that since identity has become more fluid, transient and elusive in contemporary society, individuals are increasingly disassociating themselves from traditional roles, structures and norms and engaging in "reflexive life projects with the self in the driver's seat" (Gross & Yip, 2010, p.56). With the onset of late, advanced or reflexive modernity, the concept of individualism has, according to Beck (1992), become part and parcel of the Western imagination and individuals are increasingly looking inside themselves as agents and sources of meaning rather than towards traditional systems and structures. However, my informants are reluctant to let go completely of traditional systems of meaning as they draw upon the resources provided by Catholicism. Indeed, such views, also expounded by Heelas (1996), were criticised for assuming the existence of a self-reflexive self while ignoring the social, structural and cultural formations which are bound to have an impact on the formation of the self (Wood, 2007).

Contemplative thinking could at times take different forms of expression as well as become interactive. Chris described an intense period of reflection during his early encounters with Drachma, when he was still trying to decipher himself, after having quit his role of Catechist within the Society of Christian Doctrine (MUSEUM). He used to express his deep thoughts in writing, engaging in dialogue with Drachma's coordinator and putting these thoughts on the Drachma website. His reflections were also a way of pouring out his soul to God:

> I wrote about 40,000 words in that period. It was also an intense spiritual experience. It was not just an expression of my thoughts; it was almost a dialogue with God. Internally I was literally addressing the big issues and arguing with them.

Although for my Maltese Catholic informants, a Catholic identity is almost a 'given', this is still negotiated, questioned and explored just as much as sexuality in

this process of introspective self-understanding where the self is "routinely created and sustained in the reflective activities of the individual" (Giddens, 1991, p.52). This "relationship with the self" is not just about becoming conscious of the self and getting to know the self but also about becoming "ethical subjects". Individuals establish their moral goals and transform themselves into "subjects of moral conduct" (Foucault, 1984, pp.28-29). Salazar (2006, pp.115-6) sees a shift from a sexual morality which was based on disciplining the body, especially women's bodies, to a sexual morality which disciplines the self "as a knowledgeable and responsible subject". Individuals cannot become ethical subjects unless they become knowledgeable. Consequently, Salazar (2006) sees what he terms "obedience-sexuality", where sexual morality is based on the obedience of the dictates of the Church, being replaced by "knowledge sexuality". Foucault (1984), however, contends that every morality, broadly speaking, encompasses both of these elements, that is, established moral codes and forms of subjectivation. They can never be completely set apart, although they can develop independently from each other.

Among my informants, the development of the 'ethical self' is embedded in Christian principles which are however revisited and re-evaluated in the process of engaging with the self. My informants tend to consider their experience as a way of testing and developing their faith. They had to ask questions which they would not have asked had they not been faced with the challenges of their sexuality, often strengthening their faith as a result, even if, for a period of time, they may have distanced themselves from God or from the Church.

LGBT-affirming religious communities

Despite their desire to be accepted by the Church and their endeavours to justify their rightful place within the wider religious community, LGBT Catholics may be pushed towards "subaltern communities of faith" (Thumma & Gray, 2005, p.xiii). Rodriguez (2010) considers joining an organisation which promotes both homosexuality and religion as an important means of identity integration for LGBT Catholics. Yip (1997c) found that participation in such faith groups served many functions. Participants could give and receive moral and emotional support. They could interact socially without needing to hide their sexuality. Especially for those who feel alienated from the Church, these religious groups offer a safe space where one could meet others in the same situation; where individuals can be themselves (Kaufman & Johnson, 2004). In these spaces, individuals could learn to affirm their sexual and spiritual selves by engaging with Christian theologies of sexuality and at the same time strive for change within the Church.

Narratives of a reconstructed self

The various sources of support, learning, understanding and spiritual growth furnish LGBT Catholics with the necessary techniques and skills which facilitate the process of identity reconstruction. They provide them with "the rhetoric of conversion" (Harding, 1987, p.167), a blend of practices, symbols and vocabulary enabling them to shift "from one worldview, or mind-set, to another". They enable them to revisit their cultural assumptions and re-evaluate their self-concept equipped with these newly acquired methods of organising and interpreting their experiences (Harding, 1987, p.168).

My LGBT informants refer to this process of self-transformation as a 'journey' of growth, exploration, self-reflection and discovery. Journey and travel metaphors are common in the literature pertaining to identity negotiation among LGBT people of faith (*inter alia* Browne, Munt & Yip, 2010; Gross & Yip, 2010; Rodriguez, 2010; Rosser, 1992; Schnoor, 2006; Shallenberger, 1996; Subhi et al, 2011; Taylor & Barnes, 2015; Thumma, 1991; White & White Jr., 2004; Wilcox, 2003, Wilcox, 2009; Yip, 1997a, Yip, 1997b, Yip, 2002; Yip & Page, 2013) and are often used by both my Maltese and Sicilian informants. Seeing one's self-transformation in terms of a journey is a metaphor which is derived from contemporary Western spiritual discourse and which is not exclusive to LGBT people of faith. It implies that there is some destination which, for LGBT informants, could be a goal such as self-acceptance or achieving a coherent sense of identity. However, there is also the notion of a path or a road that one traverses as one seeks to enhance one's theological understanding and spiritual growth and to 'find' oneself in the process. The 'journey' that my informants embark on is rather fluid, characterised by many hurdles and an uncertain destination. As Catholic believers, my informants also "journeyed with God" (Wilcox, 2003, p.50).

LGBT informants view their 'journey' of self-reconstruction as an experience of change from an 'old' to a 'new' self, reminiscent of the 'born again' spiritual experiences found in some Christian denominations. However, for Drachma members, the 'old' self is not that of someone who had homosexual desires and who controlled such desires in order to live according to Catholic teachings. On the contrary, the 'old' self was described as "not being who I really am", denying one's homosexuality while the 'new' self means accepting oneself, acknowledging and accepting God's love. It is a shift from a past self riddled with doubt and guilt towards a more integrated and confident sense of self. It is a conception of self which emerges from an evolving narrative of sexual and spiritual integration.

An integrated self develops in conjunction with the emergence of a personal narrative which is capable of perceiving the spiritual/divine and the religious/institutional as separate spheres. It is a narrative which employs a vocabulary of neutralisation, inspired by alternative interpretations of religious texts. It is embedded in the rhetoric acquired through therapy, spiritual direction, reading and reflection.

Conclusion

One may construe the transformation experienced by LGBT Catholics as a process of 'conversion'. From non-conforming sinners, wanting to hide from the knowing, judging eyes of God, they come to view themselves as loved creatures of God. Their 'journey' takes them from a dark place filled with guilt and shame to a point where they may even feel pride in being who they are. They come to embrace their new self even as their identity remains in a state of construction.

While LGBT informants are critical of the Church's teachings on homosexuality and keep hoping that one day the Church would revise these teachings, their hermeneutical 'journey' empowers them in their endeavour to engage critically and dialogically with the Church until they are able to reclaim their rightful place within the Catholic faith.

References

Bauman, Z. (2004). *Identity: conversations with Benedetto Vecchi*, Cambridge: Polity Press.

Beck, U. (1992). *Risk society: towards a new modernity*. London: Sage Publications.

Boellstorff, T. (2007). *A coincidence of desires.* Duke University Press, Durham & London.

Browne, K., Munt, S.R. and Yip, A.K.T. (2010). *Queer spiritual spaces: sexuality and sacred places.* Surrey: Ashgate.

Dillon, M. (1999). *Catholic identity: balancing reason, faith and power*. Cambridge: Cambridge University Press.

Epstein, A.L. (1978). *Ethos and identity: three studies in ethnicity*. London: Tavistock.

Foucault, M. (1984). *The history of sexuality, vol. 2, The use of pleasure.* London: Penguin Books.

Giddens, A. (1991). *Modernity and self-identity: self and society in the late modern age*. Cambridge: Polity Press.

Gross, M. & Yip, A.K.T. (2010). Living spirituality and sexuality: a comparison of lesbian, gay and bisexual Christians in France and Britain. *Social Compass*, 57 (1), 40–59.

Grubbs, J.B. & Exline, J.J. (2014). Why did God make me this way? Anger at God in the context of personal transgressions. *Journal of Psychology & Theology*, 42 (4), 315-325.

Harding, S.F. (1987). Convicted by the Holy Spirit: the rhetoric of Fundamental Baptist conversion. *American Ethnologist*, 14 (1), 167-181.

Heelas, P. (1996). *The New Age movement: the celebration of the self and the sacralization of modernity*. Oxford: Blackwell.

Illouz, E. (2008). *Saving the modern soul: therapy, emotions and the culture of self-help*, California:, University of California Press.

Kaufman, J.M. & Johnson, C. (2004). Stigmatized individuals and the process of identity. *The Sociological Quarterly*, 45 (4), 807-833.

Lapinski, J. & McKirnan, D. (2013). Forgive me Father for I have sinned: the role of a Christian upbringing on lesbian, gay, and bisexual identity development. *Journal of Homosexuality*, 60 (6), 853-872.

Levy, D.L. & Edmiston, A. (2014). Sexual identity, gender identity, and a Christian upbringing: comparing two studies. *Journal of Women and Social Work*, 29 (1), 66-77.

Levy, D.L. & Reeves, P. (2011). Resolving identity conflict: gay, lesbian, and queer individuals with a Christian upbringing. *Journal of Gay & Lesbian Social Services*, 23 (1), 53-68.

Mahaffy, K.A. (1996). Cognitive dissonance and its resolution: a study of lesbian Christians. *Journal for the Scientific Study of Religion*, 35 (4), 392- 402.

Polkinghorne, D.E. (1991). Narrative and self-concept. *Journal of Narrative and Life History*, 1 (2-3), 135-153.

Pietkiewicz, I.J. & Kołodziejczyk-Skrzypek, M. (2016). Living in sin? How gay Catholics manage their conflicting sexual and religious identities. *Archives of Sexual Behavior*, 45 (6), 1573–1585.

Rodriguez, E.M. (2010). At the intersection of church and gay: a review of the psychological research on gay and lesbian Christians. *Journal of Homosexuality*, 57 (1), 5–38.

Rodriguez, E.M. & Ouellette S.C. (2000). Gay and lesbian Christians: homosexual and religious identity integration in the members and participants of a gay positive church. *Journal for the Scientific Study of Religion*, 39 (3), 333–347.

Rosser, B.R.S. (1992). *Gay Catholics Down Under: the journeys in sexuality and spirituality of gay men in Australia and New Zealand*, New York: Praeger.

Salazar, C. (2006). *Anthropology and sexual morality: a theoretical investigation*. New York: Berghahn Books.

Schnoor, R.F. (2006). Being gay and Jewish: negotiating intersecting identities. *Sociology of Religion*, 67 (1), 43-60.

Schuck, K.D. & Liddle, B.J. (2001). Religious conflicts experienced by lesbian, gay, and bisexual individuals. *Journal of Gay & Lesbian Mental Health*, 5 (2), 63–82.

Shallenberger, D. (1996). Reclaiming the spirit: the journeys of gay men and lesbian women toward integration. *Qualitative Sociology*, 19 (2), 195-215.

Subhi, N. & Geelan, D. (2012). When Christianity and homosexuality collide: understanding the potential intrapersonal conflict. *Journal of Homosexuality*, 59 (10), 1382-1402.

Subhi, N., Mohamad, S.M., Sarnon, N., Nen, S., Hoesni, S.M., Alavi, K. and Tsuey Chong, S. (2011). Intrapersonal conflict between Christianity and homosexuality: the personal effects faced by gay men and lesbians. *e-BANGI : Journal of Social Sciences and Humanities*, 6 (2), 193-205.

Taylor, S. & Barnes, H. (2015). Gathering together. In: Taylor S. & Barnes H., (eds.) *And God saw it all was very good: Catholic LGBT people in Europe telling their stories*. England, European Forum of Lesbian, Gay, Bisexual and Transgender Christian Groups, pp. 17-21.

Taylor, Y. & Snowdon, R. (eds.) (2014). *Queering religion, religious queers*. New York: Routledge.

Thumma, S. (1991). Negotiating a religious identity: the case of the gay Evangelical. *Sociological Analysis*, 52 (4), 333-347.

Thumma, S. & Gray E.R. (2005). *Gay religion*. Maryland: Altamira Press.

Toft, A. (2014). Re-imagining bisexuality and Christianity: the negotiation of Christianity in the lives of bisexual women and men. *Sexualities*, 17 (5-6), 546–564.

Trammell, J.Y. (2015). "Homosexuality is bad for me": an analysis of homosexual Christian testimonies in Christianity Today Magazine, *Journal of Media and Religion*, 14 (1), 1-15.

White, D. & White O.K. Jr. (2004). Queer Christian confessions: spiritual autobiographies of gay Christians. *Culture and Religion*, 5 (2), 203-217.

Wilcox, M.M. (2002b). When Sheila's a lesbian: religious individualism among lesbian, gay, bisexual, and transgender Christians. *Sociology of Religion*, 63 (4), 497-513.

Wilcox, M.M. (2003). *Coming out in Christianity: religion, identity and community.* Indiana: Indiana University Press.

Wilcox, M.M. (2009). *Queer women and religious individualism*. Indiana, Indiana University Press.

Wolkomir, M. (2001). Emotion work, commitment, and the authentication of the self: the case of gay and ex-gay Christian support groups. *Journal of Contemporary Ethnography*, 30 (3), 305-334.

Wood, M. (2007). *Possession, power and the New Age: ambiguities of authority in neoliberal societies*. Surrey: Ashgate.

Yip, A.K.T. (1997a). Attacking the attacker: gay Christians talk back, *The British Journal of Sociology,* 48 (1), 113-127.

Yip, A.K.T. (1997b). Dare to differ: gay and lesbian Catholics' assessment of official Catholic positions on sexuality, *Sociology of Religion*, 58 (2), 165-180.

Yip, A.K.T. (1997c). *Gay male Christian couples: life stories.* New York: Praeger.

Yip, A.K.T. (2002). The persistence of faith among nonheterosexual Christians: evidence for the neosecularization thesis of religious transformation, *Journal for the Scientific Study of Religion*, 41 (2), 199-212.

Yip, A.K.T. (2005). Queering religious texts: an exploration of British non-heterosexual Christians' and Muslims' strategy of constructing sexuality affirming hermeneutics, *Sociology*, 39 (1), 47-65.

Yip, A.K.T. & Page, S.-J. (2013). *Religious and sexual identities: a multi-faith exploration of young adults*. Surrey: Ashgate.

Bio-note

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In-Neoloġiżmi fil-Malti:
Il-Lingwa bħala Għodda Mingħajr Fruntieri
Neologisms in Maltese:
Language as a Tool without Barriers

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Abstract

This study focuses on neologisms in Maltese whose diverse word formation strategies, namely the root-and-pattern morphology and concatenative morphology, offer wide possibilities for analysis. In short, the term neologisms refers to newly coined words in a language (Kilgarriff 2008). Neologisms in English include *lactivist* (n.) and *mansplain* (v.) whilst neologisms in Maltese include *stessu* 'selfie' (n.) and *kejkina* 'cupcake' (n.). The linguistic mechanisms through which these neologisms are created are numerous and give way for the language to grow and to adapt over time. In fact, on one hand, there are arguments for neologisms and their full potential in breaking language barriers, but on the other there are arguments claiming that neologisms are imposed and ephemeral. Examples from everyday life and from the different types of neologisms are explained and the productive mechanisms through which they are created in Maltese are brought to light. The MLRS Corpus also provides numerous examples for this study. Therefore, through this study I will address: (i) the definitions of neologisms and their applicability in Maltese; (ii) the mechanisms through which neologisms are formed; (iii) the relevance of neologisms in widening our vocabulary.

Keywords: neologisms, nonce, morphology, Maltese, productivity

Daħla

In-neoloġiżmi huma s-suġġett ta' diversi dibattiti li jirriflettu l-potenzjal tal-lingwa. Il-lingwa nnifisha ttina diversi għodod li permezz tagħhom niffurmaw u nagħġnu l-kliem. B'dawn l-għodod f'idejna, nesperimentaw biex konxjament jew inkoxjament inwessgħu, fost l-oħrajn, il-vokabolarju tal-istess lingwa.

Fil-qalba tal-proċess tal-ħolqien tal-kliem hemm l-att fundamentali tat-tismija u l-mod li bih nirreferu għall-oġġetti li jeżistu madwarna (Saussure, 1916, pp.111-117). Il-bniedem iħoss il-ħtieġa li jagħti isem lill-oġġetti ta' madwaru, li jidentifika l-istess

oġġetti permezz ta' isem. Meta jsib oġġett ġdid jeħtieġlu jsib ukoll isem ġdid għalih. Meta ma jsibx isem li jaqdih, jirrikorri għall-ħażna ta' mekkaniżmi li hu familjari magħha u bi ftit kreattività lingwistika joħloq il-ġdid; iħaddem l-għodod li għandu disponibbli għalih fi proċess li jurina kemm il-lingwa hi tassew għodda mingħajr fruntieri.

X'inhuma n-neoloġiżmi?

Fi ftit kliem, it-terminu 'neoloġiżmu' jirreferi għal kliem ġdid f'lingwa, ngħidu aħna *lactivist* (n.), *mansplain* (v.), u *tomgirl* (n). fl-Ingliż u *stessu* (n.), *titmazzaz* (v). u *kejkina* (n.) fil-Malti. Madankollu, insibu diversi definizzjonijiet ta' xejra lessikali, morfoloġijka jew semantika għal dan l-istess terminu. Neoloġiżmu jista' jkun ukoll kelma li ma tkunx ilha li daħlet f'lingwa jew kelma li bdiet tintuża b'tifsira ġdida, ngħidu aħna fil-Malti *plattin* kienet tirreferi għal platt żgħir li tiekol minnu iżda maż-żmien il-kelma *plattin* ħadet ukoll it-tifsira ta' platt żgħir li jisparaw fuqu. Skont Akmajian et al (2010), f'sens dejjaq, in-neoloġiżmu huwa kelma li għadha kemm tiżdied f'lingwa, filwaqt li definizzjoni iktar wiesgħa ta' neoloġiżmu hija kelma li għaddiet minn bidliet fit-tifsira (p.591). Cabré (1999) tgħid li n-neoloġiżmu jista' jkun kelma li ilha li feġġet, kelma li għadha ma daħlitx fid-dizzjunarju, kelma li jkollha instabilità formali jew instabilità semantika, u kelma li l-kelliema jqisuha ġdida (p.205).

Hemm min jissuġġerixxi li kliem missellef mit-Taljan u mill-Ingliż bħal *assessjar* u *ħuliganiżmu* u l-kliem misluf dirett miktub b'ortografija Maltija (ara *Frejp* ta' Clare Azzopardi) jew Taljana u Ingliża bħal *snapshots* u *waiter* (ara *Ulied in-Nanna Venut fl-Amerka* ta' Juann Mamo) huma neoloġiżmi wkoll. Cachia (1978) jagħmel referenza għal traduzzjonijiet litterali li jiksbu tifsira ġdida fil-Malti bħal *dgħajsa tal-ġiri* għal *speedboat* jew *imħażen tal-friża* għal *cold stores* (p.82).

Dawn it-traduzzjonijiet ifakkruna fil-kalki li jirreferu għal tip ta' self li fih il-kostitwenti morfermiċi tal-lingwa sors jiġu tradotti kelma b'kelma b'mod li jinħolqu morfemi ekwivalenti fil-lingwa mira (Crystal, 2008: p.329). Crystal jagħti l-eżempju *Superman* fl-Ingliż minn *Übermensch* fil-Ġermaniż. Fil-każ tal-Malti, nistgħu nsemmu eżempji bħal *ħasil il-moħħ* għal *brainwashing* u *qamar il-għasel* għal *honeymoon*.

B'differenza minn dan il-kliem ġdid li jaqbad mal-kelliema u jidħol parti mill-vokabolarju ta' kuljum, insibu l-kliem nonce. Cystal jiddeskrivi dal-kliem bħala "a linguistic form which a speaker consciously invents or accidentally uses on a single occasion.**" (Crystal, 2008, p.329) Il-letteratura, speċjalment il-kitba għat-tfal, toffrielna minjiera ta' eżempji. Biżżejjed inħarsu lejn *The BFG* ta' Roald Dahl li fih jippreżentalna sfida ġdida permezz tal-kliem li nagħmlu sens minnu għax fost l-oħrajn (i) jikkonforma ma' tlaqqigħat fonoloġiċi possibbli fl-Ingliż, u (ii) iħaddem suffissi eżistenti li jirrispettaw it-temp u l-klassi lessikali (Eggins, 2004, [p.27-28). Skont Crystal, jekk il-kelma taqbad, inkunu nistgħu nirreferu għaliha bħala neoloġiżmu.

Filwaqt li nżommu f'moħħna din il-varjetà ta' termini u definizzjonijiet, f'din il-

kitba se nkun qed nirreferi primarjament għan-neoloġiżmi fis-sens dejjaq tagħhom, jiġifieri kliem maħluq ġdid f'lingwa, mingħajr ma neskludi xi eżempji nonce.

Iż-żmien, xi rwol jilgħab?

Fuq naħa nsibu min jinkoraġġixxi l-ħolqien tan-neoloġiżmi u jisfrutta l-potenzjal tagħhom, u fuq in-naħa l-oħra, insibu min jargumenta li n-neoloġiżmi huma effimeri u imponuti mil-lessikografi (Hitchings, 2011). Mhux l-ewwel darba li nsibu min jargumenta li n-neoloġiżmi maħluqa għalxejn u jipproponi li nqajmu kliem li miet (Sammut, 2012, p.9). Fil-qalba ta' dan kollu hemm iż-żmien u għalhekk wieħed jistaqsi: Kemm irid jgħaddi żmien biex kelma tibda tissejjaħ neoloġiżmu? Kemm irid jgħaddi żmien biex kelma ma tibqax tissejjaħ hekk u tidħol bħala parti mill-vokabolarju tal-lingwa?

Fi kliem Żahra (2013), hu u jikkummenta fuq in-neoloġiżmi fix-xogħol ta' Mamo, "minħabba fil-ħtieġa ta' aġġornament kontinwu minn lingwa li hija ħajja, dejjem se jkun hemm kliem li meta jiġi meqjus dijokratikament u sinkrotikament, se jkun ikkunsidrat bħala kliem li ma jkunx ilu li daħal u li sar parti mill-bqija tal-kliem użat u drat mill-kelliema." (p.46) Il-kriterju taż-żmien huwa essenzjali daqskemm hu relattiv fl-aċċettazzjoni tagħna ta' kelma u t-tħaddim tagħha. Bħalma tgħallimna l-istorja, għall-ewwel, kelma aktarx li ssib reżistenza, iżda maż-żmien tindara u ssir parti mill-vokabolarju tagħna, bħalma ġara bil-kelma *tisliba*.

Hawnhekk qed nipproponi din it-tabella li tgħinna nħarsu lejn il-proċess li bih kelma tiġi aċċettata f'lingwa. Naturalment, iż-żmien preċiż huwa relattiv skont il-bżonn li hemm għal din il-kelma (ngħidu aħna, *ewro*) u l-frekwenza tal-użu (ngħidu aħna, *ittre* u *borrinu*), fost l-oħrajn.

Tabella nru 1

Bla dubju, li kelma tkun inkluża fid-dizzjunarju tgħin fl-aċċettabilità tagħha. Kelma tiġi inkluża f'dizzjunarju għax tkun qed tintuża mill-kelliema, u aktarx li tintuża iktar għax wieħed isibha f'dizzjunarju. Naturalment, f'lingwi b'iktar riżorsi minn tagħna dan il-proċess huwa iktar iffaċilitat. L-Oxford English Dictionary (2018) jaġġornaw id-dizzjunarju minn żmien għal żmien. L-aħħar żieda iktar minn 900 kelma u tifsira saret f'Ġunju 2018.

Minkejja li d-dizzjunarju mhux l-uniku kejl tal-kliem, żgur illi jagħti status lill-kliem u aċċettabilità formali u jgħin biex iż-żmien li fih tiġi aċċettata u użata l-kelma,

jitnaqqas. Li kelma tibda tieħu forom oħrajn (ngħidu aħna, verb li jibda jiġu konjugat jew jiġu derivati minnu lessemi oħrajn) huwa prova oħra li l-kelma tkun qabdet u daħlet bħala parti mill-vokabolarju tal-lingwa.

In-neoloġiżmi fil-Malti

Il-grammatiki tagħna ma jikkummentawx wisq fuq in-neoloġiżmi. Hawnhekk nikkwota biss *Iż-Żieda mat-Tagħrif fuq il-Lingwa Maltija* (1984). F'din iż-żieda nsibu referenza għan-"Neoloġiżmi Anglo-Sassoni u Rumanzi fil-Malti" u l-ortografija tagħhom. Jingħad li:

> Il-Malti, bħall-ilsna ħajjin kollha, issellef u għadu jissellef kliem l-aktar minn dawk lilsna li jiġi f'kuntatt magħhom kulturalment, soċjalment, ekonomikament u kummerċjalment. Id-dħul ta' kliem barrani li l-poplu jħoss il-bżonn tiegħu jġedded u jqawwi l-ilsien Malti, għalkemm il-Malti jibqa' fundamentalment ilsien Semitiku. Ħafna mill-kliem misssellef jingħata bixra fonetika, morfoloġika u grammatikali Maltin. Kliem ieħor, li jkun x'aktarx ġdid, ikun irid iż-żmien biex joqgħod u jaddatta ruħu għall-Malti.

Għaldaqstant, hawnhekk b'neoloġiżmu qed jinftiehem kliem li dieħel minn lingwa oħra u mhux kliem maħluq ġdid fl-istess lingwa. Fil-fatt, *Iż-Żieda mat-Tagħrif fuq il-Lingwa Maltija* tkompli billi tagħti gwida dwar kif għandu jinkiteb dan il-kliem.

Il-mekkaniżmi li bihom noħolqu n-neoloġiżmi

Il-mekkaniżmi li bihom noħolqu n-neoloġiżmi (qabelxejn verbi, nomi, aġġettivi iżda wkoll partijiet oħra tad-diskors) f'diversi lingwi (ara Akmajian et al. (2010) u Lieber (2005)) huma varji. Primarjament nagħmel referenza għall-Ingliż għax insibu l-istess kliem f'lingwi oħra Indo-Ewropej kif ukoll għaliex hija t-tieni lingwa tagħna u għandna aċċess ikbar għaliha.

Il-mekkaniżmi ewlenin li bihom noħolqu kliem ġdid huma: (i) il-kompożizzjoni bħal *kartanzjan* u *qawsalla*; eżempji interessanti oħra nsibuhom fir-rumanz *It-Tawmaturgu ta' Mark-Anthony Fenech* fosthom *spazjuplan* (vettura tal-ajru u spazjali) u *sitarra* (strument mużikali magħmul minn sitar u kitarra), (ii) it-tqarwiż bħal *dott* għal *dottore* u *microwave* għal *microwave oven*, (iii) il-blending bħal *smog* magħmula minn *smoke* u *fog* u iktar riċenti *brexit* magħmula minn *British* u *exit* (Fontaine, 2017), (iv) il-formazzjoni warranija bħal *surreali* minn *surrealiżmu*, u (v) l-akronimu bħal *NATO* għal *North Atlantic Treaty Organization*.

Is-sitwazzjoni tal-Malti hija kemxejn partikolari għax filwaqt li l-potenzjal għal kliem ġdid, teoretikament huwa fertili doppjament minħabba s-sistema konkatenattiva u s-sistema mhux konkatenattiva li jħaddem, ir-rata li biha noħolqu kliem ġdid fuq naħa, u r-reżistenza fost il-poplu u l-mezzi li bihom niffaċilitaw li jaqbad dan il-kliem fuq naħa oħra, mhumiex iwieżnu lil xulxin.

Is-sistema mhux konkatenattiva

F'*The Producticty of Arabic in Maltese* (1995) Mifsud jistqarr li "it is all too evident that the productivity of the Arabic morphological mechanism in Maltese is very limited and shows signs of further decline" (p.158). Fost il-kliem imnissel minn għeruq Semitiċi jew zkuk Romanzi nsibu *dinji* minn *dinja*, *kelliemi* minn *kellem*, u *mleħħen* minn *leħen*. Minħbba l-forma templatika li hu ffurmat biha dal-kliem, u allura sistema xi ftit jew wisq restriġġenti, ftit li xejn baqa' jinħoloq kliem li jifforma parti minn din is-sistema. Naturalment, eżempji bħal *tellgħar* minn *tella'* (għerq u forma Għarbi u zokk Rumanz) joħolqu interess kbir u jkomplu juruna kemm il-lingwa, jew aħjar il-lingwi, m'għandhomx fruntieri.

Cachia (1978), f'*Contemporary Jouralistic Maltese* jagħmel referenza għal *tisħib* li ġiet iffurmata mill-għerq SNB bl-idea ġenerali ta' sħubija, iżda b'sens ġdid, ta' sħubija politika. (p.81) Eżempju interessanti ieħor hu *tpinġija*, mhux biss għax kelma li ġejja mit-Taljan qagħdet għall-forom morfoloġiċi Għarab (Ellul, 2016: p.141), iżda wkoll għax hija kelma li maż-żmien akkwistat tifsira ġdida, dik ta' tatwaġġ (ara Żahra, 2013, p.49, u Zammit, 2016).

Is-sistema konkatenattiva

Is-sistema konkatenattiva tippermetti iktar flessibiltà. Huwa iktar faċli għall-kelliema li jżidu tarf ma' zokk stabbilit u b'hekk jagħtu tifsira ġdida liz-zokk. Din it-tendenza hija l-fenomenu tal-istabbilizzazzjoni taz-zokk li mhu xejn ġdid għall-Malti; tant illi kif jgħid Mifsud (1995) "fil-Malti Semitiku nnifsu hemm sforz biex jiġu stabbilizzat iz-zokk" (p.159). Jagħmel referenza għal numru ta' mekkaniżmi mill-Għarbi li llum ma tantx għadna nħaddmuhom, ħlief għall-konjugazzjoni li kif jgħid "While verbal derivation is limited to Arabic and Arabicised verbs, verbal inflexion has succeeded in extending it's productivity to all loan verbs" (p.154) kif anke jidher fi kliem maħluq dan l-aħħar bħal *tissajfaġġja* u *tistessja*. Dwar dan, Cachia (1978) jgħid li "verbs of this sort coined on English nouns by means of the ending *-ja*, are also very common" (p.84) u jagħti l-eżempju *strajka.* F'"The language of young people and language change in Maltese" Fabri (2011) jikkwota lil Barbara u Scicluna (2002: p.42) u jagħti l-eżempji *tiffrikja, tinnerdja, tifflertja* u *tiffrenċja*.

F'"Influwenzi fuq il-Malti: Sa fejn għandna naslu?", Mifsud (2000) iżid li

għalkemm l-Ingliż min-natura tiegħu kellu jintegra mal-bażi Għarbija tal-Malti wisq aħjar mit-Taljan, dan fil-fatt ma seħħx. Il-mkkaniżmu tat-tnissil ma kienx għadu produttuv u l-Malti, sa minn qabel il-miġja ta-Ingliżi, kien żviluppa toroq oħra eħfef għall-integrazzjoni tal-kleim misseflef. Imma daw kienu toroq li jixbhu wisq iktar lis-sistema tal-lingwi Ewropej, biz-zokk u l-affissi, milli lis-sistema nattiva tal-Malti stess, bil-għerq u l-forom miksura. (p.63)

Mifsud (1995) jirreferi għas-suffissi mit-Taljan li jrendu nom tal-aġent. Jispjega kif ix-xogħlijiet saru iktar teknici, u allura n-nomi u l-mekkaniżmi li bihom jinħoloq in-nom tal-aġent bdew jiġu importati mit-Taljan (p.155). Isemmi s-suffissi *-ar, -atur, -ur, -ant, -ist(a)* fi kliem bħal *arġentier*, *induratur*, *awtur kantant* u *bandista*. Dawn is-suffissi għadhom produttivi sal-lum il-ġurnata fi kliem bħal *salottier*, *logħoburist* u *nisatur* (ara Appendiċi 1).

Ħarsa lejn Appendiċi 1 turina lista ta' kliem maħluq fl-aħħar snin u primarjament mibni permezz tal-morfoloġija konkatenattiva. Xi kliem f'din il-lista ġie ffurmat fil-kuntest ta' logħob bil-kliem iżda xorta waħda jurina kemm il-lingwa għandha l-potenzjal li toħloq, tant li xi kliem minn dan, skont l-MLRS (Maltese Language Resource Server), diġà qed jitħaddem minn nies.

Mifsud (1995) jindika wkoll it-tħaddim tan-nom mimmat, speċjalment fejn jidħol in-nom tal-post. In-nom mimmat baqa' jitħaddem ma' kliem ieħor u joħloq kliem ġdid. Fil-fatt, Mifsud jagħmel refernza għal numru ta' neoloġiżmi b'għeruq Għarab li nħolqu matul is-snin permezz ta' dan il-mekkaniżmu fosthom *Mylsen* (ta' Vassallo) u l-*Miklem* (ta' Serracino-Inglott) u anke l-kelma *mitjar*. Fil-fatt, interessanti kif xi drabi, ċerti puristi joħolqu kliem ġdid ibbażat fuq mekkaniżmi Għarab meta jkollna kelma eżistenti, kif ġara b'*għalliema* li daħlet wara l-kelma *teacher*.

Mifsud jagħmel referenza għan-nomi tal-post li jħaddmu suffiss Taljan u dawn jgħid li huma produttivi bħal *spiżerija*, *biljetterija* u *birrerija* li kollha jħaddmu s-suffiss *-(er)ija*. Fil-fatt, dan is-suffiss għadu produttiv sal-lum u narawh f'eżempji bħal *pulpetterija* u *ftajjarija*. Kien hemm żmien li fih anke l-Kunsill Nazzjonali tal-Ilsien Malta inkoraġġixxa l-ħolqien ta' kliem ġdid Malti bħal *fenkerija*. Interessanti wkoll l-eżempju *snackeria* fejn din id-darba għandna zokk Ingliż li miegħu ngħaqad suffiss Taljan (ara Appendiċi 1).

Suffissi oħra li jeħtieġu l-attenzjoni tagħna huma *-aġni* kif imsemmi minn Fabri (2011) b'eżempji bħal *inkazzaġni*, *blasensaġni*, *vojtaġni* u *ksuħaġni* u *-izza* f'eżempji bħal *brikkunizza* u *mqarbizza*. Fabri jsemmi wkoll *-ata* bl-eżempji *żiblata* u *miġnunata* (pp.20-21). Ma' dawn nistgħu nsemmu eżmpji iktar riċenti li proprju juru kemm dawn is-suffissi għadhom produttivi bħal *bjondata, fruttata* u *bebbuxata*. Interessanti l-eżempju *każinata* li ntuża għall-ewwel darba minn għaqda studenteska u minn dak iż-żmien 'l hawn diversi għaqdiet studenteski u għaqdiet oħrajn addottaw u ħaddmu dan l-isem (ara Appendiċi 1).

In-neoloġiżmi f'kuntest

L-aħjar mod li bih niġġudikaw kelma huwa l-kuntest. Cachia (1978) fil-fatt jikkummenta fuq ir-rikostruzzjonijiet morfoloġiċi b'għeruq jew zkuk antiki jew ġodda u kif dawn iseħħu fil-gazzetti u iktar minn hekk, fil-lingwa letterarja (p.84). Kelma ġdida użata fil-gazzetta jew f'rumanz tirrifletti l-kreattività tal-awturi u tixpruna t-tħaddim ta' lessiku ġdid.

Fil-gazzetti

F'"Influwenzi fuq il-Malti: Sa fejn għandna naslu?", Mifsud (2000) jikkummenta li bit-tajjeb u l-ħażin kollu, il-lingwa qiegħda f'idejn il-ġurnalisti (p.55). Ryding (2005) tikteb li

> Particular features of MSA journalistic style include more flexible word order, coinage of neologisms, and loan translations from western languages ... It is just this ability to reflect and embody change while maintaining the major grammatical conventions and standards that make journalistic Arabic in particular, a lively and widely understood form of the written language and, within the style spectrum of Arabic as a whole, a functional written standard for all Arab countries. (p.9)

Dan jurina kemm il-ġurnaliżmu jista' jkun tassew lok ta' kreattività u twessigħ tal-fruntieri tal-lingwa.

Fenech (1978), jgħid li l-modi diversi li bihom jinħoloq kliem ġdid fil-gazzetti huma innovazzjonijiet semantiċi, innovazzjonijiet morfoloġiċi, kliem misluf addattat għall-Malti u kliem misluf li ma jinbidilx (p.80). Huwa jikteb kif bil-kelma *ħatfa* nifhmu *a snatch* imma permezz ta' speċjalizzazzjoni tat-tifsira, fil-gazzetti saret tintuża bit-tifsira ta' *kidnapping* (p.81). Iżid li numru ta' neoloġiżmi huma nomi verbali ffurmati permezz tal-prefiss t- u ħafna drabi jfissru ideat astratti bħal *tkomplija* li tfisser *completion* jew *furtherance* (p.85; ara wkoll Ellul, 2016, p.88), u *xbubija* minn *xebba* (Cachia, 1978, p. 85).

Fil-letteratura

Fil-letteratura, il-liċenzja poetika u l-kreattività lingwistika jieħdu prijorità. Hemm enfasi fuq x'qed jingħad, iżda l-iktar fuq kif qed jingħad. Il-letteratura tgħallimna nkunu kreattivi lingwistikament; tgħallimna nkissru l-fruntieri biex noħolqu l-ġdid u kif dak il-ġdid, għax iħaddem nozzjonijiet li aħna familjari magħhom, jinftiehem xorta waħda.

Cixous (2014) tgħid "... we are well aware that one knows how to fabricate neologisms; when there is a need for them, they come! As for their codification

… usage decides." (p.58) Il-kitbiet letterarji stess joħolqu l-bżonn ta' ċerti kliem. Li l-awturi joħolqu kliem ġdid biex jesprimu kunċetti li ma jsibux kliem għalihom, imur id f'id mad-dixxipplina li qed iħaddmu, u allura din insibuha minn dejjem. Eżempju ta' dan fil-letteratura tagħna huwa r-rumanz *Ulied in-Nanna Venut fl-Amerka* ta' Juann Mamo li jippreżentalna numru ta' neoloġiżmi.

Kif jirrimarka Żahra (2013), Mamo jħaddem tlieta mill-mekkaniżmi li semmejna iktar 'il fuq biex joħloq in-neoloġiżmi, jiġifieri (i) kliem missellef direttament mill-Ingliż jew it-Taljan; (ii) il-ħolqien ta' derivattivi minn zkuk Rumanzi u Ingliżi jew għeruq Semitiċi u (iii) binjiet komposti (p. 47).

M'hemmx dubju li Mamo kien kreattiv ħafna fl-użu tiegħu tal-lingwa, u xejn ma qagħad lura milli jħaddem l-għodod li kienu disponibbli għalih. Ngħidu aħna, Mamo jibdel il-kunjomijiet f'aġġettivi permezz tas-suffiss *-jan*, ngħidu aħna *Stricklondjon*. Xi drabi l-ismijiet sħaħ jew il-kunjomijiet jagħtihom plural sħiħ, ngħidu aħna minn *Girgor* joħloq *Ghirgorijet*, *Sacco* joħloq *Sakkijiet*. Kif jirrimarka Cachia f'*Contemporary Journalistic Maltese* (1978), "The words l-isperparts and l-iskajġakers could undergo another modification in assimilating themselves to Maltese by replacing the English plural in *-s* by the Maltese plural *-ijiet*, so that they would read l-isperpartijiet and l-iskajgakerijiet. The trend of making such replacements is gaining ground both the journalistic language, and in spoken and literary Maltese" (p.29). Din fil-fatt tagħmilha wkoll Clare Azzopardi fis-sensiela ta' kotba ta' Jake Cassar meta tuża l-kunjom *Pakrazjijiet*.

Mamo juża wkoll għeruq Semitiċi stabbiliti biex joħloq kliem ġdid, ngħidu aħna *nixxiefa* minn *nixef*, *mikrijin* minn *kera*, u *mħasses* minn *ħass*; juża zkuk Rumanzi stabbiliti biex joħloq kliem ġdid bħal *jiffowkussja* minn *fokus* u zkuk Ingliżi stabbiliti biex joħloq kliem ġdid bħal *jibboksja* minn *boks* u *jiddrinkja* minn *drink*.

Fil-każ tal-kwadrilitteri, Mifsud jikteb li l-proċess li bih niffurmaw il-kwadrilitteri m'għadux jiġi mħaddem mill-poplu, "tant li dawk il-ftit verbi kwadrilitteri sħaħ iffurmati riċentement b'dan il-proċess jinstabu l-aktar fil-letteratura" (Ellul 17). Hawnhekk ta' min ninnutaw l-użu tal-verb *iqanpnu* fil-poeżija "Assedju- Stil 1967" ta' Mario Azzopardi:

> fuq kull kampnar il-landi mtaqqba
> tat-tradizzjoni jqanpnu
> l-assedju tal-elfdisamija

Il-kreattività lingwistika tifjorixxi fejn tidħol il-kitba għat-tfal. Azzopardi, fis-sensiela ta' Jake Cassar tuża s-sigular *serk* u l-plural *sriek* li jirreferu għal kreaturi koroh u kattivi; qishom boċoċ żgħar suwed, ħodor, bla jdejn u bla saqajn, ħalqhom mimli snien bil-ponta; iħobbu jieklu l-Kantofonis. Il-*Kantofonis* ukoll hija kelma li tivvinta Azzopardi (għal oġġett li ħolqot hi stess) fl-istess sensiela u biha tirreferi għal pjanta li tikber biss fir-Renju Unit u kull darba li jikluha jew jixorbuha l-Uditi jintunaw il-vuċi tagħhom. Azzopardi tagħti wkoll tifsira ġdid li kliem li diġà jeżisti.

Il-kelma *karrottu* fil-ktieb *Mingu* mhix ħaxix jew kif tintuża fl-MLRS bħala oġġett li jattira lil xi ħadd, imma mnieħer twil (u xi ftit mgħawweġ ukoll).

Xi ħaġa ta' spiss fil-poeżija, hija l-innovazzjoni morfoloġika li permezz tagħha jinħoloq diskors ġdid li jiddefamiljarizzana minn norma. Din xi ħaġa li jagħmilha ħafna Glen Calleja f'*eki t'eki* (2012) u f'*kull flgaħaxija kif mal-għabex tnin u tmut saħħet il-jum* (2016). Hawnhekk se nillimita biss il-kummenti tiegħi fuq parti mill-poeżija "tini. sib. trid. dawwal. armi." (2014) Din hija silta mill-poeżija.

> iii.
> trid tibda mawrietek fis-salott tar-Reġim
> trid tagħraf, b'xagħrek quddiem għajnejk,
> xi jfissru ċerta tkaken u t-toqol tal-pass
> fejn u kif u għal min jaqgħa w jieqaf u xi jħalli wara dahru
> trid titgħallem taqra l-isdra immedaljati
> trid tmissilhom biżlejhom imqajjma minn fuq il-flokk
> biex jiftħu kamra kliem protett
> trid tmiss l-ilma u sselġu u toħloq gżejjer t'ambjent naturali pristin
> safi, dik il-kelma li ridt

> v.
> armi l-lukanda fejn morna 'l bogħod
> u ġejna lura iktar televiżivi minn qatt qabel
> armi l-gallarija mnejn ġibdu x-xena ta' ħbiberija
> armi s-sular sħiħ u l-prekawzjonijiet
> arm'imla l-kennierji tal-iMdini bil-pjanijiet tiegħek
> tiegħi magħmulin biex jorqdu w ma jqumux

> armi mill-inqas tliet ġenerazzjonijiet ta' kpiepel t'għajnejn
> wara l-kafè ta' filgħodu f'kolazzjon kollettiv
> armi l-irkoppa titriegħed nervuża taħt il-mejda
> armi l-*ma-rridx* tas-sħab imdendel dalgħodu, jew
> raxxet ftit fl-aħħar?

Hawnhekk ninnutaw diversi innovazzjonijiet morfoloġiċi fosthom is-suffiss pronominali (possessiv) *-ek* f'*mawrietek* li ġeneralment jingħaqad ma' nomi li huma qrib tagħna (bħal *id*, *saqajn* u *dar*). Calleja qed jgħaqqadu man-nom verbali tal-unità *mawra*. Iħaddem ukoll il-plural miksur f'*isdra*; bħalma minn *seqer* nagħmlu *isqra*, minn *sider* jagħmel *isdra*. Għalkemm mhux strettament neoloġiżmu, *isdra* jintuża l-iktar fil-kuntest ta' "isdra tat-tiġieġ" u għalhekk qiegħed jużah b'mod ġdid. Ftit huma l-bliet jew l-irħula li huma plural (bħall-*Imrieħel*); hawnehekk l-iktar plural popolari fil-Malti, *-i*, jużah ma' isem ta' belt biex joħloq l-*iMdini*. Jieħu spunt ukoll mill-kliem u joħolqu mill-ġdid f'kategorija grammatikali oħra: minn nom *medalja* jagħmel il-partiċipju passiv *immedaljati* u minn nom *silġ* joħroġ il-verb *isselġu*.

Walid Nabhan ukoll għandu ħila kbira fit-tħaddim tal-lingwa b'mod innovattiv. Ta' min ngħidu li Walid kelliem nattiv tal-Għarbi u allura għandu aċċess ikbar għall-mekkaniżmi Semitiċi. Nirreferi għal diversi eżempji mill-ktieb *Fi Triqti Lejha* (2014)*.* Bħal Calleja juża s-suffiss pronominali (possessiv) ma' nomi li mhux soltu jieħdu dan is-suffiss fit-tieni persuna bħal *nuqqasek*, *ħalibek*, *lariġġatek*, *liżarek* u *takkuntek*, u fl-ewwel persuna bħal *żarbuni*, *melħi*, *għajjati* u *tebuti*. Ċarament, il-morfoloġija konkatenattiva tiffaċilita l-ħolqien ta' kliem ġdid jew kliem użat b'mod ġdid u fil-fatt Nabhan juża l-plural *-ijiet* biex irendi plural il-kliem li mhux soltu nużawh fil-plural bħal *dejavuwijiet*, *imniħrijiet* u *ekujiet*. Joħroġ ukoll kliem minn kliem ieħor bħal *friskezza* (n.) minn *frisk* (n). u *twerraq* (v.) minn *weraq* (n.). Xi drabi l-kliem iżomm l-istess kategorija grammatikali u xi drabi jibdilha (ara wkoll diversi studji fl-Ingliż dwar kliem bħal *Google* u *fabulous*, fosthom Harbeck, 2014 u Kilgarriff, 2010).

Jekk hemm qasam li ftit li xejn għadu esplorat fil-Malti, huwa dak tal-fantaxjenza u allura jista' jonqos li min se jikteb dan il-ġeneru, fosthom John Bonello, irid isib kliem ġdid. Iżda ktieb li żgur qabeż il-fruntieri huwa *It-Tawmaturgu* ta' Mark-Anthony Fenech. F'dan il-ktieb, insibu numru ta' neoloġiżmi, xi wħud ivvintati kompletament u m'għadhom ebda rabta mat-tifsira tagħhom bħal *apoljos* (l-aktar punt 'il bogħod ta' korp spazjali – pjaneta, qamar jew asterojde – mix-xemx); oħrajn imsejsa fuq mekkaiżmi mħaddmin diġà bħal *attwaturi* (muturi żgħar misjuba fil-ġonot tal-armatura li jtejbu l-moviment tal-bniedem) u *telepatista* (persuna mħarrġa fl-użu tat-telepatija). Xi wħud mill-kliem li joħloq iżid tifsira ma' dik eżistenti bħal *bastimenti/ imrmiekeb spazjali* (bastiment li jivjaġġa fl-ispazju u li minħabba t-tunnellaġġ tiegħu ma jistax jidħol fl-atmosfera ta' pjaneta jew jersaq wisq qrib korp spazjali minħabba l-ġibda tal-gravità) jew jispjega lilu nnifsu bħal *fjammatur/i* (arma li tispara ġett twil ta' nar). Interessanti r-ritorn għal tifsiriet bażiċi bħal *Mulej* li ġejja minn Mula(j). F'*Il-Malti* nsibu li "Mula tfisser raġel għani, għandu ħafna ġid. Minħabba fit-tifsira, il-kelma mula saret kelma ta' ġieħ li nagħtu lill-kbarat." (p.53) Maż-żmien ħadet tifsira speċifika fil-kuntest reliġjuż iżda hawnhekk Fenech qed jużaha fis-sens oriġinali tagħha, jiġifieri kmandant venerabbli, ġeneralment terminu użat għall-kunsill tal-kmandanti veterani tal-flotta spazjali.

Kif qed naraw, il-letteratura toffrielna minjiera ta' ġdid; jekk hemm lok fejn noħolqu l-ġdid huwa proprju fil-letteratura. Permezz tal-innovazzjonijiet morfoloġiċi nitbiegħdu mid-diskors ta' kuljum. Dan ma jfissirx li kull kelma li tinħoloq se taqbad, iżda hemm il-potenzjal, u fruntieri, m'hemmx.

In-neoloġiżmi bħala għodda mingħajr fruntieri

1. Din il-ktiba kienet kontribuzzjoni ċkejkna li permezz tagħha xtaqt *Il-lingwa mhix għall-għażżenin*

    Il-Malti, bħal kull ilsien ieħor huwa sinjur, u jekk inħaddmu moħħna sew u

nkunu ftit kreattivi nistgħu noħorġu bi kliem ġdid. Il-lingwa tespandi kemm nespaduha.

2. *L-għodod tal-lingwa*

Sabiex lingwa tikber u tissaħħaħ, jeħtieġ li jkollha diversi għodod disponibbli għaliha. Ngħidu aħna, l-MLRS tana għodd indispensabbli li biha nistħarrġu kemm qed jaqbad il-kliem ġdid. Dizzjunarju li jkun aġġornat minn żmien għal żmien huwa imperattiv, kif rajna fil-każ tal-Oxford English Dictionary. Stħarriġ ta' familjarità fost il-kelliema nattivi jagħtina wkoll stampa iktar ċara ta' kemm il-kelliema huma konxji ta' dan il-kliem ġdid.

3. *Iż-żgħażagħ huma l-ġdid*

Kif rajna mill-kelma *każinata*, iż-żgħażagħ, friski u żgħar huma wkoll, għandhom il-kundizzjonijiet favorevoli biex inisslu kliem ġdid. B'rabta ma' dan, Fabri (2011) jikkummenta hekk:

> Young people tend to create and make use of innovative expressions and combinations in their desire to express themselves as intensely as possible. One could also speculate that they tend to be more adventurous with the use of loan expressions and forms. Some of these expressions fall prey to fashion and just become a passing fad, but others survive and spread. For this reason, "young people" can be considered one potential source of language change. (p.14)

In-natura tan-neoloġiżmi dejjem tinbidel u toħloq il-lingwa mill-ġdid. In-neoloġiżmi jgħaqqdu bażijiet u affissi minn lingwi differenti, ibiddlu t-tifsiriet u joħorġu tifsiriet ġodda. Anke l-istudji marbuta man-neoloġiżmi jimplikaw il-ġdid. Partijiet minn dan l-istudju, minn dawn u ftit snin oħra jkunu datati (bħalma jiġri warakollox f'diversi oqsma). Huwa għalhekk li rridu (aqrawha, il-kelliema nattivi) nibqgħu noħolqu l-lingwa u naċċessaw l-għodod disponibbli għalina, huwa għalhekk li l-Malti jista' jikber f'oqsma diversi u huwa għalhekk li l-lingwa hija għodda mingħajr fruntieri.

References

Akkademja tal-Malti. (2004). *Tagħrif fuq il-Kitba Maltija II.* Malta: L-Akkademja tal-Malti u Klabb Kotba Maltin.

Akmajian A. et al. (2010). *Linguistics: An Introduction to Language and Communication.* Cambridge: The MIT Press.

Aquilina, J. (1987). *Maltese English Dictionary.* Malta: Midsea.

Azzopardi, C. (2009 – 2015). *Jake Cassar.* Malta: Merlin. ---. (2015). *Mingu*. Malta: Merlin.

Cabré, M.T., trad. J.A. DeCesaris (1999): *Terminology. Theory, methods and applications*. Il-Pajjiżi l-Baxxi: John Benjamins.

Calleja, G. (2014). "tini. sib. trid. dawwal. armi." *Ex-Voto: Kitbiet.* < https://issuu.com/ryanfalzon/docs/ex_voto_kitbiet>

Cixous, H. (2014). *White Ink: Interviews on Sex, Text and Politics.* Londra: Routledge.

Crystal, D. (2008). *A Dictionary of Linguistics and Phonetics.* Is-6ᵗ ed. Oxford: Blackwell.

Eggins, S. (2004). *Introduction to Systemic Functional Linguistics.* Londra: Continuum.

Ellul, L. (2010). "Il-Verbi Kwadrilitteri fil-Malti." Teżi tal-BA. U ta' Malta. ---. "In-Nomi Verbali fil-Malti." Teżi tal-MA. Università ta' Malta.

Fabri, R. (2011). "The language of young people and language change in Maltese." *Variation and Change: The Dynamics of Maltese in Space, Time and Society*. Ed. Sandro Caruana, Ray Fabri, u Thomas Stolz. Berlin: Akademie Verlag. 89-108. *academia.edu*. < https://www.academia.edu/3101737/The_language_of_young_people_and_language_change_in_Maltese>

Fenech, M.A. (2017). *It-Tawmaturgu.* Malta: Horizons.

Fontaine, L. (2017). "The early semantics of the neologism BREXIT: a lexicogrammatical approach". *Functional Linguistics*. <https://functionallinguistics.springeropen.com/articles/10.1186/s40554-017-0040-x>

Harbeck, J. (2014). "Advertisers Trick Your Brain by Turning Adjectives into Nouns." Slate. <http://www.slate.com/blogs/lexicon_valley/2014/05/19/advertisers_trick_your_brain_by_turning_adjectives_into_nouns.html>

Hitchings, H. (2011). "Henry Hitchings on neologisms*." The Guardian*. <https://www.theguardian.com/books/2011/feb/05/henry-hitchings-neologisms>

Kilgarriff, A. (2010). "Google the verb." *Language Resources and Evaluation,* Vol. 44, No. 3: 281-290. <https://www.jstor.org/stable/40666362?seq=1#page_scan_tab_contents>

Saussure, F. (1916). *Course in General Linguistics*. New York: McGraw-Hill Book Company.

Lieber, R. (2005) "English Word-Formation Processes." *Handbook of Word-Formation*: 375-427. Pavol Štekauer u Rochelle Leiber (ed).L-Olanda: Springer Science & Business Media.

Mifsud, M. (1995). "The Productivity of Arabic in Maltese." *AIDA 2ⁿᵈ Conference Proceedings*. Ed. Clive C. Holes. Cambridge: AIDA: 151-160. ---. (2000). "L-Influwenzi fuq il-Malti: Sa Fejn Għandna Naslu?" Ilsien Qadim f'Millenju Ġdid. Malta: L-Akkademja tal-Malti.

MLRS. V3.0. (2016) Institute of Linguistics, and the Department of Intelligent Computer Systems. <http://mlrs.research.um.edu.mt>

Nabhan, W. (2014). *Fi Triqti Lejha.* Malta: Klabb Kotba Maltin.

Oxford English Dictionary. (2018). *Updates to the OED.* <https://public.oed.com/updates/>

Ryding, K.C. (2014). *Arabic: A Linguistic Introduction*. Cambridge: Cambridge UP. *Google Books.*

Sajdon, P.P. (1931). "Nisel u Tifsir il-Kliem." *Il-Malti*. Malta: L-Akkademja tal-Malti.

Sammut, M. (2012). "In-nazzjonalità taċ-ċittadin u ċ-ċittadinanza ta....-....?" *l-aċċent*, Novembru 2012: 9-14. <http://ec.europa.eu/translation/maltese/magazine/documents/issue_08_mt.pdf>

Żahra, C.J. (2013) "Il-Lingwa ta' Juann Mamo: Bejn il-Qadim, il-Popolari u l-Ġdid Fjamant." Teżi tal-BA. U ta' Malta.

Zammit, M. (2016). "It-tpinġija mill-primittiv għall-modern." *tvm.com.mt*. <https://www.tvm.com.mt/mt/news/it-tpingija-mill-primittiv-ghall-modern/>

Bio-note

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Appendiċi 1

Din il-lista ta' neoloġiżmi/kliem ġdid bl-ebda mod m'hija eżawrenti imma tiġbor fiha kliem maħluq ġdid f'dawn l-aħħar snin miġbur minn sorsi differenti u ċċekkjat għall-okkorrenzi fl-MLRS.

NEOLOĠIŻMU	TIFSIRA	SORS	AWTURI	MLRS (okkorrenzi)
andropawża (n.)	mill-Ingliż andropause; menopawża tal-irġiel	Kelma Kelma	Michael Spagnol	1
arjurant (n.)	xi ħadd injorant li lanqas il-kelma injorant ma jaf jgħid	Kelma Kelma	Michael Spagnol	2
awwissjana (n./aġġ.)	serata f'Awwissu	Kummissjoni Armar Marija Annunzjata, Ħal Tarxien		0
bebbuxata (n.)	ikla bebbux	Kunsill Lokali Siġġiewi		0
bjondata (n.)	stupidaġni	Kelma Kelma	Michael Spagnol	0
borrinu (n.)	bl-Ingliż snowman	Kelma Kelma	Michael Spagnol	3
ċattini (n.)	bħal galletti kbar u ċatti	Tal-Furnar		0
ewro (n.)	munita, bl-Ingliż euro	Il-Kunsill Nazzjonali tal-Ilsien Malti		40,305
fottifesti (n.)	bl-Ingliż killjoy; xi ħadd li jfotti l-festi, joqtol il-gost tan-nies	Kelma Kelma	Michael Spagnol	0
fruttata (n.)	Bl-Ingliż smoothie	Tikka Malti 1a	Clare Azzopardi/ Leanne Ellul	0
ftajjarija (n.)	Post li jsajjar il-ftajjar	Gululu		0
geddumu	(wiċċinu) :(	Kelma Kelma	Michael Spagnol	0
għalabibiżmu (n.)	indifferenza, meta tiġi għalabiebek; l-att li tiġi taqa' u tqum minn kollox u kulħadd	Kelma Kelma	Michael Spagnol	0
għemżu	(wiċċinu) ;)	Kelma Kelma	Michael Spagnol	0

NEOLOĠIŻMU	TIFSIRA	SORS	AWTURI	MLRS (okkorrenzi)
ilsienu	(wiċċinu) :P	Kelma Kelma	Michael Spagnol	0
ittre (n.)	ittra elettronika		Olvin Vella	12
każinata (n.)	lejla f'każin, ħin twil f'każin, ħarġa l-każin	Studenti MCAST L-Għaqda tal-Malti MŻPN MMSA Leisure SACES Każin Banda KSJC	Varji	0
kejkina (n.)	kejk żgħir; *cupcake*	Kumpanija Privata Kelma Kelma	Michael Spagnol	0
leglegin (n.)	Nies li jlegilgu	Ħanut		2
logħoburist (n.)	min jibgħat messaġġi lil sħabu biex jilagħbu fuq Facebook	Kelma Kelma	Michael Spagnol	0
movembru (n.)	*movember*; portmanteau tad-diminuttiv Awstraljan-Ingliż għal mustaċċi "mo" u "Novembru"; matul ix-xahar ta' Novembru l-irġiel ikabbru l-mustaċċi biex ikabbru l-kuxjenza dwar is-saħħa tar-raġel	Kelma Kelma	Michael Spagnol	0
neologażmu (n.)	meta jaqbdek eċitament meta toħloq kelma (neoloġiżmu) ġdida	Kelmet il-Malti	Paolo Cassar Manghi	0
nisatur (n.)	bl-Ingliż *womanizer*; xi ħadd li jġennen in-nisa warajh	Kelma Kelma	Michael Spagnol	0
nomofobija (n.)	mill-Ingliż *nomophobia*; il-biża' li tinqabad mingħajr mobile	Kelma Kelma	Michael Spagnol	2
pavaljun (n.)	*drop-down menu*			0
pulpetterija (n.)	Post li jsajjar il-pulpetti	Gululu		0

NEOLOĠIŻMU	TIFSIRA	SORS	AWTURI	MLRS (okkorrenzi)
qabżitlu	(wiċċinu) :@	Kelma Kelma	Michael Spagnol	0
ravjulata (n.)	Ikla ravjul	Sala Parrokkjali Mount Carmel Band Club Marija Reġina Marsa diversi posts fuq Facebook		24
sakrangħas (n.)	xi ħadd li jkollu ħafna ngħas u allura jkun qisu fis-sakra	Kelma Kelma	Michael Spagnol	0
salottier (n.)	min jiffrekwenta l-grupp *The Salott* fuq Facebook	Kelma Kelma	Michael Spagnol	0
sapjosesswali (aġġ.)	mill-Ingliż *sapiosexual*; persuna miġbuda sesswalment lejn l-intelliġenza ta' ħaddieħor	Kelma Kelma	Michael Spagnol	1
snackeria (n.)	post li minnu tista' tixtri snack	Ħanut		0
splodut (aġġ.)[1]	xi ħadd nofs ras	Kelma Kelma	Michael Spagnol	29
stessu (n.)	ritratt tiegħek innifsek	Kelmet il-Malti	Leli Forte	73
tawlini (n.)	stikek twal tal-ikel b'ingredjenti simili għall-galletti	Tal-Furnar		0
tbissimu	(wiċċinu) :)	Kelma Kelma	Michael Spagnol	0
tiffrejpja (v.)	kelma komposta minn *Facebook* u 'rape'; meta xi ħadd iħalli Facbook miftuħ u "jirrepjaw" il-Facebook tiegħu/tagħha	Kelma Kelma *Frape*	Michael Spagnol Clare Azzopardi	1

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1 Xi drabi, fl-MLRS tintuża bis-sens indikat hawn.

NEOLOĠIŻMU	TIFSIRA	SORS	AWTURI	MLRS (okkorrenzi)
tillajkja (v.)	tagħfas like fuq il-post ta' xi ħadd fuq Facebook	Kelma Kelma	Michael Spagnol	1
tinnerdja (v.)	min hu nerd jagħmel hekk	Kelma Kelma	Michael Spagnol	0
tinstagramma (v.)	ittella' ħafna ritratti fuq instagram	Kelma Kelma	Michael Spagnol	0
tissajfaġġja (v.)	tieħu pjaċir bis-sajf; tqatta' sajf sħiħ tagħmel affarijiet ta' gost	Kelma Kelma	Michael Spagnol	0
tistremmex (v.)	tistrieħ u tixxemmex	Kelma Kelma/Merlin Publishers/ToM	Michael Spagnol	0
titbarmel (v.)	ispirata mill-*Ice Bucket Challenge*; titfa' barmil ilma kiesaħ silġ fuq rasek	Kelma Kelma	Michael Spagnol	0
titmandar (v.)	issir mandra, ngħidu aħna jekk tixrob	Kelma Kelma	Michael Spagnol	1
titmazzaz (v.)[2]	issir mazza, jiġifieri ħelu u gustuż u jkun fik ġisem	Kelma Kelma	Michael Spagnol	
warazza (n.)	min għandu l-posterjuri attraenti	Kelma Kelma	Michael Spagnol	0
wiċċinu	stampa ta' wiċċ diġitali li jesprimi xi idea, ħsieb jew emozzjoni	Kelma Kelma	Michael Spagnol	0
xorbgażmu (n.)	is-sodisfazzjon li tieħu mix-xorb	Kelma Kelma	Michael Spagnol	0
żiblata (n.)	serata li matulha ssir żibel	Funky Monkey		0

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2   Insibu 184 okkorrenza tal-kelma *mazza* fl-MLRS. Numru ta' drabi tintuża fis-sens ta' ħelu/gustuż/ġisem.

Il caso delle "scritture gemelle": studio grafologico sulle identificazioni funzionali degli adolescenti di oggi

The Case of the "Twin Writings": a Graphological Study on the Functional Identifications of Today's Teenagers

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Abstract

According to graphology, the graphic style we choose to reproduce or personalise our writing symbolizes our identity. Graphology is the science of handwriting analysis, which can develop a psychological portrait by analysing handwritten texts. A basic step of the developmental path which leads to the formation of our own identity is adolescence. In this period, the upgrade of social contacts is important, because teenagers can build new relationships with their mates and peer group and make new identifications in addition to the ones already created inside their family unit. Those identifications can be easily observed by studying teenagers' handwriting. They can also become so meaningful that they produce "twin writings", similar handwritings which seem to be written by the same hand. Their peculiar traits will be shown in this study through examples of handwritten texts and appropriate notes. More than a mere coincidence or a will of imitation, the "twin writings" reveal a sharing of values, likings, ambitions and attitudes due to love, friendship or inclusion needs. If analysed by graphological techniques, they allow a proper understanding of a delicate and very important transition to maturity. In this life step, the borderlines of one's own identity fade to open passages to the other's presence.

Riassunto

La grafologia è quella scienza che in base a tecniche specifiche analizza la scrittura a mano di un individuo e ne ricostruisce la personalità tracciandone un profilo psicologico. Poiché la scrittura è un atto complesso strettamente legato alla struttura della psiche di una persona, essa è un elemento strettamente individuale. Vi sono tuttavia dei casi, piuttosto frequenti nel periodo dell'adolescenza, in cui il grafologo si trova a esaminare scritture appartenenti a persone differenti che si assomigliano

in modo talmente sorprendente da sembrare di essere state vergate da un'identica mano. Un fenomeno di tal genere, che risponde a determinate modalità adattive dei giovani d'oggi, richiede pertanto un'accurata indagine grafologica che ne possa svelare le ragioni profonde.

Parole chiave: grafologia, scrittura a mano, adolescenza, identificazioni funzionali
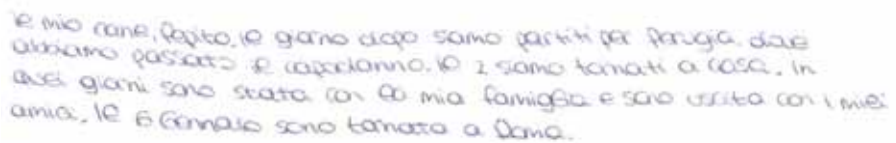
La scrittura a mano riflette la personalità di colui che scrive e pertanto essa è da considerarsi un elemento assolutamente individuale in quanto è 'il prodotto integrato dell'intera attività nervosa e cerebrale ed è legata, oltre che alle funzioni neuromuscolari, anche alla formazione corporea, mentale e psichica dello scrivente' (Crotti, Magni e Venturini, 2011, pp.109-134, 163). Lo stretto rapporto che intercorre tra il tracciato grafico di un individuo e la sua psiche è alla base della scienza della grafologia che, analizzando accuratamente la scrittura di una persona, è in grado di tracciarne il ritratto psicologico. Per tale motivo la forma grafica, così come la forza pressoria, la velocità del tracciato, il modo di collegare le lettere, il grado di inclinazione del loro asse o la gestione dello spazio, nonché la tenuta della riga, rispondendo tanto a scelte personali quanto a tendenze temperamentali ed a stati interiori, sono elementi che non possono essere facilmente modificati (Buquet, 2007, pp.11-12). Inoltre, in quanto proiezione di una personalità sia negli aspetti consapevoli che in quelli inconsci, i segni che compongono una scrittura sono sempre ben armonizzati tra loro in una 'solidarietà dinamica' che esprime naturalezza e spontaneità (Bravo, 1998, pp.111-112). Per contro, una scrittura modificata in modo volontario si presenta poco spontanea ed artefatta, in quanto lo sforzo fatto per cambiarla introduce nel tracciato grafico inequivocabili segni di innaturalezza. Tralasciando l'ambito della grafologia giudiziaria, in cui il grafologo si trova a confrontare dei tracciati grafici per stabilirne l'autenticità o meno, è possibile che egli si trovi ad analizzare scritture che, pur appartenendo a persone differenti, sembrano vergate da una stessa mano e la cui somiglianza non è dovuta, in quanto scritture spontanee e naturali, ad alcun tentativo di imitazione. Per la sua singolarità il fenomeno grafico che produce "scritture gemelle" necessita, pertanto, di uno studio grafologico approfondito e rigoroso.

Prima di procedere oltre, è importante precisare che questo studio è stato condotto secondo il metodo grafologico di scuola francese (per approfondimenti in tal senso cfr. Boille, 1998; Bresard, 1988; Colo e Pinon, 2002; Crepieux-Jamin, 2001; Gille Maisani, 2000; Hegar, 1962; Pophal, 1990; Pulver, 1983; Saudek, 1982; Teillard, 2017).

Attraverso la forma del grafismo che un individuo sceglie di adottare, egli rappresenta la propria identità. Personalizzando o riproducendo le forme apprese a scuola, ornandole con tratti aggiunti o semplificandole sopprimendone i tratti secondari, infatti, si proiettano sul bianco del foglio le proprie tendenze, le scelte, i gusti e l'ambiente culturale in cui ci si è formati (Colo e Pinon, 2002, pp.117-118).

Oltre a ciò, poiché la forma grafica non è un elemento a sé stante, essa va messa in relazione con altri due elementi costitutivi di un grafismo: il movimento e la gestione dello spazio. Il movimento è quell'impulso grazie al quale il filo grafico, snodandosi lungo la linea di base, segue una traiettoria orizzontale indicata dalla linea di base e una verticale, data dagli allunghi degli occhielli superiori ed inferiori delle lettere (Colo e Pinon, 2002, pp.93-95). Esso, diversamente dalla forma, che è il riflesso della parte razionale di un essere umano, risponde alla forza dei moti istintivi. In una scrittura, inoltre, il rapporto dinamico che si crea tra le forze espresse dalla forma e da quelle del movimento ragguaglia sul rapporto che in una persona intercorre tra la necessità di esprimere i propri sentimenti e quella di definire il proprio ruolo (Guaitoli e Orlandi, 1999, pp.32-38). Il terzo elemento costitutivo è rappresentato dallo spazio del foglio bianco che simboleggia l'ambiente che circonda un individuo, lo spazio sociale in cui egli si muove, ma anche, e allo stesso tempo, lo spazio interiore che lo pone in contatto con le sue emozioni più profonde (Colo e Pinon, 2002, pp.23-60). Analizzata in quest'ottica, quindi, la scrittura a mano non può che assumere un'impronta strettamente personale.

Le caratteristiche peculiari di una scrittura si vanno a delineare non appena il modello calligrafico appreso nelle prime classi di studio viene sottoposto a partire dagli 11-12 anni a continue modificazioni che produrranno, con il passaggio all'età adulta, un grafismo personalizzato (Guaitoli e Orlandi, 1999, p.42). Questa fase, che grafologicamente viene chiamata 'fase postcalligrafica' (ibid.), coincide proprio con il periodo dell'adolescenza che rappresenta una tappa fondamentale nel percorso evolutivo di ciascun individuo verso la formazione della propria identità. In questo periodo ha grande importanza l'ampliamento del cerchio sociale, in quanto in esso l'adolescente può creare con il gruppo dei pari nuove amicizie, realizzare nuove identificazioni oltre quelle già avvenute all'interno del proprio nucleo familiare e cercare in esse quelle conferme di sé necessarie per crescere (Erikson, 1972; Erikson, 1984; Erikson, 1995). Tali identificazioni sono facilmente riscontrabili esaminando le scritture dei giovani d'oggi che, scegliendo di adottare modelli grafici di moda come lo script, il mistoscript, lo stampato maiuscolo (Guaitoli e Orlandi, 1999, pp.71, 77-78) o le cosiddette scritture *à boule* (Esposito, 2006, pp.42-48) per sentirsi parte del gruppo dei pari, possiedono grafie molto simili tra loro come mostrano a titolo esemplificativo le seguenti scritture.

Scr. n. 1
Studentessa 18 anni

Scr. n. 2
Studentessa 18 anni

L'evidente somiglianza tra queste due scritture appartenenti a due coetanee che neppure si conoscono, sottolinea dal punto di vista grafico il notevole bisogno di appartenenza e di identificazione percepito dai giovani d'oggi. Ma tali somiglianze possono venire ulteriormente incrementate dalla presenza di un legame affettivo fino a diventare tanto numerose e significative da produrre "scritture gemelle". La perfetta similarità grafica di tali scritture mostra che la relazione che si è venuta a creare tra i loro autori è basata su un modello fortemente identificativo.
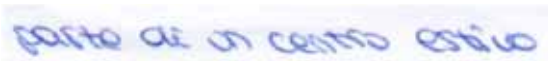
Il caso che segue documenta chiaramente non solo l'assunzione dello stesso modello grafico da parte di tre adolescenti, ma anche l'adozione di uno stile grafico identico quale espressione di modalità adattive funzionali.

Scr. n. 3
Studentessa 17 anni
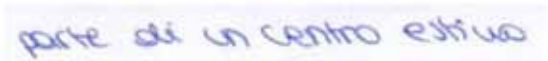
Scr. n. 4
Studentessa 17 anni

Queste prime due grafie appartengono a delle ragazze che frequentano la stessa classe di Liceo e che sono unite da una solida amicizia. Entrambe, molto mature rispetto all'età e dall'elevato profitto scolastico, hanno trovato nella loro amicizia una compensazione alla difficoltà di relazione con i loro compagni di classe, in prevalenza molto più immaturi e poco motivati allo studio. Come si può notare dal saggio grafico, queste scritture colpiscono per una somiglianza talmente elevata

che va ben oltre quella dovuta all'assunzione del medesimo modello grafico. Procedendo con un'analisi grafologica più dettagliata, si nota che le maggiori similarità riguardano la scelta della forma che, come si è detto, riflette oltre che l'identità di un individuo anche le sue scelte e le sue inclinazioni e la gestione del movimento che ne rappresenta la componente istintiva. Forti analogie vi sono anche (Colo e Pinon, 2002, pp.61-91, 165-208, 237-249) nella dimensione del corpo centrale delle lettere (l'immagine di sé proiettata all'esterno), nell'inclinazione del grafismo (atteggiamento di fronte ai sentimenti), nella forza pressoria esercitata sul foglio (patrimonio energetico individuale) e nella velocità di esecuzione (modalità in cui vengono spese le riserve energetiche).

scr. n. 3a - Particolare ingrandito – r.1

scr. n. 4a - Particolare ingrandito – r .1

Come si può notare la somiglianza è veramente sorprendente. E' soltanto nella gestione dello spazio che si possono rilevare delle differenze relative alla tenuta di riga e alla gestione dei margini, soprattutto di quello destro (molto ampio nella scr. n. 3 e invece raggiunto nella scr. n. 4). Adottando "scritture gemelle" le due ragazze non solo dimostrano di condividere valori, gusti, aspirazioni e modalità comportamentali, ma anche che tra loro è in atto una vera e propria identificazione. Attraverso di essa le due amiche possono sentirsi più forti ed in grado domare il senso di inadeguatezza e di inquietudine (Guaitoli e Manetti, 2005, pp.205-208), inevitabilmente connesso con il percorso evolutivo tipico dell'età (Winnicott, 1989; Winnicott 1994).

Prima di procedere con il nostro studio è importante rilevare che per quanto riguarda il caso delle scritture gemelle non si può prescindere dal tenere in considerazione il processo mentale dell'identificazione e delle sue valenze. Esso, infatti, essenziale per lo sviluppo della personalità di un individuo, può avere in molte circostanze della vita anche la funzione di meccanismo di difesa, cioè di attività psicologica inconscia necessaria a proteggere l'Io dalla perdita di controllo su un impulso inaccettabile (White e Gilliand, 1977, pp.15-16, 110-121, Mele, 2004, 22-24).

Prendiamo ora in esame una terza grafia appartenente ad un ragazzo che, provenendo da un'altra scuola, è stato inserito nella classe delle due ragazze (scr. n.3 e scr. n.4). All'interno di essa, le cui dinamiche relazionali sono alquanto complesse, anche lui fatica ad ambientarsi, mentre trova un'immediata sintonia con loro.

Scr. n. 5
Studente 17 anni

L'altissimo grado di similarità grafica, riscontrato tra le scritture prese in esame, si basa sui seguenti parametri: la forma delle lettere, la loro dimensione, i collegamenti tra le une e le altre, l'inclinazione del grafismo, la forza pressoria esercitata sul foglio, la velocità di esecuzione. Riguardo lo spazio si rilevano interessanti analogie, pur nella diversità della tenuta del rigo. Il raffronto tra le scritture (si veda a titolo esemplificativo la comparazione riportata dalla tabella n. 1) rivela che il legame tra il nuovo arrivato, bisognoso di sentirsi integrato, e le ragazze (desiderose di aprirsi a nuove conoscenze all'interno del gruppo classe) si è instaurato secondo quella stessa dinamica di identificazione che già caratterizzava la relazione tra le due amiche.

Iter grafici ed elementi connotativi in gruppi sillabici similari (in ingrandimento) a confronto
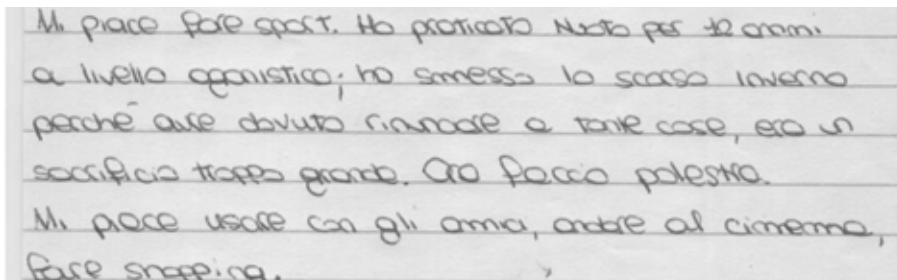
scr. 5, r.4	giovane	gioco	scr. 3, r.4
scr. 5, r.3	aveva	avevano	scr. 4, r.3
scr. 5 (Parola presente in una parte del documento omessa in questa sede)	era	era	scr. 4, r.4

Tabella n. 1

Nel caso che segue viene documentata la vera e propria nascita di un'amicizia, talmente profonda da creare una sorta di identità condivisa che non consente di segnare una linea di confine tra le due personalità.

Scr. n. 6
Studentessa 16 anni

Scr. n. 7
Studentessa 16 anni

Queste scritture, molto diverse tra loro, sono state vergate da due ragazze che frequentano la stessa classe e che si sono conosciute da poco tempo. La prima appartiene ad una ragazza molto riservata che a scuola ha un rendimento scolastico molto alto. La seconda, invece, ad una ragazza molto attenta alla sua immagine esteriore, il cui rendimento scolastico è ai limiti della sufficienza in quanto poco motivata allo studio. La loro conoscenza si limita a rapporti cordiali fino al momento in cui la giovane della scrittura n. 6 si trova ad attraversare un momento difficile. Malgrado il suo vivere in superficie la ragazza della scrittura n. 7, sensibile dal punto di vista affettivo, percepisce le difficoltà della sua compagna e la sostiene amorevolmente. Il rapporto che si viene a creare tra le due è mostrato da un saggio grafico redatto l'anno successivo.

Scr. n. 8
Studentessa 17 anni

Scr. n. 9
Studentessa 17 anni

Adottando un medesimo stile grafico le due ragazze mostrano di essersi identificate l'una nell'altra per soddisfare il bisogno di sicurezza e di appartenenza.

scr. n. 8a - Particolare ingrandito- r. 1

scr. n. 9a - Particolare ingrandito – r. 1

Come si può notare la forma delle lettere, il modo di collegarle, il tipo di movimento, la dimensione del grafismo, l'inclinazione dell'asse delle lettere, la forza pressoria mostrano una più che evidente somiglianza (si veda a titolo esemplificativo la tabella n. 2). Anche la gestione dello spazio risulta molto simile, malgrado una diversità relativa allo spazio interlineare (meno spaziata nella scrittura n. 8 e più spaziata nella scrittura n. 9).

Iter grafici ed elementi connotativi in parole similari (in ingrandimento) a confronto
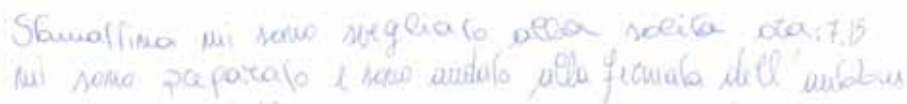
scr.8, r. 3	abbiamo	abbiamo	scr.9, r. 4
scr.8, r. 5	visitato	visitato	scr.9, r. 3
scr.8, r. 2	stata	stato	scr.9, r. 2

Tabella n. 2

E' inoltre interessante rilevare che il cambiamento cui sono state sottoposte entrambe le loro grafie documenta un'evoluzione positiva: la prima ragazza (scr. n.6 e n.8) dimostra di aver acquisito una maggiore maturità in quanto meno dipendente dal giudizio altrui e meno bisognosa di continue conferme affettive; la seconda (scr. n.7 e n.9) presenta una maggiore capacità di concentrazione ed al contempo un minore accentramento del proprio interesse su di sè.

Anche il caso che segue, seppur diverso dai precedenti, documenta dal punto di vista grafico un analogo meccanismo di identificazione tra due adolescenti. Questa volta la similarità non riguarda un intero documento, ma soltanto una parola dal valore speciale. Può accadere che in un documento vergato con un medesimo stile grafico il grafologo noti la presenza di una parola che si discosta da tale stile e che sembra stata scritta da un'altra persona. Ciò avviene in quanto essa, che in termini grafologici viene chiamata "parola affettiva", evoca nello scrivente particolari emozioni (Mele, 2017, pp.4-17).

La scrittura seguente appartiene ad un ragazzo di 15 anni, estroverso e sportivo, ma che non riesce a concentrare le sue energie per conseguire risultati scolastici apprezzabili. Come documenta la sua scrittura, la non omogeneità del suo grafismo (parole che salgono e scendono dal rigo, forme ora allargate ora ristrette, inclinazione variabile dell'asse delle lettere) lo espone a comportamenti contraddittori e dispersivi che rendono difficili la canalizzazione delle proprie forze ed il raggiungimento dei propri obiettivi.

Scr. n. 10 – Studente 15 anni

Più in basso, scorrendo il documento, si legge il nome della fidanzata.

Scr. 10a – Studente 15 anni

In quanto "parola affettiva" il nome "Claudia" viene scritto in una dimensione più grande e, pur tenendo conto della notevole variabilità grafica della scrittura di questo ragazzo, con uno stile piuttosto diverso. Ma ciò che è interessante notare, è la significativa somiglianza di tale parola con la firma della ragazza (scr. 9) a dimostrazione della quale proponiamo un esame comparato (tabella n. 3).

Scr. 11 – Studentessa 15 anni – firma

Esame comparato delle caratteristiche grafiche del nome "Claudia"

Scr. 10a	Scr. 11	Similarità
		Inclinazione del gruppo sillabico "dia"
		Rapporti dimensionali
		Inserzione di un'asola interna e sua inclinazione
		Iter grafico della lettera "a"

Tabella n. 3

Come si può notare dalla forma grafica che il nome "Claudia" ha assunto e dalla presenza di similarità non imitabili quali il grado di inclinazione, i rapporti dimensionali, la presenza di un'asola interna e l'uguaglianza di alcuni iter grafici si può comprendere quanto per questo giovane sia importante il sentimento che prova verso la sua innamorata a tal punto da, scrivendo il nome di lei, rievocarne anche lo stile grafico.

Da quanto detto è possibile comprendere maggiormente la delicata fase di passaggio dell'adolescenza in cui ogni giovane, ampliando le relazioni al di fuori del nucleo familiare, sperimenta e costruisce se stesso e la propria identità. Di fondamentale importanza la presenza di nuovi modelli di riferimento offerti dal gruppo dei pari con cui realizzare identificazioni che siano al contempo funzionali all'adattamento all'ambiente e preziose per la propria evoluzione interiore. Lo studio delle scritture gemelle permette, quindi, di osservare da vicino questa strategia adattiva, grazie alla quale i giovani d'oggi non solo soddisfano il loro forte bisogno di appartenenza, ma anche, per arginare timori ed insicurezze, instaurano legami affettivi tali da creare identità così simili da non poterne riconoscere il confine interno.

References

Boille, N. (1998). *Il gesto grafico gesto creativo.* Roma: Borla.

Bravo, A. (1998). *Variazioni naturali e artificiose della grafia.* Urbino: Libreria Moretti.

Bresard, S. (1988). *Graphologie*. Parigi: Masson.

Buquet, A. (2007). *La perizia dei documenti manoscritti.* Roma: Pioda Imaging.

Colo, C., Pinon, J. (2002). *Traité de Graphologie.* Paris: Expansion Scientifique Française.

Crepieux-Jamin, J. (2001). *ABC della grafologia.* Padova: ed. Messaggero.

Crotti, E., Magni, A.,Venturini, O. (2011). *La perizia in tribunale.* Milano: Francoangeli.

Erikson, E.H. (1972). *Infanzia e società.* Roma: Armando.

Erikson, E.H. (1984). *I cicli della vita.* Roma: Armando.

Erikson, E.H. (1995). *Gioventù e crisi d'identità.* Roma: Armando.

Esposito, S. (2006). Il gioco della palla, *Grafologia e sue applicazioni.* 31(2), 42-48.

Gille Maisani, J.-Ch. (2000). *Psicologia della scrittura.* Napoli: Liguori.

Guaitoli, A.R., Orlandi, A. (1999). *Ascoltare il segno.* Roma: Borla.

Guaitoli, A. R., Manetti, E. (2005). *Identità scrittura e segni.* Roma: CE.DI.S Editore.

Hegar, W. (1962). G*raphologie par le trait.* Paris: Vigot Freres Editeurs.

Mele, A. (2004). Le espressioni grafologiche di alcuni meccanismi di difesa, *Grafologia e sue applicazioni.* 24 (1), 22-24.

Mele, A. (2017). L'immagine anticipatrice e la parola affettiva, *Grafologia e sue applicazioni.* 1 (1), 4-17.

Pophal, R. (1990). *Scrittura e Cervello*. Padova: ed. Messaggero.

Pulver, M. (1983). *La simbologia nella scrittura.* Torino: Boringhieri.

Saudek, R. (1982). *Psicologia della scrittura.* Padova: ed. Messaggero.

Teillard, A. (2017). *L'anima e la scrittura.* Roma: Epsylon.

Vettorazzo, B. (1998). *Metodologia della perizia grafica su base grafologica.* Milano: Giuffrè Editore.

White, B., Gilliand, R. M. (1977). *I meccanismi di difesa*. Roma: Astrolabio.

Winnicott, D.W (1989). *Sviluppo affettivo e ambiente.* Roma: Armando.

Winnicott, D.W (1994). *La famiglia e lo sviluppo dell'individuo.* Roma: Armando.

Bio-note

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Combinatory Logic: From Philosophy and Mathematics to Computer Science

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Abstract

In 1920, Moses Schönfinkel provided the first rough details of what later became known as combinatory logic. This endeavour was part of Hilbert's program to formulate mathematics as a consistent logic system based on a finite set of axioms and inference rules. This program's importance to the foundations and philosophical aspects of mathematics is still celebrated today. In the 1930s, Haskell Curry furthered Schönfinkel's work on combinatory logic, attempting – and failing – to show that it can be used as a foundation for mathematics. However, in 1947, he described a high-level functional programming language based on combinatory logic. Research on functional programming languages continued, reaching a high point in the eighties. However, by this time, object-oriented programming languages began taking over and functional languages started to lose their appeal. Lately, however, a resurgence of functional languages is being noted. Indeed, many of the commonly-used programming languages nowadays incorporate functional programming elements in them, while functional languages such as Haskell, OCaml and Erlang are gaining in popularity. Thanks to this revival, it is appropriate to breathe new life into combinatory logic by presenting its main ideas and techniques in this paper.

Keywords: combinatory logic, combinator, functional programming, logic and philosophy, foundations of mathematics.

Introduction: Schönfinkel's Idea

In first-order logic, *well-formed formulas* such as the following are frequently encountered:
$$\forall x \big(Nx \rightarrow \exists y (Ny \wedge Gyx) \big).$$
Nx here means 'x is a number', while Gyx means 'y is greater than x'. The above well-formed formula thus reads 'For all x, if x is a number, then there exists y such that y is a number and y is greater than x.'

Schönfinkel wanted to write down well-formed formulas in first-order logic in a way that did not require variables (Bimbó, 2016). To do this, he invented a new symbol U and defined it as follows:

$$UAB \overset{\text{def}}{=} \neg\exists x(Ax \wedge Bx).$$

The above reads 'There does not exist x such that both Ax and Bx are true'. For example, the logical sentence 'No rabbit eats meat' can be written as URM, where Rx means 'x is a rabbit' and Mx means 'x eats meat'. In this way, the variable x is eliminated.

To do the same thing for the expression $\forall x\big(Nx \to \exists y(Ny \wedge Gyx)\big)$, the implication symbol $\to$ is first converted into a conjunction symbol $\wedge$. This is done by noticing that $A \to B$ means the same as $\neg A \vee B$ (Mendelson, 1997, p.12). In other words, the statement 'If A, then B' is equivalent to the statement 'either A is false or B is true'. It is assumed that the semantics of the word 'or' allow *at least* one of A or B to be true. For instance, the sentences 'If it is raining, then it is cloudy' and 'it is either not raining or it is cloudy (or both)' mean the same thing. Furthermore, the expression $\neg(A \wedge B)$ means the same as $\neg A \vee \neg B$ – in other words, 'it is not the case that both A and B are true' and 'either A is false or B is false (or both)' are equivalent (Mendelson, 1997, pp.11-12). In this fashion, the bracket $Nx \to \exists y(Ny \wedge Gyx)$ first gets transformed into $\neg Nx \vee \exists y(Ny \wedge Gyx)$ and then into $\neg\big(Nx \wedge \neg\exists y(Ny \wedge Gyx)\big)$. Lastly, the well-formed formula $\forall x(\neg Ax)$ is equivalent to $\neg\exists x(Ax)$ (Mendelson, 1997, p.52). In layman's terms, the statements 'all x do not satisfy property A' and 'there exists no x that satisfies property A' mean the same thing. For example, the sentences 'all rabbits do not eat meat' and 'there is no rabbit that eats meat' are synonymous. Thus, the well-formed formula $\forall x\big(Nx \to \exists y(Ny \wedge Gyx)\big)$ is converted to $\forall x\Big(\neg\big(Nx \wedge \neg\exists y(Ny \wedge Gyx)\big)\Big)$ as explained beforehand, and then to the well-formed formula

$$\neg\exists x\big(Nx \wedge \neg\exists y(Ny \wedge Gyx)\big).$$

The reason why these transformations were performed is that the above expression is much more amenable to using the U symbol mentioned above. For example, the subexpression

$$\neg\exists y(Ny \wedge Gyx)$$

is almost of the form $\neg\exists x(Ax \wedge Bx)$ needed. Unfortunately, the variable y in the expression Gyx needs to be in the end for these two expressions to match. Thus, Schönfinkel introduced the following *combinators* (1924), having the following rules:

$$\mathbf{S}xyz \overset{\text{def}}{=} xz(yz);$$
$$\mathbf{K}xy \overset{\text{def}}{=} x;$$
$$\mathbf{I}x \overset{\text{def}}{=} x;$$
$$\mathbf{B}xyz \overset{\text{def}}{=} x(yz);$$
$$\mathbf{C}xyz \overset{\text{def}}{=} xzy.$$

In our case, Gyx is written as $\mathbf{C}Gxy$, so that $\neg\exists y(Ny \wedge Gyx)$ becomes $\neg\exists y(Ny \wedge \mathbf{C}Gxy)$. The U symbol may now be applied to this expression, replacing it with $UN(\mathbf{C}Gx)$. The well-formed formula $\neg\exists x\big(Nx \wedge \neg\exists y(Ny \wedge Gyx)\big)$ hence becomes $\neg\exists x\big(Nx \wedge UN(\mathbf{C}Gx)\big)$.

Moreover, the $\mathbf{B}$ combinator is used to convert $UN(\mathbf{C}Gx)$ into $\mathbf{B}(UN)(\mathbf{C}G)x$. This allows the use of the U symbol again; $\neg\exists x\big(Nx \wedge UN(\mathbf{C}Gx)\big)$ is converted to $\neg\exists x\big(Nx \wedge \mathbf{B}(UN)(\mathbf{C}G)x\big)$, and then, finally, to $UN\big(\mathbf{B}(UN)(\mathbf{C}G)\big)$.

In this manner, Schönfinkel showed how to convert first-order well-formed formulas into expressions involving no variables at all by using the combinators $\mathbf{S}$, $\mathbf{K}$, $\mathbf{I}$, $\mathbf{B}$ and $\mathbf{C}$. This new way of writing well-formed formulas became known as *combinatory logic* (Bimbó, 2016). Combinatory logic completely solves the problem of deciding how variables are bounded to the quantifiers $\forall$ and $\exists$, by dispensing of variables altogether. The disadvantage is that the final expression $UN\big(\mathbf{B}(UN)(\mathbf{C}G)\big)$ is less readable than the original expression $\forall x\big(Nx \to \exists y(Ny \wedge Gyx)\big)$. However, this is of no concern to a computer, and, indeed, combinatory logic is the basis upon which computer functional programming languages work (Peyton Jones, 1987, pp.260-280).

Computer Science

In computer science, Schönfinkel's $\mathbf{S}$, $\mathbf{K}$, $\mathbf{I}$, $\mathbf{B}$ and $\mathbf{C}$ combinators are treated as *functions*, each of which behaves in the way defined above. This idea is the basis of what is nowadays called *functional programming*. For example, the combinator $\mathbf{I}$, having the rule $\mathbf{I}x \overset{\text{def}}{=} x$, is treated as a function that takes a variable x as input and returns x itself as output. Similarly, the $\mathbf{K}$ combinator can be interpreted as being a function that takes two inputs x and y and returns x as output, completely ignoring the second input y (Bird & Wadler, 1988, pp.8-9).

This interpretation of combinators as functions allows the input variables, like x and y above, to be functions themselves. Indeed, they may even be other combinators. For example, the $\mathbf{B}$ combinator, having the rule $\mathbf{B}xyz \overset{\text{def}}{=} x(yz)$, is interpreted as being a function taking three inputs x, y and z and which outputs the result obtained after applying the *function x* to the result of applying the *function y* to z. This means, essentially, that the expression yz means, from a functional programming perspective, 'the function y applied to z' (Bird & Wadler, 1988, p.9). In mathematics, such an expression is usually written as $y(z)$.

Another useful idea in functional programming is the fact that the output of a function may be a function itself. This is illustrated by the $\mathbf{C}$ combinator $\mathbf{C}xyz \overset{\text{def}}{=} xzy$, which takes three inputs x, y and z. The $\mathbf{C}$ combinator first applies the function x to z, resulting in the *function xz*. This function xz is then applied to the variable y, and the output of this final function application is the output of the $\mathbf{C}$

combinator. In essence, the expression xzy really means $(xz)y$. Likewise, the expression $xz(yz)$ taken from the definition of the **S** combinator means $(xz)(yz)$, and the expression **C**xyz means $(\mathbf{C}x)yz$ or even $((\mathbf{C}x)y)z$. This idea is called *currying* (Bird & Wadler, 1988, p.12; Peyton Jones, 1987, p.10), after Haskell Curry, who rediscovered combinatory logic independently of Schönfinkel and dedicated a lot of research on it.

As an aside, Schönfinkel only published two papers during his lifetime, one in 1924 (1924) and another in 1929 (Bernays & Schönfinkel, 1929). Only the 1924 paper was on combinatory logic and this idea of currying. This lack of proficiency by Schönfinkel is attributed to a mental illness, starting from 1927 till his death in 1942 (Kline & Anovskaa, 1951). Indeed, his second paper in 1929 was only published due to the efforts of his coauthor Paul Bernays. Curry always credited the concept of currying to Schönfinkel, although it must be said that the idea of currying had already been mentioned by the philosopher Gottlob Frege even before Schönfinkel (Quine, 1967). Nowadays, the programming language *Haskell* is named after Haskell Curry (Hudak *et al*, 2007).

The sufficiency of S and K

Incredibly, Schönfinkel (1924) also showed that the combinators **I**, **B** and **C** are superfluous, because they can be defined in terms of the other two combinators, **S** and **K**. Indeed:

$$\mathbf{I} = \mathbf{SKK};$$
$$\mathbf{B} = \mathbf{S(KS)K};$$
$$\mathbf{C} = \mathbf{S(BBS)(KK)}.$$

For example, **SKK**x reduces to **K**$x(\mathbf{K}x)$ by using the **S** combinator rule, and then **K**$x(\mathbf{K}x)$ reduces to x by using the **K** combinator rule. This may be written down as

$$\mathbf{SKK}x \longrightarrow \mathbf{K}x(\mathbf{K}x) \longrightarrow x$$

or simply as

$$\mathbf{SKK}x \longrightarrow x.$$

But since **I**$x \longrightarrow x$ using the **I** combinator rule, **I** and **SKK** affect the variable x in the same way. Because of this, the **I** combinator is said to be *extensionally equal* to the *combinator expression* **SKK**, written $\mathbf{I} = \mathbf{SKK}$ (Peyton Jones, 1987, p.266; Barendregt, 1984, pp.151-163; Hindley & Seldin, 2008, p.26). In a similar way, the **B** combinator may be proved to be extensionally equal to the combinator expression **S(KS)K**:

$$\mathbf{S(KS)K}xyz \longrightarrow \mathbf{KS}x(\mathbf{K}x)yz \longrightarrow \mathbf{S(K}x)yz \longrightarrow \mathbf{K}xz(yz) \longrightarrow x(yz).$$

Here is the proof that the **C** combinator is extensionally equal to the combinator expression **S(BBS)(KK)**:

$$\mathbf{S(BBS)(KK)}xyz \longrightarrow \mathbf{BBS}x(\mathbf{KK}x)yz \longrightarrow \mathbf{B(S}x)(\mathbf{KK}x)yz$$
$$\longrightarrow \mathbf{S}x(\mathbf{KK}xy)z \longrightarrow xz(\mathbf{KK}xyz) \longrightarrow xz(\mathbf{K}yz) \longrightarrow xzy.$$

Turing Completeness

Even more surprisingly, any computable function can be expressed using any or all of Schönfinkel's five combinators **S**, **K**, **I**, **B** and **C**. This means that any computer program may be written using these five combinators only (Hindley & Seldin, 2008, p.47). The combinators **S**, **K**, **I**, **B** and **C** are said to be *Turing complete*. In fact, by applying the results of the previous section, since **I**, **B** and **C** may be themselves expressed in terms of **S** and **K**, the two combinators **S** and **K** alone suffice to write *any* computer program – a result that is as astounding as it is beautiful.

The following recursive algorithm converts any function **F**, having the n inputs $x_1, x_2, x_3, \ldots, x_n$, into a combinator expression involving some or all the combinators **S**, **K**, **I**, **B** and **C** (Peyton Jones, 1987, p.270; Curry & Feys, 1958). This provides an informal proof for the claim in the previous paragraph.

Algorithm:

Step 1: If the function **F** has no arguments and is defined as the combinator expression f, then output $\mathbf{F} \stackrel{\text{def}}{=} f$ and halt.

Step 2: Otherwise, $\mathbf{F}x_1x_2x_3 \ldots x_{n-1}x \stackrel{\text{def}}{=} f$ is equivalent to the function $\mathbf{F}x_1x_2x_3 \ldots x_{n-1} \stackrel{\text{def}}{=} [f]_x$, where $[f]_x$ is defined as follows:

a. $[x]_x \stackrel{\text{def}}{=} \mathbf{I}$;

b. $[f]_x \stackrel{\text{def}}{=} \mathbf{K}f$, if the expression f does not contain the variable x;

c. $[f]_x \stackrel{\text{def}}{=} g$, if the expression f is the function application gx and g does not contain the variable x;

d. $[f]_x \stackrel{\text{def}}{=} \mathbf{B}f_1[f_2]_x$, if the expression f is the function application f_1f_2, where f_1 does not contain the variable x and f_2 contains the variable x;

e. $[f]_x \stackrel{\text{def}}{=} \mathbf{C}[f_1]_xf_2$, if the expression f is the function application f_1f_2, where f_1 contains the variable x and f_2 does not contain the variable x;

f. $[f]_x \stackrel{\text{def}}{=} \mathbf{S}[f_1]_x[f_2]_x$, if the expression f is the function application f_1f_2, where both f_1 and f_2 contain the variable x.

As an illustration, the function **W**, defined as $\mathbf{W}xy \stackrel{\text{def}}{=} xyy$, will be converted into a combinator expression using the above algorithm. Since this function has two arguments, Step 2 of the algorithm is invoked, writing down $\mathbf{W}xy \stackrel{\text{def}}{=} xyy$ as $\mathbf{W}x \stackrel{\text{def}}{=} [(xy)y]_y$. By Step 2f., $[(xy)y]_y \stackrel{\text{def}}{=} \mathbf{S}[xy]_y[y]_y$. By Step 2c. and Step 2a. respectively, $[xy]_y \stackrel{\text{def}}{=} x$ and $[y]_y \stackrel{\text{def}}{=} \mathbf{I}$. Hence

$$\mathbf{W}xy \stackrel{\text{def}}{=} xyy \text{ is the same as } \mathbf{W}x \stackrel{\text{def}}{=} \mathbf{S}x\mathbf{I}.$$

The variable y has been eliminated. To eliminate variable x, Step 2 of the algorithm is again used, so that $\mathbf{W}x \stackrel{\text{def}}{=} \mathbf{S}x\mathbf{I}$ is written down as $\mathbf{W} \stackrel{\text{def}}{=} [(\mathbf{S}x)\mathbf{I}]_x$. By Step 2e., $[(\mathbf{S}x)\mathbf{I}]_x \stackrel{\text{def}}{=} \mathbf{C}[\mathbf{S}x]_x\mathbf{I}$. Moreover, by Step 2c., $[\mathbf{S}x]_x \stackrel{\text{def}}{=} \mathbf{S}$. Thus

$$\mathbf{W}x \stackrel{\text{def}}{=} \mathbf{S}x\mathbf{I} \text{ is the same as } \mathbf{W} \stackrel{\text{def}}{=} \mathbf{CSI}.$$

Step 1 of the algorithm is now called to finalize the function **W** as the combinator expression **CSI**. The expression $\mathbf{CSI}xy$ is now checked to confirm that

it indeed reduces to the expression xyy, proving that both **W** and **CSI** produce the same output:

$$\mathbf{CSI}xy \longrightarrow \mathbf{S}x\mathbf{I}y \longrightarrow xy(\mathbf{I}y) \longrightarrow xyy.$$

The above algorithm may be thought of as a *compiler* that translates any function into a combinator expression. Indeed, compilers that translated code into combinators were used for the functional programming languages SASL and Miranda (Peyton Jones, 1987, p.2). These two programming languages later inspired the creation of the much more successful Haskell functional programming language.

Perhaps so far, the reader is not very convinced that combinatory logic may be used to write any computer program. The following sections should alleviate this concern.

Boolean Values

One very important feature of any programming language is the presence of *conditional statements*, in which different parts of a program are evaluated depending on whether a *Boolean value* is *true* or *false*. This idea may be encapsulated using so-called *Church Booleans,* named after Alonzo Church (1940) as follows:

$$t xy \stackrel{\text{def}}{=} x;$$
$$f xy \stackrel{\text{def}}{=} y.$$

The symbols t and f stand for 'true' and 'false' respectively. If a Boolean value is t, then x is evaluated, while if it f, then y is evaluated. By using the algorithm in the previous section to compile these Boolean values into combinators, the following are obtained (Smullyan, 2000, p.212):

$$t \stackrel{\text{def}}{=} \mathbf{K};$$
$$f \stackrel{\text{def}}{=} \mathbf{KI}.$$

The definition of t as being the **K** combinator shouldn't be surprising, as clearly t and **K** have the same behaviour.

Using these definitions of t and f, logical connectives such as ∧ (AND), ∨ (OR) and ¬ (NOT) may be implemented (note that the prefix notation ∧xy and ∨xy is being used here, instead of the more usual infix notation $x \wedge y$ and $x \vee y$) (Church, 1940):

$$\neg x \stackrel{\text{def}}{=} x f t;$$
$$\wedge xy \stackrel{\text{def}}{=} xy f;$$
$$\vee xy \stackrel{\text{def}}{=} x t y.$$

The first definition, $\neg x \stackrel{\text{def}}{=} x f t$, states that if x is t, then $\neg x$ evaluates to f, while if x is f, then $\neg x$ evaluates to t. This is, of course, what is expected from the behaviour of the NOT logical connective. The definition of the AND logical connective, $\wedge xy \stackrel{\text{def}}{=} xy f$, states that if x is t, then $\wedge xy$ evaluates to y, while if x is

f, then $\wedge xy$ evaluates to f. This may be verified by the reader to conform with the usual interpretation of the AND logical connective that returns t if and only if both inputs x and y are t. Finally, $\vee xy \stackrel{\text{def}}{=} xty$ states that if x is t, then $\vee xy$ returns t, while if x is f, then $\vee xy$ returns y. Again, this corresponds with how the OR logical connective is usually defined, returning f if and only if both inputs x and y are f.

Compiling these definitions using the algorithm in the previous section results in the following combinator expressions for $\neg$, $\wedge$ and $\vee$:

$$\neg \stackrel{\text{def}}{=} \mathbf{C(CI}f)t;$$
$$\wedge \stackrel{\text{def}}{=} \mathbf{CC}f;$$
$$\vee \stackrel{\text{def}}{=} \mathbf{CI}t.$$

Below, the expression $\vee(\wedge tf)(\neg f)$ is evaluated, to illustrate that these definitions do indeed work as intended:

$$\vee(\wedge tf)(\neg f)$$
$$\stackrel{\text{def}}{=} \mathbf{CI}t(\wedge tf)(\neg f) \rightarrow \mathbf{I}(\wedge tf)t(\neg f) \rightarrow \wedge tft(\neg f)$$
$$\stackrel{\text{def}}{=} \mathbf{CC}ftft(\neg f) \rightarrow \mathbf{C}tfft(\neg f) \rightarrow tfft(\neg f)$$
$$\stackrel{\text{def}}{=} \mathbf{K}fft(\neg f) \rightarrow ft(\neg f)$$
$$\stackrel{\text{def}}{=} \mathbf{KI}t(\neg f) \rightarrow \mathbf{I}(\neg f) \rightarrow \neg f$$
$$\stackrel{\text{def}}{=} \mathbf{C(CI}f)tf \rightarrow \mathbf{CI}fft \rightarrow \mathbf{I}fft \rightarrow fft$$
$$\stackrel{\text{def}}{=} \mathbf{KI}ft \rightarrow \mathbf{I}t \rightarrow t.$$

Since $\wedge tf$ evaluates to f and $\neg f$ evaluates to t, $\vee(\wedge tf)(\neg f)$ is equivalent to $\vee ft$, which evaluates to t. This shows that the above output is, indeed, the correct one.

Pairs

Combinatory logic can also model *pairs* of objects. One way to do this is to denote a pair (x, y) as $\mathcal{P}xy$, and then define the left and right functions $\mathcal{L}$ and $\mathcal{R}$ as follows:

$$\mathcal{L}(\mathcal{P}xy) \stackrel{\text{def}}{=} x;$$
$$\mathcal{R}(\mathcal{P}xy) \stackrel{\text{def}}{=} y.$$

To accomplish this behaviour, the symbols $\mathcal{P}$, $\mathcal{L}$ and $\mathcal{R}$ may be defined as underneath (Pierce, 2002):

$$\mathcal{P}xyz \stackrel{\text{def}}{=} zxy;$$
$$\mathcal{L}x \stackrel{\text{def}}{=} xt;$$
$$\mathcal{R}x \stackrel{\text{def}}{=} xf.$$

In this way, $\mathcal{L}(\mathcal{P}xy)$ would reduce to $\mathcal{P}xyt$ and then to txy, which outputs the correct value x. Similarly, $\mathcal{R}(\mathcal{P}xy)$ would reduce to fxy, which outputs y.

Compiling these definitions of $\mathcal{P}$, $\mathcal{L}$ and $\mathcal{R}$ into combinator expressions using the algorithm described earlier yields:

$$\mathcal{P} \stackrel{\text{def}}{=} \mathbf{BC(CI)};$$
$$\mathcal{L} \stackrel{\text{def}}{=} \mathbf{CI}t;$$
$$\mathcal{R} \stackrel{\text{def}}{=} \mathbf{CI}f.$$

A very important construct in functional programming is the concept of a *list*, which may simply be interpreted as an appropriately nested pair (Pierce, 2002, p.500).

Numbers

Another surprising fact about combinatory logic is that it can model the *natural numbers* 0,1,2,3, ... There are several ways of accomplishing this, for example using *Church numerals* (Church, 1933). Here, Barendregt's construction of the natural numbers using combinatory logic (Barendregt, 1976; Smullyan, 2000, pp.215-216) is described:

$$0 \overset{\text{def}}{=} \mathbf{I};$$
$$\mathfrak{S} \overset{\text{def}}{=} \mathcal{P}f.$$

The symbol $\mathfrak{S}$ stands for the *successor* of a number. For example, the number 1 is defined as $\mathfrak{S}0$, the successor of the number 0. Likewise, 2 is defined as $\mathfrak{S}1$, or as $\mathfrak{S}(\mathfrak{S}0)$, and so on. As defined above, then, the numbers 0,1,2,3, ... are defined as follows:

$$0 \overset{\text{def}}{=} \mathbf{I};$$
$$1 \overset{\text{def}}{=} \mathcal{P}f\mathbf{I};$$
$$2 \overset{\text{def}}{=} \mathcal{P}f(\mathcal{P}f\mathbf{I});$$
$$3 \overset{\text{def}}{=} \mathcal{P}f(\mathcal{P}f(\mathcal{P}f\mathbf{I}));$$
$$\vdots$$

In this way, Barendregt numerals define a number n as n nested pairs (1976).

A *predicate* is a function that returns a Boolean value. The way Barendregt numerals are defined makes it easy to create a function $\mathcal{Z}$ that tests whether its input is zero or not:

$$\mathcal{Z} \overset{\text{def}}{=} \mathcal{L}.$$

Since nonzero numerals are pairs whose left element is always f, the symbol for 'false', the definition of $\mathcal{Z}$ is simply $\mathcal{L}$, the function that extracts this left element. When $\mathcal{Z}$ is applied to 0, the following happens:

$$\mathcal{Z}0 \overset{\text{def}}{=} \mathcal{L}0 \overset{\text{def}}{=} \mathbf{CI}t0 \longrightarrow \mathbf{I}0t \longrightarrow 0t \overset{\text{def}}{=} \mathbf{I}t \longrightarrow t.$$

This new predicate $\mathcal{Z}$ may now be used to write a function $\mathfrak{P}$ that returns the *predecessor* of a number. The predecessor of the number 1 is 0, the predecessor of the number 2 is 1, and so on. Unfortunately, 0 does not have a predecessor among the natural numbers. Because of this, the predecessor of 0 is defined as 0.

$$\mathfrak{P}n \overset{\text{def}}{=} (\mathcal{Z}n)0(\mathcal{R}n).$$

The predecessor function $\mathfrak{P}$ first tests whether the input number n is 0, by invoking $\mathcal{Z}n$. If this function $\mathcal{Z}n$ returns t, then $\mathfrak{P}$ returns 0. If $\mathcal{Z}n$ returns f, then $\mathfrak{P}$ returns $\mathcal{R}n$, the right element of the pair that n is composed of. The function $\mathfrak{P}$ compiles to the following combinator expression using the algorithm presented earlier in this paper:

$$\mathfrak{P} \overset{\text{def}}{=} \mathbf{S}(\mathbf{C}\mathcal{Z}0)\mathcal{R}.$$

For example, $\mathfrak{P}2$ reduces to 1 in the following way:

$\mathfrak{P}2$
$\overset{\text{def}}{=} \mathbf{S}(\mathbf{C}\mathcal{Z}0)\mathcal{R}2 \rightarrow \mathbf{C}\mathcal{Z}02(\mathcal{R}2) \rightarrow \mathcal{Z}20(\mathcal{R}2)$
$\overset{\text{def}}{=} \mathbf{CI}t20(\mathcal{R}2) \rightarrow \mathbf{I}2t0(\mathcal{R}2) \rightarrow 2t0(\mathcal{R}2)$
$\overset{\text{def}}{=} \mathfrak{S}1t0(\mathcal{R}2) \overset{\text{def}}{=} \mathcal{P}\!\!f1t0(\mathcal{R}2) \overset{\text{def}}{=} \mathbf{BC}(\mathbf{CI})\!\!f1t0(\mathcal{R}2)$
$\rightarrow \mathbf{C}(\mathbf{CI}\!\!f)1t0(\mathcal{R}2) \rightarrow \mathbf{CI}\!\!ft10(\mathcal{R}2) \rightarrow \mathbf{I}t\!\!f10(\mathcal{R}2) \rightarrow t\!\!f10(\mathcal{R}2)$
$\overset{\text{def}}{=} \mathbf{K}\!\!f10(\mathcal{R}2) \rightarrow f0(\mathcal{R}2)$
$\overset{\text{def}}{=} \mathbf{KI}0(\mathcal{R}2) \rightarrow \mathbf{I}(\mathcal{R}2) \rightarrow \mathcal{R}2$
$\overset{\text{def}}{=} \mathbf{CI}\!\!f2 \rightarrow \mathbf{I}2\!\!f \rightarrow 2\!\!f$
$\overset{\text{def}}{=} \mathfrak{S}1\!\!f \overset{\text{def}}{=} \mathcal{P}\!\!f1\!\!f \overset{\text{def}}{=} \mathbf{BC}(\mathbf{CI})\!\!f1\!\!f$
$\rightarrow \mathbf{C}(\mathbf{CI}\!\!f)1\!\!f \rightarrow \mathbf{CI}\!\!f\!\!f1 \rightarrow \mathbf{I}\!\!f\!\!f1 \rightarrow f\!\!f1$
$\overset{\text{def}}{=} \mathbf{KI}\!\!f1 \rightarrow \mathbf{I}1 \rightarrow 1.$

The reduction process above shows how the predecessor of 2 is evaluated in a considerable number of very simple steps – a task that is very suitable to a computer.

Of course, it would be relatively useless to define numbers if no operations, like addition or multiplication, were defined on them. Before doing this, the **Y** combinator needs to be discussed first.

Recursion

A very useful programming construct is the concept of a *loop*. In functional programming, loops are expressed using *recursion*, where functions call themselves (Bird & Wadler, 1988, pp.104-108). Recursion can be expressed in combinatory logic using the **Y** combinator.

Consider the function **U** defined as follows:

$$\mathbf{U}xy \overset{\text{def}}{=} y(xxy).$$

Using the algorithm presented earlier, this function compiles into the following combinator expression:

$$\mathbf{U} \overset{\text{def}}{=} \mathbf{B}(\mathbf{SI})(\mathbf{SII}).$$

Note that, from the first definition $\mathbf{U}xy \overset{\text{def}}{=} y(xxy)$, it is clear that $\mathbf{UU}y$ reduces to $y(\mathbf{UU}y)$. Of course, $y(\mathbf{UU}y)$ reduces to $y\big(y(\mathbf{UU}y)\big)$, and then to $y\Big(y\big(y(\mathbf{UU}y)\big)\Big)$, and so on. Thus, the function $\mathbf{UU}$ is encapsulating the concept of recursion, in the sense that $\mathbf{UU}y$ keeps calling the function y forever. This is exactly how the notable computer scientist *Alan Turing* defined the **Y** combinator: as this function $\mathbf{UU}$ (1937). In terms of the five combinators **S**, **K**, **I**, **B** and **C**, the **Y** combinator is defined as

$$\mathbf{Y} \overset{\text{def}}{=} \mathbf{UU} \overset{\text{def}}{=} \mathbf{B}(\mathbf{SI})(\mathbf{SII})\big(\mathbf{B}(\mathbf{SI})(\mathbf{SII})\big).$$

This combinator expression may be slightly simplified by evaluating the **B** combinator rule, as follows:

$$\mathbf{B(SI)(SII)\big(B(SI)(SII)\big)} \longrightarrow \mathbf{SI\big(SII(B(SI)(SII))\big)}.$$

Thus

$$\mathbf{Y} \stackrel{\text{def}}{=} \mathbf{SI\big(SII(B(SI)(SII))\big)}.$$

Thanks to the **Y** combinator, addition of two numbers, for instance, may now be defined recursively, as follows:

$$+xy \stackrel{\text{def}}{=} (\mathcal{Z}x)y\big(\mathfrak{S}(+(\mathfrak{P}x)y)\big).$$

The sum of x and y ($+xy$) is obtained by first testing if x is 0. If it is, then the sum of x and y is y. If x is not 0, then $+xy$ outputs the successor of the sum of the predecessor of x and y. For example, the sum of 2 and 3 would be evaluated, informally, as follows:

$$+23 \longrightarrow \mathfrak{S}(+13) \longrightarrow \mathfrak{S}\big(\mathfrak{S}(+03)\big) \longrightarrow \mathfrak{S}(\mathfrak{S}3) \longrightarrow \mathfrak{S}4 \longrightarrow 5.$$

Since $+xy$ is defined in terms of itself, $+$ is a recursive function. In order to compile this function $+$ into a combinator expression, the referral of $+$ to itself needs to be removed first. This is accomplished by the compiler first defining the following very similar function to $+$:

$$\mathbf{F}fxy \stackrel{\text{def}}{=} (\mathcal{Z}x)y\big(\mathfrak{S}(f(\mathfrak{P}x)y)\big).$$

Essentially, **F** is like $+$, but it has an extra input f that replaces all instances of $+$ on the right-hand side. This new function **F** is, of course, not recursive, so it may be compiled into a combinator expression:

$$\mathbf{F} \stackrel{\text{def}}{=} \mathbf{B\big(S(BSZ)\big)\big(B(B(B\mathfrak{S}))(CB\mathfrak{P})\big)}.$$

Finally, $+$ is compiled using the **Y** combinator and the above **F** function, simply as:

$$+ \stackrel{\text{def}}{=} \mathbf{YF}.$$

Functional Programming

The combination of the previous sections has produced the makings of a crude functional programming language, which first compiles statements into combinator expressions, and then evaluates the user's input. The combinator expressions would be hidden from the user's view. In this section, therefore, the internal combinator expressions are hidden from the reader too.

For example, below is a possible definition of subtraction of two numbers, made in our crude programming language:

$$-xy \stackrel{\text{def}}{=} (\mathcal{Z}y)x\big(-(\mathfrak{P}x)(\mathfrak{P}y)\big).$$

$-xy$ means $x - y$ here. The subtraction $-xy$ is equal to x if y is zero, otherwise it is equal to the subtraction of the predecessor of y from the predecessor of x.

Note that if x is smaller than y, then $-xy$ returns 0. This can be used to test whether x is less than or equal to y, by defining the $\leq$ predicate in our functional programming language:

$$\leq xy \stackrel{\text{def}}{=} Z(-xy).$$

Other relational tests may easily be written, too:

$$\geq xy \stackrel{\text{def}}{=} Z(-yx);$$
$$<xy \stackrel{\text{def}}{=} \neg(\geq xy);$$
$$>xy \stackrel{\text{def}}{=} \neg(\leq xy);$$
$$=xy \stackrel{\text{def}}{=} \wedge(\leq xy)(\leq yx).$$

Note the use of the NOT ($\neg$) and AND ($\wedge$) logical connectives that were defined in an earlier section.

To conclude, here is a short program that produces the nth Fibonacci number, that is, the nth number of the sequence

$$1,1,2,3,5,8,13,21, \ldots$$

in which the first two elements are both 1 and whose subsequent elements are the sum of the previous two:

$$Qp \stackrel{\text{def}}{=} \mathcal{P}(\mathcal{R}p)\big(+(\mathcal{L}p)(\mathcal{R}p)\big)$$
$$Anfx \stackrel{\text{def}}{=} (Zn)x\big(f(A(\mathfrak{P}n)fx)\big)$$
$$Fn \stackrel{\text{def}}{=} \mathcal{L}\big(AnQ(\mathcal{P}01)\big)$$

The function Q takes a pair p as input and outputs the pair whose left element is the right element of p and whose right element is the sum of the elements of p. For example, $Q(\mathcal{P}35)$ outputs $\mathcal{P}58$.

The function A takes three inputs n, f and x and outputs f applied to x n times. For example, $A2fx$ outputs $f(fx)$, while $A3\mathfrak{S}2$ outputs $\mathfrak{S}\big(\mathfrak{S}(\mathfrak{S}2)\big)$, which represents the number 5.

Finally, the function F is our Fibonacci function. It takes a number n as input and applies the function Q to the pair $\mathcal{P}01$ n times. After doing this, F extracts the left element of the resulting pair and produces it as its output. For example, $F4$ reduces to 3, informally, as follows:

$$F4 \rightarrow \mathcal{L}\bigg(Q\Big(Q\big(Q(Q(\mathcal{P}01))\big)\Big)\bigg) \rightarrow \mathcal{L}\bigg(Q\Big(Q(Q(\mathcal{P}11))\Big)\bigg) \rightarrow \mathcal{L}\bigg(Q\big(Q(Q(\mathcal{P}12))\big)\bigg)$$
$$\rightarrow \mathcal{L}\big(Q(\mathcal{P}23)\big) \rightarrow \mathcal{L}(\mathcal{P}35) \rightarrow 3.$$

In a real-life functional programming language such as Haskell, the above program would have a much more readable form:

```
FibPairNext (a,b) = (b,a+b)
Apply 0 _ x = x
Apply n f x = f (Apply (n-1) f x)
Fibonacci n = fst (Apply n FibPairNext (0,1))
```

However, this is only a question of syntax. What was presented in this paper applies to the possible implementation of any functional programming language, including Haskell.

References

Barendregt, H. P. (1976). A Global Representation of the Recursive Functions in the Lambda-calculus. *Theoretical Computer Science*, 3, 225–242.

Barendregt, H. P. (1984). *The Lambda Calculus, Its Syntax and Semantics. Studies in Logic and the Foundations of Mathematics.* Volume 103. North Holland.

Bernays, P. & Schönfinkel, M. (1929). Zum Entscheidungsproblem der mathematischen Logik. *Mathematische Annalen* (in German). 99, 342–372.

Bimbó, K. Combinatory Logic. *The Stanford Encyclopedia of Philosophy (Fall 2018 Edition) Edward N. Zalta (ed.)*. 10 November 2016. Available at https://plato.stanford.edu/archives/fall2018/entries/logic-combinatory/ [Accessed 9 August 2018]

Bird, R. & Wadler, P. (1988). *Introduction to Functional Programming*. New York: Prentice Hall.

Church, A. (1933). A set of postulates for the foundation of logic (second paper). *The Annals of Mathematics Second Series*, 34(4), 839–864.

Church, A. (1940). A Formulation of the Simple Theory of Types. *The Journal of Symbolic Logic,* 5(2), 56–68.

Curry, H. B. & Feys, R. (1958) *Combinatory Logic, Volume I*. Amsterdam: North-Holland Co.

Hindley, J. R., & Seldin, J. P. (2008). *Lambda-calculus and Combinators, an Introduction.* Cambridge: Cambridge University Press.

Hudak, P., Hughes, J., Peyton Jones, S. and Wadler, P. (2007). A History of Haskell: Being Lazy with Class. *Proceedings of the third ACM SIGPLAN conference on History of programming languages (HOPL III)*, 12, 1–55.

Kline, G. L. & Anovskaa, S. A. (1951). Review of Foundations of Mathematics and Mathematical Logic. *Journal of Symbolic Logic*, 16(1), 46–48.

Mendelson, E. (1997). *Introduction to Mathematical Logic*. London: Chapman & Hall.

Peyton Jones, S. L. (1987). *The Implementation of Functional Programming Languages*. New York: Prentice-Hall.

Pierce, B. C. (2002). *Types and Programming Languages.* Cambridge: MIT Press.

Quine, W. V. O. (1967). On the building blocks of mathematical logic. In J. van Heijenoort, *A Source Book in Mathematical Logic, 1879–1931*, USA: Harvard University Press, 355–366.

Schönfinkel, M. (1924). Über die Bausteine der mathematischen Logik. *Mathematische Annalen* (in German), 92, 305–316.

Smullyan, R. (2000). *To Mock a Mockingbird and Other Logic Puzzles Including an Amazing Adventure in Combinatory Logic*. Oxford: Oxford University Press.

Turing, A. M. (1937). The p-function in lambda-K-conversion. *Journal of Symbolic Logic*, 2, 164.

Bio-note

Dr Alexander Farrugia is Lecturer of Mathematics at the University of Malta, Junior College and a part-time lecturer at the University of Malta. He was awarded a BSc. (Hons) in Mathematics and Computer Science in 2001 and an MSc in Mathematics in 2003 by the University of Malta. In 2016, he obtained his PhD from the same university, studying under the supervision of Professor Irene Sciriha. His area of expertise includes algebraic and spectral graph theory, with applications in molecular chemistry and control theory. In his free time, he writes about mathematics on Quora, a website where people share their knowledge with the world. He was recognised as a Top Writer on Quora in 2017, with his writings garnering more than 6.7 million views (as of February 2018).

Attracting More Students to Opt for Chemistry at Post-Secondary Level: Potential Barriers for Students to Take Up the 'Chemistry Challenge'

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Abstract

This study investigates concerns regarding the perceived decline in number of young people opting to choose chemistry at secondary and post-secondary level of education in Malta. It analyses the trends in numbers of students studying science subjects in local secondary schools. Despite the decreasing number of science candidates at SEC level, there is a gradual progression of chemistry and biology students from ordinary-level to advanced-level courses. This means that there is a good chance of a SEC science student to confirm his interest in science by retaining the subject at post-secondary level.

Literature suggests that students' attitudes to science are multidimensional and are influenced by a number of factors, mostly originating from their life experience. Studies show that whilst students held positive attitudes towards science as a discipline, there was a declining interest by students towards school science. The paper investigates the factors which determined the students' choice to study science and indicates the aspects that made science more appealing and others that hindered the students' motivation to study it at school. Students were found to be disenchanted from school science for a number of reasons such as its perceived difficulty, lack of direct relevance to their everyday life and the demanding examination syllabi, even though they enjoyed carrying out practical work in the school laboratory and were attracted towards the enterprise of science.

Chemistry is the least studied science subject in many countries. The author therefore refers to theories in chemistry education to shed some light on possible underlying issues dissuading students from choosing to study chemistry and any other potential barriers to learning the subject at school.

The study finally proposes a number of measures that could be taken by various educational stakeholders and policy makers to increase the uptake of science / chemistry in both secondary and post-secondary levels of education. These include increasing relevance of the subject, focussing on the language of communication, providing educational outreach programmes, revising the national science curricula to cater for students with different motivations and aptitudes, assisting in career

guidance, investing in human resources and increasing international cooperation between science educators.

Keywords: A-level Chemistry, Uptake of Sciences, Chemistry Education, Science Education, Studying Chemistry Post-16

Introduction

There is a complex set of interacting variables governing students' decisions to opt in or out of school science. The paper tries to understand some of these factors in a bid to address national concerns about the uptake of science subjects half way through their secondary education (year 9) and most importantly at the start of their post-compulsory stage of education (year 12).

In order to attract more students to take up sciences (and particularly chemistry) at these levels of education, one has to understand the students' attitudes towards science. One also needs to understand what factors motivate students to study science / chemistry and what are the main barriers in their learning process.

The study finally makes some recommendations in the light of what has been researched so far and how they can be applied to the Maltese context. The idea is to provide food for thought and ideas for a wider discussion involving science educators and education policy makers.

Current Local Trends at Secondary Level

Every year, more than 5,000 Maltese candidates sit for the public SEC examinations marking the end of their secondary education. Local science educators are concerned of an apparent widespread decline in interest to choose to study science at Form 3. This is partly justified when one considers the negative trend in the number of candidates sitting the biology, chemistry and physics exams at this level, over the last 12 years (Figures 1-4).

Figure 1
Adapted from University of Malta, Matsec Statistical Reports (2018)

Figure 2
Adapted from University of Malta, Matsec Statistical Reports (2018)

Figure 3
Adapted from University of Malta, Matsec Statistical Reports (2018)

Figure 4
Adapted from University of Malta, Matsec Statistical Reports (2018)

When one takes a closer look at these graphs and considers the various categories of schools of origin of, say, the SEC chemistry students, one would notice that there has been a downward trend in both church and state schools over the last decade (Figure 5).
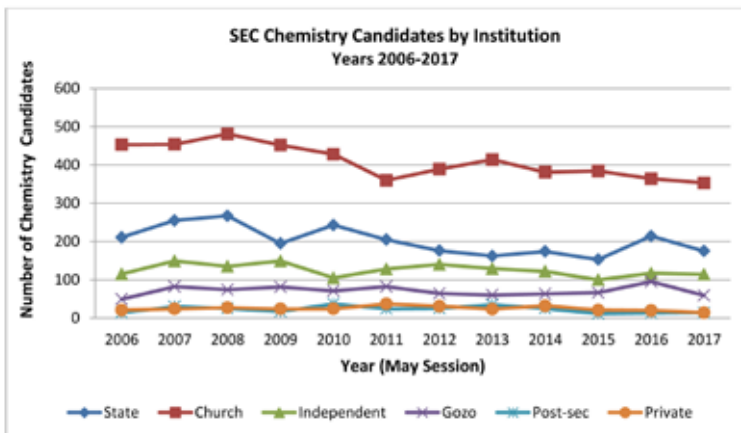
Figure 5
Adapted from University of Malta, Matsec Statistical Reports (2018)

The situation is, however, not as pessimistic as it seems, when it is observed that despite the overall negative trend in the total number of SEC registrations over the past 22 years (Figure 6), there was a recent gradual increase in the proportion of science candidates out of the total SEC cohort (Figures 7, 8 and 9).
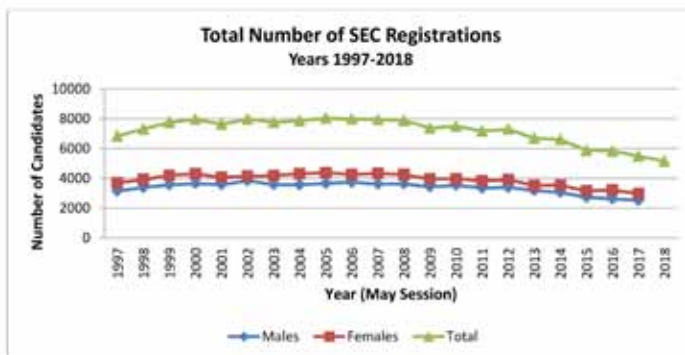
Figure 6
Adapted from University of Malta, Matsec Statistical Reports (2018)

Figure 7
Adapted from University of Malta, Matsec Statistical Reports (2018)
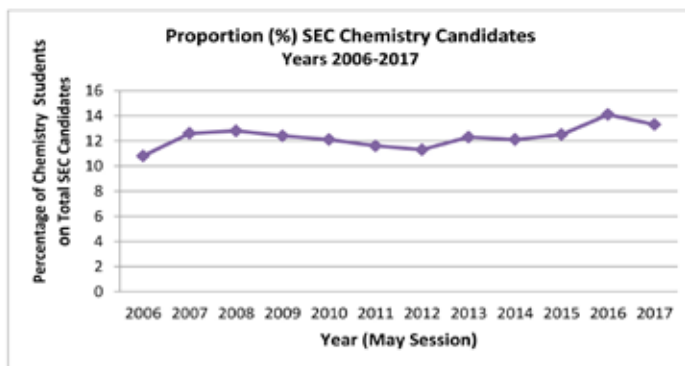
Figure 8
Adapted from University of Malta, Matsec Statistical Reports (2018)
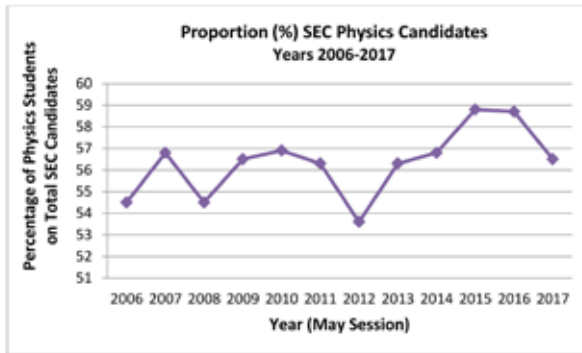
Figure 9
Adapted from University of Malta, Matsec Statistical Reports (2018)

One other point worth referring to is the comparison between the number of students studying each science subject at this level. When one analyses the figures available from state and church schools for year 2017-18 (Figures 10 and 11), it emerges that

- the number of students studying physics in state schools is almost three times those studying either chemistry or biology;
- the number of students studying physics in church schools is almost the same as the total number of chemistry and biology students in the same schools;
- the numbers of chemistry and biology students in church schools are substantially higher than those in state schools;
- the number of physics students in state schools is almost double that in church schools;
- in both church and state schools, the ratio of chemistry to biology students is approximately 3 to 5.
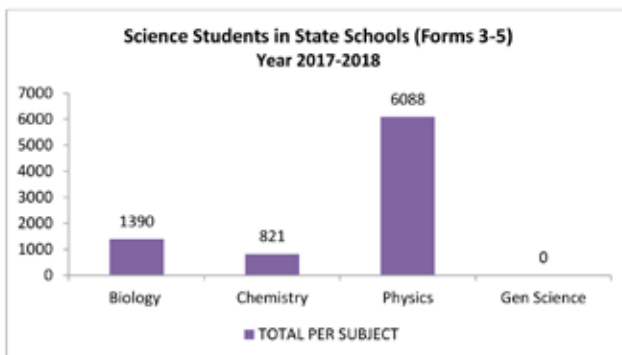
Figure 10
Source: Department for Curriculum, Lifelong Learning & Employability, Education Division (2018)
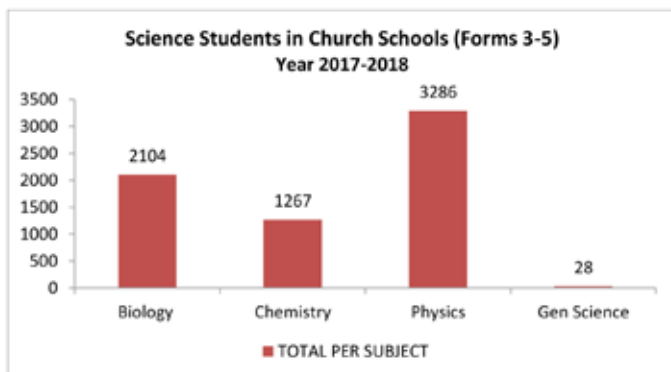
Figure 11
Source: Directorate for Curriculum & Standards, Secretariat for Catholic Education (2018)

There is no reliable data available comparing the number of students studying a single science subject, those studying two sciences and those studying all three sciences simultaneously.

Current Trends at Post-Secondary Level

In the meantime, some 3,000 Maltese students register yearly for the Matriculation certificate exams (IM and AM level) marking the end of their post-secondary phase of education and a stepping stone to higher education.

The feeling shared among science educators at a local post-secondary college is similar to that experienced by their counterparts in secondary schools. However, even though some sciences are currently experiencing what appears to be a slight negative trend (Figures 12 and 13), the situation is again not alarming.
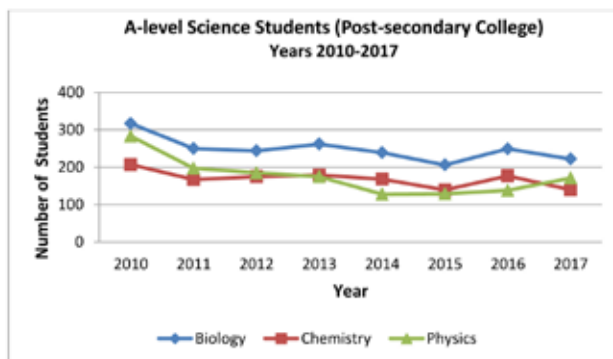
Figure 12
Source: The Administration, Post-secondary College, Malta (2018)
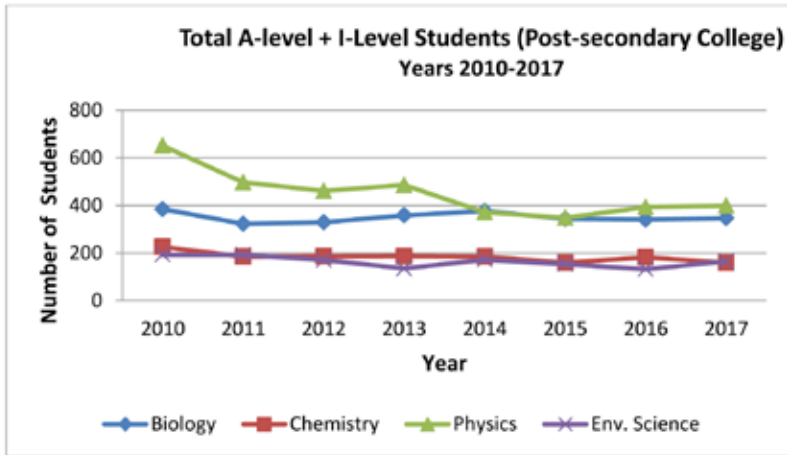
Figure 13
Source: The Administration, Post-secondary College, Malta (2018)

In fact, it can be shown that the number of candidates sitting AM biology and AM chemistry have in fact progressively increased over the last 12 years, while numbers dropped in Physics (both IM and AM) and environmental science (IM only) during the same period of time (Figures 14 and 15).
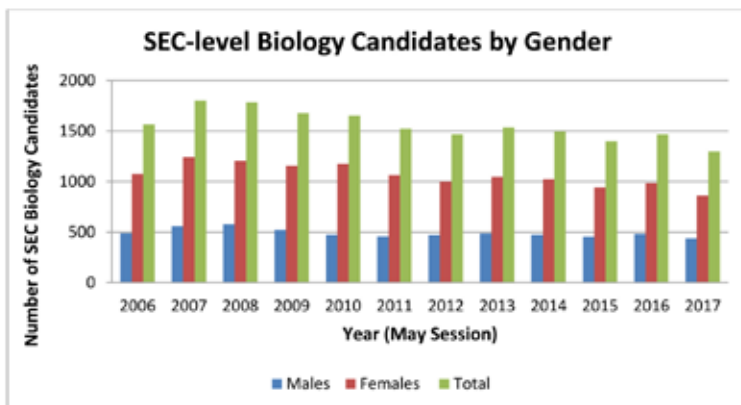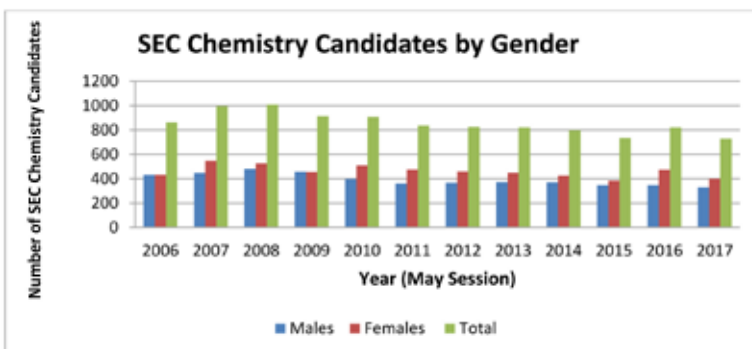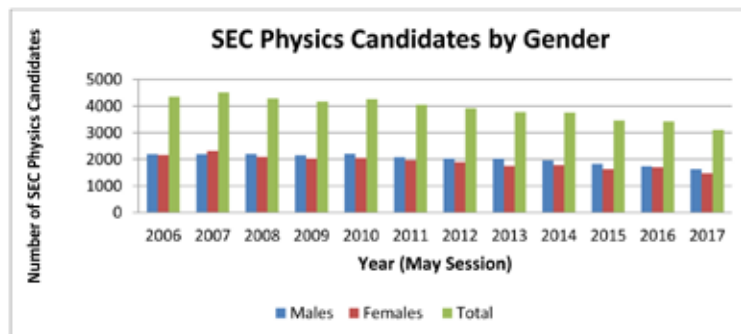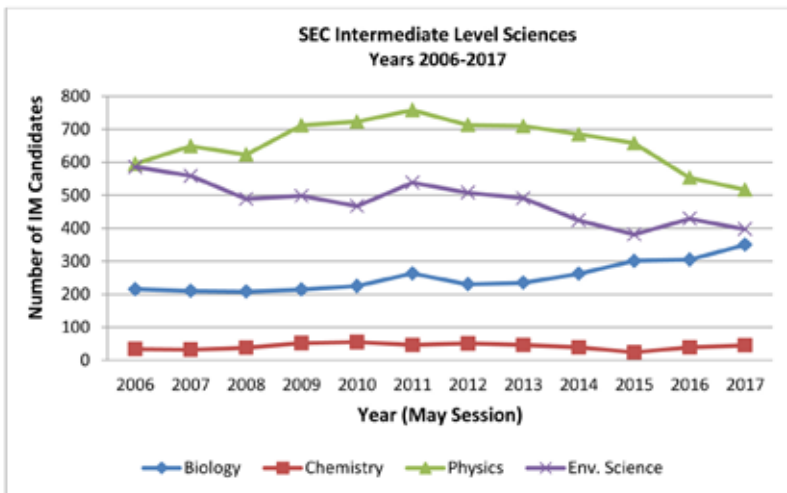

Figure 14
Adapted from University of Malta, Matsec Statistical Reports (2018)
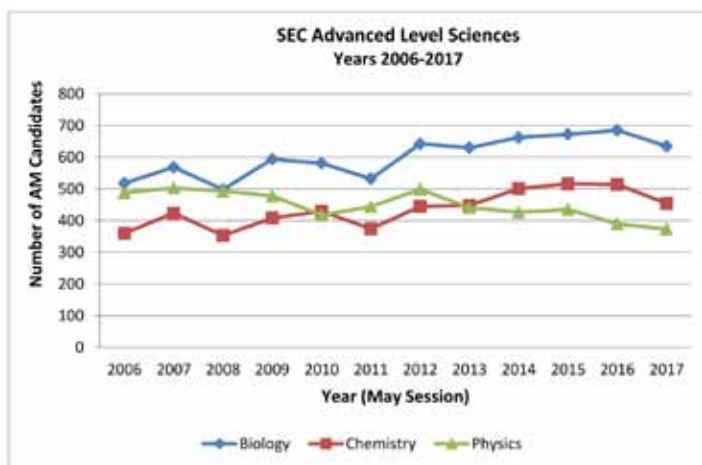
Figure 15
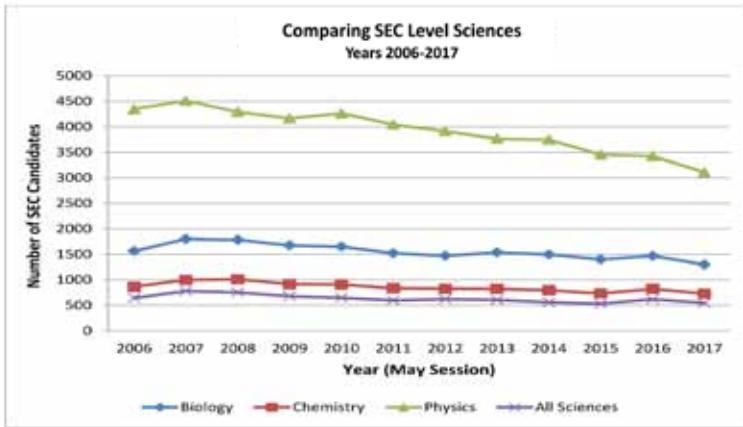**Adapted from University of Malta, Matsec Statistical Reports (2018)**

It is worth pointing out that unlike in the case of SEC, there was a recent significant overall positive trend in the total number of candidates attempting AM level exams (Figure 16).
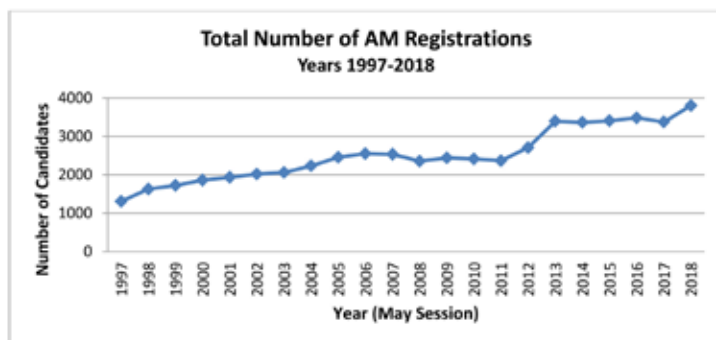
Figure 16
University of Malta, Matsec Statistical Reports (2018)

Progression from SEC to Matriculation (IM and AM) Level

Using statistics published by the Matsec Board, one can measure the progression of Maltese students in each of the 3 science subjects over a period of time. This involves a simple calculation of the percentage of intermediate (IM) or advanced (AM) candidates in one session, over those sitting the ordinary (SEC) level exam,

two years earlier. Such a metric indicates the percentage of students attempting SEC exam in the science subject who continue studying the subject at post-secondary level.

Results show that biology showed the highest progression to intermediate level over the period 2006-2017, while chemistry students registered the highest progression from SEC to AM level (Figures 17 and 18).
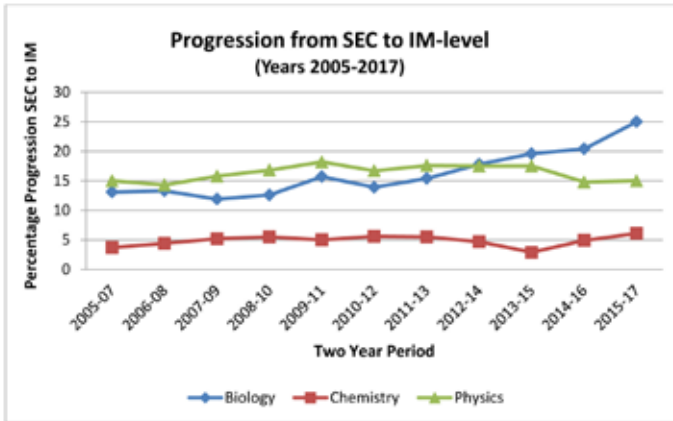
Figure 17
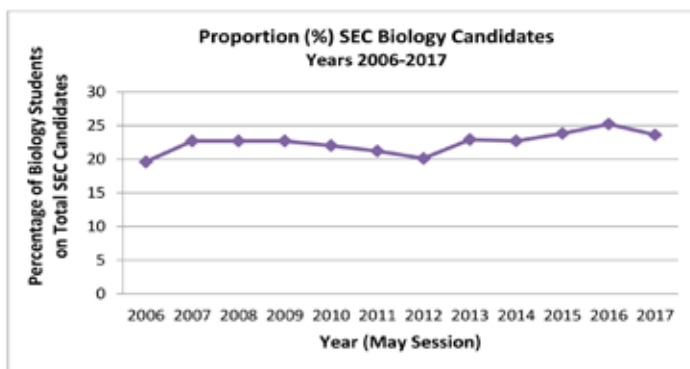**University of Malta, Matsec Statistical Reports (2018)**
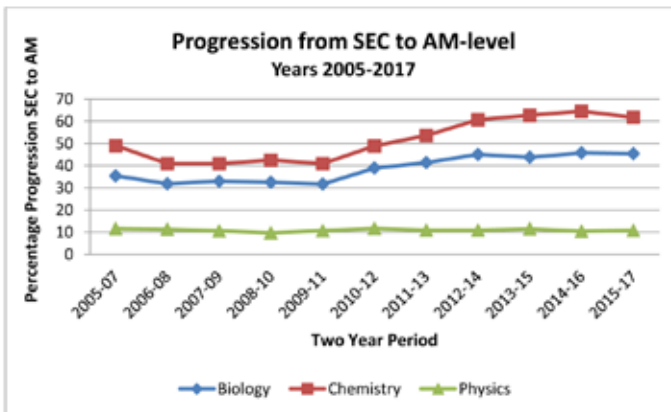
Figure 18
University of Malta, Matsec Statistical Reports (2018)

When the IM and AM numbers are combined, it seems that biology and chemistry students undergo the same progression from secondary to post-secondary level, with physics (still compulsory in most state schools) ranking a significantly lower

third. One could note an almost identical positive trend in the progression of chemistry and biology students over the last 7 years, with that of physics students remaining virtually constant (Figure 19). It is very evident that an increasing number of students studying science to SEC-level continue their science study at AM-level.
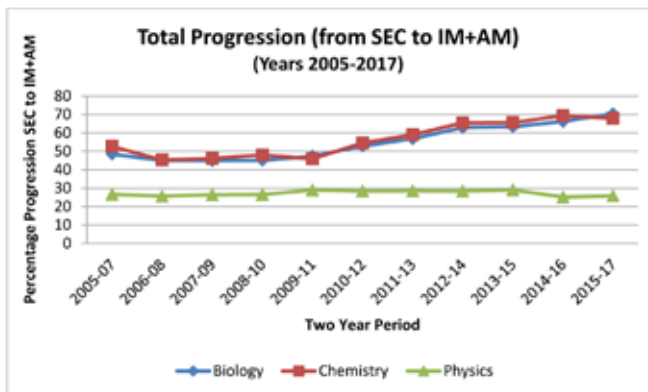
Figure 19
University of Malta, Matsec Statistical Reports (2018)

This means that in the case of chemistry and biology, a SEC student stands a good chance (currently 7 out of 10) to further his/her studies in these subjects at intermediate or advanced level. The chances of SEC students to continue studying physics at post-secondary are much lower (currently less than 3 out of 10).

Students' Attitudes towards Science

Students' attitudes towards both societal science and school science get shaped by various factors originating from their life experience.

Studies and surveys show that students' attitudes towards science itself are generally positive, with students viewing it as useful and interesting (Jenkins & Nelson, 2005). This is confirmed by the ROSE (Relevance of Science Education) study which discovered that young people view science and technology as important means to make their lives healthier, easier and more comfortable (Sjøberg & Schreiner, 2010).

By contrast, literature shows that school science is viewed by students as unattractive, as it lacks topics of interest, does not allow them to be creative and does not connect with society. It also fails to relate with the progress of research work in science and is often perceived as fragmented in different isolated disciplines which prevents students from having a coherent picture of science (Christidou, 2011; Siegel & Ranney, 2003; McSharry & Jones, 2002). Students' interest in school

science declines significantly during the period of compulsory education (Bennett & Hogarth, 2009; Christidou, 2011).

This contradiction between the students' interest in science as a discipline and their growing lack of interest to school science confirms that science appears to be a 'love-hate' subject that has a strong influence on the students' feelings, particularly at the secondary level of education (Osborne et al, 2003; Hendley et al, 1996).

Students' Attitudes towards School Chemistry

The fact that chemistry is the least studied science subject and is not so popular in Maltese schools at both secondary and post-secondary level does not make Malta an exceptional case (Kracjik et al, 2001). Physical sciences are, in fact, among the least popular school subjects in several other countries as well (Bennett, 2008).

It was found that negative attitudes towards school chemistry result from a combination of factors, such as the perception that chemistry is a rather dirty discipline, the abstract concepts and theories which make it hard to understand (De Jong, 2000) and the subject's lack of relevance to the student's everyday lives (Holbrook, 2005).

Other important aspects of school chemistry that influence the students' attitudes towards the subject are the applied method of teaching and the laboratory experience.

Factors Determining Students' Choice to Study Science

It is known that the students' interest to pursue further study in science becomes largely set in stone by the age of thirteen or fourteen (Lindahl, 2007; Osborne & Dillon, 2010).   The following are some of the features which students find interesting and uninteresting in science in general, and in chemistry in particular, at such an important phase in their education.

• What makes science more appealing

There is sufficient evidence showing that students, especially girls, are more attracted towards biology than to the other sciences (Bybee & McCrae, 2011).

In chemistry, students were particularly interested in aspects that were concrete, observable and manipulable, such as mixing of chemical reagents, odours associated with chemical changes and other observations from practical work. Students were stimulated when exposed to hazards such as toxic and explosive substances, which renders the laboratory experience even more memorable (Collins, 2011).

Students feel more engaged in relevant topics concerning contemporary issues or others that dealt with the existence of man. Students' interest also depended on teaching, with the most effective teachers being the ones that maintained order in class, were less didactic, used different resources and activities, had a sense of humour and built a good relationship with students, involving them frequently during lessons (Hampden-Thompson & Bennett, 2013; Lyons, 2006).

Researchers found that practical work helps students understand and retain better the scientific concepts (Abrahams & Millar, 2008). It also facilitates learning, resulting in a greater sense of enjoyment and a deeper understanding (Cerini et al, 2003).

One main motivation to learn science remains the prospect to land a science-related career (Osborne & Dillon, 2010), which can be a prestigious and well-paid profession.

• What makes science less appealing

Factors making science so difficult and hence less appealing include the use of language full of unfamiliar terms, the complex concepts involved, irrelevant topics, the mathematical aspect of physics and chemistry, and the need to memorise so many facts for exams (Collins, 2011). Students may also be influenced badly from people with a negative viewpoint on the subject.

Students also dislike the rushed and overburdened curriculum which they experience at school. The common feeling among students is that material is too crammed, allowing no room for reflection, participation and questions. Students feel deprived of having their own say in their own learning experience and therefore cannot express their creativity and imagination.

It is argued that the school science curriculum is failing to give students a coherent picture of the subject by providing them with fragmented pieces of knowledge usually dealt with separately under one of the three sciences, viewed by students as being so distinct from each other (Osborne and Collins, 2001).

Studies show that students often experienced a pedagogy described as condescending, patronising and dogmatic, which again did not allow sufficient space for discussion. It often created a competitive atmosphere and assumed that students cannot act as autonomous intellectual agents (Donnelly, 2001; Tobias, 1990).

Chemistry was singled out by students to be the least relevant of the three sciences, with certain aspects regarded as being unimportant and outdated. Chemistry curricula tend to put more emphasis on the subject matter than on its applications (Holbrook, 2005).

Students' Understanding of Chemistry Concepts

A significant amount of research addressed issues related with students' understanding of key chemistry concepts. Research findings indicate that problems arise from a number of potential learning difficulties:

- Students learn most things by heart in order to create their own meanings of the material being taught.
- Many students have an initial poor understanding of basic chemical concepts, making it harder for them to understand completely more advanced concepts.
- Many ideas remain vague and students are unable to identify key concepts required to understand the subject content.
- Teaching may not present the key concepts or relationships between different concepts in a sufficiently clear way for better understanding.

(Nakhleh, 1992; Pendley, Bretz & Novak,1994).

There are other possible barriers to the learning of chemistry (Gabel, 1999). These may be summarised as follows:

- Chemical concepts tend to be abstract and cannot be completely explained with the use of analogies or models.
- Learning chemistry occurs at three different levels: the **macroscopic** level; the **microscopic** level; and the **symbolic** level (Figure 20). Students find it hard to transfer readily from one level to another, while instruction usually occurs at the most abstract level, that is, at the symbolic level (Johnstone, 1991).
- During practical work, students are often expected to make observations at the macroscopic level but then they have to interpret results at the microscopic level.
- Students may perceive chemistry as being unrelated to their lives and more related to strangely named toxic or hazardous chemicals.
- The type of language and terminology used during chemistry lessons could also complicate matters.
- The chemistry curriculum is not always structured in a logical sequence that is suitable for instruction.
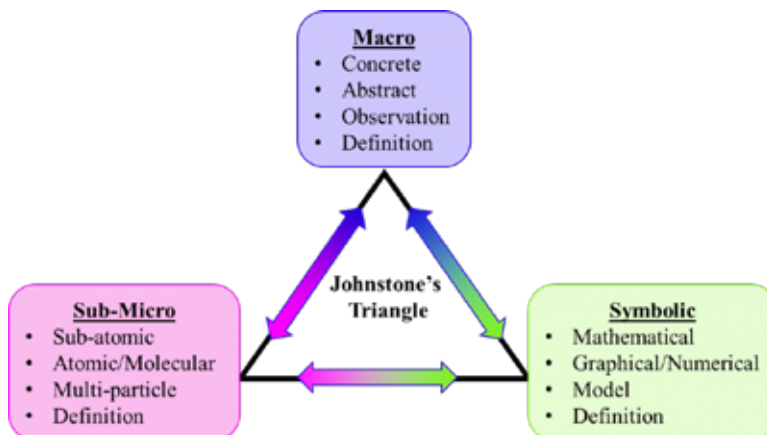
Figure 20: Johnstone's triangle of chemistry learning
(Source: Seery, 2016)

These barriers to chemistry learning need to be identified and addressed accordingly in order to facilitate the learning process and address misconceptions. For example, many chemistry teachers are not able to distinguish clearly between the three types of knowledge. This explains why students find it hard to build meaningful connections or transfer rapidly from one level to another for a given chemical system (Talanquer, 2013). Such difficulty to continuously integrate these different levels of understanding results in a fragmented picture of chemistry made up of disjointed parts that do not seem to fit together (Gabel, 1999).

In order to stress the importance of the human aspect in the learning of chemistry, Mahaffy (2004a; 2004b) added a fourth dimension, "the human element", to Johnstone's three learning levels of chemistry, to put emphasis on scientific literacy and understanding of the role of chemistry in everyday life (Figure 21).
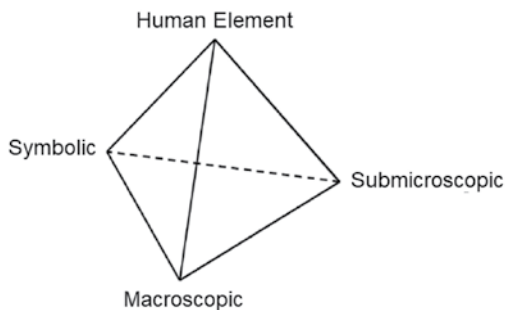
Figure 21: Tetrahedral chemistry education
(Source: Mahaffy, 2004b)

Later on, Mei-Hung Chiu (2012) added also a "language" dimension (Figure 22) to highlight the importance of teaching and learning the language of chemistry within chemistry contexts. One has to realise that although language attempts to help students understand scientific concepts more clearly, it is the same medium that sometimes hinders students' understanding.
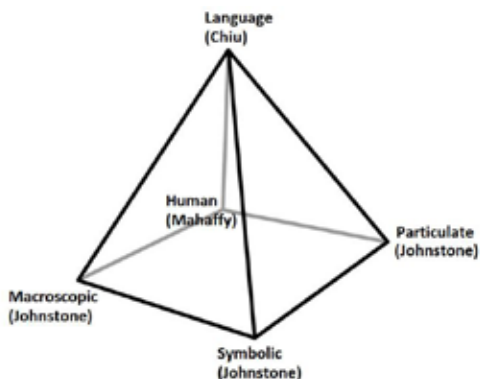
**Figure 22: The revised model of key factors influencing chemistry learning
(Source: American Chemical Society, 2012)**

Other authors indicate that there are additional areas which need to be explored further in chemistry education. These include further work on curriculum development (in view of increased use of technology), problem-solving, the type of chemistry required by different students with different career aspirations and addressing different levels of motivation (Beasley, 2009).

Implications for Policy and Practice

In the light of the abundant research and the current trends in science, one can safely conclude that there is a realistic chance of attracting more students to choose to study science at secondary level and further their studies at post-secondary level and beyond. The following are some points worth considering in any future updates of the local science education policy and teacher training programmes.

• Increase relevance of the subject

Science education needs to emphasise those aspects which are valued by students in everyday life and in different contexts, such as health and environment (Christidou, 2011). One may consider also applying inductive methods such as guided inquiry and problem-based learning with the use of real-world problems to provide more context

for all course material (Felder & Brent, 2009).

The local A-level chemistry curriculum lacks relevance and needs updating to illustrate the progress made by chemistry and its impact on contemporary society. A revamped curriculum should attempt to make it more relevant by bringing chemistry into the students' everyday experience. However one should not assume that whatever appears as topical or noteworthy is necessarily 'relevant' too.

• Improve communication via better use of language

Misconceptions in chemistry may arise with the inappropriate use of chemistry language in class. Language used in chemistry may be quite different from that used outside of chemistry. Hence efforts have to be made to ensure that students learn chemistry within chemistry contexts (Chiu, 2012).

• Educational outreach programmes

There is a strong need to organise educational outreach programmes aimed at both secondary and post-secondary science students to stimulate the learners' interest in chemistry. Such initiatives should establish contact between students and professionals or scientific researchers and increase the students' awareness of such job opportunities and ongoing research in our country. One could also explore the possibility of linking learning at school with organised school visits to industry.

• National curriculum in science

Future revisions of the national curriculum in science should continue aiming at putting less pressure on the curriculum material, allowing greater flexibility on choice of topics and putting more emphasis on practical applications (Munro & Elsom, 2000).

• Specialised science vs 'science for all' curricula

Any development in the science curricula has to address the dual objective of training a scientific elite and preparing the rest of the population, who are not interested in becoming professional scientists, to be scientifically literate citizens. Hence, the need for a specialised science curriculum starting from Form 3, which allows a smoother transition to further study and a broader curriculum serving a wider treatment of scientific knowledge, is indicated.

It is good to note that science has now been promoted to a core subject at primary level and that integrated science has returned as part of the secondary curriculum for non-science students. The next logical step is to introduce core science SEC exam for those wishing to include it in their secondary school leaving certificate. This move

could attract more students to consider retaining science subjects at least up to the intermediate post-secondary level.

• Addressing the chemistry uptake problem

Special attention is needed in the case of chemistry, which is perceived as one of the hardest A-level subjects. Indeed, some schools struggle to find qualified teachers in the subject. One needs to explore, for example, the possibility of attracting students who are less gifted in sciences and those who are late developers or late learners, but who are still interested in science despite having underachieved up to SEC level for a variety of reasons. Any initiatives taken to address this problem should always fall within an overall national strategy for developing science education in schools.

• Science education for all

There is a need to organise a strong educational campaign to promote the broader values of science subjects as being important aspects of a person's general education and career, and for the flexibility and transferability of skills at work (Munro & Elsom, 2000).

• Career advice

Attention should also be paid on the way parents and students are advised on the choice of subjects at years 9 and 12. For example, one has to highlight the implications of dropping career-relevant subjects and explain how continuing to study science does not limit students to a science career.

• Invest in human resources

One has to secure an adequate supply of properly qualified teachers of science, particularly in view of the academic reform affecting the qualifications required for the teaching of sciences. The state needs to invest in science teacher training, and possibly create more science learning centres, to enhance the continuous professional development of science educators, always keeping a balance between subject knowledge and pedagogical skills. Jenkins and Donnelly (2006) suggest that students need to enjoy learning science and this will happen if they are taught by teachers who enjoy teaching it.

• International cooperation

There is a strong need for science (including chemistry) educators to involve themselves at the international level by participating in conferences and/or other

initiatives to share and disseminate research findings in science education. Cross fertilisation of ideas and experiences in education would certainly contribute to enhance the teaching and learning processes, despite cultural and other limitations.

Conclusion

The aim of this paper was to evaluate the concerns regarding what appears to be a lack of interest by students to take up sciences, particularly chemistry, at post-secondary level and try to find what factors might be contributing to such a disenchantment among teenagers to school science.

The concerns are not fully justified, as the declining numbers of science students at secondary level in a way reflects the decreasing numbers of SEC candidates at the end of secondary education. It was also noted that there is a positive trend by secondary students studying science subjects to continue doing so at post-secondary education, thus increasing their chances to pursue further science-related studies.

The students' choices at secondary and post-secondary levels of education depend on a number of variables; it is not simply a question of convincing the most gifted students to commit themselves to become scientists at an early age. There are several stakeholders involved in the education of adolescent students, each of which can play an important role in affecting the students' decision and motivation to study science.

The paper aimed at trying to analyse these variables and inform these stakeholders, including science educators and career guidance professionals, about the complexity of students' choices at this level of education.

Chemistry is the science subject with the lowest uptake at secondary level; however, it then registers a high progression to AM level. This means that the problem of chemistry uptake mostly concerns choosing the subject half way through secondary education.

There are many initiatives and decisions that can be taken to improve the uptake of sciences in secondary education. Such initiatives should involve action from curriculum designers, policy makers, educators and scientists. Malta needs to 'catch them young' in science if it wants to increase the number of local undergraduates studying science or science-related disciplines and attract more Maltese graduates to undertake post-graduate research or follow a science-oriented career path.

References

Abrahams, I. & Millar, R. (2008). Does practical work really work? A study of the effectiveness of practical work as a teaching and learning method in school science. *International Journal of Science Education*, 30(14), 1945-1969.

American Chemical Society (ACS), Division of Chemical Education (2012) Report by 2012 International Travel Award Recipient Dr. Sam Pazicni. Available at http://www.divched. org/winter2012/IACawardreport [Accessed 1 August 2018]

Beasley, W. (2009). Teacher and student learning in chemistry: contrasts and contradictions. *Chemical Education International (online newsletter of the Committee on Chemistry Education, IUPAC),* 6(1).

Bennett, J. & Hogarth, S. (2009). Would you want to talk to a scientist at a party? High school students' attitudes to school science and to science. *International Journal of Science Education*, 31(14), 1975-1998.

Bugeja, G. (2006). TIMSS 2015 Malta Report – Curriculum. Available at https://curriculum. gov.mt/en/international_studies/.../TIMSS_2015_Malta_Report.pdf [Accessed 25 August 2018].

Bybee, R. & McCrae, B. (2011). Scientific literacy and student attitudes: Perspectives from PISA 2006 science. *International Journal of Science Education*, 33(1), 7-26.

Cerini, B., Murray, I. and Reiss, M. (2003). Student review of the science curriculum: Major findings. *London: Planet Science, Institute of Education and the Science Museum.*

Chiu, M. H. (2012). Localization, regionalization, and globalization of chemistry education. *Australian Journal of Education in Chemistry*, p.72.

Christidou, V. (2011). Interest, Attitudes and Images Related to Science: Combining Students' Voices with the Voices of School Science, Teachers, and Popular Science. *International Journal of Environmental and Science Education*, 6(2), 141-159.

Collins, S. (2011). What do students think about science. *How science works: exploring effective pedagogy and practice*, 14-30.

De Jong, O. (2000). Crossing the borders: chemical education research and teaching practice. *University Chemistry*, 4(1).

Donnelly, E. (2001). Management of science education during Key Stages 2 and 3. *MEd thesis, Queen's University, Belfast*.

Felder, R. M. & Brent, R. (2009). Effective teaching: A workshop. *Chemical Engineering Education*, 43(1), 15-16.

Gabel, D. (1999). Improving teaching and learning through chemistry education research: A look to the future. *Journal of Chemical Education*, 76(4), p.548.

Hampden-Thompson, G. & Bennett, J. (2013). Science teaching and learning activities and students' engagement in science. *International Journal of Science Education*, 35(8), 1325-1343.

Hendley, D., Stables, S. and Stables, A. (1996). Pupils' subject preferences at key stage 3 in South Wales. *Educational Studies*, 22(2), 177-186.

Holbrook, J. (1994). Scientific and technological literacy for all-the role of educators. *Science Education International*, 5(3), 10-16.

Holbrook, J. (2005). Making chemistry teaching relevant. *Chemical Education International*, 6(1), 1-12.

Jenkins, E. W. & Donnelly, J. F. (2006). Educational reform and the take-up of science post-16. In Royal Society Conference *Increasing the take-up of science post-16*, Vol.16.

Jenkins, E. W. & Nelson, N. W. (2005). Important but not for me: Students' attitudes towards secondary school science in England. *Research in Science & Technological Education*, 23(1), 41-57.

Johnstone, A. H. (1991). Why is science difficult to learn? Things are seldom what they seem. *Journal of Computer Assisted Learning*, 7(2), 75-83.

Krajcik, J., Mamlok, R. and Hug, B. (2001). Modern content and the enterprise of science: Science education in the twentieth century. *Yearbook-National Society for the Study of Education,* 1, 205-238.

Lindahl, B. (2007). A longitudinal study of students' attitudes towards science and choice of career. In *NARST Annual Conference, April 15-18, 2007*, New Orleans.

Lyons, T. (2006). Different countries, same science classes: Students' experiences of school science in their own words. *International Journal of Science Education*, 28(6), 591-613.

Mahaffy, P. (2004a). The future shape of chemistry education. *Chemistry Education Research and Practice*, 5(3), 229-245.

Mahaffy, P. (2004b). Tetrahedral chemistry education: shaping what is to come. *Chemistry International*, 26, 14-15.

McSharry, G. (2002). Television programming and advertisements: help or hindrance to effective science education?. *International Journal of Science Education*, 24(5), 487-497.

Ministry of Education, Employment & the Family (MEEF) (2011). A vision for science education in Malta. The National Curriculum Framework 2011. Consultation document, 10-13.

Munro, M. & Elsom, D. (2000). Choosing Science at 16: The Influence of Science Teachers and Career Advisers on Students' Decisions about Science Subjects and Science and Technology Careers. NICEC Briefing.

Nakhleh, M. B. (1992). Why some students don't learn chemistry: Chemical misconceptions. *Journal of Chemical Education*, 69(3), p.191.

Osborne, J. & Dillon, J. (2010). How science works: what is the nature of scientific reasoning and what do we know about students' understanding. *Good Practice in Science Education: What Research Has to Say*, 20-45.

Osborne, J., Simon, S. and Collins, S. (2003). Attitudes towards science: A review of the literature and its implications. *International Journal of Science Education*, 25(9), 1049-1079.

Pendley, B. D., Bretz, R. L. and Novak, J. D. (1994). Concept maps as a tool to assess learning in chemistry. *Journal of Chemical Education*, 71(1), p.9.

Royal Society (2006). Increasing the uptake of science post-16, report of a Royal Society Conference held on March 10th 2006.

Seery, M (2016). Is this going to be on the exam? A tour around Johnstone's triangle. Available at http://michaelseery.com/home/index.php/2016/10/a-tour-around-johnstones-triangle/ [Accessed 1 August 2018].

Siegel, M. A. & Ranney, M. A. (2003). Developing the changes in attitude about the relevance of science (CARS) questionnaire and assessing two high school science classes. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching*, 40(8), 757-775.

Sjøberg, S. & Schreiner, C. (2010). The ROSE project: An overview and key findings. *Oslo: University of Oslo*, 1-31.

Smith, E. (2010). Is there a crisis in school science education in the UK?. *Educational Review*, 62(2), 189-202.

Talanquer, V. (2013). Chemistry education: Ten facets to shape us. *Journal of Chemical Education*, 90(7), 832-838.

Tobias, S. (1990). *They're not dumb, they're different* (Vol. 101). Tucson, AZ: Research Corporation.

University of Malta (2018). Matsec Examination Board: Statistical Reports. Available at https://www.um.edu.mt/matsec/reports/statisticalreport [Accessed 1 August 2018].

Bio-note

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Perception versus Performance:
A Study on Attitudes Towards,
and Performance in Maltese and English

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Abstract

The National Curriculum Framework (2012) establishes 'the knowledge, skills, competences, attitudes and values' that a learner is expected to have at the end of the Junior Years Cycle (Year 6). Amongst the NCF's projected outcomes is the goal of seeing that children are able to competently make use of 'the range of age-appropriate language skills in both Maltese and English', whilst enabling children to 'appreciate and promote their Maltese culture and heritage', as well as appreciating their 'European and global contexts' (NCF 2012, p.21).

This paper deals with one of a series of questions laid out in a questionnaire which formed part of a quantitative survey with 987 Grade V Primary school children from State, Church and Private schools. This quantitative large-scale survey was but one section of a tripartite study which included in its totality, two large-scale quantitative surveys with Grade V primary students and subsequently Grade V parents respectively, as well as a qualitative study with Grade V teachers. The research aimed not only to gauge attitudes towards bilingualism in the Maltese Islands from the viewpoint of primary school children, but also to establish what the perceptions towards and proficiency in the two official languages of the Maltese Islands; namely, Maltese and English, were. Moreover, this study is the first of its kind to carry out research on such a large-scale, not just limiting itself to one group of respondents, but rather seeking to document the attitudes and opinions towards bilingualism as seen from the perspective of the primary school sector, from the point of view of the major stakeholders involved: students, parents and teachers.

Hence this paper focuses on the results obtained when primary school respondents were asked to rate their written Maltese and English proficiency. These perceptions are then compared to an actual impromptu written task in the two languages, thus serving as a gauge of written bilingual proficiency.

Keywords: Bilingual education, bilingualism, primary education, Maltese and English

Student respondents' written Maltese self-assessment

Considering that Maltese is the L1 for the majority of the population, it is only 22% of Maltese primary students who perceive themselves as being 'very good' at writing at what is essentially their native tongue. Only 22% of this entire sample of 987 students regard their written skills as being 'very good.' A more cautious group of 38% only go as far as rating themselves as having a 'good' proficiency; yet almost just as many, are quite uncertain of their Maltese written skills. In fact, 31% cautiously state that they would rate their written Maltese skills as being only 'so - so.' A total of 9% rated themselves as being either 'bad' or else 'very bad' at written Maltese. Therefore, the primary question should not simply concern itself with determining whether it was Maltese or English that was suffering a decline, but rather become very much aware of the fact that there was yet another discrepancy between the standards of oracy and literacy in the native language itself.

As shown in Table 1, at least 28.3% State school students seem to be the ones who are most confident about their Maltese written skills, whilst a further 39.3% also top the league, perceiving themselves to have 'good' written skills in their L1.

Table 1: Students' written Maltese self-assessment by Type of School

	State	Church	Private	Total
Very Good	129	62	28	**219**
	28.3%	15.4%	24.1%	**22.5%**
Good	179	156	35	**370**
	39.3%	38.8%	30.2%	**38%**
So - so	125	148	29	**302**
	27.4%	36.8%	25%	**31%**
Quite bad	16	24	15	**55**
	3.5%	6%	12.9%	**5.6%**
Very Bad	7	12	9	**28**
	1.5%	3%	7.8%	**2.9%**
Total	456	402	116	**974**
	100%	100%	100%	**100%**

x^2 (8) = 52.79, p= 0.000

As many as 27.4% are not so confident about their written skills, leading them to rate their written skills as being 'so - so' whilst 5% view their skills as being 'quite bad' (3.5%) or 'very bad' (1.5%). It must be said however that out of the three school types, it seems that State school students are the ones who seem to be the most confident with their written Maltese skills. There were more Private school students (24.1%) than Church schools respondents (15.4%) who rated themselves as being 'very good.' An additional 30.2% Private school respondents suggest that their skills are 'good.' The percentage of those who chose the 'so - so' option - 25%, is very similar to the percentage that this option garnered by State school students. In contrast to State school students however, 12.9% were quite forthcoming in their self-assessment and perceived their skills as being 'quite bad.' In line with general assumptions, Private schools respondents are those who have the greatest concerns with Maltese written skills. Seven point eight percent (7.8%) think of themselves as being 'very bad.' Therefore this would mean that a total of 20.7% Private school respondents consider their written Maltese skills as being 'quite bad' or 'very bad.'

This study revealed that Church school students were the ones who were the most forward in revealing that they were the least confident about their Maltese writing skills. Only 15.4% rated themselves as being 'very good' at Maltese, 38,8% rated themselves as being 'good' at it, whilst a similar percentage of 36.8% would only go as far as saying that their written skills were 'so - so.' A further 9% thought of themselves as being 'Quite bad' (6%) or 'Very Bad' (3%). This self-assessment comes across as being rather surprising considering that Church school respondents have been fairly consistent in describing themselves as the recipients of a relatively balanced exposure to both Maltese and English.

Students' written English self-assessment

The percentage of 40.2% of Maltese primary students whose rating was recorded in this study perceive themselves as being rather 'very good' at written English (Table 2).

Table 2: Students' written English self-assessment

	Frequency	**Valid Percent**
Very Good	394	40.2%
Good	368	37.6%
So – so	180	18.4%
Quite bad	24	2.5%
Very Bad	13	1.3%
No response	8	0%*
Total	987	100%

This is followed by 37.6% of the total student sample who rate themselves as being 'good' at this. A further 18.4% are less sure of their written skills whilst almost 4% perceive their written English skills as being 'Quite bad' (2.5%) or 'Very bad' (1.3%). Table 3 presents a Chi Square cross-tabulation analysis by type of school.

Table 3: Students' written English self-assessment by Type of School

	Type of School			
	State	Church	Private	Total
Very Good	144	187	63	**394**
	31.6%	46.4%	52.5%	**40.2%**
Good	171	151	46	**368**
	37.5%	37.5%	38.3%	**37.6%**
So – so	113	58	9	**180**
	24.8%	14.4%	7.5%	**18.4%**
Quite bad	18	4	2	**24**
	3.9%	1%	1.7%	**2.5%**
Very Bad	10	3	0	**13**
	2.2%	1%	0%	**1%**
Total	456	403	120	**979**
	100%	100%	100%	**100%**

$$x^2 = (8) = 51.33, p = 0.000$$

Percentages for all three school types are very similar when considering all those who chose to rate their skills in the second category 'Good.' Approximately 38% of State, Church and Private schools regard their skills as being 'good.' However, discrepancies lie in the ratings provided by the three school types in the middle scale of rating, where more State school students (24.8%) seem to be less sure of their written L2 skills.

Fewer Church school students in fact seem to think less of their written skills with 14.4% opting for this choice. Only 7.5% of Private school respondents however seem to be the least sure about their English writing skills.

Success is not only dependent on one's ability to express oneself fluently when speaking a language, but is also dependent on one being able to express one's thoughts through the written medium. However, the fact that there is rather high percentage of students who at this stage in their education are already somewhat unsure of their skills, should direct educators towards evaluating how this gap may be bridged. Exposure to the language in the home domain, as well as exposure to the target language in the school domain, from the very first stages of primary is essential. If a language such as English is not the language that is being supported

through use in the home domain, then quality exposure to the language through the media could very well help to begin to address these gaps.

Moreover, if the dominant L1 is being supported in the home and the community domain, then it follows that the school domain must endeavour to make up for that lack of additive linguistic environment and create a system which moulds itself and addresses the particular needs of the student, placing that student in a target language immersion system to help the student acquire the language through play and interaction both with the teacher and with class peers.

Language is the most essential and most basic means of expressing oneself and the inability to express oneself clearly and coherently becomes a burden which students carry throughout their lives not only in primary and secondary school, but throughout their academic and professional careers. A culture of simply 'making do' is not enough if present and future generations are to find stable positions in the employment sector. What this calls for is a carefully co-ordinated position where language exposure is to be given primary importance so as to enable children to truly grow in an additive bilingual environment.

Regardless of the standards of the past, good or bad, one must focus on a bilingual education system that adapts itself to the needs and sometimes failing to adapt to a system. As shown in Table 4 only 22.5% of respondents perceive their skills as being 'Very good', whilst a further 38% regard their written Maltese language skills as being 'Good.'

Table 4: Comparative analysis of students' written Maltese and written English self-assessment

Written Maltese	Frequency	Valid Percent
Very Good	219	22.5%
Good	370	38%
So – so	302	31%
Quite bad	55	5.6%
Very Bad	28	2.9%
N/A	13	0%*
Total	987	100%

Written English	Frequency	Valid Percent
Very Good	394	40.2%
Good	368	37.6%
So – so	180	18.4%
Quite bad	24	2.5%
Very Bad	13	1.3%
N/A	8	0%*
Total	987	100%

Of most concern is the 31% who describe their written Maltese skills as being 'so-so', coupled with 8.5% who consider the written Maltese skills as being 'Quite bad' or 'Very bad.' As the situation stands at the moment, Maltese is considered one of the core subjects necessary for students to progress from a secondary to a post-secondary institution.

Proficiency in oracy is of course invaluable, but in the current education system accuracy at the level of literacy is also essential, particularly because there are certain examinations which students must sit for in Maltese and others which students must sit for in English. Proficiency in written language is essential if one is to progress up the academic ladder. According to the way the curriculum is set at the moment, Maltese is a passport to post-secondary institutions.

The student respondents in this study are by far more confident of their written English language skills with 40.2% rating their skills as being 'very good', as opposed to the 22.5% who chose this same rating for Maltese. A further 37.6% consider themselves to be quite 'good.' All this augurs well for English. At least the perception towards the medium which is essential for progress in the academic and professional world is relatively good. However, there are those 22.2% who are either unsure of their written English skills (18.4%) as well as others who perceive themselves to be quite poor in this area.

The last exercise in the eight-page questionnaire presented to respondents, required the students to convey ideas about their goals for the upcoming holiday season. Having guided the students throughout the questionnaire, the researcher explained she was an inquisitive being who wanted to know as much detail about what they liked to do in their holidays and therefore it would be great if they could write four full sentences detailing what their adventurous exploits during the summer or wintery season would turn out to be. Students were invited to view this as a game, whereby the researcher would understand more about their habits through the written medium. The students were told that the researcher would have been so glad if students could spontaneously convey their ideas in full sentences in both Maltese and English.

As a result of the brevity of the exercise due to both time and logistical considerations, and given the fact that there was no tool that could be used to analyse students' written bilingual skills simultaneously, the researcher turned to international set of criteria of assessment as indicated by the KET (University of Cambridge Key English Test for Schools) which stands at Level A2 of the Common European Framework of Reference for Languages, for a fair evaluation of sentences written by students.

When drafting the questionnaire it was decided to have students write four sentences and to have those written as fully as possible – something the researcher emphasised both prior and during the undertaking of the exercise. When going through the written data however, the researcher ran into several difficulties because sentences were not written in full or came in the form of phrases or, at

times, single verbs, leaving very little for the markers to evaluate. Therefore in order to present an accurate representation of the students' work; it was decided to do away with the original idea of describing the written work as 'sentences' and instead refer to written work in terms of 'written expressions'.

The main aim of this grading exercise was to provide a raw score that would serve as an indication of the levels of written proficiency for both Maltese and English. The nature of this exercise was not to catch respondents out on what they did not know, but it was held in order to serve as a neutral assessment of what they did know. Hence this very brief assessment was intended as part of a normal classroom activity.

A measure of the language proficiency of the subjects was needed and hence an appropriate, language exercise was designed. Such a performance test, in which a sample of students' creative writing abilities are investigated, are 'elicited' from the individual taking the test and then 'judged' by trained individuals who reach an agreement about the rating procedure (McNamara, 2001). This study therefore gathered evidence of general written language abilities from the performance in the designed task, so as to enable the researcher to reach an assessment of how capable students were in communicating their thoughts or ideas in both languages. Data of course was limited only to an assessment of this particular student cohort at a fixed point in time. Table 5 highlights the crux of the matter. It throws the spotlight on the actual performance of students at a given point in time in written Maltese. As might be well imagined, it was Private school students who fared the worst out of the three school types, because 27.5% of the student respondents produced work which merited no more than 0 marks.

Table 5: Respondents' performance - Written Maltese Expression

State Schools Maltese		0 marks	1 mark	2 marks	3 marks	4 marks	5 marks
Verb Only	5%						
Phrase Only	20.6%	6.1%	9.1%	13.7%	28.2%	25.6%	17.4%
Meaningful expressions	65.5%						
Blank/Undecipherable	5.4%						
Church Schools Maltese		0 marks	1 mark	2 marks	3 marks	4 marks	5 marks
Verb Only	7.6%						
Phrase Only	9.6%	6.9%	5.4%	13.1%	27.8%	24.4%	22.4%
Meaningful expressions	70.2%						
Blank/Undecipherable	6.7%						
Private Schools Maltese		0 marks	1 mark	2 marks	3 marks	4 marks	5 marks
Verb Only	1.7%						
Phrase Only	14.2%	27.5%	5.8%	11.7%	18.3%	15.8%	20.8%
Meaningful expressions	55.8%						
Blank/Undecipherable	25%						

Students in State schools were the ones who were most commonly awarded 3-4 marks. Indeed, 28.2% were awarded three marks and another 25.6%, produced work which was given 4 marks. These results are quite closely followed by students in Church schools, 27.8% of whom were awarded 3 marks and 24.4% whose work was likewise awarded 4 marks. Table 5 presented above, has shown that there was a total of 28.9% State school students, 25.4% Church school students and 45% Private school students whose written Maltese work was only awarded 0 - 2 marks. This shows that these students were clearly not adequately prepared to deal with the challenges that a bilingual education system presents given that they were unable to express themselves when asked to write four simple sentences about immediate goals or plans that they had for the upcoming holiday season.

The same analysis was carried out for students' English written proficiency, the results of which are presented in Table 6 below. When comparing results for Maltese and English, one notices an increase in the percentages for those students whose work was awarded the lower marks. When analysing written English work, one may note that there is a total of 40.3% State school students whose work was given between 0 – 2 marks (when previously in Table 5, only 28.9% produced work that was attributed these same low grades). In addition, 37.4% Church school students also obtained a score ranging between 0 – 2 marks (when previously as shown in Table 5 only the work of 25.4% had been placed within these bands when their Maltese writing was being assessed).

Table 6: Respondents' performance - Written English Expressions

State Schools English		0 marks	1 mark	2 marks	3 marks	4 marks	5 marks
Verb Only	4.3%						
Phrase Only	41%	10.4%	11.5%	18.4%	32.5%	18.2%	8.9%
Meaningful expressions	37.7%						
Blank/Undecipherable	9.3%						
Church Schools English		0 marks	1 mark	2 marks	3 marks	4 marks	5 marks
Verb Only	6.9%						
Phrase Only	30.8%	7.1%	10.8%	19.5%	30.3%	21.4%	10.8%
Meaningful expressions	44.3%						
Blank/Undecipherable	6.2%						
Private Schools English		0 marks	1 mark	2 marks	3 marks	4 marks	5 marks
Verb Only	3.3%						
Phrase Only	27.5%	1.7%	6.7%	15.8%	39.2%	20.8%	15.8%
Meaningful expressions	62.5%						
Blank/Undecipherable	1.7%						

On the other hand, this trend is not observed in Private schools which had the least (out of the three school types) percentages of work which was rated as being of the lower quality (0 - 2 marks). In fact, as had been seen in Table 5, the work by 45% Private school students had been given between 0 – 2 marks for their Maltese work. Indeed, the work by Private school students was mostly assigned the average and higher marks. Only 24.2% (15.8% + 6.7%+ 1.7%) produced written work that was placed in the lowest bands. From amongst the three school types, Private school students ranked first from amongst the three school types, to produce work which was consistently awarded 5 marks. This top mark was achieved by 15.8% of Private school respondents, followed by 10.8% of Church school attendees, whilst only being achieved by 8.9% of State school students. A comparable percentage of Church and Private school students achieved 4 marks, (21.4% and 20.8% respectively), whereas State schools yet again ranked third with 18.2% achieving 4 marks. Most State school students' work (32.5%) was given 3 marks and this may therefore be considered as the median, with another 30.3% Church school students and 39.2% Private school students also obtaining this grade.

Given that the written English work by Private school students was given a rating that saw it mostly being given between 3 – 5 marks, this therefore shows that 75.8% Private school students seem to be able to perform better in written English than their counterparts in other schools. Additionally, the quality of work produced by 62.5% Church school students was also awarded a mark ranging between 3 – 5. State school students ranked last in terms of the quality of English written work they produced. Only the work produced by a little more than half the respondents (59.6%) who participated in the study was awarded 3 – 5 marks.

Concluding remarks

It is indeed of concern to see that 40.3% of the State school students, 37.4% Church school students and 24.2% Private school students who participated in this study, are certainly going to need that extra help and attention if they are ever to successfully complete their secondary education. As it is, it is clear that they are struggling to express themselves in an education system whose very foundation is based on written examinations to see them through to their next level of education. Clearly disadvantaged, these students and others facing their same predicament, cannot aspire to progress in a system where some examinations are set in the English language and where their aspirations for decent jobs in the work-force, remains unachievable. It is unacceptable that in this modern day and age, there are students who are struggling to express themselves in simple English sentences, when students have been given the opportunity to partake of a bilingual education system from the age of five.

From the results obtained in this study, it is evident that there is the need to address the lack of exposure to quality English and Maltese where this is lacking and ensure that students are able to express themselves via the written medium in both languages. Inability to perform adequately in one language or another is clearly a demeaning factor for students and despite their young age, students are very much aware of where their strengths and weaknesses lie. This study has shown the majority of this particular State school student cohort as being unable to write meaningful expressions about their immediate goals and aspirations at this level towards the end of their primary school years cycle. This shows these students to be quite a way off from the original goals and aspirations of the National Curriculum Framework (2012).

References

McNamara, T. (2001). Language assessment as social practice: Challenges for research. *Language Testing* **18**.4, 333–349.

Ministry for Education (2012). The National Curriculum Framework for All. Available at http://curriculum.gov.mt/em/resources/the-ncf/pages/default.aspx. [Accessed 3rd September 2018]

University of Cambridge ESOL Examinations. (2010). *Key English Test for Schools Past Paper Pack March 2010*. Cambridge: UCLES.

Bio-note

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The Impact of Technology on Economic, Political and Social Spheres: the Transition from Sail to Steam in 19th century Malta

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Abstract

Nowadays, we are aware that technology determines and affects our daily lives. We also acknowledge its impact on national political, economic and social development as well as its central role in contemporary globalisation. However, back in time when technology was still affirming its prominence, its impact on society was not yet so discernible. In the study of Maltese history it has often been relegated to secondary importance. One example is the research carried out on the advent and dissipation of the 19th century economic boom in the Maltese Islands. Malta went through a golden age of commerce, followed by a terrible economic slump. Whilst many hailed the entrepreneurial genius of the Maltese, the dominance of British trade and the opening of the Suez Canal, little or no credit was attributed to the new technology of steam propulsion. Adapting to a transition from sail to steam, Malta became a primary coaling station, basing its economy on bunkering and servicing of steam ships. The working population flocked to the harbours in search of making a fortune. The consequent slump, a few decades later, was often explained as a natural recession, with little reference to the fact that it was also the result of the sharp decline in visiting steam-ships, due to further advances in steam technology and the way the Maltese had dealt with this new technological breakthrough. My research delves into this transition from sail to steam: dealing first with Britain's supremacy in the technological evolution of steam and then with the impact of steam shipping in Malta. Breaking barriers in academia proved edifying. British dominance at the time, combined with the response of Maltese commerce to the advent of the steam ship, provides a context of opposing interests which shaped the history of Malta for half a century and contributed to its future political, social and economic development. This study primarily exposes the centrality of steam technology in the unfolding of 19th century Maltese history.

Keywords: Sail to Steam Transition, Steam technology, Economic Boom, Economic Slump, Fortress Colony

The advent of steam power as an engineering feat, was a key innovation of the 19th century Industrial Revolution. Steam replaced water, wind and muscle power with a system of propulsion that was faster and more efficient. Together with the other inventions and innovations, it dictated the new economies, social changes and politics of the time. Steam shipping catapulted entrepreneurial states into unprecedented wealth and prosperity. Britain, at the forefront of the revolution produced the first inventors and their technologies, and became a world leader in trade. Malta, one of its many colonies, benefited from this predominance, if only for a while. A coal bunkering and a service station, Malta was an ideal stop along the new trade routes headed towards the Suez Canal on their way to the East. Torn between serving an empire and developing its own economy, Malta experienced a golden age of commerce and well-being. Nevertheless, by the end of the 19th century, the primacy of British Imperial interests twinned with an advance in steam technology and neglect of local industries, marked the end of an economic boom and the beginning of a long recession. The invention of steam power shaped the response of Malta to the industrial revolution.

This study initially outlines the advent of steam technology and its significance; an appreciation of the main feats in the evolution of steam propulsion and its impact on the fate of Britain. Subsequently, and within this context, this paper then delves into Malta's reaction to steam shipping, on an economic, political and social level. This research represents snapshots of a previous comprehensive study on the transition from sail to steam (Gatt, 1994); including thorough investigation of numerous secondary sources dealing with shipping history as well as Maltese primary sources, namely the Malta Blue Books (MBB), National Censuses (NC), Shipping Registers of Customs: Arrivals and Departures (SRC), Council of Government debates (CG) and Chamber of Commerce Annual Reports (CCAR).

The Advent of Steam Power and its Role in Shipping

The novelty of producing steam as a means of power had already been hinted at by the Greeks (Black, 2014), however by time, science and technology uncovered its many purposes. Numerous attempts at harnessing steam power were undertaken on both sides of the Atlantic; America and Britain claimed the merit of the various feats in the process. The idea for a novel piece of machinery that was to revolutionise propulsion was conceived in Britain by Thomas Savery (1698); 'the miner's friend', was capable of pumping water out of flooded coal mines by, "admitting steam to a chamber, condensing it by cooling the outside of the chamber, allowing the partial vacuum to siphon water into the vessel, and then lifting the water with steam pressure" (Woods, 2003, p.39). This pump, originally inspired by Denis Papin's work with steam powered pistons in France (Landstrom, 1961), was the beginning of the steam engine's evolution; others perfected its functions and purposes along the

years. Savery's engine's lack of efficiency in deep waters was improved by Thomas Newcomen who redesigned a whole new engine; his *atmospheric engine* became the first commercially successful steam machine, even if it needed a continuous flow of cold water to keep the steam cylinder cool. Its technology remained unchallenged for many decades, until James Watt (1765) came up with a separate condenser that allowed the steam cylinder to be maintained at constant temperature. This engine could then be adapted to work in breweries, mills, factories and transportation. Steam propulsion for shipping purposes was made possible.

The first British attempt at the application of steam in marine engineering is attributed to Jonathan Hulls (1763), who obtained a patent for a steam tug to tow sailing vessels along rivers (Hartman, 1983). Jouffroy D'Abbans attempted at creating steam shipping in France later in the century, but failed at making it popular. In the US John Rumsey and John Fitch both claimed to have built the first steam driven vessel: Fitch launched the first steamboat in 1787 but later that year Rumsey came up with a new system using water-jets, claiming the invention of steam navigation. A year later, Patrick Miller used a William Symington engine to build the first successful steamboat in Britain; the *Charlotte Dundas* was the first commercial steamship. It pulled barges along the Rivers Forth and Clyde, until its paddles were accused of eroding the canal banks (Dean, 1937). Its legacy, however, produced two inventions, one on each side of the Atlantic. In America, Robert Fulton's *Clermont* became the first commercially successful steamboat, which could run exclusively on steam. Britain, however, claimed this success as its engine was actually built in England by Boulton and Watt. The first British merchant ship appeared in 1812 when Henry Bell launched the *Comet*. In a few years vessels sailed out of river estuaries. The first iron craft, *Aoron Mamby,* appeared in 1821 and the Pacific Ocean was also reached in 1825 (Kirkaldy, 1970). The rest of the 19th century was marked with a different kind of rivalry; steam and iron against sail and wood. It proved to be a long struggle, but ultimately the economic advantages offered by the former prevailed.

Transition and Domination – the long drawn transition from sail to steam

The transition to steam was a significant technological shift (Armstrong & Williams, 2007). It was gradual, with many significant breakthroughs driven by the need for greater speed, capacity, reliability and safety. Steam provided more predicable schedules, encouraging the expansion and formation of various shipping companies. The first successful steam vessels were tug boats and Packet Lines for carriage of mail and passengers. It was still very expensive to construct a steam ship and coal took most of the space, otherwise vacant for freight. Britain strived to solve these setbacks by significantly increasing its coal and iron production (Hope, 1990). Coupled with government aid, this encouraged companies to extend their services (Legg, 1972). In carrying cargo, steamers could not as yet compete with sail; even if a

steamship could do a voyage of two sailing ships at once, it cost three times as much to build. As coal was still expensive, steam was only economical when carrying mail and passengers, where speed counted most.

By the second half of the century iron ship building started gaining importance. The first ocean going iron steamer, Brunel's screw-fitted *Great Britain*, managed to cross the Atlantic in 1843. Iron clad ships, steam engines and Britain's abundant supply of coal gradually put British shipping ahead. It became the shipping of the future, at a time when ships from North America continued to be built from softwood (Hope, 1990). The Merchant shipping Act (1854) in Britain encouraged the use of hardwood in the construction of composite ships, where iron frames were used with teak and oak sheeting. Though smaller than American ships, due to increased weight, British ships were far stronger and lasted longer. An iron ship weighed less, could carry more cargo and could afford to be larger (Kirkaldy, 1970). Also, with the invention of the screw propeller, wooden hulls were becoming obsolete due their low resistance to continuous vibrations (Taggart, 1969). After 1865, trade of goods, other than carrying of mail and passengers became economically viable on steam as well; John Elder's invention of the compound engine saved up to 40% of the coal (Smith, 2014). Alfred Holt's improvement on this engine allowed iron clad steam ships to venture also into the Far East. This put the sail clipper builders in a corner. A trip of 90 days by a clipper could be made by steam in 65 days (Hope 1990). Sail resisted in its supremacy until the opening of the Suez Canal in 1869, when routes to the East became shorter. Steam ships availed of coal bunkering stations at convenient intervals (ex. Malta), enabling British entrepot trade. The steamer had given an impetus for the opening of the canal; correspondingly, the canal stimulated the development of steam-shipping.

Steam, trade and economic prowess: a lesson in technology

By 1870 Britain led the world in ship building and ownership. The British fleet represented 54% of world total combined tonnage (sail and steam) and it was four times as much the American foreign going fleet, five times the French fleet and six times the German and Italian fleets. By 1890, 63% of world tonnage was British (Glover, 1892). British economic dominance was also due to the role of steamships in the installation of submarine cables throughout the world, regulating trade through a telegraphic network. Industrial progress and population growth in Britain and elsewhere compelled the building of more ships, ship-repairing facilities and development of ports both in Britain and its colonies. Steam had revolutionised industries and trade.

Towards the end of 19th century steam shipping technology was still perfecting its efficiency; Siemen's introduction of steel tube plates in 1878 made the boiler efficient and safe in high pressures (Clark, 1891). Thermal efficiency and lower fuel

consumption led to the construction of the *Aberdeen,* which embodied a number of inventions, primarily the triple-expansion engine. By the addition of a third cylinder the steam was used three times instead of twice. This engine was so successful that it became the prototype in the construction of many steamers (Sennett and Oram, 1899). The new ships were iron hulled, with steel masts and rigging, together with machinery which halved the number of required seamen. Luxuries had become necessities and the standard of living rose worldwide. Technology dictated the sign of the times.

Malta: eating British cake, but ultimately missing the boat

The role of steam in Malta's economic fate was contingent on the technological evolution explained above. As a strategically placed British colony, ideal for transit-trade, Malta partook in the advent and novelty of steam shipping wholeheartedly. However, rather than harnessing the new technology to improve its own industries, Malta opted to serve the needs of foreign trade created by the technology. Here it is pertinent to qualify 'Malta' in the 19th century. There were two distinct and clashing agendas: that of the Imperial Government, for whom Malta was primarily meant to serve the interests of the navy in the Mediterranean and that of the Maltese commercial community who endeavoured to establish Malta as a commercial hub in the new trade network. These conflicting agendas became more pronounced with the advent of steam.

The reaction of Malta to steam navigation can be divided into three phases, the first of which (1840-1860) was dominated by the above mentioned conflict of interests. Even though the first steamship arrived in Malta in 1825, (SRC, 1825) it was in the 1840s that steam ships started visiting Maltese ports on a regular basis (Rowsell, 1877). The visiting sailing vessels were also on the rise, however a number of Maltese agents started to show interest in working with foreign steamers (SRC, 1840-1857). Since then steamship arrivals were always on the increase. The most popular cargoes at the time were those of Packet Steamers, carrying parcels, despatches, letters and passengers. Other steamers carried books, wine, silk, drugs and cotton, primarily from Italy (SRC, 1840-1857). In the 1850s, steam ships visits kept increasing and the nature of the transit trade became more varied; local agents Rose & Co and P. Eynaud and Co. dealt in wheats and Indian corn from the East en-route to Great Britain and other cargoes including coffee, wool and silk.

A changing pattern in visiting steam ships emerged in 1853, on the eve of the Crimean War (Rowsell, 1877, p.44). The number of visiting sailing vessels started decreasing, while that of steamships increased. Even though the number of sailing ships still exceeded that of steamers, Malta experienced the beginning of its transition. Maltese merchants started to bid on steam in a more confident manner. Statistics show that the sum of total imports more than doubled from

the previous year, while that of exports tripled (MBB, 1853 pp.290-1). In 1855, new steamship companies and agents were established (SRC 1840-1857) and mercantile documentation started recording exclusive statistics of merchant steam vessels together with forecasts for the upcoming year (MBB, 1853, pp.350-1). The role of steamships also accentuated the economic boom during the Crimean War (1854-56); apart from housing provisions and troops on their way to Crimea, Malta also imported coal on steamships and to service steamships, including HM steam gunboats. The impact of steam on this boom was even more evident after the war ended (1856), as the awaited recession was not as acute as expected. Prosperity resisted for a number of years, with an increase in population and a continuation of Mata's role as a central coal bunkering and transit trade station. In 1860, the import/export totals exceeded those of 1856 (MBB, 1860, p.p. 294-315).

Malta's prosperity was instantly recognised by the authorities. Governor R.M. O' Farrell, already in 1848, expressed his intention to improve mercantile trade and encouraged formation of a Chamber of Commerce. The Council of Government also agreed that there was a need for augmenting harbour facilities to accommodate a larger quantity of vessels (Malta Government Gazette, 1848). The Chamber, promptly set up in 1848, pushed for more storage areas and proposed the construction of a Mercantile dock, referring to steam shipping as a prime reason (CCAR, 1855):

> Lo slancio preso negli ultimi anni della navigazione a vapore nel Medierraneo, ed il progresso ognor crescent della Marina Mercantile…
> hanno suggerito in molti l'idea di formare in Malta un Bacino Mercantile (p. 11)

This proposal, launched a long-drawn clash with the Imperial authorities. The Chamber argued that Malta was lagging behind in maritime progress as the harbours could not accommodate new class vessels: it lacked a regular building yard, a foundry, deposit stores and disappointingly did not possess a single steamer (Zammit, 1859). The urgency for a new harbour was further accentuated with the imminent opening of the Suez Canal. This enthusiasm was also evident in newspaper articles, which at times highly exaggerated the impact of steam (The Malta Mail, 1854, p.2), and also thanking steam shipping for receiving foreign news in half the time. The local population also embraced the new employment opportunities and many started flocking to the harbour area for employment. Between 1842 and 1851, 34.7% of the increase in population occurred in these areas (MC, 1842 & 1851, Abstract 1). There was an increase in merchants, dealers, brokers, porters, market boys, and coachmen amongst others (MC, 1842 & 1851, Abstracts 4 & 6).

Unfortunately, the government was much slower in embracing this enthusiasm; while Chief Secretary Lytton declared that trade had doubled and Maltese merchants were ever so active, the Crown advocate made it very clear that Malta's prime importance remained in serving the Navy (The Malta Times 1859, pp.1-2).

During the next phase (1860 – 1880) steam shipping came to play a definitive

role in Malta's 'Golden Age' of commerce. The new dock issues persisted, especially when it was announced that the civil government was to pay most of the expenses and that the Navy would have access if need arose (CCAR, 1862, p.p.11-12). The Chamber of Commerce protested vehemently and petitioned the House of Commons against Imperial interests in the new dock. The Chamber was so headstrong, as in the 1860s Malta was facing a new threat due to the unification of Italy; the development of ports in the South and in Sicily challenged Maltese supremacy in the central Mediterranean. After further problems and clashes, the formal transfer of mercantile shipping to the new Marsa dock materialised in August 1874 (CCAR, 1874, p.9). In the meantime, preparations for the opening of the Suez Canal were rampant. After the Chamber's president met de Lesseps, the Chamber was aware of new routes from Northern Europe to pass through the Mediterranean via the canal and on to Arabia, the Indian Ocean, China and Australia (CCAR 1865, p.12). The success of reaping the benefits was based on steam shipping. Malta was one of the conveniently placed stations en route to the East and pre-opening trade already gave signs of future potential (CCAR, 1867, p.p.10-11.).

In 1870, only a year after the opening, most of the ships entering the harbour were steamships on their way to the East (CCAR, 1872, p.11). In 1872 the number of visiting steamships exceeded those of sail (Rowsell, 1878, p.44). Maltese agents involved in steam shipping increased and products varied; the initial hesitation to deal in steam had disappeared. The 1870s saw cargoes of cotton and rice arriving from Bombay, Calcutta and Burma and coal on its way to eastern stations. Trade from China, Singapore and Australia arrived in the Mediterranean (SRC, 1862-1880). Malta, together with Port Said, Suez and Aden became a centre of trade and a coaling station. The visiting packet steamers and their passengers increased. Imports and exports values shot up. The population continued to increase, with more than 40% living in the harbour area (MC, 1861, 1871 & 1881). Employment was abounding with an increase in porters, carriers and coal heavers, warehouse keepers and ship chandlers. The harbour was also invaded by shopkeepers, lace makers, filigree workers, carriage men and boatmen.

These statistics are very positive at face value, but unfortunately they uncovered a very negative trait; Maltese industries and crafts had been abandoned in favour of harbour employment. Even shipbuilding, though on the rise, was not producing ships for local commerce and there was a marked decline in ships belonging to the Port of Malta (MBB, 1880, p.p.1-12). This meant that Malta became dependant on transit trade and coaling, while neglecting its own commercial and industrial development. In the late 1870s the Chamber voiced these preoccupations, admitting that since the opening of the Suez Canal, Malta had prospered, however it had become dependent on foreign steam companies (CCAR, 1878). This meant that once its status as a service provider declined, there would be nothing else to fall back to. The Chamber was also aware that Malta was already losing out on the number of visiting passengers, now stopping at competing Italian ports. In its letter to the Secretary of State for the

Colonies, the Chamber referred to Malta's imminent loss of importance as a transit station and thus its primary source of commerce. The technological advancement of steamships was listed as one of the reasons, as less need of coal meant less stops. Though trade was still faring well, a decline was already on the horizon; steamships were depriving Malta of its best sources of commerce: coaling and passengers. In 1879, a decrease in number of visiting steamships and importation of coal was registered. (CCAR, 1879). Even though Malta was still an ideal warehouse for transit trade, visits for coaling decreased, steam packets and passengers were preferring Italian ports and development in telegraphy decreased reliance on steamships for postal needs.

The Chamber's preoccupations were unfortunately proved right during the next decade (1880 -1890). It was a period of technological transition and commercial decline. At a time when steam shipping was at its peak, especially in the Mediterranean, the arrival of both steamships and sailing vessels in Malta was in decline. A decline in the importation of coal and number of steamships passing Malta was evident throughout the 90s (Nicosia, 1896). The technological advance in steam shipping and the competition from Gibraltar and Port Said pointed at a future abandonment of Malta as a coaling station. In 1891 harbour activity was still good, the commercial class was still numerous and the harbour area population had even spilled into neighbouring Pieta, Msida, Sliema and St Julians, however, all else had been abandoned (NC, 1891). The Council of Government at the time was seriously preoccupied about the future, searching for means to revive commerce, attracting new investment in local industries and encouraging local commerce (CG, 1890, Vol 13, p.p. 528-9). However, these were long term solutions, which would not save Malta from an imminent economic slump.

Conclusions

It is beyond the purpose of this study to point fingers and ponder on what should have been done, however what is very pertinent in the conclusion of this study is a blatant admission from stakeholders in authority, that the neglect of local technological progress and its education played a major role in the slump. At a time when the rest of the world was revolutionising its industries, Maltese merchants invested in foreign technology while artisans, manufacturers and farmers had been left to their own devices, lacking in latest technology, education and factories (Zammit, 1886). Local industry had been left in the hands of uneducated lower classes who were not equipped to improve it. Malta was not equipped to produce iron hulls or steam engines; it could only serve companies who owned them, and this could only guarantee a transient prosperity.

These misgivings were admitted and started to be tackled; already in 1890 basic knowledge of industries had been introduced in school curricula. The New Industries

Committee was also established, including not only the usual Council of Government and Chamber members but also representatives from the Department of Education, the Society of Arts and manufacturers (CG, 1890 Vol 13, p.p.419-420). The lesson had been learnt. Malta had been carried away with the winds of technological change that made Britain supreme; winds that however proved too strong for a small fortress colony who missed the boat of progress. Steam technology in the 19th century proved the magnitude of technology's role in varying destinies.

References

Secondary Sources:

Armstrong, J., Williams, D.M. (2007). The Steamship as an Agent of Modernisation, 1812 -1840. *International Journal of Maritime History*, 19 (1), 145-160.

Black, J. The ancient invention of the steam engine by the Hero of Alexandria. *Ancient Origins*. 21 March 2014. Available at www.ancient-origins.net/ancient-technology/ancient-invention-steam-engine-hero-alexandria-001467 [Accessed 16 July 2018].

Clarke, D.K. (1891). *The Steam Engine: A Treatise on Steam Engines and Boilers Vol 2.* London: Blackie and Son

Dean, F.E. (1937). Marine Engines and their Story – 1. In C. Winchester, ed. *Shipping Wonders of the World,* Fleetway House: London

Gatt, S. (1994). *The Commercial and Social Impact of The Transition from Sail to Steam: Malta 1840 – 1890*. Bachelor of Arts (Hons.) thesis, University of Malta.

Glover, J. (1892). Tonnage Statistics of the Decade 1880-90. *Journal of the Royal Statistical Society*, 55 (1), 205-243

Hartman, T. (1993). *The Guinness Book of Ships and Shipping. Facts and Feats*. Somerset: Butler and Tanner.

Hope, R. (1990). *A New History of British Shipping.* London: John Murray Publications.

Kirkaldy, A.W. (1970). *British Shipping – Its History, Organisation and Importance*. London: David and Charles.

Landstrom, B (1961). *The Ship*. London: Allen and Unwin

Legg, S. (1972). The Business of Empire: British Trade Spans the Seas. In H.C. Field ed. *The British Empire*, Issue.28. Norwich: Jarrold and Sons

Rowsell, F.W. (1877). *Report on the Taxation of Malta*. London. Available at Malta National Archives.

Sennett R. & Oram H.J. (1899). *The Marine Steam Engine, A Treatise for Engineering Students, Young Engineers, and Officers of the Royal Navy, and Mercantile Marine*. London: Longmann's, Green & Co.

Smith, C. (2014). Witnessing Power: John Elder and the Making of the Marine Compound Engine, 1850–1858. *Technology and Culture*, 55 (1), 76-106

Taggart, R. (1969). *Marine Propulsion: Principles and Evolution*. Houston: Publishing Co.

Woods, R.O., (2003). Harnessing the Void. Mechanical Engineering [on-line] 125 (12) 38-41. Available at EBSCO*host,* search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=11580870&site=ehost-live. [Accessed 16 July, 2018]

Zammit, N. (1886). *Malta e Sue Industrie*. Stamperia di Governo, Malta.

Primary Sources:

Borsa di Malta: Rendiconti dell'Esercizii della Camera di Commercio, 1849-1869, available at Malta National Library, Valletta; 1870 – 1895, available at Chamber of Commerce Library, Valletta.

Debates of Council of Government of Malta, Sittings 1-15, 29th January 1890 – 25 June 1890, vol. 13, available at Malta National Library, Valletta.

Malta Censuses:

Malta Census for 1842, Malta Government Gazette, 31st December 1842, Valletta.

Malta Census for 1851, Malta Government Printing Office, available at Malta National Library, Valletta

Malta Censuses 1861 – 1891, Malta Government Printing Office, available at Malta National Library, Valletta.

Malta Blue Book for Statistics (1853): Imports and Exports, Chapter 19. Available at Malta Library.

Malta Blue Book for Statistics (1853): *Returns*, Chapter 24. Available at Malta Library.

Malta Blue Book for Statistics (1860): *Imports and Exports*, Chapter 22. Available at Malta Library.

Malta Blue Book for Statistics (1880): *Shipping*, Chapter 10. Available at Malta Library.

Nicosia G. (1896), Letter to Charles Beresford CBRN, available at Msc. P 1154 Ext.26. Malta National Library, Valletta.

Registers of Shipping: Customs and Arrivals and Departures (1825), Section J, Vol.1. Available at Mdina National Archives.

Registers of Shipping: Customs Arrivals and Departures (1840-1857), Section KL, Vols. 49 – 108. Available at Mdina National Archives

Registers of Shipping: Customs Arrivals and Departures (1862-1880), Section I, Vols. 5 – 26. Available at Mdina National Archives.

Registers of Shipping: Customs Arrivals and Departures (1880-1890), Section I, Vols. 26-38. Available at Mdina National Archives.

The Malta Mail, 'Steam Communication', 13th January 1854.

The Malta Times, 31st May 1859.

Bio-note

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Multi-Disciplinary Perspectives in Teaching FL Reading Skills

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Abstract

The aim of the paper is to discuss theoretical perspectives which have exerted most impact on empirical research and education concerning foreign language literacy. Two theoretical orientations are the foci of the article: a psycholinguistic perspective, which views reading as a mental process during which the reader constructs his own representation of the text and a socio-cultural orientation, which emphasises the importance of varied social and historical contexts in text production and text reception. In relation to each theoretical perspective, the role of the text, the reader and the writer in the reading situation is discussed. The presentation of the two theoretical positions leads to a discussion of teaching implications suggested by each theoretical perspective. Examples of didactic materials and teaching activities applied in contemporary educational contexts are discussed. The paper argues for viewing literacy as a complex concept and suggests an extended conceptualisation of reading as an interaction of cognitive and social factors.

Keywords: teaching reading, critical reading, socio-cultural perspectives

The importance of developing reading skills

Developing reading skills is the main aim of all education systems, also the one in Poland, as demonstrated by the Core Curriculum (MEN, 2017), a document issued by the Ministry of Education, which provides guidelines for school syllabi and coursebooks. It recommends that education concerning both native language and foreign languages prepares learners to develop subject knowledge as well as equips students with competences necessary to appreciate literary works and other texts of culture. Developing effective reading skills is also emphasised in the *European Reference Framework: Key competences for lifelong learning* (Council of Europe, 2007). Reading competence "includes the abilities to distinguish and use different types of texts, to search for, collect and process information, to use aids, and to formulate and express one's oral and written arguments in a convincing way appropriate to the context" (Council of Europe, 2007, p.3). Along with numeracy and ICT skills, it is the fundamental skill on which an individual can build learning to learn skills.

Reading as the object of psycholinguistic and socio-cultural investigations

As an object of scientific investigation, reading has been widely studied and held the interest of many disciplines, not only education and psychology, but also philosophy, artificial intelligences and linguistics.   Not surprisingly, it has gathered many different definitions and interpretations. In the discipline of education and applied linguistics, the most influential theoretical perspectives have been psycholinguistic and socio-cultural. The two orientations differ in how they see the role of the text, the reader and the writer in the reading situation, which is reflected in the way reading is researched and taught. To understand the difference between them, let us discuss theoretical principles characteristic of each perspective and look at didactic techniques each orientation recommends.

Psycholinguistic perspective – theoretical considerations

In a psycholinguistic perspective, reading is viewed as a cognitive process, a set of mental operations during which the reader creates his own representation of a text. Theoretical models conceptualise reading as two levels of mental processing: "lower", which involves letter identification, word recognition and syntactic parsing; and "higher"– which entails discourse processing and activation of the reader's knowledge concerning text characteristics and the topic of the text. Processing the text at the two levels enables the reader to construct his representation of the text.

A good example of the psycholinguistic perspective is the model of van Dijk and Kintsch (1983). According to van Dijk and Kintsch (1983), text information is represented in memory at three levels: surface form, propositional text base and situation model. Reading at the surface form results in the representation of the exact wording and syntax of the text, whereas the product of reading at the propositional text base is a multileveled, locally coherent propositional network of semantic text information. When processing the text at the situation model, the reader depicts real-life situations presented in the text, which leads him to interpret the text in his own way. In other words, the surface form processing results in understanding words and sentences in the text, the propositional text base processing enables the reader to reach a literal level of understanding the text and developing the situation model facilitates constructing the reader's individual evaluation and interpretation of the text.

Socio-cultural perspective - theoretical considerations

To understand a socio-cultural view on reading, it is necessary to discuss the concept of literacy. Johns (1997) defines literacy as a complex concept, more inclusive than

the ability to read and write, which integrates "the many and varied social, historical and cognitive influences on readers and writers as they attempt to process and produce texts" (1997, p.2). It elucidates the importance of the social context in which a discourse is produced as well as the roles and purposes of communities of readers and writers. Socio-cultural perspectives imply that in constructing his representation of the text the reader should take into account not only information expressed in the text and his background knowledge (as suggested in psycholinguistic theories) but also historical and social factors that could have influenced the process of writing this text.

It is worth discussing the McCormick (1997) model of reading as an example of a socio-cultural perspective. Reading is viewed as a cognitive activity that occurs in social contexts. It is an interaction of the reader and the text, with both readers and texts ideologically situated. The reading situation is an interaction of the reader's repertoire and the text's repertoire. McCormick (1997) defines repertoire as ''the particular subset of discourses, the combination of ideas, experiences, habits, norms, conventions and assumptions, which the text draws on that allows it to be written and take the shape it does" (p.70). The term "ideology", although often associated with propaganda, is used in cultural studies to indicate common values, ideas and assumptions of a particular society. McCormick (1997) explains that:

> Ideology helps to tie us together by giving us seemingly coherent representations and explanations of our social practices, and in particular by giving us the language by which we describe and thus try to perpetuate them. Thus general ideology acts as a kind of social glue, binding us all together. (p.74)

McCormick (1997) notes that both processes of writing and reading balance between autonomy and determination, which means that both readers and writers consciously and unconsciously draw on aspects of the general and literary repertoire of their particular social situation. Reading and writing are never individual acts of readers and writers. Comprehension of the text is influenced by the reader's place in a particular social situation. It may happen that the interaction between the reader's ideology (i.e. his worldview) and the text's repertoire (i.e. ideology implied in the text) are in conflict.

Didactic implications of psycholinguistic approaches

Since the 1970s, psycholinguistic approaches have been the most influential in foreign language pedagogy concerning reading. Reading texts is preceded by exercises which aim to pre-teach new vocabulary and revise grammar. These tasks facilitate students' efforts to construct the surface form of the text. To practice comprehension of the text at the literal level (i.e. construction of the propositional

text base), FL learners do a number of reading exercises, such as answering multiple choice questions, open ended questions, etc. This stage should lead students to the next stage – developing their own interpretation of the text, i.e. the situation model. During my work as a FL teacher I have observed that unfortunately no sufficient attention is paid to this stage of reading comprehension. Course books do not show students how to develop their own evaluation of the text. A popular follow-up task introduced after the reading comprehension stage requires students to express their own opinion about the issue raised in the text. However, such activities are usually treated as speaking practice, not as tasks that would instruct learners how to look at the text from a distance. Often no training is provided to encourage learners to venture to take a more critical stance at the text. This missing element of instruction is offered in socio-cultural perspectives, which will be discussed below.

Another important change that psycholinguistic perspectives introduced into literacy pedagogy is the shift from work mainly on linguistic and textual form to the reader's mental processes. Therefore, considerable importance is put on the role of schemata. As schema theories, e.g. Anderson (1978), claim, we comprehend new information only when there is a match of this information with something we already know, i.e. with existing schemata. In the process of reading, schemata enable the reader to make inferences on the basis of the information drawn from the text and the schemata that the reader "brings" to the text. This idea is often implemented in coursebook pre-reading tasks, which help student readers to develop or activate their background knowledge about texts. For example, students can be asked to exchange their views about the topic of the text or write questions that they would like to ask to the author of the text concerning the issues discussed in the text they are to read.

In the psycholinguistic approach, the aim of the teacher is to enhance learners' individual search for meaning and students' interaction with texts. Psycholinguistic perspectives stress the role of the reader in the reading process. Due attention is devoted to training learners to be skilled and fluent readers. Students are taught to master reading strategies, such as skimming, scanning or guessing the meaning of unknown words from the context. They practise the ability of observing, monitoring and evaluating the process of their reading.

To sum up, psycholinguistic approaches emphasise the role of the reader and his mental processes. In pedagogy, reading practice entails facilitating the reader's reception of the text by means of extending his background knowledge and equipping him with useful cognitive and metacognitive skills. However, as Johns (1997) argues, "texts are primarily socially constructed" (p.14) and failing to take into account social and cultural factors influencing text production and reception may not provide adequate support especially to those "who are culturally, socially, or linguistically distant from English academic language and discourses" (p.13). Techniques of achieving these important aims will be presented below.

Didactic implications of socio-cultural approaches

As it has been explained earlier, the sociocultural perspective claims that when constructing his representation of the text, the reader can draw not only on his background knowledge but also historical and social factors that could have influenced the process of writing this text. This conceptualisation of reading promotes a critical approach to texts. According to Dechant (1991), "critical reading demands that the reader evaluates, passes personal judgment on the quality, logic, appropriateness, reasonableness, authenticity, adequacy, value, relevancy, timeliness, accuracy, completeness, and truthfulness of what is read" (p.453). To be able to read texts in a critical way, the reader should be aware of his own beliefs and convictions, which in the process of comprehending the text may interact with those that expressed in the text.

Many literacy researchers and reading experts, e.g. Alderson (2000), Giroux (1983), Johns (1997), McCormick (1997) consider developing critical literacy an important aim of reading pedagogy. Alderson (2000) describes a critical reader as the one who reads intelligently and is prepared to take control over and responsibility for his own readings. He is also aware of the consequences of decisions that he can make in relation to his interpretation of the text. This does not involve only a skilful use of metacognitive strategies (as recommended by the psycholinguistic perspective) but developing a more mature understanding that texts do not exist in themselves but rather should be treated as "texts in use".

To recapitulate, the aim of socio-cultural approaches is to show learners that both the process of writing and reading are social phenomena. Thus, sensitising learners to social factors that influence both the writer and the reader is of paramount importance. Developing a critical approach to texts is considered the most important aim in reading instruction.

A combination of both perspectives as an optimal solution for teaching FL learners

It seems that both perspectives presented above, i.e. psycholinguistic and socio-cultural, can offer ideas that can be successfully implemented in FL reading didactics. An approach that would draw on the principles suggested by both approaches can be named socio-cognitive. The twofold nature of reading is underlined by Bernhardt (1991), who views reading as a cognitive and social process. She claims that texts have two different components: ''seen'' elements that the reader can see in black and white, and ''unseen'' elements that reflect the intention of the writer and which carry implicit sociocultural elements. Regarding reading viewed as a cognitive process, Bernhardt claims that when reading the text, the reader constructs the internal representation of the text, which is not the duplicate of the text itself. This process is generalizable, i.e. to a large extent the same for all readers. However, the

product of this process, i.e. the internal representation of the text, is individual and unique to every reader. In regard to a view on reading as a social process, Bernhardt (1991) explains that texts are "manifestations of cultures" (p.10) and in contrast to cognitive processes involved in reading the text, the processing of the text cannot be generalised since readers from different cultural contexts will read the same text in a different way.

Treating reading as a social phenomenon offers important implications for FL reading didactics. This view implies that well developed linguistic skills are not sufficient for successful comprehension.   In other words, to be successful the reader has to understand not only words and sentences, but also implied message shared by the members of the social group to whom the text is addressed. His final comprehension should depend on both the linguistic data and his language and reading skills, and his ability to respond to the text in a culturally specific way.

This "interdisciplinary" approach to teaching FL reading skills has become the focus of critical literacy studies and has been promoted by a number of teaching experts. As regards research studies, Park (2011) and Zyngier and Fialho (2010) identified students' difficulties in reading texts in a critical way and their poor understanding of sociocultural issues implied in texts. Kaura and Sidhub (2013) on the basis of their investigation concluded that learners tend to accept authors' opinions and find it difficult to question them. Weninger and Kan (2013) attributed students' inability to read in a critical way to school curricula, which give priority to teaching English as a tool for every day communication and often fail to show students how to critically interrogate language use.

As regards promoting a socio-cognitive approach to teaching reading to FL students, let us discuss Dakowska's (2005) conceptualisation of reading comprehension as a model that lends itself to addressing both aspects of reading, i.e. cognitive and social, in a foreign language situation. This model comprises three levels: semanticising, comprehending and evaluation. At the level of **semanticising** the reader is the decoder of the text. "Semanticising is the least subjective stage of comprehension because [readers] are confined by the language code" (Dakowska, 2005, p.193). The outcome of this stage of reading the text is literal comprehension of the text at the level of words, phrases and sentences. In performing reading tasks, the reader draws on his knowledge of alphabet of the target language, grammar and vocabulary. Dakowska (2005) explains that "[p]roviding the learner with prompts and feedback at this stage is inevitable in view of the language learner's deficits" (p.193). In the case of a foreign language learner, these deficits relate to the knowledge of the target language and its culture as well as automaticity necessary to skilfully process FL reading tasks. It is crucial to emphasise the facilitative role of the teaching situation, created by the coursebook task and/or the teacher, in enabling FL readers to compensate for the above-mentioned weaknesses.

At the level of **interpretation**, the reader reconstructs the message expresses in the text by the writer. The reader can be called "comprehender". His main aim

is to identify the main ideas and integrate them into a coherent whole. In the attempts to achieve global understanding of the text, the reader draws on various sources of information he considers useful in a given reading situation. Dakowska (2005) underlines the importance of the following sources of information helpful at this stage of reading: the text itself, its environment and the reader's memory. It is vital that the reader is sensitive to how the text is organised, its typography and illustrations that accompany the text. An understanding of the communicative environment of the text, which is demonstrated e.g. in the genre of the text, leads to the reconstruction of the communicative intention of the writer. The most significant source of knowledge lies in the reader himself: his knowledge of the language (both the native and the target language), factual knowledge of the topic, knowledge of discourse genres and the learner's reading "experiences". In a school situation, it is the teacher who should equip learners with the skills necessary to activate sources of knowledge useful for the reading task at hand.

Reading at the level of **evaluation** involves looking at the text message from the point of view of one's values, convictions and ideas about the topic. The learner reads from the perspective of the addressee of the writer's intention and responds to it in his own manner. This stage of reading comprehension is the most subjective one and encourages the reader to develop critical approach to the ideas expressed in the text.

At this stage of discussion, it is worthwhile emphasising that developing critical reading strategies has recently attracted the interest of many academic investigations, those that focus on theoretical considerations and those that present practical implications. For example, Skopinskaja (2009) describes a variety of techniques conducive to enhancing FL learners' critical literacy. An interesting activity is "questioning circle", which encourages FL learners to interrogate the text on the basis of the information found in the text, the reader's experience, ideas and values, as well as his knowledge of other cultures and other pieces of literature. The intersection of these areas of information should help the reader to evaluate the text and arrive at his own interpretation.

Conclusion

Reading has been an object of investigation of various disciplines and gave rise to a number of conceptualisations of what reading is and what functions it can serve in the context of FL education. In this paper, two perspectives have been discussed: psycholinguistic and socio-cultural, each offering a slightly different view on the role of writer, text and reader in the process of reception and production of texts and consequently resulting in different implications for reading instruction. It seems that for contemporary educational purposes it would be beneficial to respect a complex nature of reading as an interaction of cognitive and social factors.

Narrowing teaching reading in a foreign language just to the mastery of grammar structures and extension of vocabulary would not be sufficient. Instruction that would aim at developing basic reading strategies, such as skimming and scanning, and training learners in comprehending texts at their literal level seems promising for beginner learners, but would not satisfy the needs of more advanced students. This traditional way of teaching reading skills should not be abandoned but enriched by techniques that draw on the principles of socio-cultural perspectives. It is important that learners are aware of their active role as readers and prepared to research and critique texts. They should learn that they are many different readings of the same text and therefore their own reading of the same text may change when, e.g. they change beliefs and opinions concerning issues discussed in this text. Only by equipping students with FL competence, appropriate reading strategies and awareness of a social nature of reading and writing can we successfully prepare learners to interpret an enormous amount of information that they face in the present era of globalisation.

References

Alderson, C. (2000). *Assessing reading*. Cambridge: Cambridge University Press.

Anderson, R. C. (1978). *Schema-directed processes in language comprehension*. In A. M. Lesgold, J. W. Pellegrino, S. D. Fokkema & R. Glaser, eds. *Cognitive psychology and instruction*, New York: Plenum Press, 67-82.

Bernhardt, E. (1991). *Reading development in a second language: Theoretical, empirical and classroom perspectives*. Norwood, NY: Ablex.

Council of Europe. (2007). *European Reference Framework: Key competences for lifelong learning*. Luxembourg: Office for Official Publications of the European Communities.

Dakowska, M. (2005). *Teaching English as a foreign language. A guide for professionals*. Warszawa: Wydawnictwo Naukowe PWN.

Dechant, E. (1991). *Understanding and teaching reading: An interactive model*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Giroux, H. (1983). *Schooling and the struggle for public life*. Minneapolis: University of Minnesota Press.

Johns, A. M. (1997). *Text, role and context. Developing academic literacies*. Cambridge: Cambridge University Press.

Kaura, S. and Sidhub, G.K. (2013). Evaluating the critical literacy practices of tertiary students. *Procedia - Social and Behavioral Sciences*, 123, 44-52.

McCormick, K. (1997). *The culture of reading and the teaching of English*. Manchester: Manchester University Press.

Ministerstwo Edukacji Narodowej (MEN). 2017. Rozporządzenie Ministra Edukacji Narodowej z dnia 14 lutego 2017 r. w sprawie podstawy programowej wychowania przedszkolnego oraz podstawy programowej kształcenia ogólnego dla szkoły podstawowej. Available at https://men.gov.pl/zycie-szkoly/wychowanie-przedszkolne/c137-podstawa-programowa/rozporzadzenie-ministra-edukacji-narodowej-z-dnia-14-lutego-2017-r-w-

sprawie-podstawy-programowej-wychowania-przedszkolnego-oraz-podstawy-program-owej-ksztalcenia-ogolnego-dla-szkoly-podstawowej-w-ty.html [Accessed 3 February 2018]

Park, Y. (2011). Using news articles to build a critical literacy classroom in an EFL setting. *TESOL Journal*, 2(1), 24-51.

Skopinskaja, L. (2011). The role of critical reading in promoting dialogic interaction. In M. Kusiak, ed. *Dialogue in foreign language education,* Kraków: Jagiellonian University Press, 75-86.

Van Dijk, T. & Kintsch, W. (1983). *Strategies of discourse comprehension*. New York: Academic Press.

Weninger, C. and Kan, K. H. Y. (2013). (Critical) language awareness in business communication. *English for Specific Purposes*, 32(2), 59-71.

Zyngier, S. and Fialho, O. (2010). Pedagogical stylistics, literary awareness, and empowerment: A critical perspective. *Language and Literature*, 19(1), 13-33.

Bio-note

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Breaking Barriers of Post-Secondary Syllabi:
On the Democratic Benefits of Covering Gender and Cultural Diversity Issues in the
Advanced Level Syllabi of English and History

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Abstract

This paper investigates to what extent the subject content, texts and objectives set for English and history A-level 2020 Matsec syllabi reflect gender equality and cultural diversity. It also suggests ways in which such syllabi can become more inclusive in the future. This research is important because it sheds light on gender and cultural mainstreaming in education by showing whether the new syllabi are responding to the values of Maltese society based on the need for inclusion and the acceptance of diversity. Students need to make connections between what they study and everyday life by gaining a sense of affirmation about themselves and their culture (Colby & Lyon, 2004, pp.24-28). A recently-published report for the Maltese Ministry for Education and Employment titled *The Working Group on the Future of Post-Secondary Education* (2017) remarks that there is a need for knowledge not to be restricted by gender, race or culture, and that equality, inclusion and respect for diversity should be the foundation that unifies learning across the curriculum (p.123).

This research shows that there is a problem of gender and cultural discrimination within both the English and history A-level syllabi, but this can be eliminated if new subject content, texts and objectives are added to the syllabi. Literary texts written by Black and Asian poets and novelists should be introduced into the English syllabus, to enable students to learn about cultural diversity. For the syllabus to fully embrace gender equality in the syllabus, a play by an early female dramatist should be added. The history A-level syllabus requires new subject matter that features women from a local and global perspective.

Moreover, new learning outcomes should be added to acknowledge the need for students to identify constructions of gender roles and representations of culture in set texts in the English syllabus. In this history syllabus, there needs to be a learning outcome related to women's suffrage. This paper suggests that if these changes are implemented, the syllabi will have the potential to break gender and cultural barriers in post-secondary education in Malta.

Keywords: English, History, Syllabi, Gender, Culture

Do we really need to discuss whether the subject context, texts and objectives set for the Matsec syllabi for English and history A-level to be implemented in 2020 adequately cover issues of gender equality and cultural diversity? After all, recent policies of the National Curriculum Framework for Early, Junior and Secondary Years focused on gender and cultural issues. In a perfect world, this question would not need to be discussed, but unfortunately this is not a perfect world. Although recently Maltese society has broadened its democratic horizons by prioritising discussions about gender equality and cultural diversity, when it comes to the post-secondary curriculum, a curriculum that focuses intensely on gender and cultural inclusivity is still lacking. If such aspects are not represented in the A-level syllabi, students can be deprived of the chance to develop abilities that would make them more resilient to cope with cultural discrimination and gender inequality as adults. The subject content, texts and objectives across English and history A-level 2020 Matsec syllabi do not live up to the requirements of an inclusive and democratic curriculum, and changes are required so that they offer a positive link for students between learning and everyday life.

A recently-published report for the Maltese Ministry for Education and Employment titled *The Working Group on the Future of Post-Secondary Education* (2017) remarks that knowledge should not be restricted by "colour or gender, and that social inclusion, equality and respect for diversity are the underlining principles that unify learning" (p.123). According to the Maltese government, this shows that post-secondary education requires the development of more democratic and inclusive syllabi; that is, syllabi that are based on knowledge that responds to the needs and values of a society that includes rather than excludes, and that make us confident that we are producing open-minded students, able to cope with diversity, and to accept and celebrate gender equality.

The need for more comprehensive syllabi within post-secondary education supports the notion that both men and women should be able to develop their "personal abilities and make choice without the limitations set by stereotypes, rigid gender roles and prejudices" (ILO, 2000, p.48). In Malta, despite improvements, gender inequality still persists in the post-secondary curriculum. Students need to make connections between what they study and everyday life by gaining a sense of affirmation about themselves and their culture (Colby & Lyon, 2004, pp.24-28). The aim of this paper is to firstly provide an investigation into the extent to which subject context and texts for the 2020 English and history syllabi reflect gender equality and cultural diversity, and secondly, to suggest new subject content, texts and objectives that can be incorporated into these syllabi to reflect more democratic inclusivity in post-secondary education in the future.

This investigation uses a qualitative methodological approach to analyse two post-secondary syllabi, English and history, from a feminist and cross-cultural

perspective. The decision to concentrate on English and history is neither to privilege nor to discriminate against any other subject. However, due to practical constraints, this paper cannot provide a holistic view of all the subjects offered at post-secondary level. Furthermore, these two subjects have been specifically chosen because of their intertwined nature and the many concerns that the two share regarding issues of gender, race and society. Indeed, both subjects ask questions about how human experience is written and recorded in the past and present, and are both shaped by a given social and political moment. Therefore, an investigation of these two subjects is vital to give indications of the nature of knowledge delivered in post-secondary education in Malta.

The Matsec Examination Board demonstrates that the English level syllabus for 2020 consists of three written papers and an oral examination (Matsec Examinations Board University of Malta, 2018). Paper 1 looks at two Shakespeare plays, *Othello* and *Romeo and Juliet*, a number of poems by Elizabeth Bishop, Carol Ann Duffy and Seamus Heaney, and requires a critical appreciation of an unseen poem. Paper 2 covers five prescribed novels and a critical appreciation of an unseen literary prose passage. The novels are Margaret Atwood's *The Handmaid's Tale*, Harper Lee's *To Kill A Mocking Bird*, Emily Bronte's *Wuthering Heights*, Charles Dickens's *Great Expectations*, and Ian McEwan's *Atonement*. Paper 3 is language-based and tests the students' grammar and vocabulary, and basic concepts related to linguistics. When compared to previous syllabi, it can be said that the new English syllabus shows signs of development. This development is particularly shown by the poetry section, in the inclusion of literary works by women poets that challenge patriarchal gender roles and the centrality of male figures.

 Indeed, the set poems by Elizabeth Bishop (1911-1979) and Carol Ann Duffy (1955-) reflect gender equity by giving a voice to women through their female speakers. For example, 'In the Waiting Room' by Bishop deals with issues of femininity and sexual maturity. The poem depicts a six-year-old girl, the speaker of the poem, who is at the dentist waiting for her aunt to have her teeth fixed. As she waits, she picks up the *National Geographic*, in which she sees pictures of nude adult African women. When she sees the different colour of their skin, their lack of clothing and their bare breasts she is afraid but fascinated at the same time. Her reaction suggests that this is her first exposure to women from other cultures, and of identifying difference in the anatomy of girls' and older women's bodies (Bishop, 1979).

The representation of women through the lens of gender equality becomes even stronger in Duffy's poems such as 'Mrs Lazarus' and 'Medusa'. In her poems, Duffy challenges the centrality of male dominance and traditional binary definitions by giving a voice to female characters from history, myth and fairy-tale, who have either been marginalised or completely omitted. For example, in 'Mrs Lazarus', Duffy gives a voice to the Biblical character Lazarus's wife, whose opinions about her husband's miraculous resurrection are never represented in the Bible. In contrast to the original

tale of Lazarus, Duffy gives Mrs Lazarus a voice by presenting her emotional state (Duffy, 2004). There is no doubt that the inclusion of Bishop and Duffy's poems are in line with the report for the Ministry of Education and Employment that declares the need for post-secondary education to reflect gender equity in its curriculum.

However, this cannot be said of Heaney's poems. Although these poems are important for their portrayal of issues concerning Irish people and their search for freedom, thus helping students learn about Irish culture and the struggles of its people, from a feminist perspective, Heaney's poems are gender biased as they tend to feature dominant masculine figures that reflect traditional gender roles. This means that if students are not made aware of the gender inequality presented in Heaney's poems, they might not be able to decipher that this work is biased against women.

An example of gender stereotyping in Heaney's poems is evident in 'Digging'. Heaney's 'Digging' opens with a male speaker sitting at his desk with a pen resting in his hands, as he listens to the sound of his father's digging outside on the farm. He then remembers his grandfather digging in the past, and then proudly starts to write. It can be said that by positioning the tradition of digging embodied in his father and grandfather, the speaker situates digging as an occupation for men. In addition, by his association of the act of digging with the skill of 'digging' with a pen, which he sees as equally powerful as his forefathers' act of digging, he is emphasising the powerful role of his male ancestry, while female figures are silent and absent (Heaney, 1969).

Despite Heaney's poems' lack of gender equality in their representation, taken together, the syllabus definitely shows a development when it comes to gender recognition, both in the inclusion of more female poets and in the themes portrayed. However, this does not negate the fact that the poetry section lacks literary texts by Black, Asian, and ethnic minority writers. This fact creates cultural discrimination in the syllabus because it marginalises the voices of certain cultures. The poems are all written by white authors, and reflect experiences of white speakers. This exclusion in the syllabus can be seen as highly unexpected, particularly given that female and male Black and Asian writers constitute a high proportion of the literary world. I posit that if students studying English are not exposed to a wide range of cultures, then this runs the risk that students will not be able to grasp the true nature of literature. Moreover, with the increasing number of students in the Maltese education system who come from different countries, it is crucial that students feel that they can relate to what they are studying by the curriculum's embrace of other cultures.

The lack of texts by Black, Asian and other ethnic minority writers is not only found in the poetry section of the English syllabus, but also in the choice of novels. Cultural and gender awareness are not excluded from all the set novels, as is evident in Lee's *To Kill A Mocking-Bird* and Atwood's *The Handmaid's Tale*. By reading Lee's novel, students can learn about racial issues and discrimination in the American south in the 1930s, and the detrimental consequences this can have on humanity

(Lee, 1960), while through Atwood's novel, students learn how hierarchical societies create discrimination in women's lives (Atwood, 1986). However, the same cannot be said about Bronte's *Wuthering Heights* and Dickens's *Great Expectations* (Bronte, 2003; Dickens, 1992). Both novels can be seen to reinforce stereotypical gender roles.

It cannot be disputed that Dickens's and Bronte's works are significant novels for students, from which they may gain knowledge about traditional gender norms and Victorian society. However, this knowledge cannot be acquired adequately if the identification of gender inequality in the texts is not set as a learning outcome in the syllabus. In this way, teachers can help students gain awareness of gender constructs and of the different social and domestic spaces that men and women were expected to occupy in Victorian society. Thus, this knowledge will help students to understand about women's status in different periods in history, and at the same time remove gender discrimination from the syllabus.

When it comes to the lack of gender and cultural awareness in certain set texts, this paper suggests providing new learning outcomes that acknowledge the need for students to be able to identify and discuss gender inequality and cultural diversity within the texts. However, in order for the poetry and novel sections of the English syllabus to become completely democratic in nature, the inclusion of new texts by Black, Asian and other ethnic minority authors is required. Given the huge number of set poems, this might sound like an impossible endeavour. However, a large number of poems are selected from only three poets: twenty-one poems by Duffy, ten by Heaney and fourteen by Bishop. Some of these poems reflect a repetition of themes, and the reason why only three poets are represented is not clear, as the syllabus does not demand a comparative analysis between the poets.

Without increasing the existing course-load, this paper suggests that fewer poems should be set by Bishop, Duffy and Heaney. In this way, poems by Black and Asian writers can be included in the syllabus, reflecting different voices. This paper specifically recommends the inclusion of poems such as 'An Hymn to Humanity'; written by the first published African American poet, Phillis Wheatley (1753-1784), the poem serves as a tribute to humanity and self-discovery in the time of slavery in America (Wheatley, 2001). Other suitable poems are Moniza Alvi's 'Presents for my Aunts in Pakistan' and 'An Unknown Girl', which present themes related to loss and belonging (Alvi, 2002).

New novels could include Arundhati Roy's *The God of Small Things* (1997), which deals with issues of caste, women's position in Indian society and the influence of globalisation and decolonisation in India. This paper also suggests the inclusion of E.R. Braithwaite's *To Sir, With Love* (1959), which features themes of racism, violence and antisocial behaviour by a group of white students in an English school towards their new Black teacher. Other novels could include Toni's Morrison's *Beloved* (1987) which depicts the effects of slavery on women, and Salman Rushdie's *Midnight's Children* (1981), featuring a storyline based on India's transition from British

colonialism to independence and the partition of British India in 1947. Another novel worth considering is *Do Not Say We Have Nothing* (2016) by the Asian Canadian writer Madeleine Thein, which portrays the struggles of three musicians and their families before and after China's Tiananmen Square protests in 1989. The inclusion of these poems and novels would definitely help students to gain awareness about cultural diversity through the inclusion of distinctive voices that go beyond those offered by white writers.

I further posit that if the English syllabus is to embrace not only cultural diversity but also gender equality, it requires some changes in the set texts for drama. The set drama texts consist of two of Shakespeare's plays, *Othello* and *Romeo and Juliet.* Both plays are firmly established within the literary canon and will certainly help students to continue developing their awareness about Shakespeare's works within the Renaissance period. However, the lack of inclusion of early women dramatists will create yet another gender imbalance in the syllabus. This will not only give the students the false impression that no plays were written by women around the Renaissance and Restoration periods, but they will also not gain knowledge about literary works by women that challenged dominant ideologies of gender in the early modern period.

One play that will surely help to remedy this is the play *The Concealed Fancies* by Lady Jane Cavendish (1621-1669) and Lady Elizabeth Brackley (1616-1663). In the play, the female characters, through their actions and speeches, challenge the stereotypical gender roles of daughters and the patriarchal traditions surrounding marriage negotiations by taking an active stance. In the absence of their father and brothers, who have gone to fight in the English Civil War, the female characters gain authority by making their own marriage arrangements. If students read Shakespeare alongside *The Concealed Fancies*, they will learn how women dramatists have used writing to challenge patriarchal conventions.

The key point is that if the English A-level syllabus is to adequately cover issues pertaining to gender equality and cultural diversity, as projected by the report for the Ministry of Education and Employment, then this requires adaptations to the subject content and the inclusion of new texts and objectives to make the syllabus more inclusive and democratic for students. This idea can also be applied to the history A-level syllabus, in which certain topics tend to be marginalised, causing gender inequality in terms of knowledge given to students. The history A-level syllabus consists of three papers. Paper 1 is based on Maltese history, Paper 2 on European and international history, and Paper 3 on Mediterranean history. Each paper is subdivided into a number of topics and sub-topics (Matsec Examinations Board University of Malta, 2018).

The main topics for Paper 1 include political, economic and social development in Malta, and church-state relations in Malta between the nineteenth and twenty-first centuries. For Paper 2, the main topics are political, economic and social development in Europe and worldwide, which starts from the French Revolution in

1789 and concludes with European enlargement in 2004. In Paper 3, the main topics are political and strategic developments in the Mediterranean from 1789 to 1921, with a focus on the Napoleonic Wars, the Egyptian, Moroccan, and Balkan conflicts, and World War One. Other topics in Paper 3 include the balance of power from the 1920s until the Second World War, the decolonisation of Algeria, Cyprus and Malta, and the Arab-Israeli conflict from 1945 until 1993.

Despite the wide amount of subject content set for the history examination, one crucial topic remains absent throughout the syllabus. In all three papers, no reference is ever made to women's position in society from either a political, economic or social standpoint. Also missing is the relationship between the church and state with regard to women's right to vote in Malta. The absence of women as a topic from the syllabus is quite surprising, particularly given two crucial events that have taken place recently. The first is the issuing of a silver coin by the Central Bank of Malta in 2017 to mark the 70th anniversary of Maltese women being permitted to vote for the first time in 1947. The second is a series of celebrations held in the UK in 2018 to mark the centenary of women's suffrage. Taking both events into account, it is high time that women's achievements, both nationally and internationally, are incorporated into the syllabus, so that students gain knowledge about the important milestones that women have gained in the twentieth century. As it stands, with its lack of representation of women's place in history, the syllabus runs the risk of female students not cultivating their sense of empowerment, and for male students to lack the ability to recognise gender inequality in the past and the present.

To dispense with gender inequality in the syllabus, this paper suggests the incorporation of knowledge that deals with women into the existing topics. The first subtopic should deal with women's suffrage in Malta, taught in relation to the topic on political developments in Malta since 1921. In this way, the topic will become balanced, as it will give students knowledge about the connection between gender and political developments in Malta from the perspective of both men and women. Students will learn about the events that led women to achieve the right to vote and contest elections in 1947. At the same time, they will learn about strong powerful women such as Josephine De Bono and Helen Buhagiar, who initiated such legislative changes in Malta, serving as models of empowerment. The second subtopic can also be incorporated in Paper 1 under the topic of church-state relations, in which students will learn about the Catholic church in Malta and its views on women's position in society.

If the history syllabus is to become completely democratic, it also needs to embrace cultural diversity. This paper recommends the addition of one other subtopic, which can be within the topic that deals with politics, economics and social development in European and international history in Paper 2. This subtopic will look at the rise of women's movements in Europe and beyond, as well as drawing contrasts with non-democratic countries such as the United Arab Emirates, Saudi Arabia and Afghanistan, in which women suffer from gender inequality due to issues

related to religious and cultural values. Finally, texts that could be useful in helping students to learn more about women's issues include Carmen Sammut's *The Road to Women's Suffrage and Beyond* and Callus's *Għadma minn Għadmi. Ġrajjiet il-Mara u Jeddijietha* (*Flesh of my Flesh. The History of Women's Rights*).

Overall, the problem of gender and cultural discrimination in English and history A-level syllabi can be eliminated. It will, however, require changes in their subject content, so that both syllabi provide a positive link between students' learning and their everyday lives. This will eliminate the risks of knowledge being restricted by issues of gender, race and colour. The English syllabus needs to incorporate works by Black, Asian and other ethnic minority poets and novelists, so that students learn about cultural diversity through distinctive voices. There is also the need to include plays by early women dramatists, such as *The Concealed Fancies,* for the syllabus to fully embrace gender equality. The history A-level syllabus can also become democratic if new subject matter related to women's issues from local and global perspectives is added. New learning outcomes should acknowledge the need for students to identify, discuss and write about constructions of gender roles, challenges to patriarchal discourse, and representations of culture in set texts in the English syllabus, as well as learning about women's role in society and how it has developed in the history syllabus. If these changes can be implemented, we will surely see syllabi that break gender and cultural barriers in post-secondary education in Malta.

References

Alvi, M. (2002). *Peacock Luggage*. Huddersfield: Smith/Doorstep Books.

Atwood, M. (1986). *The Handmaid's Tale*. New York: Houghton Mifflin Harcourt Publishing Company.

Bishop, E. (1979). *The Complete Poems 1927-1979*. New York: Farrar, Straus & Giroux.

Bronte, E. (2003). *Wuthering Heights*. New York: Penguin Books.

Braithwaite, E. R. (1959). *To Sir, With Love*. Oxford: The Bodley Head.

Callus, A. (1992). *Għadma minn Għadmi. Ġrajjiet il-Mara u Jeddijietha (Flesh of my Flesh. The History of Women's Rights)* Ħaż-Żabbar: Stamperija Guttenbery.

Cavendish, J. & Brackley, E. The Concealed Fancies. Available at http://extra. shu.ac.uk/emls/iemls/renplays/ConcealedFancies.pdf [Accessed 15 February 2018].

Colby, S. A. & Lyon, A. F. (2004). Heightening Awareness about the Importance of Using Multicultural Literature. *Multicultural Education*, 11(03), 24-28.

Dickens, C. (1992). *Great Expectations*. Surrey: Thomes Nelson and Sons Ltd.

Duffy, C. A. (2004). *Selected Poems*. London: Penguin.

Heaney, S. (1969). *Death of a Naturalist*. London: Faber.

ILO (2000). *ABC Of Women Worker's Rights And Gender Equality*, Geneva: International Labour Office Press.

Lee, H. (1960). *To Kill a Mockingbird*. New York: Grand Central Publishing.

Matsec Examinations Board University of Malta (2018). AM 10 English Syllabus 2020. Available at https://www.um.edu.mt/data/assets/pdf_file/0015/354012/AM10.pdf [Accessed 11 July 2018].

Matsec Examinations Board University of Malta (2018). AM 17 History Syllabus 2020. Available at https://www.um.edu.mt/data/assets/pdf_file/0004/354559/AM17.pdf [Accessed 15 July 2018].

Morrison, T. (1987). *Beloved*. New York: Alfred A. Knopf.

Roy, A. (2017). *The God of Small Things*. London: fourth Estate HarperCollins Publishers.

Rushdie, S. (1981). *Midnight's Children*. London: Jonathan Cape.

Sammut, C. (2017). *The Road to Women's Suffrage and Beyond*. Malta: The Central Bank of Malta.

Shakespeare, W. (1964). *Romeo and Juliet* in W. J Craig, eds. The Complete Works of William Shakespeare. London: Oxford University Press, pp.764-794.

Shakespeare, W. (1964). *Othello* in W. J. Craig, eds. The Complete Works of William Shakespeare. London: Oxford University Press, pp.943-976.

The Working Group on the Future of Post-Secondary Education (2017). Report to the Ministry of Education and Employment, Malta.

Thien, M. (2017). *Do Not Say We Have Nothing*. London: Granta Publications.

Wheatley, P. (2001). *Complete Writings*. London: Penguin Classics.

Bio-note

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The Struggle of Adolescents with Physical and Sensorial Disabilities at Further and Higher Education Levels

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Abstract:

The Maltese anti-discrimination legislation stipulates that it is unlawful that an educational authority would discriminate against a person on the grounds of disability. The experience of young disabled persons with physical and sensorial disabilities attending further and higher educational institutions in Malta (and Gozo) was explored to understand the disabling barriers and enabling factors of inclusive education. The study stemmed from Dewey's theory of experience. Pragmatism was utilised as the main philosophical paradigm since lived experiences where considered essential for critical reflection on the experienced (the what) and the experiencing (the how) of experience. This paper focuses on the findings obtained from a narrative inquiry that was developed over two years with four female adolescents while attending a course at a further education institution and the University of Malta. The findings indicated that inclusive education is a social construct. The participants experienced an acceptable level of inclusive education. However, they unveiled an underlying struggle to overcome environmental, social and educational disabling barriers. It is recommended that in implementing quality inclusive education, the principles of democracy and social justice would stem from a rights-based rather than a charity-based approach.

Keywords: further education, higher education, inclusive education, disabled persons

Introduction

The experience of disabled persons with physical and sensorial disabilities attending further and higher educational institutions in Malta and Gozo was explored to understand the disabling barriers and enabling factors of inclusive education. This paper focuses on the findings obtained from a narrative inquiry that was developed with four female adolescents. This paper addresses the educational, social and environmental struggle that the participants experienced. It is envisaged that such consciousness would enable different stakeholders to reflect upon and transform personal and institutional current practices and policies that shape the politics of inclusive education.

Methodology

Based on a pragmatic approach to ontology deriving from Dewey's theory of experience (Dewey, 1938), the inquiry sought to understand the experienced (the what) and the experiencing (the how) in relation to the phenomenon of inclusive education as experienced by disabled young persons.

Narratology is a discipline "which takes as its central task the analysis of stories and narratives" (Plummer, 2001, p. 186). Cousin (2009) suggests that "narrative inquiry is particularly useful if you want to know something about how people make sense of their lives through the selective stories they tell about noteworthy episodes" (p. 93). Thus, the validity of the story should be valued more for the rich and insightful data that it provides rather than its representativeness. Narratology was implemented by conducting seven interviews with four adolescents who were given the pseudonyms of Alessia, Marie, Elena and Melanie, over a period of two years with an interval of approximately three months. In adopting Plummer's (2001) elements of narrative, the texts were analysed for key elements that shaped the lived stories to elicit meaning and interpretation of the experience of inclusive education of disabled young persons at further and higher education.

Theoretical Framework

The Maltese anti-discrimination legislation, the Equal Opportunities (Persons with Disability) Act (Laws of Malta, 2000, Chapter 413) specifies that it is unlawful that an educational authority would discriminate against a person on the grounds of disability. Moreover, as stipulated by the United Nations Convention on the Rights of Persons with Disabilities, state parties should create the measures to ensure that persons with disabilities are mobile and independent and that they experience non-discrimination and equal opportunities in education at all levels (United Nations, 2006, Articles 20, 24).

Adams and Brown (2006) argue that, "for most higher education institutions, the transition to inclusive education will require a significant cultural shift from seeing disabled students as 'outsiders coming in', to an institution which openly embraces 'all comers'" (p. 4). Thus, a pro-inclusion culture that enforces accessible and equitable quality learning and assessment practices for all students that respect student diversity and students' right of education are essential for the implementation of inclusive education.

Dewey (1930) sustains that, "not only does social life demand teaching and learning for its own permanence, but the very process of living together educates" (p. 7). However, students' diversity conveys the need for renewed commitment to teach all learners regardless of race, ethnicity, age, gender, socioeconomic status, ability or background to high standards (Gordon, 2009; Burgstahler, 2010). Florian

(2014) maintains that for teachers to sustain a commitment of inclusive pedagogy over time, they should adopt an approach that avoids marginalisation that is generated when students are treated differently, and a tactic that supports them to respond to learners' individual differences.

Findings

The findings indicated that inclusive education is a social construct. The participants experienced an acceptable level of inclusive education. However, they unveiled an underlying struggle to overcome environmental, social and educational disabling barriers on three levels, namely in relation to the self, in relation to others, and in relation to educational, assessment and employment entities.

The politics between the self and one's identity

Self-consciousness of one's limitations and abilities was associated to identity development as a person who can contribute to society. Participants learned how to adapt to their impairment, a system or persons, and be immersed into a culture of a majority of non-disabled persons. They recognised that they had to be nurtured to learn how to fend for themselves. This entailed developing self-help strategies, and a positive as well as a realistic approach towards life:

> I'm lucky enough that I see both worlds and I'm part of both. … You could have a student who can cope alone, but if he doesn't have accessibility, you've stopped everything. (Marie)

> Society makes you disabled as it won't see you in the same way as someone else. … I focus on my abilities. You need to think about what you can't do too, but you'll find another road to succeed. (Melanie)

The participants expressed that disabled people are faced with two problems, in adapting to the embedded limitations caused by the natural aspect of their impairment and coping with the disabling barriers that are socially constructed. Struggling against other people's perceptions of one's disability and disempowering attitudes was frustrating. Nurturing a rights-based approach from childhood empowered the participants to take up their responsibilities, develop self-advocacy and agency:

> You are not judging yourself as a normal person is supposed to do. You are finding someone else judging you instead. (Alessia)

> To make my voice heard, apart from being a right, I think that it's my
> duty as even if I'm not going to use it myself, someone else is going to
> use it. (Melanie)

Disabled persons should inform the school administration of their needs and that the information should be disseminated to lecturers as this could improve the quality of their learning experience. However, disclosure of needs should not imply a different treatment or a negative disability identity. Communication, collaboration, ongoing planning and training, enable stakeholders to be sensitive of the needs of diverse individuals:

> I think you always need to tell as if you'll need something different, at
> the middle of the year, maybe it will be more difficult for someone to
> help you. But then it shouldn't define you. (Elena)

> I should tell them that I am visually impaired. They'll be alerted so that
> they'll be able to prepare from beforehand. (Marie)

Conforming and experiencing life as their peers were salient factors in their education and in their identity development as an adolescent. It increased their chances of social inclusion and social cohesion. Portraying an identity of a dependent person was considered as deviating from the socially expected norm of adolescents. They tried to be independent as much as possible:

> I don't want that someone treats me as if I am of a lower value than
> others because I'm normal like anyone else. (Alessia)

> I wished to be independent. I wished to be like others. No one has an
> LSA (Learning Support Assistant) and why should I be different, not
> having my liberty, independence and privacy. (Melanie)

The hardships in overcoming the natural limitations caused by the impairment and socially constructed disabling barriers that limited the participants' academic development enabled them to develop perseverance and courage to face perils. Attending mainstream education was a learning process in developing resilience to obstacles and reflexivity in being aware that there are always persons of good-will and those who are ready to be spiteful. Past friendships increased their self-confidence and resilience to new situations:

> There are youths who speak with arrogance. Although you try not to
> pay attention, it's not easy. Now either you're going to let it to break you
> or you're going to adopt a positive approach towards others. (Melanie)

> Last year I made friends quicker for the fact that I had lectures with
> my friends. (Marie)

The politics between the self and others in experiencing inclusive education

Sensitivity towards the needs of different individuals and positive attitudes towards disabled people from family, friends, lecturers, non-academic staff, administrators and professionals affected the participants' physical and mental wellbeing. It also affected the extent environmental, social and educational disabling barriers were removed and the extent social inclusion was promoted. Friendship created a support network that promoted the development of individual and group resilience to stressors. Friendship inculcates the development of values that foster social inclusion and cohesion such as reciprocity, interdependence, altruism and solidarity without making a person feel as a second-class citizen:

> We have a presentation. The place where we hold the lectures is like a theatre and with steps. … When I told them and they made accommodations for me, I felt included. … If you're going to place a person in a school, the students around her are going to be different. That's how you'll become included and their values would be strengthened. (Melanie)

> We had spoken to the Principal because I don't see from far away. If I'll need assistance, I can go to room 103. He told us that he was going to tell the teachers, but no one knew that I had to stay at the front row. (Elena)

The importance of being courageous to try new things and face challenges was recognised by all the participants. However, lack of human resources, training and matching of human resources to the services that need to be given to students create great limitations for students to succeed. The participants indicated that time is needed for any person to become empowered and habituated to fend for oneself, but disabled persons need a bit more time due to personal limitations:

> If the LSA (Learning Support Assistant) is sick, I am not able to come to school as there isn't a pool of LSAs. I'll be absent. (Alessia)

> I didn't have an orientation visit. It would have been much easier. Last year, they provided me with an LSA (Learning Support Assistant). Her first experience as an LSA! She used to ask me what she had to do and I got confused. (Marie)

All participants agreed that lecturers are main stakeholders in creating a successful story of inclusive education. The rapport lecturers build with students, the group dynamics they create in class and inclusive pedagogies they use are crucial factors. Effective two-way communication and partnership between them and the lecturers were effective in identifying the plan of action to be implemented:

If you'll have a good relationship, it will be the most beautiful thing in the world, but if you won't have a good relationship, it's better that for each subject there will be more than one lecturer. (Elena)

Communication amongst the students and the lecturer I think that it's very important. (Marie)

The participants were afraid of being embarrassed in front of their peers as embarrassment disempowers a student and affects the type of relationship that is developed between the student and the lecturer. Causing embarrassment reflects lack of sensitivity and empathy towards others and that the lecturer went to class with stereotypical assumptions about who the students could be. The participants indicated that most of the lecturers were supportive, but there is room for improvement:

Power Points, some of them they'll be in a small font, the diagrams, the labelling will be small, notes incomplete … You'll get annoyed telling them to write bigger. … The first time I went, she told me, "Why are you with the fringe, are you blind? In front of the class I could not tell her "Yes." I didn't speak. (Elena)

Certain teachers don't expect to see a person with disability. … There are ones who don't provide slides or leave the slides flipping and he talks on something else. (Melanie)

The politics between the self and entities of education, assessment and employment

Access is a key factor that improves the quality of inclusive education. In creating environmental, social and educational access, the participants indicated that stakeholders need to work in synergy. The participants put pressure on the administration to comply to their rights. They also showed an inner mission statement to contribute for the common good of disabled people and the student cohort in general:

I won't be able to go most of the outings as they are not held in accessible places. (Alessia)

Previous students with disability sort of pave the way for someone else. Inclusivity is a culture, sort of the habits of people. I still feel, that because I am asking for help, I am at a lesser level than someone else as the others just cope with what they have to do. (Elena)

> There's the need for much more awareness even in schools. We are different, but our differences should not result into discrimination. (Marie)

The participants showed that information accessibility was an enabling factor to academic development. The availability of accessible tools on the market and in schools would give more freedom for disabled students to choose certain subjects and be able to complete tasks at par with non-disabled others:

> I went to the library of here and the university. They neither have audio books nor eBooks. … As I'm First Year repeater, I changed Maltese since a screen reader that reads in Maltese was issued at the end of last year. (Marie)

The participants recognised the importance that they are involved in decision-making as they would experience the consequences. They called for justice so that disabled persons do not have to struggle over and above other students. They experience a struggle in completing the statement of needs to prove that they are able to perform in exams or to verify that they are eligible for access arrangements:

> The psychologist didn't ask me, he asked my mother and the school that I used to attend about what access arrangements I had. What I take at school, I take at MATSEC. … I believe I don't have to pass through this board. (Melanie)

> The board decides upon the report of the doctors. I won't tell what I need. The doctors should state that I need certain things. I won't have a choice. A normal girl won't have these papers and certificates that you need to do. (Alessia)

The process of interrogation bothered the participants. It created stress over and above the stress students experience in preparation for their exams. It made them feel as second-class citizens, humiliated and submissive to a hegemonic entity that judged their entitlement for access arrangements according to their medical portfolio. The participants recognised that this is done to curb abuse, but the approach needs to be evaluated:

> The pressure that you'll start feeling while she's testing you, it's like you are doing the exam that you have to sit for. I don't think that it's fair. … You have to study for the A-levels. (Alessia)

> For the statement of needs, I did tests. You shouldn't need to redo this process every two years! (Melanie)

The stories indicated that they were generally satisfied with the access arrangements that the respective school and MATSEC board provided. However, they criticised the MATSEC system in the way students obtain access arrangements and their effectiveness. During exams the participants experienced frustration and they noted that the access arrangements disabled them rather than created an equitable situation:

> At times, I take half an hour trying to explain. … If you have Italian, at least the person who is going to be with you would know the basics of that subject. Not to help you, but to understand you! (Alessia)

> I just needed extra time and a computer that reads for me the paper. Then a technician comes, he saves it on a pen drive and prints the paper as it is. … The system that I am following now beats a scribe. (Marie)

All participants, albeit different challenges in terms of access and attitudes of non-disabled persons, recognised the benefits of attending mainstream schooling. Inclusive education was regarded useful for the school's community as by living together, a culture of inclusion from a rights-based standpoint is likely to develop over time:

> Even the students amongst themselves as it's one thing seeing the person and the wheelchair only and another seeing the abilities of the person. (Alessia)

> The fact that I'm in a class with my friends, it's better than if they locked me up in another room with three others. … People who know me sort of they'll start thinking a bit before they speak. (Elena)

There is a nexus between further/higher education institutions and employment entities, but the transition from one sector to another is not as smooth as one would expect. They remarked that there is the need for more career guidance and transparency on the type of assistance that disabled students could get while reading a course at further and higher education and what activities will they be asked to do. Lack of job opportunities suitable for different disabled persons defeats the purpose for attending mainstream education and striving during the schooling years:

> I don't know what I'm going to choose at university. There has to be more information. … I think companies need to open more, rather than closing their doors for you immediately. (Elena)

Discussion

The participants shared a common belief that adolescence is a unique developmental

stage, and limiting disabled adolescents to experience it to the full due to environmental disabling barriers was oppressive and discriminating (Shakespeare, 2006; Laws of Malta, 2000). The participants through their activism tried to challenge forms of internalised oppression that society imposes in a subtle way. According to Watermeyer (2012, p. 170) in the disability sector, internalised oppression implies "maintaining marginality, material deprivation, dependency of all sorts, ostracism and struggle as the province of those designated disabled, in order that the business of othering may continue successfully."

The research reinforced that inclusive education is essentially the onset of a social process "which engages people in trying to make sense of their experience and helping one another to question their experiences and their context to see how things can be moved forward" (Ainscow, 2008, p. 41). Dewey (1930) explains that, "communication is a process of sharing experience till it becomes a common possession. It modifies the disposition of both the parties who partake in it" in order to improve the quality of experience of those involved (p. 11). Consultation embeds democratic practices within the nuclei of classrooms and institutions that are basic in an inclusive agenda (Shevlin, 2010).

Conclusion

Inclusive education is dependent upon positive relationships between the self, the family and the community at the educational institution. It is recommended that in implementing quality inclusive education, the principles of democracy and social justice would stem from a rights-based rather than a charity-based approach. The development of a social network that promotes community building is likely to propagate social inclusion and social cohesion. Nurturing self-help strategies among disabled people and continuous planning to assist and guide diverse students across the educational sectors helps students to experience positive transitional periods between one educational institution and another. Training in implementing inclusive pedagogies such as the framework of Universal Design For Learning would increase the likelihood that the struggle of disabled persons and other minority groups would be dissipated and more students are supported to reach their full learning potential.

References

Ainscow, M. (2008). Profile. In P. Clough, & J. Corbett, eds. *Theories of inclusive education – a student's guide*, London, UK: Paul Chapman Publishing, (pp. 39-42).

Adams, M., & Brown, S. (2006). Introduction. In M. Adams, & S. Brown, eds. *Towards inclusive learning in Higher education – developing curricula for disabled students*, London, UK: Routledge, (pp. 10-22).

Burgstahler, S. E. (2010). Universal design in higher education. In S. E. Burgstahler, & R. C. Cory,

eds. *Universal design in Higher education – from principles to practice*, Cambridge, MA: Harvard Education Press (pp. 1-20).

Cousin, G. (2009). *Researching learning in higher education – An introduction to contemporary methods and approaches*. London, UK: Routledge.

Dewey, J. (1930). *Democracy and education – An introduction to the philosophy of education*. New York, NY: The Macmillan Company.

Dewey, J. (1938). *Experience and education*. New York, NY: Touchstone - Simon and Shuster.

Florian, L. (2014). What counts as evidence of inclusive education? *European Journal of Special Needs Education*, 29(3), 286–294. Available at https://www-tandfonline-com. ejournals.um.edu.mt/doi/pdf/10.1080/08856257.2014.933551?needAccess=true   ) [Accessed: 5/8/2018]

Gordon, D. T. (2009). School reform: are we just getting started? In D. T. Gordon, J. W. Gravel, & L. A. Schifter, eds. *A policy reader in Universal design for learning,* Cambridge, MA: Harvard Education Press, (pp. 19-33).

Laws of Malta. (2000). *Equal Opportunities (Persons with Disability) Act (CAP. 413)*. Available at http://docs.justice.gov.mt/lom/legislation/english/leg/vol_13/chapt413.pdf [Accessed: 5/8/2018]

Plummer, K. (2001). *Documents of life – an invitation to critical humanism*. London, UK: SAGE Publications.

Shakespeare, T. (2006). The social model of disability. In L. J. Davis, ed. *The disability studies reader* (2nd ed.), London, UK: Routledge, (pp. 197-204).

Shevlin, M. (2010). Valuing and learning from young people. In R. Rose, ed. *Confronting obstacles to inclusion – international responses to developing inclusive education*, New York, NY: Routledge, (pp. 103-121).

United Nations. (2006). *International Convention on the Rights of Persons with Disabilities*. Available at http://www.un.org/disabilities/documents/convention/convoptprot-e.pdf [Accessed: 5/8/2018]

Watermeyer, B. (2012). Is it possible to create a politically engaged, contextual psychology of disability? *Disability & Society*. 27(2), 161-174. Available at https://www-tandfonline-com.ejournals.um.edu.mt/doi/pdf/10.1080/09687599.2011.644928?needAccess=true [Accessed: 5/8/2018]

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Bernini Breaking Barriers – Sensuality Sculpted in Stone

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Abstract

This paper will attempt to demonstrate that with his virtuosity, the Baroque sculptor, Gian Lorenzo Bernini managed to challenge the barriers which the medium he worked with, namely stone (marble) offered, to produce dynamic, lifelike and realistic works that also managed to express a previously unknown element in sculpture, that of sensuality. It will try to highlight how the spiritual and physical could come together in his works. The first masterpiece that will be focused upon will be the portrait bust of Bernini's lover Costanza Piccolomini, a private work Bernini sculpted when he was thirty-nine years of age, chosen to represent the passion and worldly love that he felt for this woman. By way of contrast, the second masterpiece studied in this paper is the figure of the Blessed Ludovica Albertoni, one of his last works, chosen to represent Bernini's concept of the culmination of spiritual love that also incorporated a sensual element. The third and final masterpiece is the ecstasy of St. Teresa of Avila found in the Cornaro Chapel in the Church of Santa Maria della Vittoria, considered by many as his greatest work, as an example of how mysticism also has a sensual element to it.

Keywords: Baroque sculpture, Gian Lorenzo Bernini, sensuality, Costanza Piccolomini, Ludovica Albertoni, St Teresa d'Avila.

No one can deny that Gian Lorenzo Bernini had the extraordinary technical skill and expertise to sculpt anything that he visualised or saw. The numerous works of art that he continued to create into his maturity and almost up to his death are evidence of this. His outstanding ability to capture emotion in motion, to sculpt intense and unforgettable faces and figures and design *bel composti* made him the greatest sculptor of his time. Another reason for his great success was that the innovation in his work. Although there were many sculptors before him who were also extremely talented, among them the great Michelangelo, Bernini's works broke barriers, defying the solidness of marble to make it look plastic, soft, pliable and fluid. In his sculptures, flesh looks like real flesh, drapery falls in soft folds, and facial expressions and body movements are so real that they stimulate in the viewers very intense emotions up to this day, making his work unforgettable. A previously

unknown quality that Bernini manages to portray is sensuality, as this paper will attempt to analyse and demonstrate.

During the Renaissance, the sculptures being executed were inspired by the realism and sophistication of the Classical sculptures of human figures and busts. They were also a synthesis of the works produced in the Middle Ages. But the transition in sculpture between Higher Renaissance and the Baroque was an even greater leap. The most innovative characteristics introduced were movement and dynamism and a greater life-like quality. Bernini's virtuosity took these characteristics to new heights, managing to combine a spiritual element with the physical while at the same time making his figures look sensual. Sensuality is very hard to define, let alone portray in sculptures made of stone or marble; yet, Gian Lorenzo Bernini managed to do this. Most commonly defined as pleasurable sensations felt through the senses of touch, taste, scent, sight or sound, sensuality is often confused with sexuality, especially in modern times when so much importance is given to sexual gratification. It is true that sensuality may lead to sexuality, but it cannot be considered as being the same thing. Sensuality can go much deeper than the physical; it is also about unconditional love, a deep intimate connection that may even be spiritual and emotional. Three examples have been chosen to illustrate how Bernini with his virtuosity managed to portray sensuality in stone.

Costanza Piccolomini - Sensuality and Profane Love

The first example to be analysed is the portrait bust of Costanza Piccolomini. Although better known as Costanza Bonarelli and referred to as such in most prominent publications on sculpture, her aristocratic maiden name was Piccolomini, as has been brought to light by her last will and testament (McPhee, 2012). At the time she was the twenty-two year old wife of Matteo Bonarelli, a sculptor who worked in the *bottega* of Gian Lorenzo Bernini as his assistant. She became Bernini's lover for a period of time (Hibbard, 1965). Domenico Bernini refers to the affair in his father's biography, observing that 'Both the painted and the marble portrait of Costanza are done in such a fine style and lively manner that even in these copies of her likeness the *Cavaliere* revealed how much he was in love with the original (Bernini, 2011, p.113) (Fig.1)

Figure 1: Gian Lorenzo Bernini, Detail of Portrait Bust of Costanza Piccolomini, 1636-37, Museo Nazionale del Bargello, Florence. (Photo Scala, Florence – courtesy of the Ministero Beni e Att. Culturali e del Turismo)

The bust of Costanza was not a commission, but a private work that Bernini made for his own pleasure. Surviving portraits of other women made by him, preceding the one of Costanza were those of pious and veiled women and, save for the one of Cardinal Scipione, portrayed expressions that were serious, pensive and introvert, albeit extremely realistic. But in this portrait bust, Bernini had no regard whatsoever for the dress code and the facial expression usually deemed as appropriate for such works (Wittkower, 2013, p.88). If one had to compare, for example, Giuliano Finelli's earlier bust of Maria Barberini Duglioli with that of Costanza, one would observe a remarkable resemblance in their facial features, to the point that they could easily be considered siblings, but the likeness between the two works of art stops there. Whereas in the Finelli portrait, the *bravura* of the artist is apparent in the intricate detail of her curls, the flowers in her hair, the elaborate lace collar and the jewellery (Boucher, 1998, p.65), one is struck by Maria's blank neutral expression, an immense contrast to the piercing look of Costanza's portrait that makes eye contact with the viewer (Fig.2 and Fig.3). Bernini seems to have sculpted his lover as she would have looked at him in an intimate moment, choosing, as is usual with him, that particular instance that manages to convey the most about the sitter and in this case also about the relationship between them.

Figure 2 and 3: (*left*) Gian Lorenzo Bernini, Portrait Bust of Costanza Piccolomini c. 1636-37 and (*right*) Giuliano Finelli, Portrait Bust of Maria Barberini Duglioli 1626-27) (Photo Scala, Florence – courtesy of the Ministero Beni e Att. Culturali e del Turismo/ Web Gallery of Art)

He portrayed Costanza's sensuality through the way he sculpted her clothing (Fig.4), the way her hair was styled (Fig.5), and her parted lips (Fig.6). Wearing a simple and flimsy chemise open at the front to reveal part of her right breast and her cleavage, Costanza's head is turned naturally to look straight ahead (Fig.7). Her hair is styled in a double-coiled braided bun at the back of her head, an endearing tendril falls on

Figure 4: Detail of Costanza's neckline. (Photo Scala, Florence – courtesy of the Ministero Beni e Att. Culturali e del Turismo)

Figure 5: Detail of Costanza's hairstyle. (Photo Scala, Florence – courtesy of the Ministero Beni e Att. Culturali e del Turismo)

Figure 6: Detail of Costanza's lips
(Photo Scala, Florence – courtesy of the Ministero Beni e Att. Culturali e del Turismo)

Figure 7: Detail of Costanza's piercing gaze (Photo Scala, Florence –
courtesy of the Ministero Beni e Att. Culturali e del Turismo)

Costanza's smooth forehead whilst others curl at the nape of her neck. Her lips are parted. This emphasis on the lips is an important characteristic in Bernini's sculptures exploited in both the bust of Costanza and those of both St. Teresa of Avila and the Blessed Ludovica (Boucher, 1998, p.60). Costanza's parted lips were a break in Baroque decorum for Baroque sculpture busts, although it seems that Bernini might have been referencing an older tradition in which goddesses were often depicted open-mouthed. In parting her lips, Bernini may have been trying to place her in the realm of goddesses (McPhee, 2012, p.42). Costanza seems to be speaking or breathing heavily through her mouth and this makes her look sensual, as do her peachy cheeks and rounded chin. Although rendered in marble, she looks passionate yet pensive at the same time, looking so lifelike that the observer feels that communication with her is not impossible. This is what Bernini intended and managed to achieve, a portrait of his beloved that also expressed his passion for her youth and beauty as well as her sensuality (Schama, 2009, p.105).

Costanza's gaze is that of a remarkable, young and intelligent woman who managed to capture the heart of Bernini. Her intelligence is documented and became particularly evident after her disfigurement, an atrocity commissioned by Bernini himself after he discovered that she had betrayed him with his younger brother Luigi. This incident brought out the dark side of Bernini, although one has to analyse this within the context of the culture of seventeenth century Rome, where the *sfregio* was meant to inflict a sign of shame on the face that was considered as the mirror of honour. Face cutting and nose slashing were also common as legal punishments for adultery, so much so that, in surgical books, there was more than one method of reconstruction, referred to as Vigo's or Paré's methods (McPhee, 2012, pp.44-45). After the prison sentence for adultery, she made her way out of poverty, withstood illness and managed to keep up her husband's business after his death. She even learnt how to read at a time when very few women did (McPhee, 2012, pp.137-138).

The Blessed Ludovica Albertoni – Sensuality and Spirituality

The second example to be analysed is the marble and jasper Blessed Ludovica Albertoni on her deathbed. Bernini executed this work for Cardinal Altieri in 1671 as a family penitence for his now middle-aged brother Luigi's crime of sodomy on a much younger man inside the Vatican (Schama, 2009, p.125). Ludovica Albertoni, a noble woman born in 1473, was married and had three daughters whom she raised in the area of Trastevere in Rome. When her husband died, she became a member of the lay order called the *Penitenti* and from then on attempted to live a frugal life of mortification. There was a great devotion for her when she died and the cult grew with time until during the year she was to be beatified, a decision was taken to have a tomb sculpture by the great Bernini for the Altieri chapel in S. Francesco a Ripa in Rome, where her remains lay (Perlove, 1990, p.4).

It is documented that the Blessed Ludovica would levitate during her prayers. Bernini seems to have done his background reading, as he was apt to do before proceeding with his work. Presumably in the case of Ludovica, he would have been familiar with a publication which followed her beatification ceremony in 1670, as well as with the book *Vita* written in 1672 by Fra Paulo, who was the postulant of her case. He was probably also acquainted with *I voli d'amore*, a panegyric to Ludovica written by Bernardino Santini which, although recited in 1673 after the work had already initiated, could easily have been available to Bernini through his close contacts with Cardinal Altieri. A good example which highlights this association is the reference to the gesture of Ludovica pressing against her breast from each of these four sources and a recurrent reference to her heart which was inflamed with love (Fig.8). In a passage of the panegyric by Santini, he refers to the 'amorous exhalation of the flame nurtured in her bosom' (Perlove, 1990, p.30). Bernini's representation seems to be the visualisation of what was written in these texts.

Figure 8: Detail of the Blessed Ludovica Albertoni
(Photo Scala, Florence/Fondo Edifici di Culto - Min. dell'Interno)

Figure 9: Detail of the Blessed Ludovica Albertoni, c 1667-1674, Altieri Chapel, San Francesco a Ripa, Rome rotated by 90° clockwise. (Photo Scala, Florence/Fondo Edifici di Culto - Min. dell'Interno)

When he came to sculpt the face of the Blessed Ludovica, Bernini chose to represent spiritual love through more classical and delicate features than those of Costanza (Fig.9). He portrayed her with a much slimmer face and nose, as well as having high cheekbones more reminiscent of Michelangelo's Madonna in *La Pietà*. His work on the Blessed Ludovica is indicative of how, in the last fifteen years of his life, Bernini became fervently religious. His friend and spiritual director Padre Giovanni Paolo Oliva, Superior General of the Society of Jesus, had lengthy theological discussions with him that left him impressed with Bernini's depth of understanding of religious matters (Perlove, 1990, p.1). Bernini attempted to represent this intensity and his search for eternal salvation in this work, considered one of his finest. One cannot, however, help feeling that his experiences in worldly love would have also been influential in the level of perfection seen in the rendering of the Blessed Ludovica. Through his own experience of worldly love, together with his spiritual formation and his efforts to lead a holy life, he reached a climax with this work that further synthesised his previous works.

With the Blessed Ludovica, Bernini fashioned what many consider to be the most moving and engaging work of his artistic career. He laid her slender agitated body on a mattress with her hips raised and her back arched. Her delicate hands press into her right breast in a gesture so lifelike that one can almost empathise with the raw pain the saint was experiencing in this most crucial moment, when her soul was about to leave her body. Her lips are parted as she gasps in pain, pleasure or both and her eyes roll upwards in an ecstatic moment, expressing the intense spiritual love felt by the saint for God. The light streaming from a side window onto her face is also a contributing factor to the sensual aura created (a tactic Bernini had previously used with St. Teresa in ecstasy). This masterpiece is a personification of

death about to happen and the salvation that will ensue. It is about this saint's agony and ecstasy. When working on the Blessed Ludovica, another influential factor could have been the growing cult around St. Rosa of Lima, the first saint canonized from the New World. Moreover in 1665, a work by Melchiorre Cafà, the first sculptor to depict a saint on her death bed with an angel comforting her, had taken Rome by storm, in line with the focus on the art of dying that was so popular in the Baroque age (Boucher, 1998, p.11). According to Sciberras (2006, p.9), this masterpiece must have surely influenced the great Bernini.

The Blessed Ludovica's tunic is in compressed, irregular folds under her left hand other folds fall down her right arm and others flow down between her legs. These movements, together with the contrast between her neck abandonment and the strain in her left hand, create an atmosphere of ambiguity (Careri, 2003, pp.86-87). The figure comes alive to its viewers, seemingly squirming with the sensations being felt. Sensuality is here being portrayed by Bernini during the throes of a spiritual experience through an ensemble of details which together create an aura of sensuality closely linked with spirituality.

St Teresa of Avila – Sensuality and Mysticism

The third example to be analysed is the marble and gilded bronze depicting the Ecstasy of Saint Teresa of Avila found in the Cornaro Chapel inside the Church of Santa Maria della Vittoria in Rome, considered by many as his greatest work. (Fig. 10) The work is based on the saint's writings when she describes in detail the instance when a seraph thrust an arrow repeatedly straight to her heart, a gesture that represents St Teresa's mystic union with Christ. In this masterpiece sensuality is not only portrayed through the facial features, and the position of St Teresa's head and body but also through the expression on the seraph's face (Fig. 11) and his involvement in the scene. The subtle light that falls on the two figures, faces and on the golden rays behind them from a hidden window above them also contributes to the sensual atmosphere that Bernini created with another of his extraordinary design ideas.

There are many similarities between the facial features of St Teresa and those of the Blessed Ludovica but also some differences. St Teresa's lips are also parted but the eyes are almost completely closed, with her eyes rolling down not up (Fig.12). Her head is also thrown back, her body arched back but her arms are falling limply by her side in complete abandonment. In the eighteenth century, Chevalier de Brosses commented, tongue in cheek, that he himself had experienced the type of divine love that Bernini was representing (Schama, 2009, p.80). Many modern reactions are also in this vein but interpreting these works so superficially shows a misunderstanding of the importance of metaphor in the culture of the Baroque where spiritual ecstasy was represented by physical ecstasy. Metaphor in the Baroque age was found in all forms both in literary works, such as the writings of John

Donne, Richard Crashaw and Bernini's contemporary Giambattista Marino as well as religious ones as indicated above which borrowed from physical manifestations of passion, sensuality and eroticism to represent the heights reached even in the experience of divine love. It was an age when many yearned to be possessed by the Divine and when this type of possession was believed to involve extreme sensations of the body (Schama, 2009, p.78). Bernini seems to have succeeded in representing all of this, drawing from his experiences as a husband and lover, synthesising them with his own religious knowledge and spirituality.

Fig. 10: Gian Lorenzo Bernini, Ecstasy of St Teresa, Cornaro Chapel, Church of Santa Maria della Vittoria, Rome. (c. 1647—1652) (Photo Eric Lessing/Art Resource)

Figure 11: Detail of the Ecstasy of St Teresa (Photo Eric Lessing/Art Resource)

Conclusion

An artist can never express in his art what is not an integral part of his mind and soul and what he has experienced in life, what he has read and what he believes in and Bernini expressed this in the above three examples. It would be presumptuous to conclude that his experience with his lover Costanza and later with his wife Caterina Tezio were the only or the strongest influence in his later works. Having eleven children with his wife of longstanding would presumably have augmented his sensual knowledge. But he also gave importance to his spiritual formation. Besides his discussions with Padre Oliva, the books he read must also have influenced him. From Chantelou's diary entries on Bernini's visit to Paris, among the great sculptor's favourites books were the *Imitation of Christ* by Thomas à Kempis and the *Introduction to a Devout Life* by St. Francis de Sales, both religious texts popular with those who wished to follow in the steps of Christ (McPhee, 2000, p.443).

In fact, so many other factors could have influenced Bernini in portraying so much sensuality in his art, but this paper has shown that although worldly and spiritual love seem so far apart, spirituality and mysticism do borrow from corporeal manifestations of love. No mystic can escape from the constraints of the physical body while still on this earth and intense feelings are expressed through the same facial and body language used in much more erotic situations such as those during the physical union of two lovers. When it comes to mysticism and spirituality, there could be different levels of depth but one way of expressing it: the physical way. St. Teresa knew no man, yet, in her writings, she describes her experience with God like a woman in the throes of a passionate union with one, and this is how Bernini represented her. Some have spoken of orgasm when seeing her in ecstasy in the Cornaro Chapel, but Bernini has done justice to St. Teresa and the Blessed Ludovica, because although the expression on their face might seem both erotic and sensual, it does not detract from the nobleness of their spirit. It would indeed be sad to interpret Bernini's works so superficially when they were meant to symbolize the perfect union with God.

The sensual abandonment, in the opinion of some, verging on the eroticism, of both the Blessed Ludovica and St Teresa of Avila is so evident that many have felt that it clashes with the holiness of the churches in which they are found. Art historians have felt the compulsion to remind spectators time and time again that Bernini was a very religious and pious man and that these have to be seen and analysed not with the criteria of the present day but of those of the seventeenth century when the spiritual and the sensual could coexist. During mystical experiences the body and soul are believed to be, temporarily separated, but that the physical body is involved in the ecstatic phenomena is a fact that Bernini managed with his virtuosity to portray sculpting in stone (Careri, 2003, p.81).

Bernini had studied and drawn from classical models for years, as all sculptors do to learn the rules, but is famous for breaking these same rules, as he does in his choice of the exact moment to capture the personality and character of his subjects

by getting to know them personally or through their writings. He broke other barriers too, by making his work represent not one, but multiple images from different perspectives, as with the Costanza bust, by trying to 'uplift' his works, defying the nature of the heavy material he worked with, and by sculpting figures that seem to want to break free from the pull of gravity. He also broke barriers by using several art forms together to create spectacular, elaborate and dramatic settings, as in his Blessed Ludovica and St. Teresa works. The list seems endless, but one trait that is found in all his sculptures, from his earliest works at the age of eight up until his last works, and that has been illustrated here with the sculptures of three women (who in their time had also broken some of their own barriers albeit in very different ways), is the underlying sensuality that involves the viewer as an active participant. This paper shall end with a quotation of the great Bernini himself that seems to have guided him in his work till the very end: 'those who never dare to break the rules never surpass them' (Schama, 2009, p.85).

References

Bellori, G. P. (2009). *The lives of the Modern Painters, Sculptors and Architects*. New York: Cambridge University Press.

Bernini, D. (2011). *The Life of Gian Lorenzo Bernini: a translation and critical edition, with introduction and commentary by Franco Mormando*. Pennsylvania: Pennsylvania State University.

Boucher, B. (1998). *Italian Baroque Sculpture*. London: Thames and Hudson Ltd.

Careri, G. (2003). *Baroques,* New Jersey: Princeton University Press.

Hibbard, H. (1965). *Bernini*. Hardmondworth: Penguin Books Ltd.

McPhee, S. (2012). *Bernini's Beloved.* London: Yale University Press.

McPhee, S. (2000). 'Bernini's Books', *The Burlington Magazine*, 142(1168), 442-448.

Montagu, J. (1992). *Roman Baroque Sculpture, The Industry of the Art*. London: Yale University Press.

Schama, S. (2009). *The Power of Art*. London: The Bodley Head.

Sciberras, K. (2006). *Melchiorre Cafà, Maltese Genius of the Roman Baroque*. Malta: Midsea Books.

Perlove, S. K. (1990). *Bernini and Idealization of Death: The Blessed Ludovica Albertoni and the Altieri Chapel*. Pennsylvania: The Pennsylvania State University Press.

Wittkower, R. (2013). *Bernini: The Sculptor of the Roman Baroque.* London: Phaidon Press Ltd.

Bio-note

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Predicting Visual Spatial Relations
in the Maltese Language

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Abstract

In this paper, the automatic detection of spatial prepositions between objects depicted in an image is studied. The ultimate aim is to incorporate the findings in a system that automatically describes images in a natural language. Whereas the explicit prediction of spatial relations in images has been previously studied in English and French, the work reported in this paper addresses relations in Maltese, an understudied language. A dataset consisting of images, spatial prepositions in Maltese, and a number of geometrical and language features is assembled from previous works. A number of predictive models are developed and the results are evaluated in terms of agreement with human-selected prepositions. The relative importance of the features in predicting the various relations is discussed and the paper concludes with a discussion on future work.

Introduction

The task of predicting relationships between objects depicted in an image is a fundamental problem in both Image Understanding (IM) and Natural Language Generation (NLG) and has useful applications in, for example, the development of assistive technology for the visually impaired, text-based querying of image databases, as well as education, such as in automated assessment.

Relationships between objects in images are often referred to as visual relations (Lu, Krishna, Bernstein, and Fei-Fei, 2016). Two important types of visual relations are actions, typically expressed using verbs (e.g. a person *riding* a horse; or person *kicks* ball) and spatial relations, typically expressed using prepositions (e.g. a bottle *on* a table; or a car *behind* a gate). As an example of the latter, consider the image on the left in Figure 1. The spatial relationship between the chair ('siġġu') and the sofa ('sufan') could be captured by prepositions such as 'ħdejn' ('near') or 'viċin' ('next to'). Presumably, the choice of preposition depends on both features of the language (here, Maltese) and the spatial configuration of the objects.

**Figure 1. Screenshot of the crowdsourcing platform described in Section 2.0.
The objects of interest are surrounded by bounding boxes and marked with labels siġġu ('chair')
and sufan ('sofa). Users selected a preposition from the dropdown menu shown on the right.**

The earliest attempt at detecting visual relationships considered the development of visual phrase detectors (Sadeghi & Farhadi, 2011). In this work a model is required for each unique phrase (where each phrase is a triplet <subject, object, relation>) and therefore enough examples per unique phrase are required during training. Whereas the visual phrase system works well with a small number of unique phrases, its complexity grows exponentially with the number of objects and relations. One solution is therefore to detect the objects and relations separately. In this regard, two methods have been studied; one based on manually engineered geometrical features (Belz & Muscat, 2015; Ramisa et al., 2015) and the second method based on features detected in deep convolutional neural networks (Lu et al.,, 2016; Yu et al., 2017). Furthermore, since these studies make use of machine learning models, various visual relations datasets have been collected or developed, some of which are publicly available. These include the ViSen dataset (Ramisa et al., 2015), based on prepositions obtained by parsing human-authored image descriptions in MScoco (Lin et al., 2014) and Flickr32k (Young et al., 2014; Plummer et al., 2015); and the Visual Relationship Dataset (VRD; Lu et al., 2016), for which explicit human annotations of objects and relations where crowd-sourced.

The explicit prediction of spatial relations in images has been studied in the English and French languages. The work reported in this paper addresses the prediction of spatial prepositions in Maltese, an understudied language. The ultimate aim is to incorporate the findings in a system that describes images in natural language (Maltese). Additionally, the results from this study can be useful in products such as Augmentative and Alternative Communication (AAC) apps for the Maltese language (Abela, 2018).

In this work, machine learning models to predict prepositions in Maltese are developed and are used to study to what extent spatial prepositions can be

automatically detected. A dataset for the Maltese language is assembled (section 2) and a total of thirty-one geometrical features and two language features are computed (section 3). For prediction, a number of predictive models – more specifically a baseline k-Nearest Neighbour (kNN) model, a Decision Tree (DT), a Support Vector Machine (SVM), a logistic regression (LR) and Random Forest (RF) – are developed. The results are evaluated in terms of agreement with human-selected relations (section 4). An ablation study yields insight into the usefulness of the various features, how the models discriminate between near synonymous prepositions and how the 2D geometrical features model space in a 3D world (section 5). The paper concludes with a discussion on future work (section 6).

The Maltese Spatial Prepositions Dataset

The dataset for Maltese spatial prepositions collected in Farrugia (2017) is the starting point. This dataset is based on the VOC2010 (Everingham et al., 2010) image dataset, which provides ground truth annotations for the object label, bounding box in pixels, *pose, difficult* and *occlusion*, the latter three being binary variables. New human-generated annotations that specify the spatial relations between pairs of objects in Maltese were added using a purposely built crowdsourcing platform (Farrugia, 2017; Muscat and Belz, 2017). A screenshot is shown in Fig. 1. On the platform, human annotators were shown the image with the bounding boxes highlighting the two objects. The annotators were then asked to choose a suitable preposition from a pre-defined list of spatial prepositions, as shown in Table 1. The final dataset consisted of 4332 labelled object pairs selected from 2399 unique images, which correspond to the same number of unique object pairs. The entries in the dataset therefore consist of <image, image size, bounding box for subject, bounding box for object, subject label, object label, preposition> and the average number of prepositions per object pair is 1.81. Table 1 gives the distribution of the output labels (prepositions) over the dataset. The average number of occurrences per preposition is 270.8 with a standard deviation of 185.2. Table 2 gives the distribution of the object categories over the dataset. The average number of occurrences per object is 433.2 with a standard deviation of 520.8.

Table 1: Number of occurrences per preposition

Preposition	Freq	Preposition	Freq	Preposition	Freq
Barra minn	54	Ġo	44	qrib	255
bejn	7	Ħdejn	509	Quddiem	488
biswit	253	'Il boghod minn	252	Taħt	486
Faċċata ta'	166	Lil hinn	130	Viċin	324
Fi	18	Maġenb	539	Wara	292
Fuq	515				

Table 2: Number of occurrences per object category

Object label	Freq	Object label	Freq	Object label	Freq
Ajruplan	244	Qattus	566	Persuna	2613
Rota	273	Siġġu	386	Pjanta	202
Għasfur	347	Baqra	229	Nagħġa	248
Dgħajsa	265	Mejda	78	Sufan	327
Flixkun	213	Kelb	749	Tren	259
Xarabank	172	Żiemel	409	Televixin	269

The Vision and Language Features

The model input features are derived from both the vision and the language domain, assuming that for a given object pair, the most suitable preposition depends on the language as well as on the spatial configuration. The language features used are the object labels converted to one-hot vectors and it is left up to the model to compute or discover the distribution of the prepositions over the object labels. The geometrical features are computed from the sizes of the image and the bounding boxes and the union of the bounding boxes.

Table 3 lists the geometrical features considered, most of which are adopted from Ramisa et al.,(2015), Belz & Muscat (2015), and Muscat & Belz (2017). The features are organised in ten distinct groups. The features within each group are of the same type, however computed differently or using different inputs. For example group B represents area of each object normalised by either the area of the Union or the area of the Image, thus four different features in total. The groups are referred to in the following discussion on correlation between features.

Table 3: Geometrical features computed from image size, bounding boxes and union box.

#	Description of geometrical feature	Group
1, 2	**Aspect** Ratio of each Object	A
3...6	**Area** of each Object normalized by Union, Image area.	B
7...10	Area of Object **overlap** normalized by Union, Image, minimum and total area.	C
11..12	**Distance** between bounding box **centroids** normalized by union and image diagonal	D
13..16	**Diagonal** of each object normalised by image and union diagonal	E
17	Union diagonal normalised by image diagonal	F
18..20	**Euclidean** distance and **distance-size** ratio in between objects normalised by union, image.	G

21:24	**Ratio** of **object areas** and diagonals (max:min, trajector: landmark)	H
25..27	Trajector **position relative** to landmark (categorical and vector)	I
28..31	**Ratio of object limits** (minimum, maximum in x and y directions)	J

Intuitively, some of the features are correlated. The Pearson Correlation Coefficient was computed and Table 4 groups the features for the cases where the magnitude of the coefficient is >0.7 and, separately >0.5. As expected, a number of features show strong correlation within groups (since the difference is often the normaliser). For example normalised areas (B) and normalised diagonals (E) are strongly correlated. Surprisingly features in group I are not strongly correlated, probably due to different representations. However more importantly features in group J are not strongly correlated and only some of these are weakly correlated. Not surprisingly groups J and I are weakly correlated and also G, C and D.

Table 4: Correlated features within groups (single) and across groups (tuple)

Pearson Coefficient	Groups
>0.7	B; (B, E); C; G; H,
>0.5	(G, C, D); (J, I); (B, C, E, H); H; I; J;

The Machine Learning Models and Evaluation Metrics

The models considered in this study are (a) k-Nearest Neighbour (kNN), which is the baseline model, (c) Decision Tree (DT) model, (c) Support Vector Machine (SVM) model, (b) a logistic regression (LR) model and Random Forest (RF) model. The dataset is split into a train set, a development set, and a test set. The dataset was split on the basis of the unique image list (of size 2399) such that an image is unique to either the train, development or the test split and is not shared in between the splits. Additionally stratified sampling was used to ensure similar preposition distributions over all three splits. The development set was used to tune the hyperparameters using a grid search and was then concatenated to the training set for the final training of the models. The results quoted are those obtained from the test set.

The automatic detection of spatial prepositions is a multi-label problem, in the sense that there may be more than one preposition that is suitable for the object pair depicted in the image. In the Maltese spatial preposition dataset, half of the entries are annotated with two distinct prepositions, while a few are annotated with three distinct prepositions. This poses a problem in evaluation and most researchers use *recall@k* when evaluating the model, avoiding the use of *precision,* since the latter underestimates the model's accuracy. However *recall@k* results in the problem of

selecting the correct preposition out of *k* possibilities, which is an issue that has to be addressed for real-world applications. In Yu et al., (2017) the value of *k* is treated as a hyperparameter and in Belz and Muscat (2015), the annotators are asked to choose all suitable prepositions which allowed the computation of *precision* over the set of suitable prepositions in addition to *recall@k*. In this paper *recall@k*, (*k* = {1,2,3,4}), is the evaluation metric used in all experiments. Furthermore a multi-label set (note: this is not a complete set) was assembled by grouping all unique prepositions selected for the same object pair.

5.0 Results and Discussion

The primary results (recall@1), given in Table 5, were obtained after hyper-parameter optimisation. The 'All features' column are the results obtained when using all the language and vision features. The second column considers a selected set of features, following the correlation study in section 3, and results are given for both the single-label set and multi-label set. The kNN, LR and SVM models benefit from the selected feature set, while there is no change in the DT and RF model results. The latter observation is probably due to the feature selection methods built into these models. Furthermore, the SVM model benefited most from the feature selection. As expected the multi-label results are higher than the single label ones. The fifth and sixth column consider language and vision features separately. The vision features bring in more information compared to the language features. This result is expected since spatial prepositions are partly a function of spatial configuration. However other studies (Ramisa et al., 2015; Lu et al., 2016) report contrasting observations. These differences can however be attributed to skewed and long-tailed datasets. In contrast, the Maltese prepositions dataset is relatively balanced. Overall, the RF model obtains the highest score, closely followed by the LR and SVM models. The LR model fares best with the 'Vision Feature' set, which is probably due to the fact that the LR model fares better with real-valued features than the RF model, which is based on decision trees.

Table 5. Primary results

recall@1	All features	Selected Features		Language Features	Vision Features
		Single label	Multi-label		
kNN	31.3	32.0	40.6	29.3	31.1
LR	36.3	37.3	46.1	31.6	**35.2**
DT	31.3	31.3	41.3	27.1	31.3
SVM	32.3	36.4	44.3	28.9	34.3
RF	**37.6**	**37.6**	**46.5**	**32.0**	34.9

Table 6 expands the results for the 'selected feature' set to a set of k values, {1,2,3,4}. At k=4, scores reach the 84.1% mark. Probably, k=3 is a suitable value for this dataset, at which the score is 63.4% for the single-label. This warrants a deeper investigation into what the models are learning. To motivate such a discussion, Table 7 tabulates the scores per preposition for the best three models (RF, LR, SVM) and Fig. 2 depicts the confusion matrix as a Hinton diagram.

Table 6. Recall @k for k={1,2,3,4} for the single-label and multi-label sets

recall@k	1		2		3		4	
	Single-label	Multi-label	Single-label	Multi-label	Single-label	Multi-label	Single-label	Multi-label
kNN	32.0	40.6	47.2	60.2	57.5	70.7	66.6	79.5
LR	37.3	46.1	52.3	63.6	62.9	74.2	71.3	83.4
DT	31.3	41.3	44.7	55.9	55.8	67.6	63.9	77.0
SVM	36.4	44.3	51.8	63.0	61.3	74.7	69.8	**84.1**
RF	**37.6**	**46.5**	**53.6**	**66.5**	**63.4**	**77.0**	**71.9**	83.6

Considering recall@1 scores, the prepositions 'bejn' and 'ġo' are never recalled, while 'fi' is only recalled by the LR model, 'biswit' is only recalled by the RF model and RF fails to recall 'qrib'. While this failure can be attributed to the small number of examples for bejn (7), ġo (44) and fi (18), it is not so for 'qrib' and 'biswit', which are represented by 255 and 253 examples, respectively. However from the Hinton diagram, Fig.2, 'qrib' is being predicted mostly as 'maġenb', 'quddiem', 'viċin' and 'wara', which may all be plausible substitutes. Similarly, 'biswit' is exchanged for 'maġenb' and 'ħdejn' and to a lessor extent for 'quddiem' and 'faċċata ta'. The models score low for the preposition 'wara'. It is clear that the geometrical features do not act as a proxy for depth, which is missing in the feature set. On the other hand, 'quddiem' scores 38%, which is just higher than the average. In this case some features may be substituting for depth. The scores for the remaining prepositions, in general, can be improved by considering near-synonyms as indicated in the Hinton diagram. However there remains the question of what features are needed for fine-grained distinctions. Language priors may offer a solution. Table 7 highlights the highest score obtained per preposition. There is no one model that is clearly the best and the top scores are approximately equally shared by all three models.

Table 7. Recall@k per preposition

Model	RF				SVM				LR			
recall@k	1	2	3	4	1	2	3	4	1	2	3	4
barra minn	44	67	67	67	**67**	67	67	67	56	56	56	67
bejn	0	0	0	0	0	0	0	0	0	0	0	0
biswit	**2**	2	22	31	0	0	8	20	0	0	24	39
faċċata ta'	3	3	23	32	**16**	16	16	26	10	26	42	48
fi	0	0	0	0	0	0	0	0	**20**	20	20	20
fuq	**73**	83	84	88	**73**	84	85	87	72	76	78	80
ġo	0	0	10	20	0	0	0	10	0	20	20	20
ħdejn	19	66	75	86	12	64	77	89	**22**	54	71	78
'il bogħod minn	**59**	76	86	88	**59**	75	82	86	53	80	82	86
lil hinn	8	17	33	38	0	12	25	29	**12**	21	25	38
maġenb	53	75	84	94	**57**	74	83	92	50	74	83	91
qrib	0	2	4	13	2	4	9	18	**7**	13	20	31
quddiem	36	57	82	86	**38**	60	83	90	24	46	65	88
taħt	81	88	90	92	77	88	88	92	**93**	93	95	95
viċin	**19**	26	36	68	6	9	36	60	8	23	40	49
wara	7	25	32	46	4	9	21	32	**9**	25	39	52

Conclusion and Future Work

This paper evaluated a supervised machine learning setup for the automatic detection of prepositions that describe the spatial relationships between object pairs in images. The experiments were carried out for the Maltese language and recall scores were used in the evaluation. A Maltese spatial prepositions dataset obtained from previous work was augmented with multi-labels and a set of geometrical features. Scores of 46.1% (recall@1) and 84.1% (recall@4) were recorded and an analysis of per preposition recall scores was carried out. The latter analysis motivated a discussion for future work. In the experiments, language features were represented by one-hot integer vectors. An alternative is to make use of distributed representations, such as word2vec (Mikolov et al., 2013), though these would need to be trained specifically for Maltese. Previous results indicate that distributed representations contribute mostly in the case of unseen object pairs, since intuitively objects in unseen object pairs are substituted by simliar ones. For example 'kelb' instead of 'qattus'. Finally, if prepositions can be grouped into near synonym sets on the basis of geometrical features (for example euclidean distance) and on co-occurence statistics (which is partly addressed with a multi-label set), then it should be possible to study whether the machine is learning the similarities among prepositions.

Figure 2. The confusion matrix for the Random Forest (RF) model. The size of the white squares is proportional to the percentage score. For example 'taħt' has a score of 81% on the diagonal.
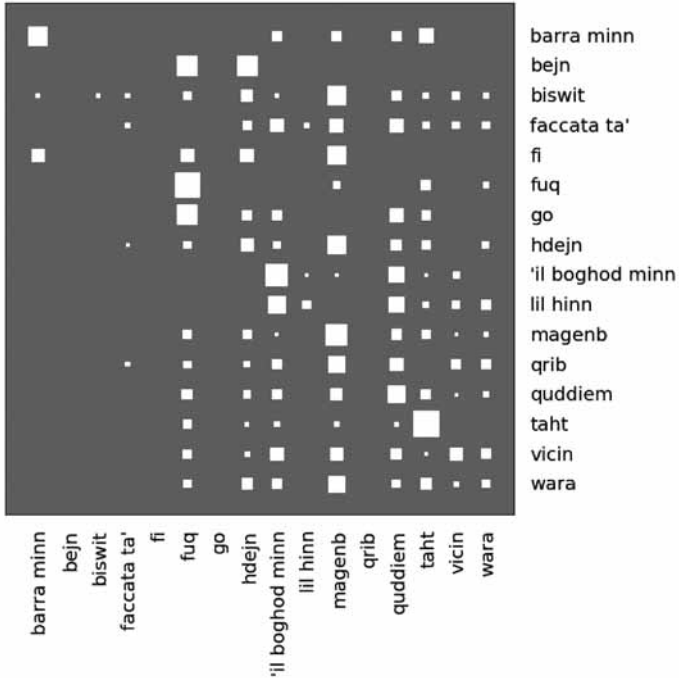
References

Belz, A., Muscat, A., Aberton, M. and Benjelloun, S. (2015). Describing Spatial Relationships between Objects in Images in English and French. *Workshop on Vision and Language 2015 (VL'15): Vision and Language Integration Meets Cognitive Systems, EMNLP-2015*, Lisbon, Portugal.

Abela, S. (2018). Development of an Augmentative and Alternative Communication App for the Maltese Language. *Dissertation, BSc in Computer Engineering*.

Everingham, M., Van Gool, L., Williams, C., Winn, J. and Zisserman, A. (2010). The pascal visual object classes (VOC) challenge. *International journal of computer vision*, 88(2), 303–338.

Farrugia, A. (2017). An Investigation into Spatial Relations in Maltese for Image Captioning. *Dissertation, BSc HLT, University of Malta.*

Lin, T. Y., Maire, M. Belongie, S., Hays, J., Perona, P., Ramanan, D., Dollar, P., and Zitnick, C. L., (2014). Microsoft COCO: common objects in context. *CoRR*, abs/1405.0312.

Lu, C., Krishna, R., Bernstein, M. and Fei-Fei, L. (2016). Visual relationship detection with language priors. European Conference on Computer Vision.

Mikolov, T., Sutskever, I, Chen, K., Corrado, G., and Dean, J. (2013). Distributed representations of words and phrases and their compositionality. *Advances in Neural Information Processing Systems,.* 26(2), 3111-3119

Muscat, A. & Belz, A. (2017). Learning to Generate Descriptions of Visual Data Anchored in Spatial Relations. *IEEE Computational Intelligence Magazine*, 12(3), 29-42

Plummer, B., Wang, L., Cervantes, C., Caicedo, J., Hockenmaier, J., and Lazebnik, S. (2015). Flickr30k entities: Collecting region-to-phrase correspondences for richer image- to-sentence models. *CoRR*, abs/1505.04870.

Ramisa, A., Wang, J., Lu, Y., Dellandrea, E., Moreno-Noguer, F., and Gaizauskas, R. (2015). Combining geometric, textual and visual features for predicting prepositions in image descriptions. *EMNLP, Lisbon, Portugal, September 2015.*

Sadeghi, M.A. & Farhadi, A. (2011). Recognition using visual phrases. *Computer Vision and Pattern Recognition (CVPR) 2011, 1745-1752.*

Young, P., Lai, A., Hodosh, M., and Hockenmaier, J. (2014). From image descriptions to visual denotations: New similarity metrics for semantic inference over event descriptions. *Transactions of the Association for Computational Linguistics*, 2, 67–78.

Yu, R., Li, A., Morariu, V. I. and Davis, L. S. (2017). Visual Relationship Detection with Internal and External Linguistic Knowledge Distillation. *IEEE International Conference on Computer Vision (ICCV)*, 1068-1076.

Bio-notes

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Perchlorate Contamination of Soils Collected from the Maltese Islands

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Abstract

During the summer months, the Maltese Islands experience a large number of religious feasts, most of which are accompanied by firework activity. Between the 26th of January and the 8th of December, approximately 86 religious feasts are celebrated annually in different towns and villages in the Maltese Islands, accompanied by both aerial and ground fireworks displays. The pyrotechnical community counts several thousand enthusiasts who passionately and without any financial compensation produce fireworks. Perchlorate contamination in the environment is a worldwide problem, with high levels detected in dust fall collected from the Maltese Islands (Vella et al., 2015). During this study the levels of perchlorate in soil samples collected from 19 different locations were determined. Perchlorate was detected in 8 of 19 samples, with 3 of these samples having levels below detection limit. The levels ranged from BDL to 357 µg kg^{-1}, with a mean value of 49.9 µg kg^{-1}. The highest perchlorate concentrations were detected in soils collected from the South of the Maltese Islands, as was observed for dust samples. This was attributed to the predominant wind direction, being from the Northwest, causing the movement of contaminants from the North to the South of the Maltese Islands. These results and perchlorate levels in dust fall (Vella et al., 2015), clearly point out that the Maltese environment is contaminated with perchlorate, due to the excessive pyrotechnic activity.

Keywords: Perchlorate, soil, Maltese Islands, fireworks

Introduction

Perchlorate has recently received great attention since it is a widespread contaminant in ground, surface and drinking water, food, milk, and breast milk (Ginsberg et al., 2005; Trumpolt et al., 2005; Wolff, 1998; Sungur & Sangun, 2011, Sanchez et al., 2006). It is a key component in most of solid propellants as an oxidizer because of its safety, performance, ease of manufacture and handling. In the United States, perchlorate has been used for several decades mainly in national defence for military applications and for manufacture of solid rocket propellants. Currently, there are no other oxidisers to replace perchlorate that can be used for military performance with the same level of

safety and low environmental impact (Cunniff et al., 2006)

In the Maltese Islands, the only known anthropogenic source of perchlorate is that imported for the production of pyrotechnic articles, which are burned locally as ground and aerial production fireworks. The national territory consists of a small (316 km^2) archipelago of two densely populated islands, Malta (the larger island) and Gozo located in the central Mediterranean. During the summer months, towns and villages on the islands celebrate religious feasts most of which are accompanied by prolonged firework activity. These festivals (over 85 in number) take place mainly between June and September, with aerial displays being let off at intervals during several days prior to the actual feast day on the Sunday. Since fireworks are a common feature in Maltese village feasts, the occurrence in air, dust and water of perchlorate is expected, especially during the festive season.

The chemicals in fireworks are not entirely used up in the explosion (Camilleri & Vella, 2016) and the post-explosion debris containing unreacted chemicals as well as other reaction products disperse in the environment by wind and other agents. Post-explosion debris may either settle on the ground as contaminated dust or dissolve partly in rain water to release soluble species that can enter the water table. The perchlorate ion is very soluble and quite stable in water bodies. Most studies have shown that perchlorate does not sorb to soils, except for those with a high anion exchange capacity (Urbansky & Brown, 2003). Perchlorate has been shown to be reduced by anaerobic microbial degradation, in the presence of significant amounts of organic carbon and nitrate and in the absence of oxygen (Trumpolt et al., 2005).

Widespread human exposure to perchlorate from both anthropogenic and natural sources occurs mainly through ingestion of water, dust and food. Perchlorate is a dietary goitrogen, since it interferes with the normal function of the thyroid gland. It competitively inhibits uptake of the iodide ion by the sodium-iodide symporters located in the thyroid gland (Charnley, 2008). These symporters are also located in the mammary gland and in the placenta and have a higher affinity to perchlorate than iodide ions (Wolff, 1998). At high levels perchlorate may interfere with the production of triiodothyronine (T3) and thyroxine (T4), which regulate growth, metabolic activity and development (Wolff, 1998). These thyroid hormones are required for normal growth, most importantly in foetuses and newborns where they are involved in the development of the central nervous system (brain and skeleton) and for metabolic activity in adults (Wolff, 1998).

The United States Environmental Protection Agency (US EPA) has set a reference dose (RfD) for perchlorate of 0.7 µg kg^{-1}day^{-1}, which is equivalent to 49 µg per day for a 70 kg adult (Shi et al., 2007).

In this paper, the presence of perchlorate in soils collected from different sites in the Maltese Islands is reported. Recent publications have shown the presence of perchlorate in different matrices, including dust and water samples (Vella et al., 2012; Vella et al., 2015; Pace et al. 2016): These results are novel, since the level of perchlorate in local soil samples, had not previously been determined.

Chemicals and Reagents

Potassium perchlorate (98 + % pure) was obtained from Acros Organics. Sodium hydroxide and sulfuric acid were ANALAR grade reagents from Sigma Aldrich. Deionised water was prepared from distilled water using the Elga Purelab Classic purification system.

Field sample collection and preparation

Surface soil was sampled from 18 different localities in Malta (Figure 1). Soil samples were collected from sites 1 to 12 were collected from agricultural land, while samples from sites 13 to 19 were collected from waste land. The surface soil was sampled (top 0 – 10 cms) using an HDPE sampling bottle and the sample was transferred to a Ziploc polyethylene bag and sealed. A total of 40 g soil was sampled from each site, and this was referred to as the bulk sample. The samples were dried in an oven at 90°C for 48 hrs, after which the soil was powdered using a Kenwood coffee grinder. Any rocks or fauna present in the sample was removed using tweezers prior to drying. Approximately 4 g of sample were accurately weighed and transferred to a 200 mL conical flask, 40 mL of deionized water was added and the solution was stirred for 48 hrs. The solution was then transferred to 50 mL vial and was centrifuged for 20 minutes at high speed. The supernatant was treated with alumina to remove any soil dissolved organic matter which may interfere with the ion chromatographic system. The resulting solution was filtered using Anatop filters and analysed using the ion chromatographic method described below.
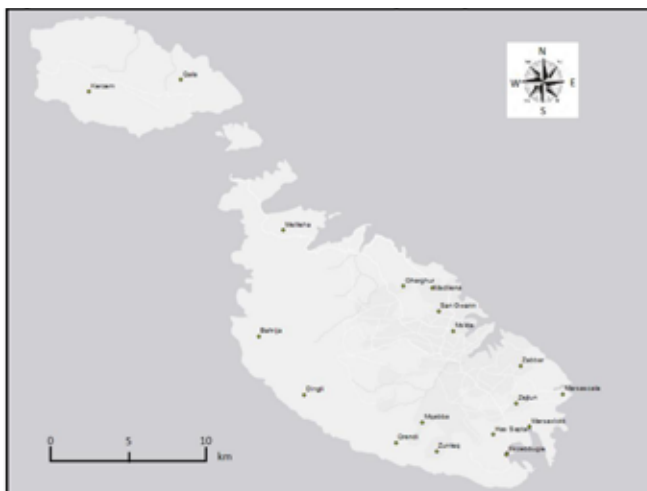
Figure 1 - Sites from which surface soil was sampled for perchlorate and chlorate analysis

In order to confirm that the extraction method is sufficient for the extraction of perchlorate from soil, samples were spiked with a known amount of perchlorate. An unspiked sample was also prepared using the same soil, to establish whether perchlorate is originally present in the sampled soil and at what concentration. The % recoveries for spiked samples ranged from 80.4 % to 104.0 %.

Chromatographic analysis

The apparatus used was a Thermo Scientific Dionex ICS 900 system equipped with a 250 mm x 4 mm analytical column (Dionex IonPac AS16) and a 50 mm x 4 mm guard column (Dionex IonPac AG16). The ICS 900 was equipped with an Anion ICE-Micromembrane Suppressor AMMS ICE-300 to reduce background conductivity and increase analyte signal. The injection volume was 700 µL with a flow rate of 0.8 mL/min: an autosampler was used. The eluent and regenerant solutions were 50 mM NaOH and 37.5 mM H_2SO_4, respectively. Perchlorate eluted at approximately 18 minutes. The peak area in a sample was compared with that of external working standards at 28 and 11 µg L^{-1} which standards were used to bracket the field samples. Working standards were prepared weekly from a stock solution (1.1 g L^{-1}) by serial dilution. The chromatographic method was validated using standard solutions ranging from 2 to 200 µg L^{-1} for which the correlation coefficient r^2 was 0.999. The limit of detection for perchlorate in soils was 20 µg kg^{-1}. Samples containing perchlorate at concentrations below these levels are below detection limit. Blank runs were performed prior to sample analysis to confirm absence of carryover from previous runs or other contamination and every ten field samples were bracketed with standard perchlorate solution for quality assurance.

Results and Discussion

Perchlorate content in soils from different localities were determined. The results are shown in Table 1. Figure 1 shows the spatial distribution of perchlorate in soils in Malta and Gozo.

Site	Soil Sample (Locality)	Sampling Date	Perchlorate (μgkg⁻¹)	Chlorate (μgkg⁻¹)
1	San Gwann	March 2013	ND	ND
2	Madliena	March 2013	36.8	(29.3)
3	Gharghur	March 2013	ND	(30.3)
4	Qrendi	March 2013	315	68.7
5	Zurrieq	March 2013	(14.9)	ND
6	Mqabba	March 2013	ND	94.4
7	Dingli	March 2013	82.1	ND
8	Bahrija	March 2013	103	(15.0)
9	Birzebbugia	March 2013	ND	ND
10	Mellieha	March 2013	(18.2)	65.5
11	Kercem	March 2013	ND	ND
12	Qala	March 2013	(4.30)	ND
13	Marsaxlokk	September 2013	(10.8)	ND
14	Zabbar	September 2013	ND	(30.6)
15	Zejtun	September 2013	(0.50)	(20.9)
16	Marsascala	September 2013	ND	ND
17	Birzebbugia	September 2013	(2.00)	83.9
18	Msida	September 2013	(3.10)	ND
19	Hal Saptan	October 2013	356.8	ND

ND - Not Detected; Values in parenthesis are below detection limit.

Table 1 - Perchlorate and chlorate concentrations (μg kg⁻¹) in soils collected from different localities during March, September and October 2013.
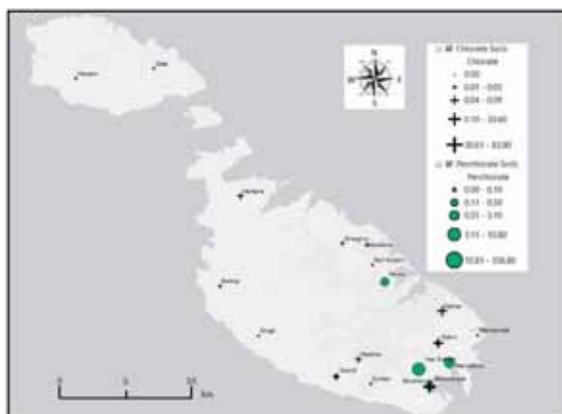

Figure 1 - Map of the Maltese Islands showing the concentrations of perchlorate for soils collected from different localities during March and September 2013 using ArcMap 10.1 Software

The highest concentration of perchlorate was observed in Hal Saptan at 357 µg kg^{-1}, followed by Qrendi with a concentration of 315 µg kg^{-1}. Perchlorate was detected in 8 of 19 samples, however 3 of the 8 samples had levels below the detection limit. The highest perchlorate concentrations were detected in soils collected from the South of the Maltese Islands, as was observed for dust samples. This was attributed to the predominant wind direction, being from the Northwest, causing the movement of contaminants from the North to the South of the Maltese Islands.

The concentrations of perchlorate in soils collected from the Maltese Islands were higher than those detected in soils collected from other countries. In a study carried out in Northeastern China, soils were collected during September 2010 and March 2011 (Ye et al., 2013). Fireworks and firecracker displays were held between the Spring Festival on the 2nd February 2011 and the Lantern Festival on the 17th of February 2011. For the soils collected during September 2010, perchlorate was detected in only 1 of 36 samples, presumable because perchlorate in the soil would have been washed out by the melting snow and precipitation which is very common in the Summer months (between May and September), in this part of China. All the soil samples collected during March 2011 contained detectable levels of perchlorate with concentrations ranging from 2.15 to 7.02 µg kg^{-1}. The increase in perchlorate in soils collected during March, was attributed to the firework displays during February. The concentration of perchlorate in local soils ranged from BDL to 356.8 µg kg^{-1} with a mean value of 49.9 µg kg^{-1}, which compares with the mean for Chinese soils of 3.87 µg kg^{-1}, i.e. one tenth that of Malta. Most of the local soil samples were collected during the fireworks-free period, however perchlorate was still detected in 50 % of the samples collected during March. Even though large amounts of precipitation (356 mm) took place between the 'festa' season and collection of the samples, perchlorate was still detected in half of the samples.

During another study carried out in China, the concentration of perchlorate ranged from 0.001 to 216 mg/kg (Zhiwey et al., 2014), with higher concentrations in Northern China when compared to Southern China. Northern China is drier than Southern China, therefore the deposited perchlorate will be less mobilized in Northern China compared to Southern China, resulting in higher concentrations in dust and soils. This concentration is approximately 1000 times higher than the concentrations found in the Maltese soils. The reason for such a large difference could be due to the large consumption of fireworks in China during a short period of time, just before sampling.

The levels of perchlorate and chlorate detected in soils were much lower than those detected in local dust fall samples. The mean concentrations of perchlorate and chlorate in dust fall samples collected during 2012 were 500 times and 200 times higher than those detected in soil samples respectively. The average concentration of perchlorate in dust fall was 24.1 mg kg^{-1}, compared to 49.9 µg kg^{-1} in soils. The higher concentrations of perchlorate in dust fall are expected, since, in the absence

of rain, the main method of downward transport of post-firework debris from the atmosphere is by deposition of dust. In soils the concentrations are diluted, since there are many other components present. Also, when precipitation takes place any perchlorate present in soils is expected to dissolve and will percolate into the water table. In the study carried out in China (Zhiwey et al., 2014), on perchlorate levels in dust and soils, the concentrations of perchlorate in dust were 25 times to 150 times higher than those detected in soils, as was observed locally.

A large number of studies have been carried out on perchlorate degradation in soils. During a study carried out by Tipton et al. (2003), it was shown that perchlorate can be degraded by some microorganisms in the presence of moisture, a carbon source and anaerobic conditions. In most cases the limiting factor is not the microbes but the environmental conditions (Wu et al., 2001). In another study on degradation of perchlorate in the presence of nitrate, it was shown that high nitrate concentrations interfere with perchlorate degradation in soils (Tan et al., 2004). The presence of nitrate, especially when in high concentrations as in the case of the Maltese soils, explains the persistence of perchlorate which is present in lower concentrations. However, during the study by Tipton (2003) it was shown that in soils which had previously been exposed to perchlorate, the microbes will degrade perchlorate and nitrate simultaneously.

Studies have been conducted showing that perchlorate is able to move from perchlorate-contaminated soils through the roots and accumulates in tissues and other plant organs (Sundberg et al., 2003). Plant uptake of water-soluble contaminants, such as perchlorate, occurs via passive transport by processes of diffusion and mass flow with no sufficient barriers for these contaminants. This is very worrying since perchlorate is easily transported in crops and is retained. Nowadays, there is a great deal of research being carried out with respect to uptake of perchlorate in plants, with the main reason being that these crops are used for human consumption with consequent health implications on humans. One advantage for the phytoaccumulation of perchlorate is the remediation of perchlorate from contaminated sites with many studies confirming this. Dust fall containing perchlorate may deposits on lettuce leaves, however for perchlorate to enter the plant it must enter through the roots into the transpiration stream. This means that perchlorate present in dust and soil has to dissolve in water (irrigation or precipitation), for bioconcentration to take place.

According to the National Statistics Office, the consumption of perchlorate in the Maltese Islands has decreased from 17 tonnes per annum in 2010 to about 2.5 tonnes per annum for years between 2011 and 2014. From levels of perchlorate detected in dust fall samples and from the rate of total deposition, it was calculated that the actual imported amount in 2012 of perchlorate was 90 tonnes, 36 times higher than the registered amount (Pace et al., 2016). This environmental evidence appears to provide proof that pyrotechnic manufacturing on Malta is more active than officially recognized which increases the risk to both the pyrotechnic community, and also

the health of the general population, due to negative impacts from contaminated dust, soils and water.

Conclusion

The levels of perchlorate in soil collected from 19 different localities ranged from BDL to 357 µg kg^{-1}. The highest perchlorate concentrations were observed in soils collected from Hal Saptan and Qrendi, both of which are located to the South of the Maltese Islands. The highest concentrations were detected in sites to the South of the Maltese Islands, due to the predominant Northwesterly wind. This causes the transfer of the contaminated dust and airborne particles to the South of the Maltese Islands. In most of the foreign studies it has been shown that high perchlorate concentrations were detected in breast milk, dairy milk and infant formula solutions (Borjan et al., 2011; Valentini-Blasini et al., 2007; Leung et al., 2009; Dyke et al., 2007; Kirk et al., 2005), meaning that newborns are also at a high risk from the adverse effects caused by perchlorate. Since no studies on perchlorate levels in breast milk and dairy milk have been carried out locally, the extent of the damage to these susceptible individuals is not yet known.

Since the results of this work have shown elevated levels of perchlorate in soils, it would appear prudent to consider whether there is a connection between perchlorate concentration and human health, including the local occurrence of thyroid disorders, including cancer. The precautionary principle would argue for a reduction in the intensity of firework activities, which clearly conduce to the presence of the contaminants in the environment, even if such activities may otherwise be beneficial for the development of Malta's tourism and cultural entertainment sector.

References

Borjan M., Marcella S., Blount B., Greenberg M., Zhang J., Murphy E., Valentin-Blasini L., and Robson M., 2011. Perchlorate exposure in lactating women in an urban community in New Jersey. *Science of the Total Environment*, 409, 460-464.

Camilleri R. & Vella A.J., 2010. Effect of fireworks on ambient air quality in Malta, *Atmospheric Environment*, 44 (35), 4521-4527.

Charnley G., 2008. Perchlorate: Overview of risks and regulations. *Food Chem Toxicol*, 46 (7), 2307-2315.

Cunniff, S.E., Cramer R.J. and Maupin, H.E. 2006. Perchlorate: Challenges and lessons. In *Perchlorate Environmental Occurrences, Interactions, and Treatment*. B. Gu and J.D. Coates, (Eds). Springer, New York, 1-14.

Dyke J.V., Kirk A.B., Martinelango P.K. and Dasgupta P.K., 2006. Sample processing methods for the determination of perchlorate in milk, *Analytica Chimica Acta*, 567, 73-78.

Dyke J.V., Ito K., Obitsu T., Hisamatsu Y., Dasgupta P.K. and Blount B.C., 2007. Perchlorate in dairy milk comparison of Japan versus the United States, *Environ Sci Technology*, 2007, 41, 88-92.

Ginsberg G. & Rice D., 2005. The NAS perchlorate review: questions remain about the perchlorate RfD, Environmental Health Perspective, 113(9), 1117-1119.

Kirk A.B., Marinelango P.K., Tian K., Dutta A., Smith E.E. and Dasgupta P.K., 2005. Perchlorate and iodide in dairy and breast milk, *Environmental Science and Technology*, 39(7), pp 2011-2017.

Leung A.M., Pearce E.N., Hamilton T., He X., Pino S., Merewood A. and Braverman L.E., 2009. Colostrum iodine and perchlorate concentrations in Boston-area women: a cross sectional study. *Clin Endocrinol (Oxf);* 70, 326-30.

Pace C. & Vella A.J., 2016. Escalation of fireworks in Malta: Environmental forensic evidence from perchlorate in dust fall. Malta Chamber of Scientists, Vol 7.

Sanchez C.A., Krieger R.I., Khandaker N.R., Valentin-Blasini L. and Blount, B.C., 2006. Potential perchlorate exposure from *Citrus* sp. Irrigated with contaminated water, Analytica Chimica Acta, Vol 567, pp 33-38.

Shi Y., Zhang P., Wang Y., Shi J., Cai Y., Mou S. and Jiang G., 2007. Perchlorate in sewage sludge, rice, bottled water and milk collected from different areas in China, *Environ Int.,* Vol 33(7), 955-962.

Sundberg, S.E., Ellington J.J., Evans J.J., Keys D.A. and Fisher J.W., 2003. Accumulation of perchlorate in tobacco plant: Development of a plant kinetic model, *J. Environ. Monit.*, Vol. 5, 505-512.

Sungur S. & Sangun M.K., 2011. Ion chromatographic determination of perchlorate in foods consumed in Hatay region, Food Chem, Vol 126(1), 326-331.

Tan K., Anderson T.A. and Jackson W.A., 2004. Degradation kinetics of perchlorate in sediments and soils, Water, *Air and Soil Pollution*, Vol 151(1-4), 245-259.

Tipton D.K., Kolson D.E. and Scow K.M., 2003. Transport and Biodegradation of perchlorate in soils, *Journal of Environmental Quality*, 32(1), 40-46.

Trumpolt C.W., Crain M., Cillison G.D., Flanagan S., Siegel L. and Lathrop S., 2005. Perchlorate: Sources, uses and occurrences in the environment, *Remediation Journal*, 16(1), 65-89.

Urbansky E.T. & Brown S.K.; 2003. Perchlorate retention and mobility in soils, *J. Environ Monit*, 5(3), 455-62.

US EPA, 2008. Interim Drinking Water Health Advisory for Perchlorate, http://www.epa.gov/waterscience, EPA822-R-08-025, [Accessed on 1st June 2018].

Valentini-Blasini L., Blount B.C. and Delinsky A., 2007. Quantification of iodide and sodium-iodide symporter inhibitors in human urine using ion chromatography tandem mass spectrometry, *J Chromatogr A*, 1155, 40-46.

Vella A.J., Aquilina B., Delicata F. and Farrugia A., 2012. *Perchlorates in Dustfall: Evidence of contamination by fireworks in Malta*, 13th International Symposium on Fireworks, Valletta, Malta.

Vella A.J., Chircop C., Micallef T. and Pace C., 2015. Perchlorate in dustfall and indoor dust in Malta: An effect of fireworks, *Science of the Total Environment*, Vol 521-522, 46-51.

Wollf J., 1998. Perchlorate and the thyroid gland, *Pharmacol. Rev.*, Vol 50 (1), 89-105.

Wu J., Unz R., Zhang H. and Logan B., 2001. Persistence of Perchlorate and the Relative Numbers of Perchlorate- and Chlorate-Respiring Microorganisms in Natural Waters, Soils, and Wastewater. *Bioremediation Journal*, 5 (2), 119-130.

Wu Q., Zhang T., Sun H. and Kannan K., 2010. Perchlorate in tap water, groundwater, surface waters, and bottled water from China and its association with other inorganic anions and with disinfection byproducts, Arch Environ Contam Toxicol, 58, 543-550.

Ye L., You H., Yao J., Kang X. and Tang L., 2012. Seasonal variation and factors influencing perchlorate in water, snow, soils and corns in Northeastern China, *Chemosphere*, 90(10), 2493-2498.

Zhiwey G., Hongwen S., Ruonan W. and Yuanyuan D., 2014. Occurrence and exposure evaluation of perchlorate in outdoor dust and soil in mainland China, *The Science of the Total Environment*, 99(8), 470-471.

Bio-note

Dr Colette Pace is a Chemistry lecturer at the Junior College and a parttime lecturer at the Chemistry Department at the University of Malta. She conducted her PhD research on Environmental Chemistry, focusing on the atmospheric and water pollution as a result of pyrotechnic activity. She worked for 8 years at a research and development laboratory in the pharmaceutical industry. Her main research interests are atmospheric pollution, water pollution and fate of pollutants in the environment.

Foreign Languages within Post-Compulsory and Tertiary Institutions. What future?

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Abstract

An important sub-objective of the Lisbon Strategy states that there is a need to improve foreign language teaching at all levels of education throughout Europe. This is seen to be a key means of giving expression to the multilingual nature of the European Union. In the 21st century, foreign language competence and proficiency and intercultural understanding are no longer considered as optional but have become an essential part of being a citizen. Countries in the world have become more and more interdependent, and new technologies have erased many existing borders giving rise to an ever-increasing need for good communication skills in foreign languages. This has brought in turn new efforts aimed at improving foreign language education with many countries introducing well-articulated curriculum frameworks that motivate and guide the development of an effective system of foreign language education even at post-compulsory and at tertiary level. The same cannot be said, unfortunately, for Malta where the number of students studying foreign languages at post compulsory education is on the decline with the result that in the 3 most important institutions in Malta that offer tertiary education, the presence of foreign languages is negligible. This brings us to a very pertinent question. Do we need modern language graduates in a globalised world? Or better, do we need graduates who are also proficient in one or more foreign languages?

Keywords: Foreign languages; Tertiary education; multilingualism.

An important sub-objective of the Lisbon Strategy states that there is a need to improve foreign language teaching at all levels of education throughout Europe. This is seen to be a key means of giving expression to the multilingual nature of the European Union. Pace (2017) argues that foreign language competence and proficiency and intercultural understanding are no longer considered as optional but have become an essential part of being a citizen. Within a global economy, the ability to understand and communicate in other languages has become an increasingly important characteristic that contributes to the cultural and linguistic richness of our society whilst promoting global citizenship.

Over the past two decades countries in the world have become ever more interdependent and many existing borders have been erased. Multilingualism, or

proficiency in more than one language, is internationally gaining positive support and is viewed as an educational goal by many countries (McPake, Tinsley & James 2007). This has brought about a situation where foreign language teaching and learning has become more necessary than ever not simply for linking with the rest of the world but above all for producing active citizens able to function in today's ever-shrinking world. Good communication skills in foreign languages has never been so important and necessary. Around the globe, parents struggle to ensure that their children, whatever their age, achieve a good command in a number of foreign languages and consequently, a large number of opportunities to learn languages have been provided in many different ways. As a result, in various countries across the world new efforts have been made aiming at improving foreign language education with the introduction of well-articulated curriculum frameworks that motivate and guide the development of an effective system of foreign language education even at post-secondary and at tertiary level (Pace 2015 and 2017).

The purpose of this paper is, firstly, to provide a clear and accurate picture of the current status of the teaching of modern foreign languages (MFL) at Post-Secondary and Tertiary levels in Malta. Secondly, to reflect upon the value and role of these languages for employees and graduates and, thirdly, to make a proposal of possible measures that could be taken to improve foreign-language teaching at Post-Secondary and Tertiary Level.

During these past few years Malta has seen various initiatives, at all levels of compulsory education, with the scope of enticing more students to study MFL. September 2018 saw the introduction of the Foreign Language Awareness Programme (FLAP) offered to primary school pupils aged 8–11. FLAP puts a special focus on students in multilingual classrooms, as its introduction comes at a time in which the linguistic landscape of the country is becoming increasingly complex due to a growing multilingualism, resulting from both migration as well as globalisation. The Secondary school level saw the introduction of the Subject Proficiency Assessment (SPA) programme, with the intent to set up a home-grown alternative assessment based on foreign language proficiency at levels 1 and 2 of the Malta Qualifications Framework (MQF). As Pace (2015) emphasises, "the main scope of the programme is to enable learners acquire and develop a communicative competence which allows for an effective and meaningful interaction in diversified social contexts" (p.612).

MFL teaching has been a traditional staple of secondary and post-secondary education for decades, with the most common languages taught in schools in Malta – Italian and French, followed by German and Spanish – remaining consistently popular. The introduction of the SPA programme made MFL learning more relevant to the students' needs in the hope of reverting the negative trend of the last decade which saw a decrease in the number of students sitting for end of compulsory schooling exams in foreign languages, (resulting in a decline in the number of post-secondary students studying MFL), a clear indication that the interest in MFL learning among

students in Malta is waning and that a large number of students complete their studies at Secondary Level without obtaining any form of certification in a foreign language (Pace, 2015). However, notwithstanding all efforts done, an overall decline in the popularity of MFL learning in post-compulsory education in Malta has been apparent since the beginning of the new century, reaching alarming proportions in the last decade. This has raised concerns about the generally low proficiency level in foreign languages among youth at the end of compulsory education as well as about the future of languages in education from all leading sectors, among which employers, the teaching professionals and politicians.

Unfortunately, at the post-secondary and tertiary level, this decline began when it was decided to make languages optional at SEC level, at a time when educators and decision makers believed that students would automatically want to carry on studying foreign languages at the end of compulsory education. Since then, foreign languages started being perceived to be difficult and less important, especially in the context of an education system which was very much exam oriented with students, teachers and parents not only focusing their attention and efforts on the compulsory subjects but also being orientated towards other subjects like sciences and IT. The result of such a decision is that today there exists a language deficit in the teaching of foreign languages when it comes to key vocational and academic areas and consequently there exists a dire need to broaden the range of students taking foreign languages at different levels[1].

At Post-Compulsory level, the number of students studying MFL is alarmingly low and if we were to have a look at the number of students furthering their studies in foreign languages at Post-Secondary level in the past two scholastic years, we soon realise that the situation is, to say the least, distressing. In fact the total number of 1st year Sixth Form students studying a foreign language at Advanced level is steadily decreasing. This includes all 1st year students studying Italian, French, German, Spanish and Arabic in any post-secondary educational institution in Malta and Gozo (See Figures 1 & 2 below).

"A" level - 1st Year	Italian	French	Spanish	German	Arabic	Totals
G.F. Abela J. C.	33	20	13	12	-	78
GCHSS Naxxar	48	9	9	5	2	73
Sir M.A. Refalo Gozo	10	5	2	2	-	19
St Aloysius College	4	11	-	-	-	15
De La Salle College	1	3	-	-	-	4
TOTALS	96	48	24	19	2	189

Fig. 1: Scholastic Year 2016–17. 1st year foreign language students at "Advanced" level.

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1   In Malta, English is not considered a foreign language.

"A" Level - 1st Year	Italian	French	Spanish	German	Arabic	Totals
G.F. ABELA J.C.	32	25	11	9	-	77
GCHSS Naxxar	35	5	4	11	3	58
Sir M.A. Refalo Gozo	4	2	3	3	-	12
St Aloysius College	2	4	-	-	-	6
De La Salle College	6	2	-	-	-	8
St Martin's College	2	-	-	-	-	2
TOTALS	81	38	18	23	3	163

Fig. 2: Scholastic Year 2017–18. 1st year foreign language students at "Advanced" level.

Consequently, as shown in Figure 3, a very low percentage of post-secondary students and adults opt to sit for a foreign language at "Advanced" or "Intermediate" level.

2017	No. of registered students for "A" level.	No of students who sat for at least 1 foreign language at "A" level	% of students who sat for at least 1 foreign language at "A" level	No. of registered students for "INT" level.	No of students who sat for at least 1 foreign language at "INT" level	% of students who sat for at least 1 foreign language at "INT" level
May session	3374	171	5.1	3298	218	6.6
September session	1140	30	2.6	2255	115	5.1
Total	4514	201	4.5	5553	333	6.0

Fig. 3: Post-Secondary students and adults who opted to sit for a foreign language at "A" and "INT" levels. Source: MATSEC.

At Tertiary level the situation is not any better. Suffice it to say that within the 3 most important institutions in Malta that offer tertiary education, the presence of foreign languages is negligible. At the University of Malta (UM), only two Faculties are involved in the teaching of foreign languages, namely the Faculty of Education and the Faculty of Arts, together with the Department of Interpretation and Translation Studies. The Faculty of Arts also offers the possibility for UM students coming from different faculties to follow a foreign language proficiency course throughout their years on campus but the number of students opting to follow these courses is extremely low, around 90 in all. And unlike many other universities around

Europe, there exists no Foreign Language Centre or Institute at the UM. At the Malta College for Arts, Science and Technology (MCAST), foreign language teaching has only been introduced on a voluntary basis as from academic year 2017-18 with the introduction of the SPA programme in Italian, French and German. Over 110 students from different levels across all Institutes opted to start learning a foreign language in addition to their current programme of studies, with lessons being held in the evenings and on a voluntary basis. On successful completion of the course students are certified for the acquired language skills at the level obtained and are offered the opportunity to further their language proficiency skills throughout their years at the College. Finally, at the Institute for Tourism Studies (ITS), foreign language proficiency courses are still not compulsory for all students.

This scenario is, to say the least, very worrying and in sharp contrast with the European Commission Council's Explanatory Memorandum (2018) which states that "Improving the learning of European languages contributes to mutual understanding and mobility within the Union and helps to increase productivity, competitiveness and economic resilience" (p.1). Furthermore, Malta's economy is dependent on human resources and foreign trade with the two most important employability sectors being tourism and digital gaming for which foreign language skills are an integral and indispensable component in the provision of a high standard of service. In the tourism industry there exists a strong link between excellence in tourism services and excellence in language skills while several research studies show that a variety of languages are required on international markets and that the most quoted barrier to intra-European mobility remains lack of foreign language skills. In the world of work, language skills are becoming always increasingly important in organisations and businesses who want to remain competitive on an international level. The Report from the thematic working group "Languages for Jobs" European Strategic Framework for Education and Training (ET 2020) highlights the rising demand for foreign languages and communication skills on the European labour market and underlines the need for the development and dissemination of new methods of teaching languages which are more learner-focused, practically oriented and more applied to professional contexts in order to reduce the gap between supply and demand of language skills and to increase the motivation of learners. And it is no surprise that language skills are considered by employers as one of the ten most important skills for future graduates. This was confirmed by a recent Eurobarometer study where 40% of recruiters in the industry sector highlighted the importance of language skills for future higher education graduates. And yet, based on the first European Survey on Language Competences[2], despite investment in language learning and teaching, education systems are still struggling with improving language competences.

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2   The European Survey on Language Competences was conducted in 2011. Its findings were published in June 2012. http://ec.europa.eu/dgs/education_culture/repository/languages/library/studies/executive-summary-eslc_en.pdf

In Malta unfortunately, we have reached a point where even those who do achieve an end of compulsory schooling certification in one or more foreign languages do not necessarily find opportunities to further improve their language competences given that their field of specialisation at post-secondary and tertiary level often does not provide the opportunity to do so. And this is further confirmed by the fact that, whereas at Post-Secondary and Tertiary Levels the number of enrolled students studying a foreign language is extremely low, an opposite trend exists when it comes to adult learners. In fact, the last couple of years saw a dramatic increase in the number of adults enrolling to study MFL at the Lifelong Learning Centres (LLC)[3] found around the Maltese Islands which goes to show not only that the scenario and the need for educational opportunities at post-secondary and tertiary level have changed considerably in the last decade but above all that there is an urgent need for a review of the future of post-secondary education in Malta, especially with regards to MFL, which will hopefully bring about the necessary changes to address the needs of all young persons seeking to further their language proficiency on completion of compulsory education. In fact, the number of adult learners who have applied to learn a foreign language at a LLC during the year 2018/19 has reached a staggering 1054, of which 453 are foreigners[4].

Lifelong Learning 2018-2019	Arabic	Spanish	Chinese (Mandarin)	French	German	Japanese	Turkish	Greek	Russian	Italian	TOTAL
No. of adult learner applications	27	402	25	104	127	36	14	19	20	280	1054

Fig. 4: Scholastic Year 2018–19. No of adult learners who applied (until mid-August) to learn a foreign language at a LLC. Numbers are set to increase as applications close in September. Source: DCLE.

It is clear that in Malta MFL today require a new market, and that language teaching and learning must go well beyond formal compulsory schooling, which does not necessarily always provide the best context to motivate students to learn languages. It is only natural that students are willing to work harder at something if and when they connect what is being learned in class to the outside world and when they realise that they can apply it to real life. So, although the teaching and learning of MFL does need to take root in schools, it can only flourish if students are motivated by the provision of the right opportunities at post compulsory level

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3   At the Lifelong Learning Centres, MFL teaching and learning will gradually follow the SPA programme starting from 2018-19.

4   At the time of writing this paper the number of applicants for foreign languages at the LLC stood at 1054. However there was still 1 month left for the closing date of applications.

offering them the possibility to further enhance their proficiency in the various language skills. And this explains perfectly why in Malta the market of MFL learning and teaching is improving steadily among adults, through the LLCs, but decreasing at post compulsory and at tertiary levels.

This brings us to another very pertinent question. Do we need modern language graduates and/or employees in a globalised world? Or better, do we need graduates and employees who are also proficient in one or more foreign languages? Apart from the huge benefits of foreign language learning like the acquisition of vital cognitive skills and intercultural awareness, graduates and employees with high levels of language competence find it much easier to engage effectively with the rest of the world, giving them a cutting edge over their colleagues and/or competitors when it comes to research collaborations, trade, diplomacy, etc. As the Reflection Paper on 'Harnessing Globalisation' (2017) states rightfully, "(a) more connected world has brought with it new opportunities. Nowadays, people travel, work, learn and live in different countries. They interact with each other on the web, sharing their ideas, cultures and experiences. Students have online access to courses run by leading universities across the world" (p.7). But language competences are key features in order to have access to these new opportunities, in order for our youngsters to make the most of these new opportunities and to "connect" with their counterparts across the globe. If we really believe in this, we need to move away from a "one size fits all" system at post-secondary and tertiary institutions. At present, the only option for students who would like to further their studies at post-secondary in any particular foreign language is to either go for an "A" level course or for an "Intermediate" course as part of the MATSEC certificate, with a lot of emphasis being on grammatical accuracy, literature and culture rather than proficiency in the target language. Although the value of literature is undisputed and should be promoted for the cultural benefit of students, young people who would like to improve their proficiency in the basic foreign language skills, namely listening, speaking, reading and writing in view of future job prospects and/or requirements, feel frustrated at the fact that to date there exist no such language proficiency courses at post-secondary level.

In view of these scenarios, there have been, over the past four or five years, various efforts and initiatives aimed at improving the current situation in Malta by creating the possibility of offering an alternative way of obtaining certification in foreign languages apart from MATSEC involving various stakeholders including the Ministry for Education & Employment (MEDE), various Embassies, UM, MCAST, and industry bodies among others. As already mentioned, a first step to address this situation in post compulsory education has been the introduction on a voluntary basis of foreign language proficiency courses to students following full time and/or part-time courses at MCAST and UM. The main aim of such courses is to give our youngsters the opportunity to acquire fluency in one or more foreign languages while studying to obtain their MCAST or UM certificate.

Another initiative in the same direction, undertaken by MEDE in collaboration with MCAST, will be the introduction of a Foreign Language Proficiency Course at MQF level 3 & 4 which will focus on communicative competence and which will offer accredited certification in each of the four basic language skills separately. These courses, to be offered as from October 2018 (Level 3) and from 2019 (Level 4) respectively, will be offered at both post-secondary and tertiary institutions, among which the Giovanni Curmi Higher Secondary School in Naxxar, Sir M.A. Refalo Sixth Form in Gozo, the LLCs around the Maltese Islands and MCAST. The rationale behind the introduction of these 2 courses is that given the fast rate with which the labour world is changing and the way employment scenarios change within a very short period of time, and given that our students are usually asked to choose their subject options when they are still 13 years old (Year 9 Secondary), provisions need to be taken for those students or employees who, during their years at a post-secondary or tertiary institution or in employment, would like to improve their proficiency in a foreign language to MQF levels 3 or 4. Such a provision will surely benefit not only the large number of students who only decide to opt for a particular course at University after the end of compulsory schooling but also anyone willing to upskill his/her foreign language proficiency skills for employment, promotion or mobility purposes given that limited foreign language competences remain one of the main obstacles for young people to benefit from the opportunities offered by the European education, training and youth programmes. This is just a first step in the right direction but a lot more needs to be done if, as a country, we want to attract more youngsters to further their studies in MFL at post compulsory and at tertiary levels. At UM, although the introduction of offering combined degrees even with foreign universities was definitely a bold and wise decision which in itself might, directly or indirectly, motivate undergraduates to improve their proficiency in one or more foreign language, maybe the time has come to introduce combinations of foreign languages to other subjects. Such a formula is proving to be quite popular in various countries with Ucas figures for 2015[5] showing, for example, how in British universities 8 out of every 10 students are opting to combine a language with another subject. And the combination of subjects to MFL do not simply vary from humanities to social sciences and to business studies, but also to maths, physics, engineering or natural sciences.

The writing is on the wall. As far as MFL teaching and learning at Post-Secondary and Tertiary levels is concerned, there is an urgent need for a planned, sustained commitment to a programme of change. During these past years, a lot has been written, said and discussed, but what is urgently needed is pragmatic action. If not we are risking to witness a diminishing supply of young, home-grown linguists available

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5 The Universities and Colleges Admissions Service (UCAS) is a UK-based organisation whose main role is to operate the application process for British universities. Ucas figures are available at: https://www.ucas.com/corporate/data-and-analysis/ucas-undergraduate-releases/ucas-undergraduate-analysis-reports/ucas-undergraduate-end-cycle-reports

to businesses wishing to work internationally or to train as teachers, which in turn could create long-term difficulties for our country. This sense of urgency becomes even more pronounced in view of the European Commission Council's Explanatory Memorandum statement (2018),

> Language competences are at the heart of the vision of a European Education Area. With increasing mobility for education, training and work inside the Union, increasing migration from third countries into the Union, and the overall global cooperation, education and training systems need to reconsider the challenges in teaching and learning of languages and the opportunities provided by Europe's linguistic diversity (p.11).

References

European Commission (2010). *Employers' perception of graduate employability. Eurobarometer 304*. Available at http://ec.europa.eu/commfrontoffice/publicopinion/flash/fl_304_en.pdf [Accessed 14 July 2018].

European Commission (2017). *Reflection paper on harnessing globalisation.* Available at https://ec.europa.eu/commission/sites/beta-political/files/reflection-paper-globalisation_en.pdf [Accessed 1 August 2018].

European Commission (2018). *Proposal for a council recommendation on a comprehensive approach to the teaching and learning of languages*. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri [Accessed 20 July 2018].

European Commission (n.d.). *Languages for Jobs. Providing multilingual communication skills for the labour market.* Report from the thematic working group "Languages for Jobs" European Strategic Framework for Education and Training (ET 2020). Available at http://ec.europa.eu/assets/eac/languages/policy/strategic-framework/documents/languages-for-jobs-report_en.pdf. [Accessed 20 July 2018].

McPake, J., Tinsley, T. and James, C. (2007). *Making provision for community languages: issues for teacher education in the UK.* The Language Learning Journal, 35(1), 99-112, DOI: 10.1080/09571730701317705. Taylor & Francis Online. Available at https://www.tandfonline.com [Accessed 3 August 2018].

Pace, M. (2015). *Speaking their language. Reviving the teaching of foreign languages in secondary schools in Malta. The Language Proficiency Assessment National Project*, in L.Gomez Chova, A. Lopez Martinez and I. Candel Torres, eds. *INTED 2015 Proceedings*, Madrid: IATED. pp. 609-617.

Pace, M. (2017). *A Foreign language Awareness Programme (FLAP) in Primary Schools – Why and How* in L. Gómez Chova , A. López Martínez and I. Candel Torres, eds. *INTED2017 Proceedings*, Valencia: IATED Academy. pp. 152-160.

The European Survey on Language Competences (2012). Available at http://ec.europa.eu/dgs/education_culture/repository/languages/library/studies/executive-summary-eslc_en.pdf [Accessed 10 August 2018].

Bio-note

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Lejn Mużika Siekta:
Taħdita mużikali fi tliet movimenti
Towards Silent Music:
A Musical Talk in Three Movements

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Abstract

Before the advent of music, sounds emanated from natural elements. Man broke the first barrier by creating music which, over time, appeared in different cultures that gave birth to myriad styles. However, this also contributed to an increase in many artificial noises which came about as a result of 'progress'. Man tried in vain to translate these 'noises' into his compositions but music still lacked the necessary oxygen injected by previous composers into their masterpieces. A second barrier was broken by creating a new style which contained fewer notes to the accompaniment of celestial harmonies. The true final break came with the arrival of perfect silent music.

This paper will focus on how these three ground-breaking barriers came about: (i) Ode to Jubal – father of music; (ii) Edge of silence in Camilleri's music; (iii) In the shadow of silence with Cage. This presentation will also include piano and violin performances of three musical excerpts. As part of this musical voyage I shall be talking about (i) the biblical character of Jubal, inventor of musical instruments, and my work in his honour; (ii) the creation of silent music in one of Camilleri's latest works; (iii) the arrival of silence in a famous work by Cage which represents the type of music containing imaginary sounds.

Keywords: Jubal, musical genesis, silent music, sound of silence, Charles Mario Camilleri, John Cage

L-Ewwel moviment: Odi Lil Ġubal Bin Lamek – Missier il-Mużika Bnedmija

Il-ħsejjes naturali kienu ferm qabel ewl il-bniedem fuq wiċċ id-dinja. Tant hu hekk, li huwa twieled b'par widnejn biex ikun jista' jismagħhom. Megħlub mill-kurżità li minnha sa minn dejjem kien ibati u l-effett li dal-ħsejjes iħallu fuqu, il-bniedem ra kif għamel u beda jikkontempla kif jista' b'xi mod jimitahom għax ġo fih ħass li permezz tagħhom seta' jesprimi l-ħsus primittivi tiegħu.

Skont it-Testment il-Qadim, fil-kotba tal-Ġenesi, li jitkellmu fuq il-ħolqien tal-univers u l-bniedem, insibu li Ġubal, iben Lamek u Għada, huwa missier dawk kollha

li jdoqqu l-istrumenti mużikali. Ġubal kellu wkoll ħuh Ġabal, missier dawk li jgħixu fl-għerejjex u jrabbu l-imrieħel. Il-Bibbja tgħid li dan Ġubal kien il-bniedem li ivvinta ċ-ċetra, strument tal-korda, biex bid-daqq doċli tal-akkordji kien ikun jista' jhenni 'l qalbu skont il-qagħda sentimentali li kien ikun jibsab fiha; kif ukoll il-flawt, strument magħmul mill-qasba, li d-daqq rqiq u leġġier tiegħu huwa xbieha kważi perfetta tal-għana spirtu pront tal-għasafar, għax Alla ħa ħsieb iwelled lill-bniedem fuq xbiha tiegħu, mogħni bl-għerf u l-intelliġenza, u fuq kollox b'sens ta' kreattività li mill-iċken ħsieb astratt f'moħħu għandu ħila jdawru f'xi ħaġa tanġibbli.

Dan kollu jfisser li Ġubal kien l-ewwel mużiċist u kompożitur li tgħallem waħdu li nafu bih, u l-ewwel bniedem li ġih f'rasu li mix-xejn jikkomponi l-ewwel bċejjeċ mużikali, aktarx improvvizzati, li qatt eżistew fuq wiċċ id-dinja. Qablu qatt ħadd ma kien hemm li seta' jurih x'inhija mużika, jew li b'xi mod seta' jsemmagħhielu jew jgħallimhielu, u l-unika ispirazzjoni tiegħu bilfors li kienet ġejja mill-ħafna ħsejjes, kbar u żgħar, irqaq jew ħoxnin, ħelwin jew tal-biża' li kienu konstament jiżgħedu lill-ambjent primordjali ta' madwaru. Iżda wisq naħseb li Ġubal, aktar milli ħalaq il-mużika sempliċiment biex joqgħod jitpaxxa biha waħdu biss, fiha sab il-mod kif seta' jibda jesprimi l-ħsus ġewwiena tiegħu u fl-istess ħin jaqsamhom flimkien ma' oħrajn. Dan żgur li wassal biex ta' madwaru stess, u oħrajn li bdew jiġu eżatt warajh, jitħajru minnu u mingħandu jibdew jitgħallmu jdoqqu strument. U aktar kemm bdew igerbu l-iżmna qodma, il-mużika aktar bdiet tieħu x-xejra artistika tagħha. Għallanqas fil-kamp mużikali, żgur li Ġubal irnexxielu jikser l-ewwel barriera peress li kien hu l-pijunier ewlieni li bl-inventar u d-daqq tal-istrumenti tiegħu, il-ħsejjes inġiebu flimkien biex jagħmlu sens mużikali. Minn dakinhar 'il quddiem is-skiet kien siket bil-ħolqien tan-noti mużikali li bdew ħerġin minn fomm l-istrumenti tiegħu.

Ippermettuli hawnhekk ngħid kelmtejn dwar xogħol minn tiegħi, **Odi Lil Ġubal Bin Lamek** - **Missier il-Mużika Bnedmija**, li jiena kkomponejt espressament għal dil-okkażjoni. Ma kienx fil-ħsieb tiegħi li noqgħod noħloq xi tip ta' mużika li fl-istħajjil tiegħi b'xi mod setgħet tqarreb lejn id-daqq spirtu pront ta' Ġubal b'dawk is-swaba' għaġġiela tiegħu. Aktar ridt li nipprezenta mużika li minkejja qsuritha, jirnexxilha tpenġi impressjoni tal-ambjent mimli ħsejjes elementali naturali kif kien jesperjenzah Ġubal, filwaqt li tipprova, imqar għal waqt wieħed biss, b'xi mod tesprimi ħsusu. Għal dal-għan, kemm stajt ħloqt mużika b'burdati differenti li jistgħu jkunu aggressivi u/jew minaċċanti, oħrajn sielma u/jew kontemplattivi, saħansitra misterjużi. Dan stajt nagħmlu billi f'xogħli nħaddem sistema ta' ġustapożizzjoni li permezz tagħha motivi differenti u/jew kuntrastanti jitqiegħdu wara xulxin u mhux bilfors jindaqqu dejjem fl-istess ordni. Iżda għad li xogħli hu magħmul minn sensiela ta' motivi msenslin flimkien, xorta waħda għandu forma ternarja miż-żgħar, fejn iż-żewġ partijiet ta' barra għandhom karattru robust ħafna, filwaqt li dak tan-nofs hu aktar miġbur u joffri ċertu diqa.

Il-mużika hija għall-vjolin, li huwa strument tal-korda u għandu ħafna minn leħen il-bniedem, imsieħeb mid-daqq tal-pjanu li jintuża aktar b'mod perkussiv milli kif nafuh tradizzjonalment, kif aktarx insibuh f'xogħlijiet tas-seklu għoxrin.

Tindaqq l-ewwel silta mużikali: Odi Lil Ġubal Bin Lamek - Missier il-Mużika Bnedmija ta' Manoel Pirotta (c.2'45'') minn Odile Micallef (vjolin) u Petra Magri Gatt (pjanu)

Żewġ siltiet qosra minn *Odi lil Ġubal Bin Lamek – Missier il-Mużika Bnedmija* b'burdati differenti, il-waħda mmarkata *Con fuoco (b. 1-12)* u l-oħra *Adagio lamentoso ma minacciante* (b. 21-27).

It-Tieni moviment: Tarf is-skiet fil-mużika ta' Camilleri

Għaddew għexieren kbar tas-snin minn mindu Ġubal ivvinta l-ewwel strumenti u daqq il-mużika tiegħu fuqhom. Minn dakinhar 'l hawn, il-mużika xterdet ma' kull rokna tad-dinja u sabet postha bħala esrpressjoni artistika. Fil-kontinent tal-Ewropa biss, din laħqet il-milja tagħha fix-xogħlijiet kapolavuri ta' kompożituri kbar. Ġara iżda, li l-bniedem tant niġġeż id-dinja ta' madwaru bl-istorbju kontinwu ta' ħsejjes artifiċjali li ħalaq huwa stess, li spiċċa ħonoq lill-istess mużika li tant kien iħobb. Minħabba f'hekk, il-kompożitur beda jmur aktar għas-silenzju sinfoniku milli l-geġwiġija kakofona f'kitbietu.

Wieħed minn dawn huwa proprju Charles Mario Camilleri, meqjus bħala l-kompożitur ewlieni nazzjonali malti, u minn tal-ewwel li kien iħobb idaħħal ħafna mistrieħ b'mod konkret fil-kompożizzjonijiet mużikali tiegħu. Diġà, f'xi xogħlijiet bikrin tiegħu, fosthom 'Ħemda' għall-pjanu, 'Talba' għall-obwe waħdu, u n-notturn mimli diqa nostalġika mill-'Malta Suite' għall-orkestra sinfonika, Camilleri wera dispożizzjoni qawwija għal dal-fenominu tas-silenzju li skontu jifforma parti integrali mill-ambjent malti speċjali waqt tlugħ u nżul ix-xemx, u l-ħedla ta' wara nofsinhar sajfi.

Mis-snin sebgħin tas-seklu l-ieħor 'il quddiem dil-ġibda lejn is-silenzju kompliet tintensifika ruħha f'xogħlijietu li bdew ikunu aktar influwenzati mill-filosofija orjentali u l-istħajjil ta' ħsejjes smewwija. Waħda minn dax-xogħlijiet fil-fatt iġġib l-isem ta' 'Chemins', jew 'Inspace', li permezz tagħha Camilleri ta bidu għal tip ta' xogħlijiet ġodda fejn is-silenzju beda jirbaħ sew fuq in-noti mużikali. Infatti, f'dax-xogħol pjanistiku żgħir ħafna u b'sinifikat kbir insibu biss 15-il battuta, fejn kull waħda mit-tliet taqsimiet għandha ġix battuti minn kull ħamsa battala għal kollox u jerġa' b'kuruna twila fuqhom – liema sinjal ifisser li d-dewmien tagħhom hu fil-fatt ferm itwal minn kif jidher fuq il-karta tal-mużika li jkollu quddiemu l-pjanista waqt l-eżekuzzjoni. Fl-istess xogħol ukoll, il-kompożitur iħaddem biss noti mill-iskala pentatonika li ma joffru l-ebda kunflitt semitonali bejniethom, u fejn il-melodija u r-ritmu huma assenti bl-iskop li s-sens ta' żmien jiġi eradikat. Minflok, il-mużika tistrieħ biss fuq l-ftit ilwien bla mittiefsa li jistgħu joffru dal-ħames noti taħsibhom imxerrdin 'addoċċ' u b'mod spazjali maż-żewġ pentagrammi, u d-daqq ta' xi qanpiena solitarja, li bid-daqq dgħajjef u sporadiku tagħha tibqa' tipprova tħeġġeġ spiritwalment lis-semmiegħ. 'Chemins' huwa biss xogħol minn sett ta' ħamsa li jġib l-istess isem, bl-erbgħa l-oħra jisimhom 'Machine Music', 'Just a Thought', 'Rhythmic Kit' u 'Shadows of Silence' rispettivament. Is-sett kollu kien ġie stampat fl-1980 u nħareġ ukoll fuq diska kumpatta.

Xogħol ieħor importanti ta' Camilleri ta' perjodu aktar riċenti hu 'The Edge of Silence' tal-1994 għal vjolin u pjanu, u li dwaru xtaqt nitkellem ftit aktar fit-tul qabel ma mmorru biex nisimgħuh. Dan-numru jifforma parti minn xogħol akbar fi tliet biċċiet li jġib l-istess isem, bit-tnejn l-oħra jisimhom 'Still Star' u 'Energies Radiantes'. Kif jixhed ismu stess, il-mużika tinsab f'xifer is-silenzju, u bin-noti jsiru dejjem aktar sparsi, waqtiet kemm kemm jinstemgħu.

Għad li x-xogħol jagħtik impressjoni li m'għandu l-ebda qafas strutturali, fil-fatt mhuwiex hekk għax il-forma tiegħu tinħeba wara t-taparsi natura kaotika ta' noti mitfugħin 'addoċċ' min-naħa tal-vjolin, u logħob bid-dewmien eżaġerat fid-daqq tal-akkordji min-naħa tal-pjanu, li b'ilwienhom mhux tas-soltu jsaħħru 'l dak li jkun għal warajhom. Ma' dan kollu wieħed irid iżid jgħid ukoll li t-temp ġenerali hu mmarkat *Lento spazioso*, li fit-tkaxkir ta' mixjietu jkompli jgħin biex jinqered is-sens ta' ħin. Huwa biss lejn nofs ix-xogħol li t-temp għal waqt wieħed isir ftit aġitat, bis-semiminimi joqorbu lejn it-taħbit regolari ta' qalb il-bniedem. Jiġri iżda, li f'dil-istess parti qsajra ċentrali Camilleri jħaddem l-atomizzazzjoni tal-bit, għodda mużikali vvintata minnu stess u li spiss kien iħobb jużaha fix-xogħlijiet mwaħħrin tiegħu. Permezz tagħha huwa jagħti l-impressjoni li l-mużika qed tindaqq spirtu pront u n-noti mhumiex jaqblu ritmikament bejniethom meta fil-fatt dawn ikunu mniżżlin b'mod mill-aktar preċiż fuq il-pentagramma. U għad li fi smigħ għandek geġwiġija ta' noti jiġru 'l hawn u 'l hinn bla ebda rażan, din mhix għajr improvvizzjoni bil-miktub.

Fuq kull naħa tal-*Agitato* li għadna kif semmejna hemm jerġa' żewġ taqsimiet żgħar oħra, u li permezz tagħhom ix-xogħol jieħu l-forma a-b-ċ-b-a, fejn 'ċ' hija l-parti tan-nofs, filwaqt li 'a' u 'b' jeqilbu l-ordni tagħhom meta jiġu warajha – dik li aħna fil-mużika nsejħulha forma retrogradabbli li tixbah il-kelma jew fraż palindromika. Parti 'a' hi magħmula min-noti twal fuq iż-żewġ strumenti u mqassmin f'erba' frażijiet żgħar, bil-pawsi bejn waħda u oħra. Fiha nsibu ammont kbir t'aspetti, u l-ftit noti li niltaqgħu magħhom idumu jkaxkru għal ħin twil, u li b'għemilhom stess donnhom iridu joħolqu estasi. Jekk tiġbor il-ftit noti tal-vjolin flimkien għandna mnejn insibu xi forma ta' tema prinċipali. Il-pjanu min-naħa tiegħu xogħlu hu li jlewwen dil-'melodija' b'akkordji sbieħ mhux konvenzjonali li jagħmlu użu mir-reġistri kollha possibli tiegħu. Jekk niġu mbagħad għat-tieni parti 'b', fiha naraw jitwieled ritmu kostanti, fejn il-mużika ssir suġġetta għaż-żmien peress li l-kromi jridu jindaqqu f'ħinhom. Mhux biss, iżda l-vjolin hu mitlub biex juża l-vibrat waqt id-daqq biex b'hekk jagħti l-ħajja lil kull nota, imsieħba dejjem min-noti semi-stakkati tal-pjanu. Jiġri li wara ftit, il-ħoss kemm kemm jinstema' ta' dan-noti jibda jinġema' minħabba li l-istess pedala li tkun qed issostnihom tibqa' magħfusa l-ħin kollu 'l isfel. Bħal fil-każ ta' 'Chemins', hawn ukoll għandna ħjiel ta' daqq ta' qniepen ġej min-naħa tal-vjolin - liema tokki effimeri malajr jiddgħajfu u jmutu. Dan iseħħ eżatt qabel il-wasla tal-*Agitato* li diġà tkellimna fuqu. It-tieni parti 'a' fiha ħafna anqas noti mill-ewwel waħda u ħafna aktar silenzju, u mill-erba' frażijiet ftit imlaħħma li kellha qabel issa jifdal biss skeletru tagħhom. Minn dan kollu naraw lil Camilleri bħala wieħed mill-pijunieri moderni li rnexxielu jisfida d-direzzjoni ġenerali tradizzjonali u jibda miexi fuq il-fruntiera li tifred id-dinja tal-ħoss minn dik tas-silenzju fil-kompożizzjonijiet tiegħu.

Tindaqq it-tieni silta mużikali: Edge of Silence ta' Charles Mario Camilleri (c. 3' 45") minn Odile Micallef (vjolin) u Petra Magri Gatt (pjanu)

It-Tielet moviment: Ma' Cage għad-dell tal-mużika siekta

U sa fl-aħħar is-silenzju. Din tas-silenzju fil-mużika kienet ilha ġejja żgur sa minn żmien Erik Satie, kompożitur eċċentriku franċiż tal-bidu tas-seklu l-ieħor li fix-xogħlijiet tiegħu diġà kien beda jagħti lok għal kitba mużikali li tinvolvi sewwa s-silenzju, jew allanqas nuqqas serju ta' noti fuq il-paġni tal-mużika, speċjalment f'dawk iddedikati lill-Ordni li tagħha kien kompożitur uffiċjali u *maestro di cappella*. Meta jfettillu wkoll, kien iħalli spazju vojt bejn il-kjavi tal-bidu u l-ewwel noti għal xejn b'xejn, u mhux l-ewwel darba li l-mużika tiegħu kienet timxi mingħajr stangetti li normalment jitqiegħdu bejn battuta u oħra.

Minn daqshekk, Satie kien wieħed mill-avangwardisti ta' żmienu, iżda dan ma jfissirx li ma kien hemm ħadd qablu li seta' esperimenta b'xi forma ta' silenzju fil-mużika. B'xi mod jew ieħor, fix-xogħlijiet ta' kull żmien issib li l-mistrieħ fil-mużika jiddaħħal dejjem tant li hemm anki sinjali apposta għalihom biex jindikaw id-dewmien tagħhom. Silenzju twil jew qasir waqt biċċa mużika jaf ikun effettiv ħafna u huwa dejjem apprezzat, kemm mill-kompożitur li jiktibha, kif ukoll minn min ikun qed jismagħha. Speċjalment f'xogħlijiet li jinvolvu aktar minn strument jew vuċi waħda, huwa essenzjali li dawn ma jitħallewx idoqqu jew ikantaw bla waqfien, mhux biss għall-istess instrumentalisti jew kantanti, li jkollhom bżonn jieħdu xi ftit tan-nifs kultant ħin, imma wkoll għall-effett fih innifsu billi jsaħħaħ l-ilħna ta' dawk involuti. Tant għandu saħħa s-silenzju li saħansitra teżisti pawsa ġenerali li permezz tagħha titwaqqaf orkestra sħiħa milli ddoqq. Wieħed imbagħad irid joqgħod ferm attent li dak li jkun ma jidħolx qabel ma din tintemm għax ir-riżultati jafu jkunu devastanti.

Jista' jingħad li kien il-kompożitur amerikan John Cage li ħareġ għall-ewwel darba bl-idea sublimi li ma jdaħħal l-ebda nota fil-mużika tiegħu meta fl-1952 kiteb il-famuża erba' minuti u tlieta u tletin sekonda għall-pjanu. Ix-xogħol fih tliet movimenti żgħar, u għad li għajr silenzju ma tismax, xorta waħda għandhom immarkat il-ħin preċiż li fih iridu jindaqqu. Il-bidu u t-tmiem ta' kull moviment jintwera billi l-pjanist jagħlaq u jerġa' jiftaħ l-għatu tal-pjanu. Mhux l-ewwel darba wkoll li dax-xogħol ġie traskritt għal orkestra sħiħa, bil-ħafna mużiċisti joqgħodu bilqiegħda bl-istrument f'idhom daqslikieku qegħdin idoqqu, waqt li d-direttur tal-orkestra jżommilhom il-ħin fuq l-arloġġ li jkollu quddiemu fuq il-leġiju li minn fuqu soltu jidderieġi. Il-ħsieb wara dax-xogħol huwa li fis-skiet kulħadd jista' jsir kompożitur billi jibda jimmaġina l-mużika tiegħu qegħda tindaqq mill-kumpless li jkollu quddiemu. F'dak li hu titlu mbagħad, l-għadd tal-ħin huwa intiż biex jirredikola lill-istess żmien għax jekk dan ma jinżammlux il-ħin bl-arloġġ ma tkunx taf kemm ser itul. Infatti, il-ħinijiet li jagħti Cage jistgħu jinbidlu minn eżekuzzjoni għal oħra skont il-ħtieġa, l-ambjent li fih jindaqq, u l-udjenza li jkollok quddiemek. Normalment, l-esekuturi jżommu mal-ħin oriġinali kif hemm imniżżel fl-istess nota tal-kompożitur għax ħafna drabi t-tendenza min-naħa tal-udjenza hi li tieħu dax-xogħol bħala ċajta mużikali, bħalma ġieli kiteb xi waħda wkoll Mozart, imma mhux bil-logħob tas-silenzju. Jekk forsi mbagħad ikun hemm min jitħajjar jesperjenza s-silenzju fil-mużika għal ħin itwal hemm ukoll 'The

Monotone Symphony' għall-orkestra tal-artist franċiż Yves Klein li b'kollox iddum siegħa. Fl-ewwel moviment tisma' biss it-twerdin fuq l-istess nota għal għoxrin minuta sħaħ, u bil-bqija taż-żewġ movimenti l-oħra xejn għajr silenzju ħiereġ minn fomm l-istrumenti tal-orkestra.

John Cage kien proprju l-pijunier li rnexxielu jifdi 'l-mużika mill-madmad li kienet waqgħet fih bil-ħafna noti li sawruha tul is-snin, u minflok taha dimensjoni għal kollox differenti bl-introduzzjoni tas-silenzju assolut. Irid ikun issa xi Ġubal ieħor biex jivvinta tip ta' mużika oħra li ma smajniex bħalha qabel. Minnu li qatt ħadd ma sema' bil-mużika smewwija tal-anġli, imma tistgħu tibqgħu ċerti li fis-sikta tagħha hija l-waħda l-perfetta għax hija ispirata direttament mill-Id il-moħbija.

Iżda qabel ma nagħlaq dit-taħdita nixtieq imqar insemmagħlkom l-ewwel moviment minn ta' dax-xogħol li jiena ttraskrivejt għal vjolin u pjanu, u li għandu jdum biss madwar nofs minuta, jew biex inkun aktar preċiż, tlieta u tletin sekonda.

Tindaqq it-tielet silta mużikali: l-ewwel moviment (Tacet I) minn 4' 33" ta' John Cage (33") minn Odile Micallef (vjolin) u Petra Magri Gatt (pjanu)

L-awtur jixtieq jirringrazzja lil Odile Micallef (vjolin) u lil Petra Magri Gatt (pjanu) għall-esekuzzjoni tat-tliet biċċiet xogħol imsemmija waqt it-taħdita.

Bio-note

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A Spiritual Journey of Discovery: Breaking Free from Man-Made Autonomy through Interior Freedom

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Abstract

Spirituality is a lifelong journey one is urged to discover in order to live life to the full. One of today's challenges is man's own creation of autonomy. This can either, if well tempered be an asset; but many a times, if misunderstood and misused can be a great hindrance.

This paper is going to present this theme from a Christian perspective, aiming to share some insights and suggestions for a spirituality that enhances man's potential towards living a wholesome life.

Within this realm, one might ask: is modern man aware that autonomy is being misunderstood and that it differs from the God-given-gift of liberty? What are the most salient barriers one must overcome in order to use liberty as an antithesis to the potential enslavement of autonomy? How can one discover new and healthier means in order to live a healthy spiritual life where the intellect and the volitional enable a healthy life based on interior freedom, where autonomy is moulded into an asset for the good of the individual and of the common good?

In *The End of the Modern World*, philosopher and theologian Romano Guardini aptly wrote that: "Once the 'autonomous' state has broken all bonds, ...man will either succeed in converting his mastery into good - then his accomplishment would be immense indeed - ...or man himself will be at an end."

Keywords: spirituality, journey, liberty, freedom, autonomy, virtues

Introduction

Journeys are part of man's life. It is in man's nature to journey and all journeys leave an indelible mark in one's life. One might make meaning of an adventure, but can never live it to the full like the one who personally experiences it. One such journey, which only the bold dare to embark on, is the spiritual journey. It is a journey to the deepest core of one's being, where one meets oneself. It is only through this journey that one realises the need for inner freedom, and how this inner strength can lead man to true liberty. Liberty to overcome barriers - man-made ones, such

as autonomy. When the latter is used well it can be a great asset but alas, when misused it enslaves and encapsules man within barriers.

Through the confined space of this paper, one will get a glimpse of a few salient barriers that challenge man with the misuse of autonomy and subsequently the proposed virtues that one can practise through the spiritual journey in order to counteract the difficulties that these barriers create.

Defining spirituality

Spirituality is a word frequently used, but easily misunderstood and misused. Philip Sheldrake states that despite being commonly used, the term spirituality is difficult to define (2003, p.514). One must distinguish spirituality from spiritism and spiritualism (Online Oxford Dictionary, 2018). The etymology of the word "spirituality" derives from the word *spiritualitas* which corresponds to the Greek *pneuma,* that is "spirit". As the Sacred Scripture points out, a spiritual person is someone in whom the Spirit of God dwells (1Corinthians 2:14,15).

Spirituality cannot be limited to devotions, even if these may contribute to one's spiritual journey. Spirituality is more concerned with the mysteries of the human being's wholesomeness and how to give meaning to one's life through a dynamic relationship with God. Thus, any generic definition of spirituality is rather problematic, since spirituality is always conditioned by the context, language of tradition, themes and symbols (Sheldrake, 2003, p.521) Furthermore, while one might propose a definition of spirituality, yet the spiritual journey is unique to every person just as much as each person is unique in existence.

As in any human relationship, the spiritual journey is a process and it is a gradual one. It is a personal one, aimed at discovering and meeting oneself, for the whole integration of oneself with the Transcendent (God), with other human beings and with the whole of creation. Sandra Schneiders states that spirituality is "the experience of conscious involvement in the project of life-integration through self-transcendence towards the ultimate value one perceives" (2005). Hence, spirituality, which involves a relationship with God and operates through God's gift of freedom, is aimed at liberating man from all that enslaves him, thus enabling him to better understand the meaning of autonomy.

A glimpse at defining liberty, freedom and autonomy

The Oxford dictionary defines liberty as the state of being free from any oppressive restrictions imposed by authority on one's way of life, behaviour or political views (Online Oxford Dictionary, 2018). In fact, the term liberty enunciates the capacity to speak about rights, civil liberties as well as release from slavery and imprisonment.

One can say that liberty deals more with the law *nomos*, and the rights of the human being. Liberty is distinct from freedom. The latter is a gift from God, the former is gained through pain and toll. Many are those who confuse these two words. Man is created free to choose and to live one's life; liberty is always a struggle from some form of enslavement.

In the Christian tradition, the state of inner freedom is gained through the grace of God during one's spiritual journey. The main 'tool' for this spiritual journey leading to freedom is faith - a personal faith which believes that Jesus Christ is the Truth, the Way, and the Life (John 14:6). When one disconnects inner freedom from the Source - Jesus Christ - one lives a freedom based on an illusion, an illusion that demands liberation.

Besides this, many confuse freedom with liberty and with autonomy. The etymology of the word autonomy is composed of two Greek words: *auto,* meaning "self" and *nomos*, meaning "custom, or law", where man makes a clear statement that s/he is the law. From the Kantian moral philosophy perspective, to be autonomous is to act according to one's duty rather than from one's desire – the former is the right starting point (Online Oxford Dictionary, 2018).

However, if man's autonomy is seen as the right to govern oneself and one's affairs without the respect for God, for others and for creation (Pope Francis, 2015), but rather as an opportunity to act independently of all - in order to satisfy one's own desires rather than performing one's duties through responsibility, faithfulness and truthfulness - then autonomy is the destructive route for the human person.

In today's milieu, we need to break the barrier of the false and destructive interpretation of autonomy, which amongst other things, is often linked to money, to popularism and to the misuse of power. When such things are exercised and further influenced by a value-free society – a society void of moral principles, based mainly on subjective, egocentric beliefs and where the common good is ignored for the 'need' of the few, when the 'few' claim they are the law, and perform thus – then each man (and society at large) has to carry out some serious reflection on how to exercise one's God-given gift of freedom, be liberated from this egoistic frame of mind and learn how to acquire the inner freedom which teaches man how to serenely live in truth amidst this chaos.

The misuse of autonomy is often demonstrated in the misuse of power. Many times these unlawful actions send a subtle message to society that God and moral principles are not totally rejected, rather they are just ignored, perhaps considered to be no longer needed! When individual conveniences prevail over good moral convictions which are the fruit of a firm relationship with God, then man and society have many barriers to overcome. As Cardinal Joseph Ratzinger states while being interviewed by Peter Seewald, nowadays attempts are made to create an ethic without God and to manufacture one's inner fulfilment, one's happiness as a kind of product (Ratzinger, 2002, p.28). This is an illusion! Some might view it as progress, others as very liberating, but in truth it is an enslavement, created by man for man.

Man feels liberated and really free through an ethic whereby God is put at the centre, where faith and love are like the air that one breathes and the rails of one's spiritual journey.

Gleaning proposals from the New Testament writings

During his time Jesus Christ also lived in an ambience where the misuse of autonomy and power were very prevalent. In the Bible, particularly in the New Testament, the Gospels and the subsequent Letters, one finds sound moral teachings that depict how man can be aware of such realities and how one can overcome these barriers and get liberated through inner freedom. In the Gospel of St. Luke we find: "The Spirit of the Lord is on me, because he has anointed me to proclaim good news to the poor. He has sent me to proclaim freedom for the prisoners and recovery of sight for the blind, to set the oppressed free." (Luke 8:14)

In his Letter to the Romans, St Paul clearly states that one shares in the glorious liberty of the Son of God (Romans 8:21). In the Letter to the Corinthians, he states that where there is the spirit of the Lord, there is liberty (2Corinthians 3:17). To the Galatians, he advocates that the very call to be a Christian is a sign of liberation (Galatians 5:1), resonating St John's Gospel that truth will set us free (John 8:32). Thus, it is highly evident that the Christian message is intertwined with the right use of inner freedom - a freedom from slavery of sin or the Old law, a freedom to live as sons and daughters of God.

This salvific message and mission carries within it hope and offers a faith journey which is open to all: Jews, Christians, Muslims, and adherents of other religions including those who declare themselves agnostics and atheists. It is not a liberty brought about by power, but it is a liberation through the encounter with Jesus Christ, where His Incarnation "is the point where "filial freedom" enters into the dynamism of creaturely freedom" (Melina et al., 2017, par. 5.1). It is enough and more powerful and liberating to have faith in Jesus Christ as He is "the way, the truth and the life" (John 14:6).

Inspired and animated by Holy Scripture and the writings of the forefathers of the Church and of contemporary ones, Christianity has always believed that the actions and choices of man are not isolated actions, but are all integrated in life as a whole.

Modern Christian Thought

Romano Guardini (1885–1968) - an Italian-born German Catholic priest, theologian, philosopher, author and academic, whose insights and writings are nowadays considered as prophetic - conveyed the following with regard to the use of power:

"The core of the new epoch's intellectual task will be to integrate power into life in such a way that man can employ power without forfeiting his humanity" (2013a, p.119). Guardini further stresses that one might either match his power with the strength of humanity, or surrender his humanity to power and perish. Writing in the 60s, Romano Guardini suggested, that in order to counteract individual and society destruction there must be a rehabilitation of virtues (2013b, p.3).

In addition to this, along the years the Catholic Church always had to heart how to teach mankind, how to cultivate one's freedom and how to use autonomy in a responsible manner. In the document of Vatican Council II: *Guadium et Spes*, it is stated that: "if by the term 'the autonomy of earthy affairs', it is meant that material being does not depend on God and that man can use it as if it had no relation to its creator, then the falsity of such a claim will be obvious to anyone who believes in God." (*Guadium et Spes*, Vatican II, 1965, par.36)

Furthermore, in relation to man's freedom, truth and the common good, the Encyclical *Fides et Ratio* states that: "Truth and freedom either go together hand in hand or together they perish in misery" (Pope John Paul II, 1998, par.90). Pope John Paul II, in the Encyclical - *Veritatis Splendor* wrote: "People today need to turn to Christ once again in order to receive from Him the answer to their questions about what is good and what is evil" (1993, par.8). Subsequently he wrote: "The self is fulfilled through an encounter with the fullness of Christ" (1993, pars.8,83,85). While doing so one will participate in the continuous salvific mission brought about through Jesus Christ. A salvation which is full and complete through Jesus Christ, but needs our free response and participation: "precisely the awareness of having received the gift, of possessing in Jesus Christ the love of God, generates and sustains the free response of a full love for God and the brethren" (1993, par.24).

Lately, in the Letter *Placuit Deo,* addressed to all the bishops in the Catholic Church*,* Archbishop Luis F. Ladaria S.J, draws our attention to two challenges that today's society is facing, namely, neo-Pelagianism and neo-Gnosticism both of which are errors rooted in antiquity, and resurfacing strongly in modern times. Through two different yet complementary dimensions both deal with the misuse of autonomy.

During the press conference for *Placuit Deo*, the aforementioned Archbishop explained about the new form of Pelagianism in which the radically autonomous person presumes to save oneself, without the need of the grace of God (Ladaria Ferrer, 2018). Thus, with neo-Pelagianism, salvation depends on the strength of the individual and on purely human structures, disconnected from the Spirit of God, and disregarding the work of God in us and for us (2018, par.2-3). This is a clear example of the misuse of autonomy that promotes an individualistic vision of salvation, attained only through one's own efforts and refusing God's grace.

Additionally, when dealing with the new form of Gnosticism, Archbishop Ladaria explains that neo-Gnosticism liberates the person from both the body and the material universe, distant from the provident hand of the Creator and hence deprived from meaning. Consequently, one is made foreign to the fundamental identity of the

person, and thus can easily be manipulated by the interests of man, resulting in loss of harmony, and leading to the reign of disintegration and death (Ladaria Ferrer, 2018, par.7). This is a reductionist approach that promotes purely internal salvation, where salvation is reduced to a practice or internal feeling without God's hands.

Further elaborating on this theme, in the second chapter of the Apostolic Letter *Gaudete et Exultate*, Pope Francis refers to both neo-Pelagianism and neo-Gnosticism as two subtle enemies of holiness – deterrents to one's spiritual journey. These reductionist tendencies, are two of the most salient barriers one is to overcome, in order to vanquish the enslavement of man-made autonomy. Liberation from these, as suggested by the Pope, is brought about by truth and inner freedom (Pope Francis, 2018, par.35). Furthermore Pope Francis maintains that truth and freedom are spiritually attained if one co-operates with the grace of God, insisting that one must avoid assuming that everything depends only on human effort and will (2018, par.56). In fact, such a reductionist approach in both neo-Gnosticism and neo-Pelagianism can easily mislead the person in becoming the law himself and disregarding the grace of God, which is demonstrated in daily life through the misuse of autonomy and of power.

Proposals for a Spiritual Journey

For man to be eventually liberated from the enslavement of the misuse of autonomy and of power, one is to become aware of the need of a spiritual journey. It is a lifelong journey, where one comes face-to-face with the truth about oneself and about the many things that are enslaving the person. Eventually, inner freedom is gained, and through it one gains the strength to overcome many barriers.

A spiritual journey demands the practice of virtues, which in turn are the fruit of a strong relationship with God. The practice of virtues enhances inner freedom and the more one feels free internally, the more s/he practises virtues. This is the kernel of a spiritual journey, which one is invited to take in order to overcome, in this case, barriers brought about by the misuse of power and of autonomy. These barriers include: deceptions, sloth, greed, pride – vainglory. Some virtues that could counteract these barriers include: truthfulness, courage, love/charity and humility.

The misuse of autonomy easily leads to the cultivation of all kinds of deception. Creating deceptions, living them and promoting them is harmful to oneself, to humanity at large and to all of creation. They create a make believe world, a world built on betrayals. To counteract barriers that impede, amongst others: sincerity, transparency and accountability, Guardini proposes the virtue of truthfulness (Guardini, 2013b, pp.13-23). He stresses that one should cultivate this virtue by making an effort and eventually a habit to tell the truth, telling it at the right time, and living it. Truth with love, but always the truth. Ultimately, one who holds to the truth holds to God, and one who deceives rebels against God.

Another barrier worth mentioning is sloth. The misuse of power breeds contempt and often this is demonstrated by people in the form of sloth which might be expressed through lack of commitment, indifference, passiveness. Christianity teaches that sloth is one of the seven deadly sins. It is considered as the root of all vices. Sloth is always described as self-centred. To overcome this barrier, Guardini proposes the virtues of courage, bravery and boldness (2013b, pp.97-108). One needs courage to become aware of this vice in one's life and subsequently to comprehend its harmfulness and own its consequences with responsibility. A spiritual journey enables one to come face-to-face with this truth, and to be bold enough to work on oneself to overcome it.

Greed is another barrier worth vanquishing. Greed thrives on selfishness that breeds a thirst for power. The worst experiences in man's history are all rooted and executed through greed. Greed is a vice and also one of the seven deadly sins that destroy all that is humane and beautiful in all of creation. In order to overcome this barrier Guardini proposes love. Love is the antithesis of greed. The hymn of love, described by St Paul in his first letter to the Corinthians (1Corinthians 13:1-13), is a spiritual journey that combats many vices especially that of greed. True love knows no limits; greed is too self-centred.

Yet another barrier worth conquering is that of pride, of vainglory. From the onset of creation our fore parents have sinned because of pride. Pride owns no guilt feelings, and no trace of remorse is found in the heart of a proud, vain person. Pride turns man's heart into stone, incapable of any feeling, incapable of any logical reasoning. Pride's view is very myopic, it sees only the "I", the "me". Here Guardini proposes the virtue of humility. If God humbles himself for the salvation and love of humanity, why is man - a creature of God - not able to understand that pride and vainglory do not save oneself, much less the whole of creation? Why does man forget that he is not the Creator but merely a creature made by the Creator-God?

Humility is the queen of virtues. It takes a lifelong spiritual journey for any person to accept and to practise humility as a way of life. Humility is not cowardice, neither does it bring 'decadence' on anyone, much less makes one a 'slave of morality', as Nietzsche claims. Humility is a virtue of strength (Guardini, 2013a, pp.140-147). It is humility that nourishes inner strength - interior freedom that eventually enables one to vanquish many barriers in life. The proud person forgets that all that s/he is and all that s/he has is a gift, nothing is by right, there are no entitlements, all is given out of love, and that man has the responsibility to cherish and to sustain these gifts for oneself and for the wholesomeness of all creation. In his writings, Elder Joseph – the monk on Mount Athos, maintains: "Inner humility is for one to feel, that whatever he has, life, health, wealth, wisdom all are foreign, are gifts from God" (Elder Joseph, 2018).

Such a spiritual journey is undertaken by the bold, by those who want to leave a world better than the one they inhabited. This spiritual journey demands a strong relationship with God, a firm desire for one's wholesomeness and selfless love for

all of creation. Barriers might never be totally vanquished, but their strength could be diminished. Such a spiritual journey would be fruitful if the person undertaking it seeks the expert help of a professional who takes to heart one's own spiritual journey and is well versed in spiritual companionship.

Conclusion

This paper has offered a glimpse into how, through a spiritual journey, one is enabled to discover oneself and the barriers that are hindering him and those around him, and through the practice of virtues, eventually be able to acquire inner freedom. This provides one with the inner strength needed to overcome these barriers and be liberated from those fetters that constrain one's life. As the philosopher and theologian Romano Guardini aptly wrote in his book: *The End of the Modern World*: "Once the 'autonomous' state has broken all bonds, ...man will either succeed in converting his mastery into good - then his accomplishment would be immense indeed - ...or man himself will be at an end" (Guardini, 2013, p.56). Such barriers, as man-made autonomy and the misuse of power impede one's wholesomeness and the holistic welfare of all creation. A spiritual journey is a life-long journey. When taken seriously it enables one to meet oneself face-to-face; only the bold dare undertake it, once taken its fruit is beneficial to both oneself and the whole of creation. Our world would surely be a better place if many undertake such a spiritual journey. Alas!

References

Elder Joseph, (2015). Gleanings from Orthodox Christian authors and the Holy Fathers, Available at http://www.orthodox.net/gleanings/humility.html, [Accessed 13 August 2018].

Guardini, R. (2013a). *The end of the modern world*, Delaware: ISI Books Wilmington.

Guardini, R. (2013b). *Learning the virtues that lead you to God*, Manchester, New Hampshire: Sophia Institute Press.

Ladaria Ferrer, L.F. (2018). *Placuit Deo*, Available at http://www.vatican.va/roman_curia/congregations/cfaith/documents/rc_con_cfaith_doc_20180222_placuit-deo-en.html, [Accessed 27 August 2018].

Melina, L., Noriega, J. and Pérez-Soba, J.J. (2017). *Camminare nella luce dell'amore. I fondamenti della morale Cristiana, Siena: Cantagalli,* Available at http://www.istitutogp2.it/areadiricerca/Tesi%20in%20inglese.html, par. 5.1 [Accessed 25 August 2018].

Oxford Dictionary, (2018). Available at https://en.oxforddictionaries.com/ [Accessed 25 August 2018].

Pope Francis, (2015). *Encyclical Laudato Si,* Available at http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html, [Accessed 27 August 2018].

Pope Francis, (2018). Apostolic Exhortation *Gaudete et Exultate,* Available at http://w2.vatican.va/content/francesco/en/apost_exhortations/documents/papa-francesco_esortazione-ap_20180319_gaudete-et-exsultate.html, [Accessed 27 August 2018].

Pope John Paul II, (1993). Encyclical *Veritatis Splendor,* Available at http://w2.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_06081993_veritatis-splendor.html, [Accessed 27 August 2018].

Pope John Paul II, (1998). Encyclical *Fides et Ratio,* Available at http://w2.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_14091998_fides-et-ratio.html, [Accessed 27 August 2018].

Ratzinger, J. (2002). *God and the world. A conversation with Peter Seewald*, San Francisco: Ignatius Press.

Schneiders, S. (2005). *The study of Christian spirituality: contours and dynamics of a discipline.* In E.A. Dyer & M. Burrows, eds. *Minding the Spirit: the study of Christian spirituality*, Baltimore, London: The Johns Hopkins University Press.

Sheldrake, P. (2003). *Spirituality and theology*. In Peter & Leslie Houlden, eds. *Companion encyclopedia of theology*, London & New York: Routledge.

The New Jerusalem Bible. London: Darton, Longman & Todd.

Vatican II, (1965). Guadium et Spes. In A. Flannery gen. ed. *Vatican II. The conciliar and post conciliar documents*. Northport, New York: Costello Publishing Company.

Bio-note

Fr Marco Portelli a diocesan priest of the Archdiocese of Malta was ordained to priesthood in 1996 and served as vice-parish priest at Msida and Naxxar, as parish priest at Paola Lourdes, at the Diocesan Youth Commission (KDZ) and MCAST Chaplaincy. Since 2014, he has been working as a Chaplain at Junior College, Msida. Since 2011, he has lectured at the Pastoral Formation Institute in the area of spirituality, for the following courses: Higher Education Award in Adolescent & Youth Ministry, and Higher Education Award in Pastoral Care in Schools. He was awarded a BA (Hons) (Melit.) in Theology & Human Studies (1996) with the thesis *Structures of Sin. A Study of Intolerance in Malta*, and an MA (Melit.) Spiritual Companionship (2011) with the thesis *Marriage: A call to wholeness. Spiritual accompaniment for the initial years.*

Breaking Human Limits:
Identifying the Reasons which Compel Athletes to Run Ultra Distances

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Abstract

This paper aimed to investigate the lived experiences of ultra trail mountain runners to make meaning of the reasons why they felt the need to run vast distances over mountain trails and endure the extreme hours and pain to reach their goal. Three experienced ultra trail runners who participated in various ultra trail races registered with the International Trail Running Association (ITRA) were recruited. In depth interviews were conducted to answer the exploratory question: "Can you describe your experiences when running a mountain ultra trail?". The participants verbally stated their experiences which were then transcribed. Thematic analysis (Braun and Clarke, 2006) was used to analyse the data collected. Significant findings which emerged from the data included the disassociation the mind from the body, where the participants even described a feeling of war between the two. They also anticipated that the ultra was going to be painful, so they devised strategies to cope with the pain throughout the duration of the race.

None of the participants referred to the ultra as a race but rather as a journey and described it as a learning experience comparable to the journey of life.

Keywords: ultra trail mountain running, challenge, pain, journey.

Ultra trail running is an extreme endurance sport, involving distances which exceed the marathon distance (42.2 km). Sirch (2014) categories it as an "extreme endurance sport" which is "characterised by long distances" (p.7).

According to the International trail running association (ITRA):

Trail-running is a pedestrian race open to all, in a natural environment (mountain, desert, forest, plain…) with minimal possible paved or asphalt road (which should not exceed 20% of the total course). The terrain can vary (dirt road, forest trail, single track…) and the route must be properly marked. The race is ideally – but not necessarily – in self-sufficiency or semi self-sufficiency and is held in the respect for sporting ethics, loyalty, solidarity and the environment (ITRA, n.d.).

Ultra distance running was recognised as a distinct discipline by the International Association of Athletics Federation (IAAF) in 1988.

This paper will focus on *ultra trail mountain running*, a very specialised ultra distance which involves running on trails across mountain ranges or massifs with thousands of metres of elevation gains and losses. Races can range from 50 km to over 300 km, mostly at high altitude over mountain paths, treacherous terrain with rocks, boulders, scree and ice.

Due to the extreme distances and technical terrain, an average runner takes about 20 to 24 consecutive hours to run 100 km with more than 6000 m of elevation gain. Participants suffer fatigue, muscle cramps and inflammation, nausea and stomach issues, problems associated with high altitude, sleep deprivation and hallucinations. Jurek (2012) believes that "the distance strips you bare" (p.123). According to Askworth (2003), "This is how death must feel. Not the pain, although I imagine most deaths must be painful, but the fear…Every muscle in my body is shaking, both feet are blistered raw…" (p.1).

The finishing rates in such mountain ultras are not very high when compared to road marathons. During the 2018 Madeira Island Ultra Trail (115 km, +/- 7100 m), 63.4% finished the race (MIUT, 2018). This is in sharp contrast to the 2018 Boston marathon where 95.8% crossed the finish line (Boston marathon, 2018).

The preparation for running a mountain ultra is very rigorous. Rüst et al. (2012b), argue that ultra trail runners have to put in an extremely high amount of mileage and hours. Training demands unmeasurable hours to master the skills of mountain running, and years to build an extreme endurance. A long training run can take from 4 to 7 hours of running on technical terrain with as much elevation as possible. Training is also required for mastering the technical steep downhills, as one has to learn how to keep balance between holding oneself upright while descending at a dangerous pace on the treacherous terrain.

Research question

Despite these difficulties, the popularity of ultra trail races has increased phenomenally in the last couple of decades. Prestigious races like Ultra Trail du Mont Blanc (UTMB) have a demand which far exceeds the acceptance rates, even though the application process is very rigorous. During the first year of UTMB, 2003, there were 722 participants, while 2537 participants were accepted in 2017 with hundreds more not having made it to the entry list. (UTMB, n.d.).

This paper will try to explore the reasons, through lived experiences of ultra trail mountain runners, why athletes willingly put themselves through such an arduous experience that only a few are capable of accomplishing.

Literature Review

Ultra trail mountain running as a challenge

Running such an extreme distance is a challenge of the body and mind to test human limits (Crust, Nesti and Bond, 2010). This challenge is driven by various factors including personal goals (Krouse et al., 2011; Hanson et al., 2015).

Ferrer et al. (2015) also agree that "Ultra-marathoners may feel a sense of accomplishment or achievement by attempting to complete such a demanding task and the health benefits associated with the large volume of training with such an event drive their motivation to engage in ultra-marathons" (p.1167). Le Breton (2000) argues that athletes participating in extreme sports where they have to overcome suffering by challenging their limits, will gain recognition in today's world which gives more significance to physical values than moral values. In doing so they will feel more fulfilled in their lives. The adventure of the run itself was also a challenging factor according to Doppelmayr and Molkenthin (2004).

Ultra trail mountain running as an escape

Jurek (2012) explains that, "The longer and farther I ran, the more I realised that what I was often chasing was a frame of mind. A place where worries that seemed monumental melted away, where beauty and timelessness of the universe, of the present moment came into sharp focus" (p.181). When the ultra runner is running, all day to day frustrations are forgotten, set aside. Csikszentmihalyi, Latter, Weinkauff Duranso (2017) believe that "The overwhelming sense of pleasure that accompanies these experiences helps explain why engaging in challenging activities is still so prized, even as people live in a society where laptops and smartphones make leaving the couch unnecessary" (p.6).

Scott, Kayla and Cava (2017), on the other hand argue that extreme experiences help tired white-collar workers escape from the reality of their lives by immersing themselves in pain during extreme activities. This makes them focus on themselves and forget the mundane. Through pain they will find the self.

Ultra trail mountain running as a journey to self discovery

Humans are curious creatures who are constantly seeking and exploring. They might be seeking new limits or how much they can endure. When running a long ultra, where they are not surrounded by the distractions and comforts of everyday life they might just discover what they are looking for. Doppelmayr and Molkenthin (2004) believe that ultra marathons are important because, "If a sport or running is highly important for a person, makes the life more purposeful or has philosophical foundations, this of course has an effect on the factor of life meaning" (p.322).

Ultra trail mountain running for health

Past research has indicated that ultra runners cite health reasons for their participation in the sport.

Veterans and women especially, consider the health benefits associated with ultra running as being very positive (Ferrer et al., 2015; Krouse et al., 2011). On the other hand, Knechtle and Nikolaidis (2018) give details of the adverse effects that running for such a length of time has on the kidneys, heart, blood values, hormones, immune system and the musculoskeletal system.

A very interesting fact emerged from a research by Hoffmann and Krouse (2018), where they asked participants whether they would stop practicing the sport knowing that it was detrimental for their health. 74.1% said that they would not stop.

Borghini et al. (2015) argue that telomere length which influences the ageing process is protected by ultra training implying that ageing is slowed down. Denham et al. (2013) also suggest that normal endurance training protects against ageing.

Methodology

To understand why ultra runners feel compelled to stretch their limits, lived experiences were deemed the best option, as depth, not aggregates best suited the research question. Since an in-depth understanding of the phenomenon was being sought, a qualitative multiple case study research was found to be the most suitable research strategy. The verbal data was collected through in depth interviews which were transcribed and coded. The broad and exploratory interview question asked was "Can you describe your experiences when running a mountain ultra trail?".

According to Yin (2003), "case studies are the preferred strategy when "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context" (p.2). A multiple case study approach was adopted as according to Herriott and Firestone (1983), when multiple cases are being studied, it strengthens and solidifies the overall study. Gustafsson (2012), also agrees that that the "benefits are that the evidence generated from a multiple case study is strong and reliable and the writer can clarify if the findings from the results are valuable or not" (p.11). To analyse the data, thematic analysis was used. According to Braun and Clarke (2006), "Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data" (p.7). Important overall themes were elicited from the transcripts which were then analysed. "A theme captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set" (p.840).

Participants

Three active ultra runners were recruited via word of mouth. Two participants were male (ages 44 and 35) and one was female (age 30). Of the males, one resided in Italy and one in Malta. The female resided in Ukraine. Names were changed.

The athletes had participated in ultras from the 'Ultra Trail World Tour Series' ensuring that they had the same level of mastery of the sport. These ultras require that the participants accumulate points or have proof that they had previously participated in approved ultras.

THEMES	CODES
The body achieves what the mind believes	Coping strategies
	Meditation
	Psychological resilience
	Overcoming the challenge
Time warp	Immersion/'Flow'
	Mindless running
	The present
Flat is boring	Conquering the challenge of extreme duration
	Victorious
	Feeling special
Sweet pain	Physical and mental resilience
	Embracing pain
	Pain is finite
	Breaking limits
	Achievement
The tribe	Idealisation
	Camaraderie
	Trail running community
Microcosm of life	Undulating journey
	Parallel with life
	Self discovery
	Goal oriented/scope
	Motivation, discovery, curiosity, addiction

Findings and discussion

The body achieves what the mind believes

A recurrent theme emphasised by the participants was the dissociation of the mind from the body.

All agreed that they could only complete the ultra and overcome pain by using the power of their mind as a separate entity from their body. According to John, "When your body shuts down, from there on it's the mind that takes over". Irina even personalised it. "It was like my mind was telling me enough, no more suffering". Dario talked about "voices in my head" and cited "inner demons" which left him "shaken".

According to John, the body and mind are acting against each other. "When you cannot even lift your foot from off the ground, there is a war at that stage, between mind and body."

The participants appeared to be using a method of disassociation between embodiment and mind as a coping mechanism whereby the mind acted as the driving force when fatigue and despair took their toll. This body and mind disassociation in the cognitive function of the athletes during ultra, was also referred to by Holt et al. (2014) as a "mental/physical battle" (p.29). Carriker (2017), also sees the importance of both physical training and mental preparation to combat the elements of fatigue in a high intensity event.

Sweet Pain

The participants revealed that they were aware that during the race, they were going to feel discouraged, or in pain. Lane and Wilson (2011), argue that such feelings are always going to be present in endurance events. The outcome then depends on how the athlete deals with such feelings. Holt et al. (2014) identify such problems as "during race stressors" (p.7).

"In ultra races, there is a sort of point, when you feel pain and just run with this pain, walk with pain, so you become friendly. Kiss the pain" (Irina). This is in accordance with the findings of Crust and Bond (2007), who refer to mental resilience. Ultra runners are not any different from other human beings. They still feel the pain, but their threshold may be a bit different from that of other people only because they train a lot and they adapted their body to the demands of mountain ultra running. In a study referred to by Roebuck et al. (2018), cold pain threshold of ultra trail runners was studied. The authors of this study, Freund et al. (2013) argue that ultra trail runners have a higher cold pain threshold.

However, none of the athletes felt superior with regard to higher pain tolerance. They embraced pain as they knew it is only a transient phase. "I won't feel like this for ever. Everything shall pass" (Dario). In fact, they even developed strategies to cope with it. These experiences are in contrast to the idea that people are actually seeking pain during extreme experiences as mentioned by Scott, Kayla and Cava (2017).

The coping strategies mentioned during this study were:

Dividing the ultra in sections, like from Refugio to Refugio (feed stations are located there). "I break up the distance and time into smaller amounts that I can manage that time" (John).

Thinking about the goal (the finish) and looking at the kms and elevations conquered instead of what still needs to be done.

Being positive and happy for small achievements like reaching a peak, arriving on time at the checkpoints, seeing the sunrise after a night running. "Forcing positivity also usually works for me and this can be as simple as smiling and thanking the spectators or volunteers" (Dario).

Appreciating their capabilities and feeling gratitude for the privilege of having them, "Just understanding that you can run the route that normal hikers take 5 days to walk it and you run it in 20 hours, just that…it makes it exciting and you feel satisfaction" (Irina).

Self Motivation: Irina mentioned that when she was suffering she told her "mind to shut up" and "just start doing simple counting. One two, one two…I just like talking to myself with some simple words like, let's go, keep doing it and then just trying to increase the pace". This was also reported by Dolan, Houston, and Martin (2011) when studying strategies used by triathletes.

Some of these coping strategies mentioned were in accordance with strategies mentioned by Holt et al. (2014).

The Tribe

Participants pointed out that the trail community acts like a family. "After the race, I like the atmosphere around, because the community of trail is completely different from the road one… You have a big family, everybody is very supportive" (Irina). "That is the primary reason I think, the community" (John). This concurs with Holt et al. (2014), who argue that, "A rather unique aspect of our findings was that participants also drew support from other racers" (p.11).

Although participants show a great sense of camaraderie and willingly assist each other during races, amongst the regulations of races like Lavaredo Ultra Trail (LUT), it is specified that failing to assist a participant in need will result in disqualification (LUT, n.d.).

Time warp

The race is an undulating journey where athletes feel either on top of the world or carrying the weight of the world. Sometimes a feeling of timelessness ensues and all the attention is focussed on running. Irina compared it to "meditation". "Your head is kind of empty and free and you think about nothing and you just enjoy the moment". According to Jurek (2012), "An empty mind is dominant mind" (p.87). During these moments, athletes perform to the best of their abilities. "You are not even noticing that you are running and km after km you are arriving to the finishing line" (John).

This is similar to what is referred to a being in the "zone" or as Csikszentmihalyi, Latter, Weinkauff Duranso (2017) describe it, "as having a moment of "flow" where the "attention is so sharply focused on the task that all extraneous thoughts and anxieties disappear" (p.6). Past research has shown that during marathons, distractions will not help in obtaining a good result and athletes will be more likely to hit the wall (Stevinson & Bidle, 1998). But as Holt et al. (2014), rightly argue it is impossible not to distracted during such a length of time.

Flat is boring

Training for a mountain ultra must include long challenging runs with steep elevations. To make it more bearable, the trail running axion, "flat is boring" is often used.

The participants agreed that they drifted into the sport because they wanted a challenge. "I like to explore, first myself and to challenge myself to see how far I can go" (Irina). For John, "…the real challenge is to do mountains and difficult terrain… to see the limit for myself, the limit to what happens to my body, what happens to my mind". This concurs with past research which also concludes that motivation arises from overcoming a challenge. (Doppelmayr and Molkenthin, 2004; Hanson et al., 2015). Jurek (2012), also believes that to find one's limits, one has to challenge them. "What were my limits? And how could I discover them unless I tried to go beyond them?" (p.189).

Dario believed that our comfortable life has become boring and we are always looking for ways to escape the mundane. "There is no doubt in my mind that our lives have become extremely comfortable and therefore unexciting… ultra running is one of the preferred outlets for many people as it gives a sense of doing something adventurous and out there…I guess we sign up to feel alive". This in accordance with past research which argues that extreme sport experiences may act as a form of escapism (Edensor, 2000; Scott, Kayla & Cava, 2017).

Microcosm of life

The participants referred to ultra trail races as a "journey" rather than a race. Dario explained that

"An ultra always feels like a journey. And not just through the landscape but also through life as we are surrounded by both nature and humanity in all its race facets in a race". When talking about problem solving during the race, John argued that, "If you compare that with life, it is the same, you know you have a problem, you know it will pass. Trail running is like a mirror of life". According to Doppelmayr and Molkenthin (2004), participants in an ultra have a decreased interest in the competitive aspect and give more value to life meaning. Irina also felt that it is parallel to life. "It's really some small life but compressed in 20/30 hours".

Holt et al. (2014) argue that the ultra is "a major life experience" which "may provide opportunities for growth" (p.30), but they do not compare it to a journey. The participants in this study were very persistent with their view that this "journey" left an impact, changed them, and gave them tools to handle life situations better. John admits that he learnt how to compartmentalise life to deal with problems. "You have your ups and downs. You have to break down your life into smaller pieces like work, family. So I think that trail running resembles life a lot". Tedeschi and Calhoun (2004) also agree that people use life experiences to grow.

Dario questioned the reasoning behind "what is essentially a futile endeavour". Jurek (2012), argues that there are times when running to the point of almost destroying oneself seems worthless, but then a simple a gesture like "an act of kindness" brings clarity and for that moment also brings understanding that actually "nothing is futile" and finishing the ultra is "the most meaningful thing in the world" (p.183). It is the same with life, we question our actions and sometimes our existence, but then, at times, through actions, or encounters, we find what we are looking for.

Limitations

The participants did not refer to the same race when speaking about their experiences, so comparisons within the same event were not possible. They had roughly the same ability, placing within the first 20% of the finishers, so the perceptions of back of the pack runners were not analysed.

Being an ultra trail mountain runner myself, and having participated in various big ultras, I tried to be as objective as possible when formulating the research question and choosing the literature involved. However, despite my objectivity, I was also biased, and the choices of the theories consulted, the type of questions posed during the interviews and the interpretation of data inevitably reflect my bias.

Conclusions

This research offered a valid insight into the lived experiences of ultra trail mountain runners. Although sometimes seen as heroes, their motivation stems from curiosity, the challenge of the endeavour and the need to test one's limits, rather than from seeking idolisation. They feel incredibly privileged and grateful for their physical capabilities which allow them to pursue their goals within a community built on the spirit of a pure sport.

Although they endure extreme hours of training per week, they feel that training is part of a journey where they are their own muse, constantly pushing their physical and mental limits to make it to the start of the race. The race itself is brutal, but it is through facing and overcoming pain, doubt and obstacles that they find their motivation and potential.

A salient finding was the dissociation of the body from the mind. Participants indicated that to be successful, they must use mental strength to force their body towards the finish line.

By using parallels, trail runners indicate that they are seeking meaning to the journey of life.

They also develop techniques to get them through the experience and feel that lessons learnt during training and the race itself will be of value in all aspects of life.

This research does not show that the participants were motivated by health reasons as revealed by past research (Hanson et al., 2015; Ferrer et al., 2015), but rather they were responding to an internal calling to test themselves and grow.

Suggestions for future research

The average age of the participants in this study is 36.3 years. Research shows that the average age of both genders in long ultras is between 45- 49 years (Romer et al., 2014). However, we find that there is a growing interest from young participants in trail races. This can be seen from the participation of youngsters in trail races specifically organised for them. During the UTMB race summit, we find the "Mini UTMB", a series of races organised for children from 3 to 13 years. (UTMB, n.d.). Research can identify the reasons why young people are seeking trail running from such a young age.

References

Acevedo, E. O., Dzewaltowski, D. A., Gill, D.L., and Noble, J.M. (1992). Cognitive Orientations of Ultramarathoners. *The sport psychologist*, 6(3), 242-252.

Allen-Collinson, J., & Owton, H. (2015). Intense Embodiment: Senses of Heat in Women's Running and Boxing. *Body & Society,* 21 (2), 245-268.

Arnould, E., & Price, L. (1993). River Magic: Extraordinary Experience and the Extended Service Encounter. *Journal of Consumer Research,* 20 (1), 24-45.

Askwith, R. (2004). *Feet in the clouds*. London: Aurum Press Ltd.

Belk, R.W., & Costa, J.A. (1998). The Mountain Man Myth: A Contemporary Consuming Fantasy. *Journal of consumer research,* 25(3), 218-240.

Boston marathon (n.d.). Available at www.baa.org/races/boston-marathon/results [Accessed 8th August 2018]

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology,* 3(2), 77-101.

Canniford, R., & Shankar, A. (2013). Purifying practices: how consumers assemble romantic experiences of nature. *Journal of Consumer Research,* 39(5), 1051-1069.

Carriker, C. R. (2017). Components of Fatigue: Mind and Body. *Journal of Strength and Conditioning Research,* 31(11), 3170–3176.

Ceylan, M. (2017). The Effect of Duration of Extreme Sports Involvement on the Perception of These Sports to be Extreme. *International Journal of Science and Research,* 6(12), 554-556.

Crust, L. (2007). Mental toughness in sport: A review. *International Journal of Sport and Exercise Psychology*, 5, 270-290.

Crust, L., Nesti, M., and Bond, K. (2010). Mental toughness and coping in an ultra endurance event. *Athletic Insight Journal* 2, (1) 35-54.

Culver, D. M., Gilbert, W. D. and Trudel, P. (2003). A Decade of Qualitative Research in Sport Psychology Journals: 1990-1999. *The Sport Psychologist*, 17, 1-15.

Csikszentmihalyi, M., & Hunter, J. (2003). Happiness in everyday life: The uses of experience sampling. *Journal of Happiness Studies* 4, 185-199.

Csikszentmihalyi, M. (1990). *The Psychology of Optimal Experience*. New York: Harper and Row.

Csikszentmihalyi, M., Latter. P., and Weinkauff Duranso, C. (2017). *Running flow*. Available at http:// https://lccn.loc.gov/2016049246 [Accessed 2 June 2018].

Doppelmayr, M., & Molkenthin, A. (2004). Motivation of participants in adventure ultramarathons compared to other foot races. *Biology of sport,* 21(4), 319-324.

Edensor, T. (2000). Walking in the British Countryside: Reflexivity, Embodied Practices and Ways to Escape. *Body & Society,* 6(3-4), 81-106.

Ferrer, D., Baumann, C.W., Brandenberger, K. J., and Ellis, R. (2015). Physical Motivation Influences Race Performance Over a 24-hour Ultra-Marathon. *International Journal of Sport Studies.* 5(10), 1162-1169.

Freund, W., Weber, F., Billich, C., Birklein, F., Breimhorst, M., and Schuetz, U. H. (2013). Ultra-marathon runners are different: Investigations into pain tolerance and personality traits of participants of the Trans Europe Foot Race 2009. *The psychology of ultra-marathon runners: A systematic review,* 13(7), 524–53.

Gustafsson, J. (2017). *Single case studies vs. multiple case studies: A comparative study*. Unpublished Dissertation. Sweden: Halmstad University.

Hanson, N. J., Madaras, L., Dickie, J., and Buckworth, J. (2015). Motivational differences between half, full and ultramarathoners. *Journal of Sport Behavior*, 38 (2), 180-191.

Herriott, R.E., & Firestone, W.A. (1983). Multisite qualitative policy research: Optimizing Description and Generalization. *Educational Researcher,* 12(2), 14-19.

Holt, N.L., Lee, H., Kim, Y., and Klein, K. (2014). Exploring Experiences of Running an Ultramarathon. *The Sport Psychologist,* 28(1), 22-35.

Houston, M., Dolan, S., and Martin, S. (2011). The impact of physical, nutritional, and mental preparation on triathlon performance. *The journal of sports medicine and physical fitness,* 51(4), 583-94.

Hirschman,E.C., & Holbrook, M.B., (Summer 1982). Hedonic Consumption: Emerging Concepts, Methods and Propositions. *Journal of Marketing,* 46(3), 92-101.

International Trail running association. (n.d.). Available at W [Accessed 8th August 2018]

Jackson, S. A., & Roberts, G. C. (1992). The rewarding effect of flow experience on performance in a marathon race. *Sport psychologist,* 6(2), 156-171.

Jones, G., Hanton, S., and Connaughton, D. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology*, 14, 205-218.

Jurek, S., & Friedman, S. (2012). *Eat and Run: My Unlikely Journey to Ultramarathon Greatness*. New york: Houghton Mifflin Harcourt.

Keinan, A., & Kivetz, R. (2011). Productivity Orientation and the Consumption of Collectable Experiences. *Journal of consumer research,* 37(6), 935-935.

Knechtle, B., & Nikolaidis, P. T. (2018). Physiology and Pathophysiology in Ultra-Marathon Running. *Frontiers in physiology,* 9, 634.

Knechtle, B., Knechtle, P., Andonie, J. L., and Kohler, G. (2009). Body Composition, Energy, and Fluid Turnover in a Five-Day Multistage Ultratriathlon: A Case Study. *Research in sports medicine,* 17(2), 95-111.

Krouse, R., Ransdell, L., Lucas, S., and Pritchard, M. (2011). Motivation, Goal Orientation, Coaching, and Training Habits of Women Ultrarunners. *Journal of Strength and Conditioning Research,* 25(10), 2835-2842.

Lavaredo ultra trail. (n.d.). Available at www.ultratrail.it/en/ [Accessed 8th August 2018]

Lane, A. M., & Wilson, M. (2011). Emotions and trait emotional intelligence among ultra-endurance runners. *Journal of Science and Medicine in Sport*, 14(4), 358-362.

Le Breton, D. (2000). Playing Symbolically with Death in Extreme Sports. *Body and Society,* 6(1), 1-11.

Lucas, S. J. E., Anson, J. G., Palmer, C. D., Hellemans, I. J., and Cotter, J. D. (2009). The impact of 100 hours of exercise and sleep deprivation on cognitive function and physical capacities. *Journal of Sports Sciences.* 27(7), 719–728.

Madeira Island Ultra trail (n.d.). Available at http://miutmadeira.com/pt/ [Accessed 8th August 2018].

Nicholls, A. R., & Polman, R. C. (2007). Coping in sport: A systematic review. *Journal of sport sciences,* 25, 11-31.

Plant, S., Cohen, S., and Taylor, L. (1979). Escape Attempts: The Theory and Practice of Resistance to Everyday Life. *Journal of consumer research,* 20(3), 416-416.

Powell, B. (2011). *Relentless forward progress*. New York: Breakaway Books.

Roebuck, G. S., Fitzgerald, P. B., Urquhart, D. M., Ng, S-K., Cicuttini, F., and Fitzgibbon, B. M. (2018). The psychology of ultra-marathon runners: A systematic review. *Psychology of Sport and Exercise,* 37, 43-58.

Romer, T., Rust, C. A., Zingg, M. A., and Rosemann, T. (2014). Age and ultra marathon performances - 50 -1000km distances from 1969 to 2012. *Springerplus,* 3, 693.

Schuller, J., & Brunner, S. (2009). The rewarding effect of flow experience on performance in a marathon race. *Psychology of Sport and Exercise,* 10(1), 168-179.

Scott, R., Cova, B., and Cayla, J. (2017). Selling Pain to the Saturated Self. *Journal of consumer research,* 44(1), 22–43.

Temesi, J., Arnal, P. J., Rupp,T., Fésson, L., Cartier, R., Gergelé, l., Verges, S., Martin, V., and Millet, G. Y. (2014). Are females more resistant to neuromuscular fatigue? *Medicine and science in sports and exercise.* 47(7), 1372-82.

Ultra trail du mont blanc (n.d.). Available at utmbmontblanc.com [Accessed 8th August 2018].

Ultra trail World tour series (n.d.). Available at www.ultratrail-worldtour.com [Accessed 8th August 2018].

Western states endurance race (n.d.). Available at www.wser.org [Accessed 8th August 2018].

Wolcott, H. (1994). *Transforming qualitative data*. London: Sage.

Yin, R. (2003). *Case study research: design and methods*. 2nd ed. London: Sage publications.

Bio-note

Nadia Portelli is Senior Lecturer at the University of Malta, Junior College. She has been teaching physics for the past 26 years. Nadia has participated in various Erasmus+ projects including "InterAct for Tolerance" and "Eating for Life" which saw the participation of various European countries. Nadia started running 27 years ago and participated in various road races both locally and abroad, including the London Marathon. Nadia's interest in ultra-trail running started four years ago when she participated in Gozo Ultra and placed first female. She participated in various ultra-trail mountain races, including the prestigious CCC (Courmayeur, Champex, Chamonix, 101km, 6100m elevation gain), Ultra Pirineu (110km, 6400m elevation gain), Madeira Ultra Trail (115km, 7100m elevation gain) and Lavaredo Ultra Trail (120km, 5800m elevation gain).

"This Neighbourhood is Killing Us!" The Impact of Neighbourhood Conditions on the Health and Wellbeing of People Living in Deprived Neighbourhoods in Malta

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Abstract

A number of studies emphasise that the place of residence determines the health and wellbeing of its inhabitants. Although it is well known that similar to wealth, health varies across countries, few realise that the health and wellbeing of individuals also vary across local neighbourhoods. This qualitative study explores how the health and wellbeing of families living in deprived neighbourhood conditions in Malta are being affected due to the neighbourhood conditions.

Participant parents and children narrate feelings of stigma experienced because of where they live and due to the physical conditions of their neighbourhood environment. Apart from the impact on the inhabitants' self-esteem, the dilapidated neighbourhood environment reduces the possibility of enjoying social interaction with resourceful persons. This creates feelings of inequality and social exclusion which constrain these inhabitants from involving themselves in educational and cultural activities and thus inhibiting their wellbeing and the future success of their children. Moreover living in deprived neighbourhoods also puts the respondents at risk of ill-health and obesity due to the lack of adequately maintained open spaces for physical activity.

Keywords: neighbourhood, inequality, wellbeing, Malta

Introduction

Over the past decades researchers in various countries have thoroughly investigated how much the neighbourhood environment where we live relates to our health and wellbeing. Several studies found that people living in deprived neighbourhood environments are most likely to suffer ill-health and lack of wellbeing (Kearns, 1993; Curtis, 2004; Cummins et al., 2007; Satariano and Curtis, 2018). This study explores the experiences of families living in deprived Maltese neighbourhoods and how this deprived context impacts on their health and wellbeing.

An important aspect that considers the idea of interaction between people and place is how and why *context* and *composition* are important for people's health and wellbeing. The area of residence may have significant influences on health and wellbeing, over and above the effects of individual characteristics (Macintyre et al., 1993; Jones and Moon, 1993; Curtis, 2010; Gattrell and Elliot, 2015). If we observe differences in health population between places, these could be because of differences in the kind of people who live in these places (compositional explanation) or because of differences between the places (a contextual explanation). Who you are explains a lot of geographical variation in health outcomes, however there is also an effect of where you are. The composition of a geographically defined population results from the extent to which people with similar socio-economic status or educational level tend to congregate within certain areas, either because they share a common culture or because they are attracted to the area due to lack of personal resources, money or other (Harvey, 1973; De Koninck and Pampalon, 2007). Contextual attributes of places are connected to various aspects of the environment which affect the health of whole groups, over and above the contribution of aggregate individual characteristics (Duncan et al., 1993; Macintyre and Ellaway, 2000; Macintyre et al., 2002). Smith and Easterlow (2005) explain that there has been a period of neo-conservatism where the variations of health were interpreted as being due to personal lifestyles or individual behaviours. This was followed by a perspective that assigns responsibilities to governments and collectives, placing emphasis on the material conditions of place rather than on the people and their subcultural explanations. The idea that context matters for individual health is not new and has its roots in traditional medicine (Cummins et al., 2007), based on the argument that there are contextual processes operating at the scale of whole communities or geographical areas which are important for health and health inequalities (Macintyre et al., 1993). A number of studies have demonstrated the importance of contextual effects in relation to a range of health outcomes, including self-reported health (Cummins et al., 2005), mortality (Waitzman and Smith, 1998; Yen and Kaplan, 1998) and morbidity (Shouls et al., 1996; DiezRoux et al., 1997; Sundquist et al., 1999), and to health behaviours, such as smoking (Duncan et al., 1999; Frohlich et al., 2002). However most of the time 'contextual' factors may be more 'distal' in their effects on the health determinants which in turn influence individual health determinants and thus indirectly influence health thus seeming more predictive of health inequality.

A related strand of literature argues that relative inequality in the wealth of the community can also determine health and wellbeing. Wilkinson and Pickett (2009) in their study of the 'spirit level', present evidence that several developed countries are above the absolute poverty threshold but are also countries with unequal societies and therefore the inhabitants of these types of countries suffer worse health conditions than those who live in more equal countries. This shows that good health is not determined according to wealth but according to the level of

equality. In unequal societies, the relative social status exerts a significant impact on health through feelings of inferiority, anxiety, shame, and worthlessness, which can all lead to ill-health (Wilkinson, 1996). The theory suggests that social status and social affiliations are related to psychosocial risk factors that affect health outcomes, especially in developed countries where the general standard of living is such that most people are not exposed to 'absolute' poverty and extreme material deprivation (Wilkinson, 1999; Wilkinson and Pickett, 2006).

It is argued that in developed countries, although the average health of populations may have improved, the health of materially deprived groups has either improved at a much slower rate or in some cases it has even worsened (Hanlon et al., 2006). This underlines how health inequality is defined as '*the differences found in various aspects of health between different groups in society*' (Blamey et al., 2002, p.5). Research in economically disadvantaged neighbourhoods has showed that there are various dimensions of socio-economic inequalities that are associated with health inequality and which contribute to vulnerability to health related problems such as: cardiovascular disease (Diez-Roux, 2001); asthma (Cagney and Browning, 2004); poor physical functioning (Feldman and Steptoe, 2004); tobacco consumption (Duncan et al., 1996); smoking initiation (Frohlich et al., 2002) and mortality risk (Martikainen et al., 2003; Wight et al., 2010). This work suggests that more deprived neighbourhoods are linked to worse ill-health outcomes (Twigg, 2014). Several researchers such as Wilson (1987), Furstenberg et al. (1999) and Judge et al. (2006), have demonstrated that social groups suffering from low levels of health are often clustered in certain localities and neighbourhoods which socially and geographically reinforce their isolation from resources. This argument suggests that inequality not only impinges on physical health and mortality but also on a range of inter-related socio-economic factors. Therefore poor health is related not only to material poverty (Ewles, 2005; WHO, 2008), but also to social class (Marmot and Brunner, 2005), education (Erikson, 2001; Suhrcke and de Paz Nieves, 2011), employment (Marmot and Wilkinson, 1999; Bartley et al., 2004), social networks (Putnam, 1995; Marmot and Wilkinson, 1999; Fowler and Christakis, 2008) and culture (Burch, 2008; WHO, 2009). The argument is that those who live in isolated and resource-deficient neighbourhoods for a long period of time are trapped by the accumulation of poverty and poverty associated behaviours across generations, creating an inter-generational transmission of poverty (Wilson, 1987).

Methodology

This study, through in-depth interviews, explores the lived experiences of families living in deprived neighbourhoods. The life stories of children and adolescents are included in this study as it was felt that their neighbourhood experience is important and valid as that of adults.

In order to address my research objectives, I have chosen three localities in Malta, identified by the national government as being mostly in need of the social services, as explained in the literature above showing that people who are suffering from poor health and lack of wellbeing are more concentrated in deprived areas (Congdon, 1996; Whitley et al., 1999; Curtis et al., 2000; Pampalon and Raymond, 2000; Martinez et al., 2003; Weich et al., 2003; Pampalon et al., 2008; Curtis et al., 2009). The residents living in these areas are more frequently dependent on social benefits when compared to inhabitants of other localities in Malta. Neighbourhoods deprived of economic and educational resources also tend to be deficient in health-promoting social resources.

A sample of ten families, comprising parents and their children, was chosen from each of the three study areas and the children in the family were between five and sixteen years. All the respondents are anonymised. Ethical approval was obtained from the University where the author was affiliated at the time of research. In order to recruit the sample, the author participated in local activities, so that trust could be gained. Permission for interviews was obtained from both the parents and the children, with written consent to conduct the interview. Due to the sensitivity of the topic, it was felt that the names of the neighbourhoods remain anonymous in order not to generate further stigma to the inhabitants of the neighbourhood thus protecting the identity of the informants. The narratives were transcribed, and an 'open coding' approach was used for the analysis of this study.

Analysis

In this study the neighbourhood environment is analysed in a dynamic manner and is highly dependent on the perception and experience of the respondents. The respondents of this study narrated a number of factors explaining why where they live may be putting their health and wellbeing at risk.

The participants first pointed out that they experience stigma since they reside in a deprived neighbourhood and that the perceptions of people living in other neighbourhoods are increasing their level of deprivation. Rodianne explains how this stigma on her neighbourhood community is generating feelings of inequality and is impacting negatively on her health and wellbeing and on that of her community. Rodianne explains that the media has contributed in giving a bad name to her locality as many times the media falsely reports that a person from her locality committed a crime. Yet in reality this person would not be from Rodianne's neighbourhood. Therefore according to Rodianne the media reports are shaming her neighbourhood. *When you tell people where you come from, you see them feeling astonished and taken aback. I am sure that many think that I might be a person of bad character. (Rodianne)*

Ruth further explains that the stigma on her neighbourhood locality is so great that it has affected her employability.

> *I applied with three cleaning companies and I am sure that two of them refused me because I live in this neighbourhood. Then I wrote my sister's address since she lives in another locality and they employed me immediately. It hurts because this means that people are chosen according to where they live and not according to who they really are! (Ruth)*

This therefore implies that people living in deprived neighbourhood communities are finding it more difficult to move out of poverty due to stigma. These feelings of inequality experienced by some of the residents are causing harm on their health and wellbeing.

Apart from the feelings of neighbourhood social stigma the respondents also explained feelings of low self-esteem due to the derelict neighbourhood environment. The physical features of the environment such as empty properties and graffiti have been known to relate to the prevalence of delinquency and vandalism. Several residents have commented on the fact that the walls of vacant dwellings are being abominably covered with graffiti. Monica commented that, '*Some corner buildings have really foul words written on them, some are written in large print…no one here seems to take the initiative to whitewash the wall. Having to read them every day is sickening.*' This too may have effects on the psychological health of the inhabitants. This points to the idea of the 'Broken windows' scenario where vandalism to property such as graffiti and broken windows create the idea that social incivility and disorders in the area is high and which results in a vicious cycle of spiralling degeneration (Kelling and Coles, 1996; Curtis, 2010). Moreover, Weich et al. (2002) link the number of graffiti in the neighbourhood with higher rates of depression and ill-health of the people living in the area.

Respondents in this study also complained about the lack of cleanliness they encounter in their neighbourhoods. Research states that those individuals who leave litter are more likely to do so in locations that are not well maintained and where litter has already been dropped (Cialdini et al., 1990, 1991; Keizer et al., 2008, 2013). Yet the respondents are more likely to find fault with the authorities rather than with fellow residents and in their narratives have accused the local council of never enforcing its cleanliness regulations against offenders. The residents' concern about this derelict image is also due to the fact that their locality is not reattracting people who are qualified and would help improve the image of their neighbourhood. Indeed, Pawlu explains '*Doctors, lawyers and professional people used to live here… but now everyone left. With this dilapidation who is attracted to live here? No one!*'

The dereliction in these deprived neighbourhoods is also impacting on the health and wellbeing of the adolescents and children. Jane's daughter explained that as

she attends a church school outside her neighbourhood and none of her friends are from her locality, she feels ashamed to ask her friends to visit her, not because her house is not up to standard but because her neighbourhood is dirty and neglected. This feeling was also expressed by Isaac, Luca and Shyesidin which clearly shows that the physical environment plays an important role on one's self-esteem.

> *I am afraid to tell my friends where I live because the pavements are dirty and broken, there is always a scent of rubbish and urine. I am afraid that the children would bully me when they see where I live! (Raisa)*

This matches with the findings of Fagg (2009) who stated that living in the most deprived Canadian neighbourhoods was significantly related to low self-esteem in boys. Moreover, the study of Haney (2007) found that the residents' perception of neighbourhood physical disorder is significantly related to self–esteem even more than the effect of living in poverty.

Apart from the adequate maintenance of the neighbourhood the teenage respondents from the deprived neighbourhoods are concerned about the lack of suitable open spaces where to meet friends and where to spend their free time. Moreover, since some of the streets are narrow and there is a lack of parking spaces, the few available open spaces are being taken up as parking lots.

Furthermore, Patricia compared their open public spaces with those of other towns and villages. They find that the latter have taken care to modernise and maintain their public spaces in good order while theirs are old, unsafe and drab.

> *In these playgrounds everything is broken, the swings are made of iron with scraped paint. How different other playgrounds are! Everything is made of plastic and they also have rubber mats so that the children cannot hurt themselves. There is space for them to run about. Here everything is old and shabby… there isn't even space where the children can run because it is so small! If there are ten children they have to queue up to go on a swing. That is why children end up fighting because it is so crowded! (Patricia)*

The parents and children are disappointed that the only public gardens available are not suitable for children because they are not allowed to play with a ball or ride a bicycle. Some respondents argued that the central government is more concerned with improving and embellishing touristic sites than seeing to the needs of the local citizens, especially children.

> *They have just restored and landscaped the garden nearby, yet we cannot take the children to play there. (Patricia)*

Jose argues,

> '*What do you expect me to do, a 13-year-old teenager, to play in a playground with two swings and a seesaw? There is nowhere to go*

> *around here for children of our age!... So we can only ride the bicycle*
> *in the streets. I've been hit twice by a car while doing so!*

Other research has highlighted unhealthy behaviours because of high levels of physical inactivity amongst disadvantaged socio-economic groups (Droomers et al., 2001; Giles-Corti and Donovan, 2002). These studies have explained that the socio-economic conditions of the neighbourhood influence physical activity amongst the residents. Similarly, Ruth explains that when her 14-year-old son was playing football in an alley nearby, he shattered a window pane and consequently sustained serious injuries with the result of losing the full function of his hand. This incident constrained Ruth to prevent her children from playing outside in the street again. She adds that due to the lack of public playgrounds, she had to buy a *Playstation* for her children so that they can spend their free time playing indoors and avoid the perils of the streets outside.

> *I had to spend quite a sum of money on the Playstation and I'm not*
> *happy about it because the children are becoming hyperactive, as they*
> *are not doing any physical exercise. (Ruth)*

The parents of these children are not only unhappy about their children's lack of physical exercise but are also concerned that their children are not benefiting from the effects that sports can have on the character formation of their children.

> *I know that sport is important as it helps in the healthy development of*
> *our children. I know that sports can help them avoid drugs and other*
> *addictions. (Tracey)*
> *As these youths have nowhere to go and play I am afraid that they*
> *start frequenting bars and lead disorderly lives. (Monica)*

Therefore the lack of adequate open spaces in these neighbourhoods may lead to a chain of negative circumstances which ultimately affect the health of children and youths. The inability to practise sports because of lack of availability of open spaces, is leading to inactive and undisciplined youths, who are more prone to anti-social behaviour.

Apart from the impact of the social and physical neighbourhood conditions it also emerged that the neighbourhood environment impacts on the educational success of the children and adolescents living in these deprived neighbourhoods. From the interviewees' life experiences, it transpired that the value of education in some deprived neighbourhoods is so low that many parents wait anxiously for the time when their children can leave school to start work and earn some money. This mind-set is greatly undervaluing education and the opportunities that children are offered when they attend school.

In her narrations Ruth exhibits the traditional type of mentality that a woman's place is in the home bearing and rearing children. Ruth expresses doubts about her

daughter's ability to reach O' level standards in her education. It is not due to lack of potential on the part of the daughter but due to the culture which perceives post-secondary education as irrelevant for girls.

> *We are not that type! We are not the type of people who sit for O levels and obtain certificates. It is impossible for us, it is even unthinkable. (Ruth, Charmaine's mother)*

This is lowering Ruth's daughter, Charmaine's self-esteem, and limiting her determination to reach her goals and succeed. However, Charmaine explains that she uses all her resilience to go against the current and strives hard to obtain good exam results. She states that it is only with the help of the school counsellor and the subject teachers that she can defy the norms. Such gatekeepers, who can help her and guide her in her educational attainment, are seen to be few in her neighbourhood.

> *You see what annoys me about my neighbourhood. They discourage you, they never motivate you to continue your studies. I have no one in my family or in my neighbourhood who can direct me. I cannot ask my sister to tell me about O levels because she never sat for any O' levels. (Charmaine)*

Young people, are experiencing a sense of helplessness and a lack of aspiration in life to the extend that Rose's son explains that he would feel guilty taking money from his mother to sit for the O' level exams when he assumes that he would not pass.

> *Taking money from my mother to pay for my O levels would be money down the drain. (Gilmor)*

Conclusion

Similar to other international studies it clearly emerged that place is a determinant of health for deprived Maltese families and that living in such neighbourhood environment is likely to put the inhabitants at risk of ill-health and lack of wellbeing. The place with its physical and social processes that occur in the deprived neighbourhoods under study can develop a reputation which can in turn create a cycle of inequality and continue to put the residents of the neighbourhood at risk of ill-health and wellbeing.

It emerged that children's present wellbeing is being harmed due to the ill-maintained neighbourhood environment which is causing social exclusion. This may also limit the prospect of future educational and social mobility and thus success in life. Furthermore, not having attractive places where to play and be active may be causing harm to the physical health and putting children and adolescents at risk of illicit behaviour.

Thus the neighbourhood environment within a Maltese context can impose risks, social exclusion, feelings of stigma, feelings of inequality, and psychological stress and anxiety due to a lack of adequate investment in the social and physical environment of the neighbourhood.

This paper sheds light on the fact that the neighbourhood environment is an important determinant of health and wellbeing for Maltese families. Therefore, this research study calls for attention that context and place should be given due attention to future studies focusing on health, deprivation and social inequalities. Indeed, health and place in Malta 'are inextricably inter-connected' (Bambra, 2012) and consequently neighbourhoods in Malta can either create opportunities and resources or constrain healthy living.

References

Bambra, C. (2012). Forward. In: S. Atkinson, S. Fuller, and J. Painter, (eds.) *Wellbeing and place*. Farnham, UK: Ashgate.

Bartley, M., Sacker, A. and Clarke, P. (2004). Employment status, employment conditions, and limiting illness: prospective evidence from the British household panel survey 1991- 2001. *Journal of Epidemiology and Community Health,* 58, 501-506.

Blamey, A., Hanlon, P., Judge, K. and Muirie, J. (eds.) (2002). *Health Inequalities in the New Scotland*. Glasgow: Public Health Institute of Scotland.

Burch, S. (2008). Cultural and Anthropological Studies. In: J. Naidoo, and J. Wills (eds.) (2008) *Health Studies – an introduction* (2nd ed.). Palgrave Macmillan.

Cagney, K.A. and Browning, C.R. (2004). Exploring neighborhood-level variation in asthma and other respiratory diseases: the contribution of neighborhood social context. *Journal of General Internal Medicine*, 19 (3), 229-236.

Cialdini, R. B., Kallgren, C. A. and Reno, R. R. (1991). A focus theory of normative conduct: a theoretical refinement and re-evaluation of the role of norms in human behaviour. *Advances in Experimental Social Psychology*, 12, 105-109.

Congdon, P. (1996). Suicide and parasuicide in London: a small-area study. *Urban Studies*, 33, 137–158.

Cummins, S., Curtis, S., Diez-Roux, A. V. and Macintyre, S. (2007). Understanding and representing 'place' in health research: A relational approach. *Social Science and Medicine*, 65(9), 1825-1838.

Cummins, S., Stafford, M., Macintyre, S., Marmot, M. and Ellaway, A. (2005). Neighbourhood environment and its association with self-rated health: evidence from Scotland and England. *Journal of Epidemiology and Community health*, 59, 207-213.

Curtis, S. (2004). *Health and Inequality: Geographical Perspectives*. Thousand Oaks, CA: Sage.

Curtis, S. (2010). *Space, Place and Mental Health*. Ashgate, Farnham, UK.

Curtis, S. and Riva, M. (2009). Complexity and geographies of health care systems and policy. *Progress in Human Geography,* 34 (4) 513-520.

Curtis. S, Gesler, W., Smith, G. and Washburn, S. (2000). Approaches to sampling and case selection in qualitative research: examples in the geography of health. *Social Science and Medicine*, 50, 1001-14.

De Koninck, M. and Pampalon, R. (2007). Living Environments and Health at the Local Level: The Case of Three Localities in the Québec City Region. *Canadian Journal of Public Health*, 98, 45-53.

Diez-Roux, A. (2001). Investigating neighborhood and area effects on health. *American Journal of Public Health*, 91, 1783–1789.

Diez-Roux, A.V., Nieto, F.J., Muntaner, C., Tyroler, H.A., Comstock, G.W., Shahar, E., Cooper, L.S., Watson, R.L. and Szklo, M. (1997). Neighborhood environments and coronary heart disease: a multilevel analysis. *American Journal of Epidemiology*, 146, 48-63.

Droomers, M., Schrijvers, C.T.M. and Mackenbach, J. P. (2001). Educational level and decreases in leisure time physical activity: Predictors from the longitudinal GLOBE study. *Journal of Epidemiology and Community Health,* 55 (8), 562-568.

Duncan, C., Jones, K. and Moon, G. (1993). Do places matter – a multilevel analysis of regional variations in health-related behaviour in Britain? *Social Science & Medicine*, 37 (6), 725–733.

Duncan, C., Jones, K. and Moon, G. (1996). Health related behavioring context: a multilevel modelling approach. *Social Science and Medicine,* 42 (6), 817–30.

Duncan, C., Jones, K. and Moon, G. (1999). Smoking and deprivation: are there neighbourhood effects? *Social Science and Medicine*, 48, 497-505.

Erikson, R. (2001). Why do Graduates Live Longer? In: J.O. Jonsson, and C. Mills (eds.), *Cradle to grave: Life-course change in modern Sweden*. Durham: Sociology Press.

Ewles, L. (2005). *Key Topics in Public Health Promotion*. London: Elsevier Churchill Livingstone.

Fagg, J. (2009). *Transitions of self-esteem and neighbourhood deprivation, findings from the British Household Panel Study*. PhD. Department of Geography, Queen Mary, University of London.

Feldman, P.J. and Steptoe, A. (2004). How neighborhoods and physical functioning are related: the roles of neighborhood socioeconomic status, perceived neighborhood strain, and individual health risk factors. *Annals of Behavioral Medicine*, 27, 91-99.

Fowler, J.H. and Christakis, N. A., (2008). Estimating peer effects on health in Social networks: A response to Cohen-Cole and Fletcher; and Trogdon, Nonnemaker, and Pais. *Journal of Health Economics*, 27, 1400-1405.

Frohlich, K. L., Potvin, L., Chabot, P. and Corin, E. (2002). A theoretical and empirical analysis of context: neigbourhoods, smoking and youth. *Social Science and Medicine*, 54, 1401-17.

Furstenberg, F.F., Cook, T.D., Eccles, J., Elder, G.H. and Sameroff, A. (1999). *Managing to make it: Urban families and adolescent success*. Chicago: University of Chicago Press.

Gattrel, A. and Elliot, S. (2015). *Geographies of health: an introduction* (3rd ed.). NYSE: John Wiley.

Giles-Corti, B. and Donovan, R.J., (2002). The relative influence of individual, social and physical environment determinants of physical activity. *Social Science and Medicine,* 54, 1793-1812.

Haney T.J. (2007). Broken Windows and Self-Esteem: subjective understandings of neighbourhood Poverty and Disorder. *Social Science Research*, 36 (3), 968-994.

Hanlon, P., Walsh, D. and Whyte, B. (2006). *Let Glasgow Flourish*. Glasgow: Glasgow Centre for Population Health.

Harvey, D. (1973). *Social Justice and the City*. London: Edward Arnold.

Jones, K. and Moon, G. (1993). Medical geography: taking space seriously. *Progress in Human Geography*, 17, 515-24.

Judge, K., Platt, S., Costongs, C. and Jurczak, K. (2006). *Health Inequalities: A challenge for Europe*. London: Department of Health.

Kearns, R., (1993). Place and Health: towards a reformed medical geography. *The Professional Geographer*, 45, 139-147.

Keizer, K., Lindenberg, S. and Steg, L. (2008). The spreading of disorder. *Science*, 332, 1681-1685.

Keizer, K., Lindenberg, S. and Steg, L. (2013). The importance of demonstratively restoring order. *Plus One*, 8 (6), 65137.

Kelling, G. and Coles, C. (1996). *Fixing broken windows: Restoring order and reducing crime in our communities*. New York: Free Press.

Macintyre, S. and Ellaway, A. (2000). Ecological approaches: Rediscovering the role of the physical and social environment. In L. Berkman, and I. Kawachi (eds.), *Social epidemiology* Oxford: Oxford University Press, 332–348.

Macintyre, S., Ellaway, A. and Cummins, S. (2002). Place effects on health: How can we conceptualise, operationalise and measure them? *Social Science and Medicine*, 55 (1), 125-139.

Macintyre, S., Maciver, S. and Soomans, A. (1993). Area, class and health: Should we be focusing in places or people. *Journal of Social Policy*, 22 (2), 213-234.

Marmot, M. and Brunner, E. (2005). Cohort profile: The Whitehall II study. *International Journal of Epidemiology*, 34, 251-56.

Marmot, M. and Wilkinson, R. (1999). *Social Determinants of Health.* Oxford: Oxford University Press.

Martikainen, P., Kauppinen, T.M. and Valkonen, T. (2003). Effects of the characteristics of neighbourhoods and the characteristics of people on cause specific mortality: a register based follow up study of 252,000 men. *Journal of Epidemiology and Community Health,* 57, 210-217.

Pampalon, R. and Raymond, G. (2000). A deprivation index for health and welfare planning in Quebec. *Chronic Diseases in Canada*, 21 (3), 104-113.

Pampalon, R., Hamel, D. and Gamache, P. (2008). Recent changes in the geography of social disparities in premature mortality in Quebec. *Social Science and Medicine*, 67, 1269-1281.

Putnam, R.D. (1995). Tuning in, Tuning out - the Strange Disappearance of Social Capital in America. *Political Science and Politics*, 28 (4), 664-683.

Satariano, B. and Curtis, S.E. (2018) The experience of Social Determinants of Health within a Southern European Maltese culture. *Health and Place*, 51C 45-51.

Shouls, S., Congdon, P. and Curtis, S. (1996). Modelling inequality in reported long term illness in the UK: combining individual and area characteristics. *Journal of Epidemiol Community Health*, 50, 366-76.

Smith, S.J. and Easterlow, D. (2005). The strange geography of health inequalities. *Transactions of the Institute of British Geographers*, 30, pp.173-190.

Suhrcke, M. and de Paz Nieves, C. (2011). *The impact of health and health behaviours on educational outcomes in high income countries: a review of evidence*. Copenhagen: WHO Regional Office for Europe.

Sundquist, J., Malmstrom, M. and Johansson, S.E. (1999). Neighborhood environment and self-reported health status: a multilevel analysis. *American Journal of Public Health*, 89, 1181-1186.

Twigg, L. (2014). Geographies of space, place and population health. In *The Wiley Blackwell encyclopaedia of health, illness, behaviour, and society.* Cockerham, W. C., Dingwall, R. and Quah, S. R. (eds.). Chichester: Wiley-Blackwell Publishing Ltd.

Waitzman, N. and Smith, K. (1998). Phantom of the area: Poverty-area residence and mortality in the United States. *American Journal of Public Health*, 88, 973-976.

Weich, S., Blanchard, M., Prince, M., Burton, E., Erens, B. and Sproston, K. (2002). Mental health and the built environment: Cross-sectional survey of individual and contextual risk factors for depression. *British Journal of Psychiatry*, 180, 428–433.

Weich, S., Twigg, L., Holt, G., Lewis, G. and Jones, K. (2003). Contextual risk factors for the common mental disorders in Britain: a multilevel investigation of the effects of place. *Journal of Epidemiology Community Health*, 57, 616-621.

Whitley, E., Gunnell, D., Dorling, D. and Smith, G. (1999). Ecological fragmentation, poverty and suicide. *British Medical Journal*, 319, 1034–1037.

Wight, R.G., Cummings, J.R., Karlamangla, A.S. and Aneshensel, C.S. (2010). Urban neighborhood context and mortality in late life. *Journal of Aging and Health*, 22, 197-218.

Wilkinson, R. (1996). *Unhealthy Societies: The Afflictions of Inequality*. London: Routledge.

Wilkinson, R. and Pickett, K. (2009). *The spirit level. Why more equal societies almost always do better*. London, UK: Penguin Books.

Wilkinson, R.G. (1999). Income inequalities, social cohesion and health: clarifying the theory. *International Journal of Health Services*, 29, 525–543.

Wilkinson, R.G. and Pickett, K.E. (2006). Income inequality and population health: a review and explanation of the evidence. *Social Science & Medicine,* 62 (7), 1768–1784.

Wilson, W.J. (1987). *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago: University of Chicago Press.

World Health Organization (2008). *The World Health Report 2008: Primary Health Care- Now More Than Ever*. Geneva: WHO.

World Health Organization (2009). *Health Impact Assessment: Determinants of Health*.

Yen, I. and Kaplan, G. (1998). Poverty are residence and changes in Physical activity level. *American Journal of Public Health*, 88,709-1712.

Bio-note

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Kif għelibt il-ħondoq kulturali bejn tliet ilsna fit-traduzzjoni tiegħi tar-rumanz ta' Charlotte Link *Der Beobachter/In-Nemmies*
Breaking Barriers through Translation

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Abstract

In my short presentation, I shall focus on some of the problems encountered by the translator when translating from one language (German – an Indo-Germanic language) into another (Maltese – Semitic /Romance) particularly, in the case of In-Nemmies, which is set in an English setting (English – Anglo-Saxon, German and English long lost siblings). By means of practical examples I shall show some of the methods I adopted to overcome these problems whilst remaining as close as possible to the original text whilst using as many Maltese words as possible. However, sometimes I had either to resort to using English words, particularly those which have been accepted in everyday usage or to coin new words or paraphrase the original word or phrase.

Keywords: Translation problems, Indo-germanic/semitic, romance, *in-Nemmies*, methods of translation.

Fl-ewwel parti tal-preżentazzjoni tiegħi, nibda bil-kelma Ġermaniża għal traduzzjoni i.e űbersetzen li għandha żewġ tifsiriet skont fejn wieħed jitfa' l-aċċent 1) tieħu nies jew oġġetti minn post għal ieħor (aċċent fuq űber) u 2) taqleb minn ilsien għal ieħor (aċċent fuq setzen). Dawn iż-żewġ tifsiriet, barra li huma marbutin ma' xulxin, imorru tajjeb ħafna ukoll mat-tema tal-konferenza 'Breaking Barriers' fis-sens ta' 'breaking barriers through translation' jew kif wieħed jegħleb il-ħondoq kulturali bejn tliet ilsna (Ġermaniż/Ingliż/Malti) meta jkun qed jaqleb minn ilsien għal ieħor.

Dan jien għamiltu fl-aħħar traduzzjoni tiegħi tar-rumanz polizjesk 'Der Beobachter'/*In-Nemmies* tal-awtriċi internazzjonalment magħrufa Charlotte Link li twieldet Frankfurt u wara karriera brillanti bħala avukatessa, bdiet tikteb rumanzi polizjeski kif ukoll dwar il-ħajja kontemporanja li għamluha magħrufa mad-dinja kollha.

Ir-rumanz miktub bil-Ġermaniz imma Charlotte Link ambjentatu bħal ħafna mill-kotba l-oħra tagħha, l-Ingilterra, u b'hekk ħolqitli problema oħra biex insib kliem ta' kulturi oħra li fil-Malti m'għandnix u biex negħleb il-ħondoq lessikali u kulturali li

jifred dawn it-tliet ilsna magħżulin għal kollox minn xulxin (indo-germanic, anglo-saxon, semitic/romance).

Fejn stajt, użajt il-kelma bil-Malti, drabi oħra il-kelma bl-Ingliż, l-aktar jekk din tkun daħlet u ġiet aċċettata f'ilsienna, drabi oħra kelli jew noħloq kelma ġdida jew nipparafrażizza. Dan kollu spjegajtu f'nota tat-traduttur li hemm fil-bidu tar-rumanz u wrejtu permezz ta' xi eżempji waqt il-preżentazzjoni.

Bio-note

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Living Three Worlds: Individual Experience and Social Reality in the Contemporary Era

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Abstract

Aboriginal inhabitants on remote lands may only know a commonsensical world just as all human ancestors who lived a long time ago in primitive societies. Faithful believers may only care about their religious world just as most Christians who struggled with spirituality during the Middle Ages. Dedicated scientists may only perceive and produce things in the world of science as if nothing could ever meaningfully exist besides it. However, the majority of contemporaries who grow up with probably a dotted exposure to religious service and likely systematic access to scientific education tend to approach reality, frame experience, and organize life with input from and output to a multitude of sources. This chapter points to the fact that people in the contemporary era live in a general world of reality with connections to commonsense, religion, and science. Compared to commonsense, the general world incorporates not only religious elements for non-earthly meanings but also scientific forces with productive outcomes. In contrast to religion, it exhibits both the practicality of commonsense and the rationality of science. With regard to science, it shows a direct involvement in commonsensical experience as well as a simple commitment to religious transcendence.

Aboriginal inhabitants on remote lands may only know a commonsensical world just as all human ancestors who lived a long time ago in primitive societies. Faithful believers may only care about their religious world just as most Christians and Muslims who struggled with spirituality during the Middle Ages. Dedicated scientists may only perceive, entertain, and produce things and events in the world of science as if nothing could ever meaningfully exist besides or beyond it. However, the majority of contemporaries who grow up with probably a dotted exposure to religious service and likely systematic access to scientific education through family, school, and the mass media tend to approach reality, frame experience, and organize life with input from and output to a multitude of sources, especially the world of commonsense, the world of religion, and the world of science (Heschel 1967; Odum 1971; McGinn 1990; Weber 1991; Durkheim 1995; Childress 2000; Merton 2002;

Rosenberg 2002; Ligotti & Brassier 2010; McDowell & Morrow 2010; Mirola et al. 2011; Watts 2011; Bijker et al. 2012; Roberts & Yamane 2012; Rifkin 2014; Harari 2015; Shaw 2015; Stolorow 2015; Christiano et al. 2016; Easton 2016; Johnstone 2016; Mirola & Monahan 2016; Nye 2016; Wahl 2016; Melich 2017; Newman 2017).

Image

With knowledge about and access to all three worlds, from commonsense to religion to science, people in the contemporary era can hold a comprehensive view of reality and may take a systematic approach to the environment in which they live.

The physical world is not simply what we sense by seeing, hearing, touching, smelling, and tasting. There are original objects and their natural configurations, normal processes, and actual effects on the humans and human senses to be described and explained by science through research. For example, a black stone is seen falling off a cliff. Falling is caused by the gravity of the stone. Like any object sitting on the face of a round-shaped planet, the stone automatically pulls toward the centre of the Earth by its weight. The stone appears in colour when it emits composite lights from its surface. In composition, the stone may break down into chemical elements such as Iron and Silicon as well as chemical compounds including various metal and nonmetal oxides. Moreover, there are meanings, purposes, and spirits to be found, felt, and understood about things and their ups and downs, gains and losses, births and deaths in the world of commonsense. For instance, hot springs from a local mountain are said to have healing effects on certain diseases. It is not enough just to pinpoint in science what is contained in the springs and how the spring water acts on the body and its biochemical process. It often takes faith and all the awe, care, or fear associated with faith to achieve a full effect in treatment. It is beyond scientific calculation as to how much more powerful the hot springs would work on devout believers as a blessing from God with a divine message than a mixture of materials with some healing effects.

Similarly, social reality is not just what we experience and witness in everyday life. An individual rises to wealth, power, or fame in the secular world of commonsense. Science can follow his or her path to identify and analyse all personal and social factors and forces that lie beneath his or her success. Religion may declare that the individual has won blessings from God for his or her fortunes. Just as scientific explanations cannot be logically exhaustive in accounting for individual success or failure, religious proclamations may never be convincingly exclusive in ruling out all mundane endeavours for personal loss or gain. A regular person in his or her commonsense would cautiously keep his or her awe for God or any God-like force while doing all he or she could in chartering his or her personal journey step by step throughout life. A society falls into poverty, chaos, or ruins as part of commonsensical reality. Scientists can find a spectrum of causes from culture, economy, and

government to social dynamics and point out how they converge to lead to the society's decline or demise. Priests may blame infidelity or atheism across the population or condemn a Satan-like leader and his various evil acts for the society's moral decay and structural breakdowns. While neither scientists nor priests could be completely correct and valid in their explanations or condemnations, a normal collective or a typical society in commonsensical reality would reflect on history, learn from past stories of failure and success, avoid blasphemy, irreverence, and sacrilege, keep peace with surroundings, do what is good, effective, and efficient, and work on what is lacking, inadequate, or improper toward unity, stability, and prosperity.

Indeed, commonsense, religion, and science coexist with mutual penetration and joint interaction through individual effort as well as societal integration. Commonsense takes meaning and purpose with religion as the latter secures base and life via the former. Religion becomes logical and plausible through science while the latter turns spiritual and metaphysical by way of the former. Science gains application and demonstrates utility in commonsense whereas the latter achieves understandability and attains transformation with the aid of the former. Of course, all these interactions among commonsense, religion, and science occur when individuals think across and act upon their three such worlds in social settings or as societies appeal to religion and resort to science to achieve structural integration, material affluence, and temporal maintainability in the world of commonsense.

Element

What issues does a typical contemporary have to wrestle with in his or her everyday life? At the outset, there are body, mind, their divisions, and respective needs. On the part of the body, matters range from sensuality, pain, pleasure, and sustainability to liveability. With regard to the mind, concerns can go spiritual over belief, norm, value, and morality or become intellectual alongside logic, knowledge, intelligence, and rationality.

Physically, contemporaries must face their commonsensical world for a living. Life goes from day to day. Resources, opportunities, or means of survival matter. With an adequate supply of material goods, individuals live in sufficiency, affluence, or happiness. The body operates with comfort, joy, and pleasure. Without basic subsistence, however, the body endures hunger, exposure, or pain. Individuals suffer from poverty, illness, and danger. It is therefore important that people embrace their commonsensical world, mobilising resources, utilizing opportunities, transforming material environments, creating amenities, and producing means of sustenance. Among people and groups, it is also critical that surplus is kept in check, competition is put in perspective, and the market is maintained as a fair and open place for trade and exchange. With no doubt, the quality of life differs so dramatically from

individual to individual and from population to population largely due to human abuse, exploitation, and manipulation against one another.

On spiritual dimension, contemporaries have to deal with what is right and wrong, what is good and bad, what is beautiful and ugly, what is friendly and hostile, what is holy and secular, and various other contrasts in everyday life. They desire kindness, beauty, and comfort. They long for morality, peace, and happiness. They strive for the good, the right, and the spiritual. However, when they face discrimination and mistreatment, they could only hope for justice. When they suffer in pain or poverty, they would still wish fortune. They might candidly pray for forgiveness when they have committed the wrong or have fallen in disgrace. Obviously, contemporaries face the issue of belief whether they believe in God, a supernatural force, science, reality, themselves, or something else. They have to act on the matter of value as to what is good, pretty, important, or significant among things they do and with fellow human beings they come in touch. They also need to grapple with the problem of norm so that they can meaningfully perceive themselves as well as all others as deviants, criminals, or law-abiding ordinaries.

Intellectually, most contemporaries follow a standard socialization process that includes family influence, schooling, peer interaction, and media exposure when they grow up from infancy to childhood to adolescence to adulthood. Family influence can be commonsensical, religious, scientific, or a combination thereof, depending upon parents and their educational, religious, and occupational backgrounds. Schooling primarily features scientific knowledge even though it may carry a religious, communal, or commonsensical flavour. Peer interaction takes place saliently in the commonsensical world. Children reared in the countryside tend to develop awe for and adaptation to events, forces, and their reappearances in nature whereas youths matured in the city are likely to form sensation and alignment with structures, processes, and their changes in manmade environments. Finally, the media revolve around the dominant knowledge enterprise as well as the prevailing value system. In the contemporary era, both become a mixed affair of logic, science, technology, reason, rationality, instrumentality, practicality, profitability, productivity, liveability, effectiveness, efficiency, and sustainability.

Stage

The world unfolds and unravels with different forms, contents, and outlooks in their eyes and experiences as contemporaries traverse the course of life through its main stages.

Infants and children explore the world of commonsense with curiosity. They see, hear, smell, touch, and taste things, learning what is white versus black, what is music versus noise, what is fragrance versus stink, what is soft versus hard, and what is sweet versus bitter. They practice trial and error. They ask questions: Why

does the Sun become scorching hot in the summer? Where does the Moon hide during the day? Can water flow from low to high places? May I fly like a bird? How can fish swim all day in the water? As they look for answers and fill their minds with commonsensical knowledge, children may develop a fear for nature, a superstition toward existence, and a caution with reality. Upon introduction by parents or other caretakers, they may progress into religion, following God or a godly entity to find some solutions or come up with certain resolutions in their life. The stage of religiosity can be atheism or egoism as long as an individual subject becomes capable of managing all his or her inner concerns and outer issues without resort to an external force.

Teenagers and youths experiment with the world of science through efforts in school or standard education. They take classes, learning how to read for outer information, how to speak for inner experiences, and how to write for self-creations. They observe models, replicas, and simulations, getting to know why day alternates with night out of relative movements among the Sun, the Earth, and the Moon, why colour changes from white to black with differential combinations of red, orange, yellow, green, blue, and violet, and why weather appears in the form of wind, snow, rain, thunder, or heatwave due to a plethora of forces such as the distance of the Sun, the surface of the Earth, temperature, pressure, and the changing states of water from solid to liquid to gas. They perform laboratory experiments, create chemical reactions, and make mechanical devices, demonstrating what governs as universal laws, what prevails as ultimate truths, and what sustains as general patterns. While they focus on facts, follow reasons, and aim at results, they also grow and become habituated to see the importance of commonsense as the fundamental framework of everyday life and understand the relevance of religion or religiosity as an essential element in the minds of many individuals with regard to the meaning of this life as well the nature of an afterlife.

Adults and seniors live in a general world of reality with information, inspirations, and mandates from all three worlds, the world of commonsense in which they are born, the world of religion by which they are cultured, and the world of science with which they are educated. Sensing and observations turn multidimensional. The Sun is not just a moving fireball in the sky that lights and warms us who live on the flat ground. It is not just a star sitting at the centre of the solar system. It is not just a sacred symbol of God. It is all three: Commonsense shows where the Sun is, religion dictates what the Sun means, and science explains why and how the Sun behaves phenomenally in nature and improvises spiritually out of human fear and imagination. Coping and experiences become layered and all-way functional. In commonsense, water flows in creeks and rivers, gathers in lakes and oceans, and quenches thirsts and fires. In religion, water symbolizes blessing, extends miraculous healing in the form of a spring, or represents the power of destruction by way of a flood. In science, water comes into being when hydrogen burns with oxygen, life multiplies when water combines with carbon to form a great variety of

carbon hydrates, and energy flows when water strikes the turbine of a generator in a hydroelectric powerhouse. Indeed, most contemporaries in their adulthood are capable of availing themselves of the information and knowledge they have about all three worlds to find effective means, essential meaning, and vivid experience in their journey of life.

The human civilisation seems to follow a similar stage from the commonsensical to religious to scientific to general. In the beginning, people in primitive societies live at the mercy of nature, gaining a complete exposure to all polarities of a harsh environment in their commonsensical world. Tough reality keeps people in awe and fear of everything that comes in their everyday encounters. They conjure up supernatural forces for protection and miracle. They dream of God for guidance and salvation. Religion then arrives in the scene, granting people a retreat where they remember and forget, hope and regret, express and purify, act and moderate in the face of inner ambivalence and outer challenge amid daily survivals. After a long period of struggle in darkness such as the Middle Ages in Europe, people wake up with a realization of their own intelligence and intellectual faculty. They begin to focus on facts to find the order of this world. They start to follow reasons to uncover the rationality of the current existence. The torch of science lights up, allowing people to see the working mechanism of many different things in the universe. Most important, people are enabled to find better means of living with findings from science. Since history is additive and whatever has occurred remains on record for reference and re-enactment, a minority of contemporaries can delve into any one-dimensional world to live a life featuring just commonsensical simplicity, only devout religiosity, or merely technological complexity. The majority of contemporaries, however, seem to be capable of drawing upon all three sources of influence to live a general life toward a combination of commonsensical happiness, spiritual meaningfulness, and scientific effectiveness.

Connection

The general world that most contemporaries can now take for granted builds upon commonsense, religion, and science. It remains connected to, accessible by, and analysable through each of these three worlds.

Compared to commonsense, the general world has incorporated not only religious elements for non-earthly meanings but also scientific forces with productive outcomes. Things are not just what we know through sensing and senses. They have purposes, carry wills, and signify the order an almighty entity or power designs and desires for the world. For example, an age-old tree can be deified to represent God or a godly force. People worship it for blessing, fortune, miracle, or protection. On the other hand, people can follow scientific principles and technical procedures to find out what the tree is, how old it becomes, why it has survived years of weather

to still stand firm and strong. For its rarity or significance, scientific researchers may take actions to protect it with labels, fences, or guarding devices deployed around the tree just as religious believers would do to sanctify it as an object of prayer. Through positivistic inquiry and analysis, people study things for their applied practical utilities as well as their basic scientific values. In general, they attempt to augment pure knowledge about as well as to increase predictive control over nature.

In contrast to religion, the general world exhibits both the practicality of commonsense and the rationality of science. Before any contemplation of the meaning of life, contemporaries know and understand that they must create physical amenities and improve material conditions to make life affordable, liveable, convenient, comfortable, and happy by their sensing and sensible needs. In creating amenities for life, they can follow science and technology as how to deploy labour, draw upon resources, seek opportunities, and manage processes for an optimal level of effectiveness, success, and efficiency. For instance, people in the contemporary era would not bother much to pray to God for the blessing of water or seek God's approval in their endeavour to save, use, reserve, or recycle water when they face a drought. Instead, they would turn directly to science and technology to make rains, build reservoirs or irrigation networks, or adopt more efficient water use policies. To a large extent, contemporaries can focus more on their immediate everyday needs and have them sensibly met through scientific discoveries and technological inventions with or without serious concerns over God, a supernatural force, the other world, and issues of damnation and salvation in religion.

With regard to science, the general world shows a direct involvement in commonsensical experience as well as a simple commitment to religious transcendence. Whether they know or are able to find out something beneath its phenomenal displays in commonsense, contemporaries recognise that sensing and sensible experiences are real, instant, and important, and from place to place can be quickly taken care of only through tools and mechanisms obvious and immediate in the world of commonsense. For example, someone has to jump into the water, without any thought and delay, to save a drowning child before people follow Archimedes of Syracuse and his principle (Any object, wholly or partially immersed in a fluid, is buoyed up by a force equal to the weight of the fluid displaced by the object) to figure out how to increase the amount of the water displaced by the drowning child for a greater buoyance to keep him or her afloat and alive. Similarly, whether they understand or are capable of discerning anything in the aftermath of a religious fervor or fanaticism, contemporaries realize that feeling and sensational outputs are tangible, constant, and critical, and from time to time can be promptly managed only through ways and means accessible and approachable from the world of religion. For instance, construction fails to move forward, marriage ceases to materialize, and people remain in fear and anxiety if some religious ceremonies are not properly performed, if some superstitious rituals are not piously conducted, or if some traditional taboos are not sincerely observed. It does not matter if Karl Marx

critically declares that religion is the opium of the people, if W. I. Thomas intuitively says that if men define situations as real, they are real in their consequences, or if social scientists analytically reason that religion reigns and superstitious practices prevail only in a time when people live helplessly in a society with a low productive force.

In all, contemporaries live in a general world of reality with open connections to commonsense, religion, and science. They have choices to delve into one, combine two, or integrate all three worlds for a living journey of particular dimensionality, intensity, or meaningfulness or a life course of universal dynamics, vividness, and richness.

Metaphysics

Thinking metaphysically is part of the mindset for contemporaries. Going above and beyond physics is what contemporaries do in managing their commonsensical experiences, how they behave in channelling their religious sentiments, and why they act inquisitively yet innocently in satisfying their scientific curiosity.

Living in the world of commonsense, contemporaries make free and easy reference to general metaphysical dimensions in their mental sphere when they deal with things in specific physical outlooks and settings. From a scientific point of view, they can pinpoint the metaphysical truism of a physical object or phenomenon. In religious terms, they may uncover the metaphysical meaning of a physical deed or observance. For example, a man falls off a cliff into his death. Surrounding this simple event in the physical world of commonsense, people in the contemporary era can feel natural and reasonable to say that the man inevitably followed the law of gravity once he accidentally lost his balance of weight at the edge of the cliff. People may also take some degree of sorrow and relief in claiming that the man has made his ultimate sacrifice after years of defiance, disobedience, or rebellion with regard to nature, law, morality, a supernatural force, or a godly will.

Mesmerising in the world of religion, believers in contemporary society may seek metaphysical validations of their faith from ideas, objects, and practices to deeds. With knowledge about science and scientific reasoning, they may go above spiritual doctrines and teachings to find the background of a story, the logic of an argument, the rationality of a claim, the practicality of a lifestyle, and the possibility of a prediction. They may also move beyond practising settings and objects to figure out how geological sites, architectural designs, building materials, and other physical elements converge to show the sanctity of a church, mosque, or temple, what makes a preaching by a well-known figure in a mass so particularly touching, and why one thing is combined with another in a ceremony. As far as commonsense is concerned, authentication of a word, confirmation of a deed, or verification of a claim may sound just metaphysical in sensual and sensible experiences. For instance,

a couple giving birth to a child after years of effort as a physical incidence in the world of commonsense can feel like a miracle, a metaphysical phenomenon, when believers take it as a blessing from God or the validation of teaching by the church that faith, honesty, loyalty, sincerity, and praying can move our Father, bringing about forgiveness and fortune.

Navigating through the world of science, analysts, logicians, researchers, and scholars need to go back to their sensing and experiential world to be a normal human being with regular participation in everyday life. Living in the physical reality of commonsense may hence feel like metaphysical retreat and relief from or supernatural recreation and rejuvenation for continuing expeditions in the world of logical reasoning, modelling, and scientific analysis. In religious dimension, scientists may from time to time contemplate the purpose of their inquiry beyond knowledge and rationality. They may sometimes meditate the meaning of their discovery above intellectual enlightenment and technical utility. Is there spirituality underlying order and chaos in the universe? Is there an almighty power behind dynamics and equilibrium in the material world? Is there God or a supernatural force creating and changing the existence in accordance with the law of universality or the rule of particularity from order, symmetry, homogeneity, or simplicity toward entropy, asymmetry, heterogeneity, or complexity?

References

Bijker, W. E., Hughes, T. P., and Pinch, T. (2012). *The social construction of technological systems: New directions in the sociology and history of technology*. Boston, MA: MIT Press.

Childress, D. H. (2000). *Technology of the Gods: The incredible sciences of the ancients*. Kempton, IL: Adventures Unlimited Press.

Christiano, K. J., Swatos, W. H., Jr., and Kivisto, P. (2016). *Sociology of religion: Contemporary developments*. Lanham, MD: Rowman & Littlefield.

Durkheim, E. (1995). *The elementary forms of the religious life*. New York: The Free Press.

Easton, T. (2016). *Taking sides: Clashing views in science, technology, and society*. New York: McGraw-Hill.

Harari, Y. N. (2015). *Sapiens: A brief history of humankind*. New York: HarperCollins Publishers.

Heschel, A. J. (1967). *The insecurity of freedom: Essays on human existence*. New York: Farrar, Straus and Giroux.

Johnstone, R. L. (2016). *Religion in society: A sociology of religion*. New York: Routledge.

Ligotti, T., & Brassier, R. (2010). *The conspiracy against the human race: A contrivance of horror*. New York: Hippocampus Press.

McDowell, S., & Morrow, J. (2010). *Is God just a human invention?* Grand Rapids, MI: Kregel Publications.

McGinn, R. E. (1990). *Science, technology and society*. Upper Saddle River, NJ: Pearson.

Melich, W. R. (2017). *Profound and simple: The nature and meaning of reality and human existence*. Bloomington, IN: Xlibris.

Merton, R. K. (2002). *Science, technology, and society in seventeenth-century England*. New York: Howard Fertig.

Mirola, W., & Monahan, S. C. (2016). *Religion matters: What sociology teaches us about religion*. New York: Routledge.

Mirola, W., Monahan, S. C., and Emerson, M. (2011). *Sociology of religion: A reader*. New York: Routledge.

Newman, D. M. (2017). *Sociology: Exploring the architecture of everyday life*. Thousand Oaks, CA: Sage Publications.

Nye, B. (2016). *Unstoppable: Harnessing science to change the world*. New York: St. Martin's Press.

Odum, H. T. (1971). *Environment, power, and society*. New York: Wiley.

Rifkin, M. (2014). *Settler common sense: Queerness and everyday colonialism in the American renaissance*. Minneapolis, MN: University of Minnesota Press.

Roberts, K. A., & Yamane, D. A. (2012). *Religion in sociological perspective*. Thousand Oaks, CA: Pine Forge Press.

Rosenberg, S. W. (2002). *The not so common sense: Differences in how people judge social and political life*. New Haven, CT: Yale University Press.

Shaw, V. N. (2015). *Conspicuous and inconspicuous discriminations in everyday life*. New York: Routledge.

Stolorow, R. D. (2015). *Trauma and human existence: Autobiographical, psychanalytical, and philosophical reflections*. New York: Routledge.

Wahl, J. (2016). *Human existence and transcendence* (W. Hackett, Trans.). Notre Dame, IN: University of Notre Dame Press.

Watts, D. J. (2011). *Everything is obvious: how common sense fails us*. New York: Crown Publishing.

Weber, M. (1991). *The sociology of religion*. New York: Beacon Press.

Bio-note

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The Use of Blogs in the Practical Literary Criticism Classroom

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Abstract

This paper explores the use of blogs in the literary criticism classroom as a means of enhancing student interaction with unseen literary passages. Unfortunately, the majority of students find literary criticism challenging since it does not simply require the identification of the thematic concerns of the unseen passage, but also the ability to comment on various literary aspects such as, imagery, diction and figurative language. Therefore, one major barrier that students would need to overcome is that of effectively visualising what the poem or prose passage is depicting. This visualisation would lead to the proper identification of literary aspects and the effect the author or poet intends to create. In other words, students must first establish a sense of confidence with the passage - one that is normally lacking during their first months of experience with literary criticism of unseen poetry / prose passages. This research, based on a pilot project, seeks to address this lack of confidence by using a specifically-created blog where the students are free to express their thoughts and comments on a particular poem or prose passage in an online collaborative atmosphere which goes beyond the classroom setting. This fosters confidence, whilst concomitantly promoting other supplementary skills.

Keywords: blogs, Literary Criticism, online collaboration, new literacies, thinking skills

Introduction

One of the most challenging tasks that Advanced Level students of English face during their post-secondary academic experience in local Further Education Institutions is that of Literary Criticism. This is a compulsory task for all students sitting for the MATSEC (Matriculation and Secondary Education Certificate) English 'A' Level examination where in Papers I and II the students are required to write a literary analysis of not less than 400 words on an unseen poem (Paper I) and prose passage (Paper II). No choice of text is offered in both of these sections and the essays "should be an exercise in practical criticism and should demonstrate the candidate's ability to describe, interpret, analyse, critically assess and appreciate

a given unseen poem" (MATSEC Syllabus 2012, n.d.) or prose passage. Apart from the general learning outcomes for other language features such as coherence, structure and appropriate vocabulary, the syllabus lists ten learning outcomes for the literary criticism essay. These learning outcomes primarily focus on the ability of the students to 'analyse an unseen poem through the application of appropriate critical strategies', interpret and appraise 'the effectiveness and distinctiveness of literary language in a given unseen poem' while demonstrating an awareness of the necessary critical terminology in their appraisal of the unseen poem. Moreover, these learning outcomes also focus on the importance of organizing 'observations (description, analysis, critique and appraisal) about an unseen poem in a cogent essay of not less than 400 words.'(Ibid.)

Apart from examination exigencies, the task of literary criticism exposes students to meaningful contexts that are characterised by the use of descriptive and figurative language. Literary criticism "also appeals to [the students'] imagination, develops cultural awareness, and encourages critical thinking about plots, themes, and characters." (Van Truong, 2009, p.2)

The Barrier

As one of the lecturers teaching literary criticism in a post-secondary institution, I believe that the root of students' anxiety in relation to poetry criticism is that of 'disenfranchisement' (Regis, 2013). Many students perceive poetry (especially when it is unseen) as something which they cannot relate to and as having a meaning which they will fail to unravel. In other words, their fear of 'misunderstanding' the poem and getting it wrong is so high that it sometimes obfuscates even their basic and literal understanding of the poem. Consequently, the subject is perceived by many to be challenging and inaccessible.

The typical process, which starts with the students reading the unseen poem for the first time until their final critical essay on the poem, can be outlined as follows:
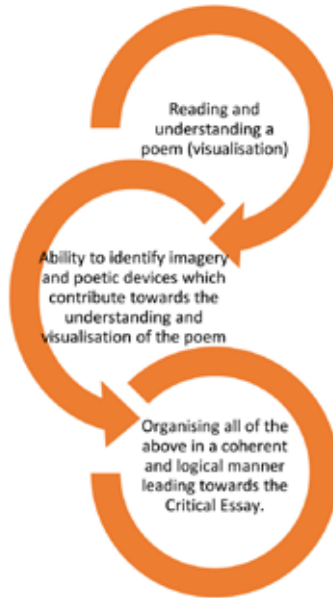
Figure 1: Literary Criticism process leading to the Critical Essay

After reading the poem the student attempts to visualise what the poem is depicting (through figurative language, mood, atmosphere, theme, etc.). This is followed by a closer look at the poetic language employed where the student should note how it contributes towards the theme and the overall image or vision the poem creates. The final step is to express all this in a coherent and logical critical essay using a formal and analytical style. Unfortunately, even after any challenging vocabulary is explained, many students encounter a major hurdle in the very first step of this process and therefore, due to the interdependency of these steps, they would not be able to proceed with the rest. The students' sense of 'disenfranchisement' and their perception of the subject as being inaccessible are the main factors that serve to drain the required confidence necessary to attain a basic understanding of the poem.

The Research Questions

Given this scenario, I decided to pursue this issue further with my main research questions being:
- How can a sense of confidence in literary criticism be instilled while making students aware that critical thought is something personal and that, as long

as it is accompanied by appropriate argumentation, there is no right and wrong answer?

- How can the subject's lecturing atmosphere be deformalized and hence make the subject more accessible through effective student collaboration?
- Would the above ultimately facilitate the visualisation of the poem?

'Deformalizing' the subject, ideally through student collaboration, necessarily entails a change in the medium of delivery itself. I had to find a medium that would not simply transcend the formal lecturing atmosphere but act as a supplement to it ideally by promoting peer collaboration.

Breaking the Barrier

We are all aware of the dependency of teenagers on technology, it "is like oxygen—a necessary component of their life" (Lacina and Griffith, 2012, p.316). Children of the 21st century are 'digital natives', they "are all 'native speakers' of the digital language of computers, video games and the Internet" (Prensky, 2001, p.1). Students taking down notes during lectures on their tablets or laptops, and others asking if they can use their devices instead of traditional paper books are all situations with which we are familiar. Whether one should radically condemn or accept such use of technology in the light of current trends in education is a topic, which I feel, necessitates discussion.

This directed my attention to the fact that technology must be the medium through which the confidence barrier can be broken. With a plethora of Web 2.0 tools, availability of wireless internet throughout the college, all students being in possession of an email address and a personal background in education technology, I decided to explore how technology can assist my students in gaining the required confidence in literary criticism ideally through a collaborative online forum. For this reason, I decided to explore the use of weblogs as a technological tool for creating an online environment where students can discuss a particular poem or prose passage in an informal / deformalized atmosphere. My previous research questions could now be simplified as: Does a blog serve to deformalize the subject (whilst maintaining the necessary formality in language use) and hence boost student confidence through online collaboration; and would this lead the students to an effective visualisation of the unseen poem that allows them to ultimately write a cogent literary essay?

What is a Blog?

One of the major benefits brought about by Web 2.0 tools is the possibility of the internet user to become a participant and not simply a consumer of information. Now, internet users can produce information and learners are empowered with the possibility of contributing to the resources and not just consume them (Handsfield, Dean and Cieloch, 2009). Consequently, Web 2.0 tools opened up the possibility of collaboration where users can co-create content and share it with the world. Blogs (short for web logs) are interactive and personally composed Web 2.0 spaces in which entries typically appear in reverse chronological order. Blogs may include images, videos and hyperlinks to websites and bloggers can interact with their audience via a comment section at the end of the blog (Ibid.). Creating and maintaining a blog is very simple since the interface provided by the platform is highly intuitive and user-friendly. No prior knowledge of web coding and design is required since all platforms provide the user with WYSIWYG editing facilities.

There are many free blogging platforms available with those most used being WordPress, Blogger, Tumblr and Squarespace (Haines, 2017). All of these platforms are also available as smartphone apps, so users can receive instant notifications on their devices whenever someone leaves a comment on a particular blog entry.

Why use a Blog?

Before discussing the ways in which blogs can assist in the literary criticism classroom, it is important to locate their importance within the framework of new literacies. Due to their participatory and collaborative nature, blogs are a paradigm case of a tool that assists in new literacy practices (Knobel and Lankshear, 2014). New literacy goes beyond the basic skills associated with reading and writing and include activities like text-messaging, social networking, blogs, podcasting, and video making. These digital technologies extend our communication abilities and change what it means to both "read" and "write" texts. New literacies "are more participatory, collaborative, and distributed, and less "published," less "author-centric," and less "individual" than conventional literacies" (Ibid. p.98). Blogs are therefore an ideal means how new literacies can be implemented in our classrooms.

Deformalization and Collaboration

As far as the students' perception of the subject of literary criticism is concerned, a blog's possibility of providing social collaboration in a non-formal setting should enable them to attain the necessary confidence in the subject. Owing to its constant availability, a blog has the potential to extend beyond the classroom thereby enabling the students to comment on a particular blog entry in their free time.

Even those students who are reticent and do not engage in class discussions might be interested in joining the blog discussion at their leisure by writing comments or replying to existing ones. By taking this task out of the classroom, blogs allow students to express their voice even from their own private spaces whilst injecting a sense of 'play' which 'lowers the emotional stakes of failing' (Jenkins, 2006, p.23). Ironically, blogs' capability of taking the task out of the classroom strengthens even further the collaboration between students. This is because students now feel part of a 'team' where knowledge is shared and developed collectively by means of a constant exchange and brainstorming of ideas.

One other reason why blogs enable 'deformalization' is that in blogging the students are not writing for a central reader but to their peers by providing feedback on what has been discussed or by proposing new ideas and arguments. The absence of a central judgemental reader is a factor that contributes towards making blogs a means of 'deformalization' because, in line with the new literacy practices, blogs can only operate if the teacher or lecturer becomes a participant in the task and not someone who "requires, assigns, models, and mandates" (Steller, 2015, p.17). The role of the teacher in a blogging task, which is discussed below, is that of a moderator who establishes parameters, since the value of blogs in education lies precisely in the fact that bloggers "recognize that quality is judged by groups rather than by appointed experts" (Knobel and Lankshear, 2014, p.98).

Another benefit of blogging, which results from its collaborative nature, is that it allows the students to write for a wider audience. In the blogosphere, students' comments are not simply read by the lecturer but by other classmates and anyone around the world who locates the blog. However, this might create a problem given that my particular situation had to deal with boosting student confidence in the subject. Widening the audience to my students' writing and thinking could have a counter-effect; yet seeing that the benefits posed by the project far outweigh the disadvantages, this was a risk worth taking.

Enhances other skills

Besides serving as a motivation-booster by promoting collaboration and decentralisation of authority, blogging leaves a positive impact on other skills. Zawilinski maintains that literature discussion blogs promote higher order thinking (HOT) skills especially in relation to reading and writing because on the internet "writing is intrinsically integrated with the reading comprehension process" (Zaliwinski, 2009, p.652). These new literacies of online reading comprehension essentially serve to "emphasize higher order thinking skills like analysis, synthesis and evaluation" (Ibid. p.652). These skills are not simply required for online communication but also form an integral part of the task of literary criticism and are all skills that "can be practiced through blogging" (Ibid. p.652).

Lecturer's role

Before introducing the blogging task for the first time, my role as lecturer had to be re-defined. On one hand, it was clear that the presence of a sage who knows everything does not fit in the realm of the blogosphere. On the other, guidance had to be provided to the students as to what the purpose of the blog is and what is required from them. It was clear that my role had to be twofold: providing the necessary guidance and facilitation but also acting as an active participant in the task. The following are the factors I took into consideration and explained to my students when the blog was introduced:

Purpose of the blog: Having a clear purpose helps both the readers and writers to better define their contributions to the blog, so it was explained that the purpose of the blog is to act as a brainstorming activity where everyone is free to express his or her own thoughts on the poem being discussed. Students were encouraged to read and respond to each other's comments and later, when directed by myself, use this shared information to write their own critical essay.

Establish the level of formality: Even though my aim was to create an informal setting to promote participation, the need for a formal writing style synonymous with literary discussion was requested. When participants are responding to each other's comments, they should utilise accurate spelling, punctuation and grammar.

Defining the lecturer's role: In order to maximise the sense of confidence and promote participation as much as possible, I defined the role that I will be assuming in this task namely that of participating in the discussion by providing guidance and checking the quality of the blog entries. No grades or marks will be assigned to the entries since the scope of this task is that of fostering discussion and peer learning. All posts will be made public only after my approval.

The *CritBlog*

The institution provides a Virtual Learning Environment (VLE) which I could have used to create the blog. All students have access to this platform where lecturers upload handouts, notes, hyperlinks and can even conduct online surveys. Using this VLE would have served all my requirements; however, I decided to use an independent platform in order to distance this project from the academic setting as much as possible. For this reason, I opted for WordPress, which is a free open-source platform that operates 30% of the web (WordPress, n.d.), to create the blog and named it *CritBlog* (http://critblogspace.wordpress.com). One other reason why WordPress was chosen is that it enables the installation of an app on the students' mobile devices. In this way, the students can receive instant notifications hence creating a social-media community with which the students are familiar.

Step 1: The first blog entry consisted of a welcome message describing the purpose and scope of the *CritBlog* emphasising the importance of students' contribution towards the discussion.

Figure 2: CritBlog welcome message

In order to provide the students with all the necessary tools and ease of use, the *CritBlog*'s header included links to online resources such as a complete list of figures of speech and tips on how to write literature essays.

Figure 3: CritBlog header

Step 2: The first task was then posted and for this purpose I chose Ted Hughes's *The Thought-Fox* which is a highly accessible poem yet rich in figurative language. Constantly aware of my role as facilitator, I did not simply post a poem but also provided further guidance by providing a link to a YouTube video featuring the poet's voice reading the poem and images that complement what is being read. A checklist with various elements used in literary criticism (such as theme, speaker/ voice, imagery, tone, atmosphere, diction and rhyme) was also included in order to enable the students to analyse the poem in the light of these important elements.

Step 3: A week after the launch of the blog I reminded those students who had not yet submitted a comment to do so. This resulted in more entries and the following week I asked the students to write a critical essay on the poem. At this point, the students were asked to read all comments submitted and, if necessary, ask other students for clarification or to further develop a particular argument. The students were given one week to write the critical essay.

Results

Students started submitting comments from the first day the blog was introduced. WordPress statistics show that all of the 17 students in my class had visited the blog; all of them watched the YouTube video though only 10 students submitted a comment. All comments made use of a formal style and, even though I previewed them before appearing live, it was not necessary to make any changes to the entries. My role was that of guiding the discussion by answering and acknowledging all comments and hinting towards the discussion of other poetic elements such as tone, voice and sound effects. It was evident that students were finding this medium conducive to reflection since the comments submitted demonstrated a close and critical reading of the poem. The following are excerpts from what two students posted:

1. The words "something else is alive", reinforce uncertainty to create the atmosphere of suspense. The transferred epithet "the clock's loneliness" shows that it is the poet that is lonely not the clock. In addition, the ticking of the clock emphasizes the loneliness the poet feels, as the seconds are drawn-out. However, the poet feels lonely not because he is alone but because he does not have any inspiration to write.

2. The poem portrays a VERY strong sense of auditory imagery. It immediately mentions "clock" in the first stanza and the word "ticks" in the last. This is to emphasise the poet's solitude and quietness. The atmosphere is silent and tense. "…this midnight moment's forest:" this shows us that his description is set in the present and he is experiencing it as he's writing it.

These two samples, like the rest of the submissions, clearly demonstrate the students' attention to the poet's use of language while focussing on poetic devices and how they contribute towards creating a particular effect. Moreover, three of the submissions were from students who are normally silent in class and so the blog provided them with a 'voice', a boost in confidence that was lacking in the classroom environment. This shows that writing for a wider audience did not serve as a deterrent to these students.

It should be noted that, contrary to my expectations, no student submitted an entry in direct response to a comment left by another student. Even though it was clear that the comments submitted were based on developments of previous entries, no student submitted an entry that directly challenges or develops an argument left by another student.

When it comes to the critical essay, it was evident that the blog, in making the students view themselves as readers and writers, assisted them to be better writers (Steller, 2015, p.13). This is because the majority of the essays demonstrated a significant improvement in structure, coherence and critical thought. Even though some students did not leave a comment on the blog, they consulted other students' comments to write their essay. The sense of confidence that the blog instilled enabled them to express their ideas logically and coherently in the writing assignment by assimilating and incorporating the various ideas presented in the blog and develop them further.

Post-project Survey

After submitting their critical essays, the students were asked to answer a very brief online questionnaire comprising three questions:
1. How would you rate your overall *CritBlog* experience?
2. What did you find most interesting in using a blog for literary analysis?
3. Apart from commenting on a literary passage, what other skills did you gain from using this blog?

The purpose of this questionnaire was to obtain feedback from the students themselves as to how they perceived the blogging experience. Being a pilot project, this questionnaire would also shed light on which areas require improvement. All the ten students who participated in the blog answered the questionnaire with 66.7% of them finding the *CritBlog* an enjoyable experience and 33.3% finding it extremely enjoyable. When asked 'What did you find most interesting in using a blog for literary analysis?' and with the possibility of choosing more than one answer, the students responded as follows:
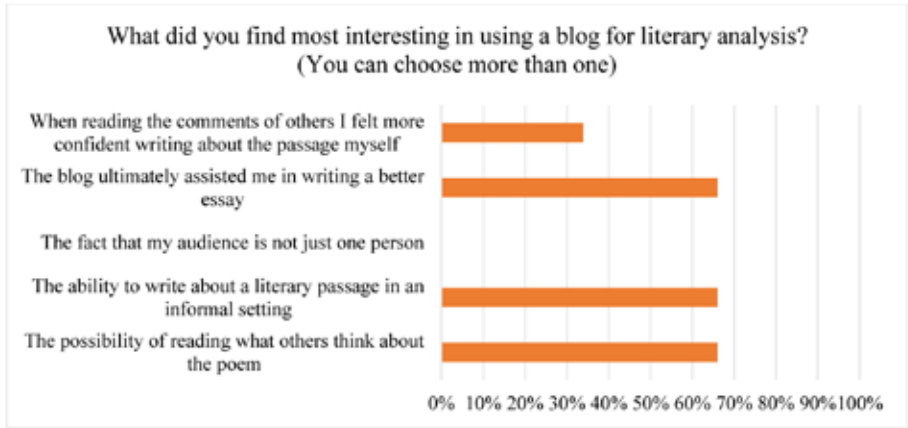
Figure 4

These results show that the blog, by offering the students the possibility to read each other's comments (even though they did not address or answer any of their colleagues' remarks), served as a tool which assisted them in the writing process mostly because of its deformalized setting (66%) and hence boosting their confidence (34%).

When asked to identify which skills, apart from commenting on a literary passage, are gained from using a blog, the students answered as follows:
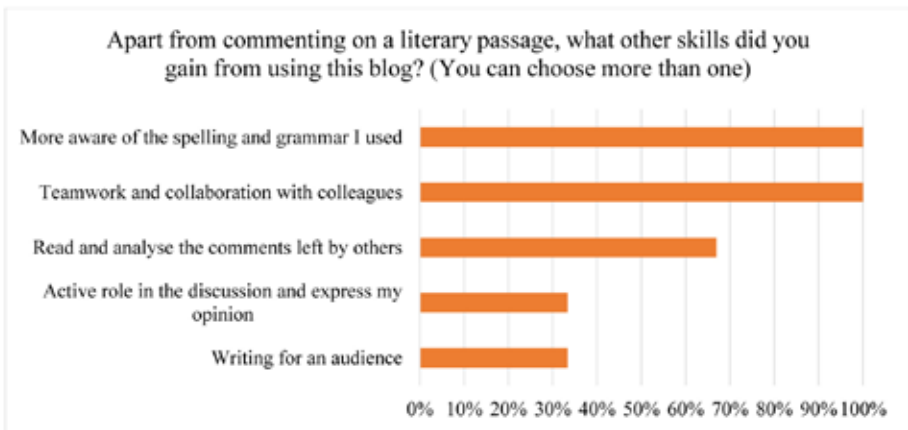

Figure 5

It is clear that writing for an audience did not prove to be an obstacle but, on the other hand, all of the students who answered the questionnaire felt more aware of the spelling and grammar used. Another important skill that students felt to have gained by means of blogging is that of teamwork. Even though there were no direct exchanges between students, it was clear that they were using the blog to learn from each other and consequently assimilated these ideas in their essays.

Conclusion: Reflections and Improvements

As already noted, this was a pilot project so there is ample room for future improvement and development. Among the steps to be taken into consideration for future implementation is the insistence on the use of the blog as a brainstorming collaborative space where students do not simply post their opinion but also challenge and develop ideas presented by their peers. A less accessible text might be used which would necessitate students posing questions to their colleagues thereby enhancing teamwork and collaboration. Since writing for an audience is a motivating factor in itself, the implementation of the *CritBlog* with more than one group/class of students should also be considered. This helps to widen the students' audience, enables the creation of a social media community whilst encouraging the students to view themselves as readers and writers.

This initial experience with using a blog in a literary criticism classroom clearly highlights the effectiveness of this tool as a means of creating collaboration and boosting student confidence. It leaves a positive effect on the depth of analysis and improves critical reading and writing skills. In a world where technological literacy skills are becoming increasingly important, a blog is not only academically beneficial but also enhances the students' communicative and digital skills.

References

Haines, B. (2017). The Best Free Blogging Platforms. Available at www.thebalancesmb.com/top-free-best-blogging-platforms-2531530 [Accessed 15 May 2018].

Handsfield, L.J, Dean, T. R and Cieloch, K.M. (2009). Becoming Critical Consumers and Producers of Text: Teaching Literacy with Web 1.0 and Web 2.0. *The Reading Teacher*, 63(1), 40–50.

Jenkins, H. (2006). Confronting the Challenges of Participatory Culture: Media Education for the 21st Century, MacArthur Foundation. p.23. Available at https://www.macfound.org/media/article_pdfs/JENKINS_WHITE_PAPER.PDF [Accessed 22 March 2018].

Knobel, M. & Lankshear, C. (2014). Studying New Literacies. *Journal of Adolescent & Adult Literacy,* 58(2), 97-101.

Lacina, J. & Griffith, R. (2012). Blogging as a means of crafting writing. *The Reading Teacher,* 66 (4), 316–320.

MATSEC Examinations Board University of Malta (n.d.). MATSEC Syllabus 2020. Available at www.um.edu.mt/__data/assets/pdf_file/0015/354012/AM10.pdf [Accessed 11 June 2018].

Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1. *On the Horizon*, 9 (5), 1-6.

Regis, A. (2013). Why do students fear poetry and how can they access it better? *The Guardian*. Available at www.theguardian.com/higher-education-network/blog/2013/mar/21/world-poetry-day-student-occupy [Accessed 20 July 2018].

Steller, P. (2015). Blogging in response to literature: reading, writing, and thinking through the digital medium. *Theses and Dissertations*. 312. Available at https://rdw.rowan.edu/etd/312 [Accessed 20th January 2018].

Van Truong, T.M. (2009). The Relevance of Literary Analysis to Teaching Literature in the EFL Classroom. *English Teaching Forum*, 47 (3), 2-9.

WordPress (n.d.). Available at https://wordpress.org [Accessed 21 July 2018].

Zaliwinski, L. (2009). HOT Blogging: A Framework for Blogging to Promote Higher Order Thinking. *The Reading Teacher*, 62 (8), 650–661.

Bio-note

Dr Elton Stivala is Assistant Lecturer in the Department of English at the Junior College. He obtained his PhD in 2010 from the University of Malta and his thesis focused on the poetry of William Wordsworth. Before joining the Junior College he worked for more than 15 years in the English as a Foreign Language (EFL) industry as a *Language Centre Director* for an international franchise of language schools. He was trained in language centre management and pedagogy in Princeton, New Jersey, USA. During this time, he was also responsible for various IT-related projects within the local group of companies. This fostered his interest in the various uses of technology in the language classroom especially how new technologies assist in language learning and teaching.

The Use of Grounded Theory in Educational Research: Exploring the Application of the Methodology in an Investigation on e-Learning in Maltese SMEs

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Abstract

Emergent researchers are faced with a plethora of research methodologies to choose from for their investigations. Deciding on which approach best fits their ontological and epistemological beliefs and requirements can be a daunting task. Many, indeed, shy away from the Grounded Theory (GT) method which is often considered to be much more labour intensive than other approaches. This paper attempts to make a case for this methodology, in its constructivist form, and as it is being applied in a current case study in Maltese SMEs.

Keywords: adult education and training, e-learning, Grounded Theory (GT), qualitative research, small and medium-sized enterprises (SMEs)

Introduction

Through a Grounded Theory (GT) research project, the author is currently trying to develop a conceptual model that explains the adoption, or otherwise, of e-learning, particularly distance online learning, by older (50+) Maltese workers, including those employed in small and medium-sized enterprises (SMEs). Why was GT selected for this project among so many other research approaches?

At the planning stage of the case study, a systematic review of the literature revealed that there was a lack of scientific publications on education (both formal and informal) and training, and particularly e-learning, among SME employees including older workers. Moreover, Nolan and Garavan (2016, p.85), through their review of research on human resource development (HRD) in SMEs, note that "studies do not address employees' perceptions and responses to HR practices" and quantitative investigations "often stopped at the owner-managers rather than the employers". Johnson and Devins (2008, p.2), in their review of studies on training in SMEs in the UK, also found that the existing research, which is mainly survey-based, "do(es) not take sufficient account of the informal, flexible nature of much workforce development that takes place in small organisations". There is, consequently, a lack of a theory about older employee learning, and particularly e-learning in the unique

context of these businesses. In such a research dimension, Creswell (2012, p.423) suggests, "when existing theories do not address your problem or the participants that you plan to study", the GT method is one of the better research options.

GT has other important characteristics that fit well with this researcher's ontological and epistemological beliefs, and the investigation's objectives. First, conceptualisations are developed from grounded data. This allows the investigation not to become contaminated by the researcher's bias towards pre-existing theories, prior knowledge, beliefs and experiences, and particularly his social and critical constructivist alignment. Indeed, to further ensure rigour and reliability and to safeguard the investigation from the researcher's previously 'accumulated knowledge' (Dey, 1993, p.66), GT demands the researcher to engage in a constant and continuous exercise of reflexivity. Second, the methodology does not allow the investigation to become a positivist exercise of validation or rejection of a hypothesis that is developed through a literature review (Lawrence and Tar, 2013). Third, GT uses the researched subjects' "interpretations, perceptions, meanings and understandings" as "the primary sources of data" (Mason, 2007, p.56). Fourth, GT, as a research method, has become a popular choice in many social science disciplines (Lawrence and Tar, 2013), including education (see, for example Cherubini et. al., 2010; Chong and Yeo, 2015; Drugli, Clifford and Larsson, 2008; Givon and Court, 2010; Jones, 2002; Jones and Hill, 2003; Leino, 2006; Smart and Brent, 2010).

Yet, Thornberg (2014, p.243) notes that there are still too many emergent educational researchers who are only aware of the original formulation of GT which comes with the "classic dictum of delaying a literature review" after the collection and analysis of data. This limited knowledge of the methodology "might lead to a rejection of GT among educational researchers" (ibid.). Dey (1999, p.2) moreover notes that there are "probably as many versions of GT as there (are) grounded theorists", while Priya (2016, p.50) argues that "its epistemology and techniques of data collection and analyses are still matters of animated debates among the social scientists", making the choice for GT for an educational investigation, such as a PhD project or otherwise, difficult.

Moreover, today, many different forms of GT exist, making the choice of the methodology even more complicated, particularly for novice researchers. After its development by Barney Glaser and Anselm Strauss in the late 1960s, the technique developed in "somewhat conflicting directions" (Charmaz, 2000, p.510). Even Glaser and Strauss parted ways. The former went as far as accusing Strauss of no longer being a true grounded theorist (Glaser, 1992), and, later, claiming to be the original founder of GT (Grounded Theory Institute, 2018). His claim is supported by his followers who argue that his article 'The Constant Comparative Method of Qualitative Research' (Glaser, 1965) confirms that Glaser "already had conceived and written about all the basic principles of Grounded Theory before his work with Anselm Strauss" (Grounded Theory Institute, 2018). Researchers entered into this "methodological fray" (Charmaz, 2006, p.xi) adapting and adopting this approach

(including Clarke, 2005; Charmaz, 2006; Bowers and Schatzman, 2009; Babchuk, 2011) leading the debate to the brink of a "theoretical Armageddon" (Babchuk, 2008, p.10). A "family of methods" (Bryant and Charmaz, 2007b, p.11) eventually developed with "certain (shared) key characteristics that distinguish all versions from other qualitative designs" (Babchuk, 2008, p.10). One of these methods is the constructivist GT approach developed by Charmaz (2000, 2006, 2011, 2017) and others (Bryant, 2002; Mills, Bonner and Francis, 2006, 2008). This method was used in the current case study (Vancell, 2018) and will be described in the rest of this paper.

Origins of GT

In a GT investigation, a researcher can use any data collection strategy. These include quantitative techniques (see, for example, Glaser and Strauss, 1967; Lösch, 2006; Glaser, 2007; 2008). However, the roots of this methodology lie in the qualitative research tradition (Babchuk, 2011; Birks and Mills, 2011).

The 'Chicago School' sociologists, in the 1920s and 1930s, legitimised qualitative inquiry in sociology (Denzin and Lincoln, 2010; Bryant and Charmaz, 2007c; Babchuk, 2011). However, up till the 1950s, scholars still "relegated qualitative research to a subordinate status in the scientific arena" (Denzin and Lincoln, 2005, p.2) and quantitative 'objectivist' methodologies, akin to the experimental sciences, dominated the social sciences (Charmaz, 2000; 2006). Positivism was the 'gold standard' of educational research (Wright, 2006).

Qualitative research only gained the respect of the scientific world in the post-World War II era (Birks and Mills, 2011). Denzin and Lincoln (2005, p.17) refer to the period 1950–1970 as the "modernist moment" in the social sciences and consider it to be the "golden age of rigorous qualitative analysis". One of the most important books of this second phase of qualitative research was Glaser and Strauss's (1967) the *Discovery of Grounded Theory*. In this book, the authors describe how they developed GT through their investigation of the experience of patients dying in hospital.

Glaser's background comprised rigorous training in quantitative methods. Strauss, in contrast, had a background in symbolic interactionism, "embraced while in his doctoral program at the University of Chicago" (Charmaz, 2006, p.7), and its emphasis on pragmatist philosophy, social psychology and ethnographic field research (Bryant and Charmaz, 2007a). Pragmatist philosophers, including Mead (1917) and Dewey (1916; 1929), assume that knowledge is created through action and interaction and view reality as characterised by indeterminacy and fluidity, and as open to multiple interpretations.

Glaser and Strauss, through their new, jointly created research approach, sought "to understand human beings and their behaviour by developing a systematic and

detailed procedure which would be viewed as positivistic and, therefore, truly scientific" (as cited in Bluff, 2005, p.148). This "systematic inductive" (Charmaz, 2000, p.509) approach to social science research was one in which "the researcher has no preconceived ideas to prove or disprove" (Mills, Bonner and Francis, 2006, p.27) and theory is grounded in data. Mills, Bonner and Francis (2006, p.27) succinctly describe the GT process as proposed by Glaser and Strauss:

> The researcher analyzes data by constant comparison, initially of data with data, progressing to comparisons between their interpretations translated into codes and categories and more data. This constant comparison of analysis to the field grounds the researcher's final theorizing in the participants' experiences.

By developing this method, Glaser and Strauss (1967, p.3) aimed to move away from a model where theory was "generated by logical deduction from a priori assumptions", as happened in other research models. However, the GT proposed by Glaser and Strauss, resided in the positivist paradigm "which holds that the veracity of a theory can be determined simply by recourse to the data" (Bryant and Charmaz, 2007c, p.33). The 'classical GT' also carried an epistemological dilemma - the researcher had to believe or pretend to be a 'tabula rasa' who was free of any preconceptions and knowledge about the field and subjects under study.

The rest of the paper is structured as follows. It begins with an overview of the origin and development of GT. It is followed by an exploration of the key elements of its constructivist approach, and the way the methodology is being used in a case study in the Maltese labour market. Finally, some conclusions are presented.

The Evolution of GT

After their collaboration, Glaser and Strauss parted ways and, later, published work of conflicting ontological and epistemological positions. Glaser (1978) "remained in the positivist camp" (Charmaz, 2000, p.512). Strauss, with Juliet Corbin in 1990, co-authored the book *Basics of Qualitative Research.* The book was republished in 1998, and after Strauss's death, its 3rd edition was published in 2008 with Corbin as the main author. In Corbin and Strauss's books, the authors challenge the underpinnings of the initial formulation of GT particularly the assumptions of the existence of an objective, external reality, and 'the researcher as a theoretical virgin' myth (Clark, 2005). Instead, the authors also claimed that "the truth is enacted' and there are multiple variations of reality" (Corbin and Strauss, 2008, p.4). Thus, to understand experience, "that experience must be located within and can't be divorced from the larger events in a social, political, cultural, racial, gender-related, informational, and technological framework" (ibid.).

Denzin and Lincoln (2005, pp.16-17) note that between 1970 and 1986,

"the naturalistic, postpositivist and constructionist paradigms gained power" in qualitative research. In these years scientists did their best "to locate themselves and their subjects in reflexive texts" (Birks and Mills, 2011, p. 6) and constructivist thinking became very important in social research. For the constructivist researcher "meanings are constructed by human beings as they engage with the world they are interpreting based on their historical and social perspective" (Mogoshoa, 2014, p.57).

Constructivist GT

The influence of constructivism on social research was, by the 1990s, very strong. In 1995, Kathy Charmaz wrote her first piece about a reformulated GT. This author continued to develop her work and in 2000 published a milestone contribution in the *SAGE Handbook of Qualitative Research* in which she took a further move away from positivism. She insisted that Strauss and Corbin, like Glaser, still stood "in the objectivist terrain" and that they still believed that GT was "verificational" (Charmaz, 2000, p.512). Charmaz noted that, when developing "analytic questions, hypothesis [relational statements], and methodological applications" (ibid., p.513), Corbin and Strauss still assumed the existence of an external reality. She thus proposed a 'repositioned' GT which was "ontologically relativist and epistemologically subjectivist" and positioned within the social constructivist research paradigm. In practical terms, Charmaz (1995; 2000) proposed that researchers co-create meaning with the subjects of their study, in the process producing tentative or 'fuzzy' (Bassey, 1998) interpretations of the phenomenon under study.

The next section provides an introductory description of the procedures involved in collecting and analysing data in a constructivist GT investigation.

Essential GT Elements

The constructivist GT approach, as proposed by Charmaz (2006), and as applied in Vancell (2018), has the key elements of the 'first generation' GT process which include "...data collection, coding and analysing through memoing, theoretical sampling and sorting to writing, using the constant comparative method" (Glaser, 1998, p.12). The methods of sampling, data collection and data analysis are not considered as separate procedural steps in the research process. Instead, they are considered as a continuous cycle of data collection, analysis and sampling (Elliott and Lazenbatt, 2005). However, Lawrence and Tar (2013, p.30), echoing Corbin and Strauss (2008), warn that "rigid adherence to any procedure can hinder the analytic process and stifle a researcher's creativity". Indeed, Lawrence and Tar (2013, p.31) also recommend that these elements "should be thought of as rules of thumb, rather

than hard or fixed rules, and advise researchers to study these rules of thumb, use them, and modify them in accordance with the requirements of their research".

Theoretical Sampling and Saturation

In other research designs, the sampling procedure is "designed in advance and adhered to rigorously" (Schreiber 2001, p.64). In GT, the sampling process is entirely controlled by the emerging theory (Glaser and Strauss, 1967, p.45) and thereby called "theoretical sampling". The pioneers of GT defined theoretical sampling as:

> the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses his (sic) data and decides what data to collect next and where to find them, in order to develop his (sic) theory as it emerges (Glaser and Strauss 1967, p.45).

In the case study (Vancell, 2018), the researcher entered the field, that is, Maltese SMEs, with a very open research question: How is e-learning used by older workers? The researcher, therefore, had no pre-conceived theory to guide the sampling. This research started with interviews with key informants and gatekeepers and included key personnel from Jobsplus, the Malta Chamber of SMEs (GRTU), the Malta College of Arts, Science and Technology (MCAST) and SME owner-managers. After coding and analysing these first interviews it became apparent that the number of SMEs engaged in e-learning was very small (Vancell, 2018). It also emerged that most owner-managers considered professional development to be 'the responsibility' of the employees, particularly if they were no longer young, not the business. Moreover, there was agreement that a 'rationality of informality' (Johnson & Devins, 2008) was pervasive in SMEs. This heavily affected the adoption, or otherwise, of training initiatives. It was thus important to interview older employees to gain a better insight into their workplace reality, and particularly their educational perspectives and needs.

As the research progressed, theoretical sampling continued to be used to guide and adapt the interview questions. It was also used, in the sampling of employees, so as to ensure the theory would develop as fully as possible – in GT terms, until it reached "theoretical saturation" (Elliott & Lazenbatt, 2005, p.4). This is achieved, according to Charmaz (2006, p.113), when "gathering fresh data no longer sparks new theoretical insights, nor reveals new properties of the core theoretical category/ies".

Theoretical sampling and coding (described below) occurred concurrently with the review of a sample of literature, selectively identified to support or refute the conceptual categories that were developing through the research, and add depth to the analysis. This selective sample was not covered in the systematic review of literature that was undertaken before the start of the iterative data collection and analysis process, and which was important in sensitising the researcher to the field.

The Constant Comparative Method

Charmaz (2006, p.187) defines the constant comparative method, first presented by Glaser and Strauss (1967), as

> a method of analysis that generates successively more abstract concepts and theories through inductive processes of comparing data with data, data with category, category with category, and category to concept. Comparisons then constitute each stage of analytic development.

This method, according to Glaser and Strauss (1967), involves four stages:
1. Comparing incidents applicable to each category;
2. Integrating categories and their properties;
3. Delimiting the theory; and
4. Writing theory.

All forms of GT, including the constructivist approach, have these four stages as the basis for constant comparison, albeit with some variations. For example, in the case study (Vancell, 2018) this researcher followed the recommendations of Charmaz (2006) and Birks and Mills (2011) as to what constitutes the key features of the constant comparative method. These include (i) coding, (ii) concurrent data generation or collection and analysis, and (iii) memo writing. These will be explained in the next sections.

Coding

Saldaña (2009, p.3) explains that "a code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data".

Coding, according to Holton (2007, p.238)

> gets the researcher off the empirical level by fracturing the data, then conceptualizing the underlying pattern of a set of empirical indicators within the data as a theory that explains what is happening in the data.

It also provides, the researcher with

> a condensed, abstract view with scope and dimension that encompasses otherwise seemingly disparate phenomena (ibid.).

The coding in the present study was aided by Atlas.ti, a computer-assisted qualitative data analysis software (CAQDAS). It consisted of two main phases

drawn from Charmaz (2006), Saldaña (2009) and Birks and Mills (2011): (i) an initial phase, that is, a 'first cycle' (Saldaña, 2009, p.3) of *open coding* which involved "identifying important words, or groups of words, in the data and then labelling them accordingly" (Birks and Mills, 2011, p. 9), and (ii) a 'second cycle' (Saldaña, 2009, p.149) of '*intermediate coding*' (Birks and Mills, 2011, p.11) in which the most significant initial codes were sorted, synthesised and/or integrated (Charmaz, 2006), and, subsequent (and/or concurrent) '*theoretical coding*' through which the substantive codes are related to each other "as hypothesis to be integrated into a theory" (Glaser, 1978, p.72).

The initial coding stuck closely to the data and was a non-sequential and iterative inductive process. It started with the development of an initial list of two types of open codes: (i) *in vivo* codes taken directly from the respondents' narratives and (ii) researcher codes (Glaser, 1978; Charmaz, 2006; Corbin and Strauss, 2008).

In the second cycle of coding, the researcher did not use the 'axial coding' method as suggested by Charmaz (2006) and Corbin and Strauss (2008). The researcher felt that this process was too complicated in the context of this case study. Instead, he used an intermediate process consisting of *focused coding*: conceptually similar codes were merged together, codes that were infrequent were reassessed for their usefulness in the emerging theory, and some codes, which during the initial cycle seemed like good conceptualisations, were dropped because they were considered marginal or redundant to the emerging theory. Theoretical coding was then used to lend form to the focused codes and develop the 'core category', the one "that appears to have the greatest explanatory relevance" for the phenomenon (Corbin and Strauss, 2008, p.104). During this stage, this researcher also engaged in computer-aided diagramming to integrate theoretical codes.

Concurrent data generation or collection and analysis

Birks and Mills (2011) note that concurrent data generation or collection and analysis are fundamental in a GT study. To achieve this in the case study, the researcher worked in the following manner: after the first interview, he coded its transcript; he then examined the codes and found that some of these codes could be integrated into categories. This process started to highlight areas of theoretical interest which the researcher revisited and re-evaluated (through other interviews) when returning to the research setting.

As described in Vancell (2018, p.397), the researcher, to gain a deep understanding of the educational beliefs and lifeworld of the respondents used "intensive qualitative interviews" as recommended by Charmaz (2006, 28). These interviews, which followed no scripted questions, but a topic guide, allowed the interviewer and respondent to engage in "conversations with a purpose" (Burgess, 1984, p. 102) in which knowledge was constructed rather than discovered.

Memo writing

Throughout all the coding stages, as suggested by Saldaña (2011), Friese (2012), and Grounded Theorists, including Glaser and Strauss (1967), Charmaz (2006) and Corbin and Strauss (2008), this researcher engaged in the writing of memos concurrently with coding. Memos are analytical notes in which the researcher records his thinking. They can be a sentence, a paragraph or a few pages of notes. Saldaña (2009, p.32) explains:

> The purpose of analytic memo writing is to document and reflect on: your coding process and code choices; how the process is taking shape; and the emergent patterns, categories and subcategories, themes, and concepts in your data – all possibly leading toward theory.

For Charmaz (2006) memos form the core of a GT investigation and will help the researcher identify the 'core category'. They are also important in the audit trail that ensures rigour in a qualitative research investigation (Chiovitti and Piran, 2003).

Conclusion

This paper explored the constructivist GT approach that underpins a case study – part of a larger project - which is looking at the e-learning experiences and perceptions of older workers in Maltese SMEs. GT is particularly important in the field of educational research because it allows the researcher to delve deeply into the social perceptions of learners while 'bracketing' his prior beliefs through constant reflexivity, theoretical sampling, semi-structured interviews and concurrent and iterative coding and reviewing of literature, category building and memo writing. The methodology was originally developed by Glaser and Strauss (1967) within the positivist paradigm, elevating in the process the status of the method in the scientific world. Later, Charmaz (2000; 2006) took a middle ground between positivism and postmodernism, and developed an 'evolved' and constructivist GT which "assumed the relativism of multiple social realities, recognised the mutual creation of knowledge by the viewer and the viewed, and aimed toward interpretive understanding of subjects' meanings" (Charmaz, 2000, p.510).

Lawrence and Tar (2013, p.31) do however warn of a very practical problem with constructivist GT: the methodology is "extremely labour intensive". However, this researcher believes that the method is very effective in studying the hidden world of training and e-learning in SMEs, as well as other educational and training settings.

Acknowledgement

References

Babchuk, W. A. (2008). 'Variations on a theme revisited: Operationalizing grounded theory for research and practice'. Rowland, M. L. (Ed.) *Proceedings of the 27th Annual Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education*. Bowling Green: Western Kentucky University, pp.7-13.

Babchuk, W. A. (2011). 'Grounded Theory as a "Family of Methods": A Genealogical Analysis to Guide Research'. *Proceedings of the 2010 Adult Education Research Conference (AERC).* US-China Education Review: David Publishing, 3(a), pp.10-16.

Bassey, M. (1998). 'Fuzzy Generalisation: an approach to building educational theory'. Proceedings of the British Educational Research Association Annual Conference, The Queen's University of Belfast: Northern Ireland, pp.27–30.

Birks, M. & Mills, J. (2011). *Grounded theory: a practical guide.* London: SAGE.

Birks, M., Chapman, Y. and Francis, K. (2008). Memoing in qualitative research: probing data and processes. *Journal of Research in Nursing*, 13(1), pp.68-75.

Bluff, R. (2005). 'Grounded Theory: the Methodology'. Holloway, I. ed. *Qualitative Research in Health Care*, Maidenhead: Open University Press, pp.147-67.

Bowers, B. & Schatzman, L. (2009). 'Dimensional analysis'. Morse, J. M., Stern, J., Corbin, J., Bowers, B., Charmaz, K. and Clarke, A. E., eds. *Developing grounded theory: the second generation,* Walnut Creek, California: Left Coast Press, pp.186-196.

Bryant, A. & Charmaz, K. (2007a). 'Grounded Theory in Historical Perspective: an epistemological account', in Bryant, A. & Charmaz, K., eds. *The SAGE handbook of Grounded Theory*. London: SAGE, pp.31-57.

Bryant, A. & Charmaz, K. (2007b) 'Grounded theory research: methods and practices', in Bryant, A. & Charmaz, K. eds. *The SAGE handbook of Grounded Theory*. London: SAGE, pp. 1-27.

Bryant, A. & Charmaz, K. (2007c) eds. *The SAGE handbook of Grounded Theory*. London: SAGE.

Charmaz, K. (1995). Grounded Theory. In Smith, J., Harre, R. and Langenhove, L. V. (Eds.) *Rethinking methods in psychology*. London: SAGE, pp.27-65.

Charmaz, K. (2000). Grounded Theory: Objectivist and Constructivist Methods, in Denzin, N. K. & Lincoln, Y. S., eds. *The SAGE handbook of qualitative research*. Thousand Oaks: California, SAGE, pp.509-535.

Charmaz, K. (2006). *Constructing grounded theory: a practical guide through qualitative analysis*. London: SAGE.

Charmaz, K. (2011). Grounded Theory methods in social justice research, in Denzin, N. K. & Lincoln, Y. S., eds. *The SAGE Handbook of Qualitative Research*, London: SAGE, pp.359-380.

Charmaz, K. (2017). Special invited paper: Continuities, contradictions, and critical inquiry in Grounded Theory. *International Journal of Qualitative Methods*, 16(1), pp.1-8.

Cherubini, L., Niemczyk, E., Hodson, J., and McGean, S. (2010). A grounded theory of new Aboriginal teachers' perceptions: The cultural attributions of medicine wheel teachings. *Teachers and Teaching: Theory and Practice*, 16, pp.545–557.

Chiovitti, R. F. & Piran, N. (2003). 'Rigour and grounded theory research'. *Journal of Advanced Nursing*, 44 (4), pp.427-435.

Chong, C. H., & Yeo, K. J. (2015). An overview of grounded theory design in educational research. *Asian Social Science*, 11(12), pp.258-268.

Clarke, A. E. (2005). *Situational Analysis: Grounded Theory after the Postmodern Turn*. London: SAGE.

Corbin, J. M. & Strauss, A. L. (2008). *Basics of qualitative research: techniques and procedures for developing grounded theory*. Los Angeles, California: SAGE.

Creswell, J. W. (2012). *Educational research. Planning, conducting, and evaluating quantitative and qualitative research (Fourth Edition)*. Boston: Pearson.

Denzin, N. K. (2010). 'Grounded and Indigenous Theories and the Politics of Pragmatism'. *Sociological Inquiry,* 80(2), pp.296-312.

Denzin, N. K. & Lincoln, Y. S. (2005). *The SAGE Handbook of Qualitative Research.* London: SAGE.

Denzin, N.K. & Lincoln, Y.S. (2005). 'Introduction: The Discipline and Practice of Qualitative Research'. Denzin, N.K. and Lincoln, Y. S., eds. *Handbook of Qualitative Research, 3rd Edition*. Thousand Oaks: SAGE, pp.1-32.

Dewey, J. (1916). *Democracy and education: an introduction to the philosophy of education*, New York: Free Press (1966 Edition).

Dewey, J. (1929). 'My Pedagogic Creed'. *Journal of the National Education Association,*18(9), pp.291–295.

Dey, I. (1993). *Qualitative data analysis: a user-friendly guide for social scientists*. London: Routledge.

Dey, I. (1999). *Grounding grounded theory: guidelines for qualitative inquiry*. San Diego: Academic Press.

Drugli, M. B., Clifford, G., and Larsson, B. (2008). Teachers' experience and management of young children treated because of home conduct problems: A qualitative study. *Scandinavian Journal of Educational Research*, 52, pp.279–291.

Elliott, N. & Lazenbatt, A. (2005). 'How to recognise a 'quality' grounded theory research study'. *The Australian Journal of Advanced Nursing: A Quarterly Publication of The Royal Australian Nursing Federation*. 22(3), pp.48-52.

Friese, S. (2012). *Qualitative data analysis with ATLAS.ti*. London: SAGE.

Givon, S., & Court, D. (2010). Coping strategies of high school students with learning disabilities: A longitudinal qualitative study and grounded theory. *International Journal of Qualitative Studies in Education*, 23, pp.283–303.

Glaser, B. G. (1965). 'The Constant Comparative Method of Qualitative Analysis'. *Social Problems*. 12(4), pp.436-445.

Glaser, B. G. (1978). *Theoretical sensitivity: advances in the methodology of grounded theory*. Mill Valley, California: Sociology Press.

Glaser, B. G. (1992). *Emergence vs. Forcing: Basics of Grounded Theory Analysis.* Mill Valley, California: Sociology Press.

Glaser, B. G. (1998). *Doing grounded theory: issues and discussions*. Mill Valley, California: Sociology Press.

Glaser, B. G. (2001). *The grounded theory perspective: conceptualization contrasted with description.* Mill Valley, California: Sociology Press.

Glaser, B. G. (2002). 'Constructivist Grounded Theory?'. *Forum Qualitative Sozialforschung/ Forum: Qualitative Social Research,* 3(3). Available at http://www.qualitative-research. net/index.php/fqs/article/view/825/1792 [Accessed 3 August 2018].

Glaser, B. G. (2005). *The grounded theory perspective III: Theoretical coding*. Mill Valley, California: Sociology Press.

Glaser, B. G. (2007). 'Theoretical elaboration of quantitative data'. *The Grounded Theory Review*. 6(3), pp.1-38.

Glaser, B. G. (2008). *Doing quantitative grounded theory*. Mill Valley, California: Sociology Press.

Glaser, B. G. (2011). '*Doing Formal Theory'*. Bryant, A. & Charmaz, K., eds. *The SAGE Handbook of Grounded Theory*. London: SAGE, pp.97-113.

Glaser, B. G. & Strauss, A. (1967). *The discovery of grounded theory: strategies for qualitative research.* London: Weinenfeld and Nicolson.

Grounded Theory Institute (2018). Available at http://www.groundedtheory.com/ [Accessed 3 August 2018]

Holton, J. (2007). 'The coding process and its challenges'. Bryant, A. & Charmaz, K., eds. *The SAGE Handbook of Grounded Theory*. London: SAGE, pp.237-261.

Johnson, S., & Devins, D. (2008). *Training and workforce development in SMEs: Myth and reality.* SSDA Catalyst Issue 7. London, England: UK Commission for Employment and Skills.

Jones, S. R. (2002). '(Re)writing the word: Methodological strategies and issues in qualitative research'. *Journal of College Student Development,* 43(4), pp.461-473.

Jones, S. R. & Hill, K. E. (2003). Understanding Patterns of Commitment: Student Motivation for Community Service Involvement. *Journal of Higher Education,* 74(5), pp.516-39.

Lawrence, J., & Tar, U. (2013). The use of grounded theory technique as a practical tool for qualitative data collection and analysis. *Electronic Journal of Business Research Methods*, 11(1), pp.29-40.

Leino, K. (2006). Reading the web – students' perceptions about the Internet. *Scandinavian Journal of Educational Research*, 50, pp.541–557.

Losch, A. (2006). 'Combining Quantitative Methods and Grounded Theory for Researching E-Reverse Auctions'. *Libri: International Journal of Libraries & Information Services,* 56(3), pp.133-144.

Mason, J. (2007). *Qualitative researching (2nd Edition).* London: SAGE.

Mead, G. H. (1917). 'Scientific method and the individual thinker'. Dewey, J. (Ed.) *Creative intelligence: Essays in the Pragmatic*. New York: Henry Holt and Company, pp.176-227.

Mills, J., Bonner, A. and Francis (2008). 'Getting to know a stranger - rural nurses' experiences of mentoring: A grounded theory'. *International Journal of Nursing Studies,* 45(4), pp.599-607.

Mills, J., Bonner, A. and Francis, K. (2006). The development of constructivist grounded theory *International Journal of Qualitative Methods*, 5(1), pp.1-10.

Nolan, C. T., & Garavan, T. N. (2016a). Human resource development in SMEs: a systematic review of the literature. *International Journal of Management Reviews*, 18(1), pp.85-107.

Nolan, C. T., & Garavan, T. N. (2016b). Problematizing HRD in SMEs: A "critical" exploration of context, informality, and empirical realities. *Human Resource Development Quarterly,* 27(3), pp.407-442.

Priya, A. (2016). Grounded theory as a Strategy of Qualitative Research: An Attempt at Demystifying its Intricacies. *Sociological Bulletin*, 65(1), pp.50-68.

Saldaña, J. (2009). *The coding manual for qualitative researchers,* London: SAGE.

Schreiber, R. S. (2001). 'The 'How to' of Grounded Theory: avoiding the pitfalls', in Schreiber, R. S. & Stern, P. N. (Eds.) *Using grounded theory in nursing*. New York: Springer, pp.55-83.

Smart, J. B., & Brent, I. L. (2010). A grounded theory of behavior management strategy selection, implementation, and perceived effectiveness reported by first-year elementary teachers. *Elementary School Journal*, 110, pp.567–584.

Strauss, A. L. & Corbin, J. (1990). *Basics of qualitative research: grounded theory procedures and techniques.* Thousand Oaks, London: SAGE.

Thornberg, R. (2012). Informed grounded theory. *Scandinavian Journal of Educational Research*, 56(3), pp.243-259.

Vancell, J. (2018). e-Learning for older workers in SMEs? The perceptions of owners and workers in Maltese microenterprises. *Symposia Melitensia*, 14, pp.391-403.

Wright, H. K. (2006). 'Are we (t)here yet? Qualitative research in education's profuse and contested present'. *International Journal of Qualitative Studies in Education (QSE).* 19(6), pp. 793-802.

Bio-note

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It-Traduzzjoni tfittex li tinnegozja l-Ħondoq Kulturali rifless fil-Lingwi differenti: Il-Każ ta' *In-Nemmies* bħala traduzzjoni ta' *Der Beobachter*
Translation Seeks to Negotiate the Cultural Chasm Mirrored by Different Languages: The case of *In-Nemmies* as a translation of *Der Beobachter*

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Abstract

This paper will focus on some of the strategic linguistic methods applied by Mr Alfred Scalpello, in his book ***In-Nemmies*** (2016); a direct German translation of Charlotte Link's original, ***Der Beobachter*** (2011). The ways with which the translator maintains the meaning of the primary text and the expressive flow of the original language (German) whilst adhering as closely as possible to the Maltese idiom will be analysed and discussed in the paper. It will also consider how some of the translation's employed idioms, fixed Maltese expressions and neologisms were used to successfully overcome the challenges found in the target language's lexical void. All this is done with the double aim of conveying the meaning expressed in German whilst imparting a tinge of local colour to the translated work, which in itself allows the Maltese readers to better relate, and to better experience a close affinity, with the world of the text. The proposed analysis also shows how ***In-Nemmies*** excellently fuses together the three main linguistic elements - the Semitic, the Romance and the Germanic - which across the centuries have formed the contemporary Maltese language. Thus, ***In-Nemmies***s showcases the versatility of the aforementioned language and also proves that the Maltese speaker-writer-thinker can accept with sterling success the challenge of translating foreign languages into the vernacular.

Ir-rumanz ***In-Nemmies*** ta' Charlotte Link, ippubblikat għall-ewwel darba fl-2011 fl-oriġinal bil-Ġermaniż – ***Der Beobachter***; u bħala ***The Watcher*** bl-Ingliż fl-2014, inbiegħ bir-radam – huwa dak li bl-Ingliż insejħulu *best-seller*. Barra minn hekk, fl-

2015 inħareġ ukoll film eponimu bil-Ġermaniż li ntwera fuq l-istazzjon televiżiv ZDF, imfassal fuq l-istess ġrajja.

F'dan id-dawl, il-qlib ta' *Der Beobachter* għall-Malti, flimkien mal-pubblikazzjoni tiegħu, offrew l-opportunità lil dawk il-Maltin litterati monolingwi jew bilingwi, li jkunu jistgħu jaqraw dan il-ktieb b'nisġa intriganti fi lsienhom nattiv. Dan il-fatt waħdu hu ta' benefiċċju għas-soċjetà Maltija, għaliex iżid jinkoraġġixxi l-qari f'pajjiżna b'mod in ġenerali, u dak bil-lingwa nattiva b'mod partikolari.

Bħala rumanz ġjallesk, *In-Nemmies* hu ktieb li jixpruna lill-qarrej tiegħu biex jaqra mhux biss b'interess fil-ġrajja, imma wkoll b'għatx klubi sabiex ikun jaf it-taħlila tal-kobba tan-nisġa kif sejra sseħħ u, m'għandniex xi ngħidu, l-identità tal-perpetratur tas-serje ta' delitti faħxija u għaliex.

Din il-karatteristika ta' *In-Nemmies* bħala qallieb il-paġni (bl-Ingliż ngħidulu *page-turner*), m'għandix dubju li xeħtet piż ieħor fuq spallejn it-traduttur tal-ktieb mill-Ġermaniż għall-Malti li barra li ried iżomm fidil lejn it-tifsiriet tal-ilsien sors (il-Ġermaniż) waqt li jirrendihom għall-ilsien mira (il-Malti), kellu wkoll ir-responsabbiltà li jżomm ir-ritmu espressiv kemm jista' jkun leġġer, mhux pedantiku, qrib l-espressjoni mitħaddta mill-Maltin, u għaldaqstant idjomatiku kemm jista' jkun.

Dan kollu Alfred Scalpello kellu jwettqu f'ħin wieħed, u bħalma jintwera fis-siltiet magħżula, irnexxielu jagħmlu b'mod effettiv u bil-ħila ta' traduttur imrawwem u mkisser sew f'xogħlu. Mhux hekk biss. Minħabba li l-ġrajja ta' *In-Nemmies* hi ambjentata f'pajjiż barrani, sewwasew fl-Ingilterra, it-traduttur kellu jaffaċċja l-problema li mhux dejjem ifittex b'suċċess, termini bil-Malti li jkunu ekwivalenti (fit-tifsir) għal dawk barranin, jew li jirrispekkjaw faċilment ir-realtà kulturali li jirreferu għaliha. Allura kellu jirrikorri għall-ħolqien tan-neoloġiżmi (jiġifieri l-ħolqien ta' kliem jew espressjonijiet fil-lingwa); inkella jirrikorri għal mezzi oħra 'innovattivi' (bħal ngħidu aħna l-perifrażi) biex is-sens fl-ilsien sors jitwassal kemm jista' jkun bla mittiefes. Dawn huma każijiet interessanti li jixhdu s-siwi mitqlu deheb tat-tlaqqigħ ta' lsien ma' ieħor fil-qasam tat-traduzzjoni, u l-benefiċċju tal-istess fenomenu fil-każ ta' lsienna meta din l-isfida quddiem xi vojt lessikali tingħeleb, u tingħeleb b'mod xieraq.

Ngħidu aħna waqt il-qari ta' *In-Nemmies*, ġie nnutat fost l-oħrajn il-ħolqien/l-użu ta' termini bħal:

Paġna	Malti	Ingliż	Ġermaniż
282	"kamra taħt il-bejt" (frażi)	*attic/storeroom*	Gerűmpelkammer unter dem Dach
386	"slitta, speċi ta' ħaġa ċatta ħamra, b'post biex joqgħod fiha bniedem wieħed." (perifrażi)	*toboggan*	Schlitten mit einem kleinen geformten Sitz
386	"slitti tal-injam" (frażi)	*sleighs*	Schlitten
432	"tettiera"	*teapot*	Kanne

672	"bil-fruntuni ta' saqaf forfiċi u t-turretta" (deskrizzjoni)	*with gables and slanted roof*	Giebel und Tűrmchen
669	"irġiel tas-silġ" (frażi)	*snowmen*	Schneemänner
566	"post/(binja) tal-kaċċaturi" (frażi)	*hunters' lodge*	Hűtte
669	"iċ-ċnut tal-ġonna" (frażi)	*garden fences*	Auf den Gartenzäunen

Dawn ilkoll jixhdu mhux biss il-metikolożità tas-Sur Scalpello fil-qlib tiegħu tat-test imsemmi mill-Ġermaniż għall-Malti, imma wkoll id-dedikazzjoni tiegħu lejn ilsienna. Scalpello m'għażilx li jintelaq mal-kurrent u – bħalma sfortunatament qed ikollna frekwentement – ċeda l-armi u rrikorra mill-ewwel għall-Ingliż; imma meta u fejn possibbli, ipprovda termini jew frażijiet awtoktoniċi (jiġifieri li joriġinaw fi ħdan il-post jew pajjiż) biex jirreferi għal entitajiet li fil-Malti – minħabba l-fatt li r-realtà Maltija mgħajxa hi dik li hi – m'għandniex (jew aħjar ma kellniex – għax issa għandna) termini għalihom.

Hawnhekk għadni kif għedt "meta u fejn possibbli", u allura ħa norqom daqsxejn dak li għadni kif għedt ... għaliex Scalpello, attwalment jagħmel użu minn termini ta' nisel Ġermaniku (mill-Ingliż), għaliex jirrikonoxxi u jirrispetta wkoll il-konswetudni fost il-kelliema ta' lsienna, li fi żminijiet reċenti, biex iżommu l-Malti aġġornat maż-żminijiet kontemporanji, introduċew u integraw termini bħal *kompjuter*, *mowbajl* u *risiver*. F'dan m'hemm ebda nuqqas, basta l-introduzzjonijiet isiru bil-qies, skont kif u kemm meħtieġ. U hekk għamel ukoll Scalpello.

Madankollu ta' min ngħidu wkoll, li sforz kemm Scalpello jirreżisti t-tendenza li jaqbad u jirrikorri għall-għażla faċli – jiġifieri li jaqbad u 'jissellef' xi terminu ta' oriġini Ingliża – saħansitra jasal biex iħaddem it-terminu misjub fid-dizzjunarju tal-Prof Ġ. Aquilina (1987) 'buta' għal *luggage-booth,* flok kif jagħmlu bosta Maltin, li jgħidu 'but (ta' quddiem/ta' wara) [ta' karozza]' ... (kelma li minħabba li l-Maltin għandhom tendenza ma jippronunzjawx it-*th* /Θ/ tal-Ingliż, inzertat omofona ma' 'but', bl-Ingliż *pocket*). L-istess fil-każ ta' 'karavana' (meta bosta Maltin illum aktarx li jgħidu 'karavan' [jekk mhux ukoll 'kemper' – mill-Ingliż *camper*).

Kollox ma' kollox, il-verżjoni tradotta għall-Malti minn Scalpello żżewweġ b'mod xieraq u effettiv ħafna t-tliet elementi ewlenin li matul is-sekli sawru lsienna biex hu kif nafuh illum. **In-Nemmies**, waqt li huwa mera tal-versatilità ta' lsienna, huwa wkoll prova oħra li l-kelliem-kittieb ħassieb Malti jista' mhux biss jaċċetta l-isfida li jittraduċi minn ilsna barranin għall-vernakular, imma wkoll jegħleb dik l-isfida b'suċċess.

Bħala xhieda ta' dan, hawnhekk mhux biss se tinġieb silta mill-ktieb **In-Nemmies**, biex tintwera l-fluwidità tal-Malti mħaddem, iżda se tiġi preżentata wkoll grafikament bil-kliem imlewwen skont l-oriġini tiegħu Semitika (jiġifieri mill-Għarbi); Rumanza (jiġifieri mil-Latin/Taljan/Sqalli); jew Ġermanika (jiġifieri mill-Ingliż). Dan biex jintwera l-interzjar li jirnexxilu jagħmel Scalpello bħala mezz biex jilħaq għanijietu – ir-rendiment ta' **In-Nemmies** fl-ilsien Malti b'mod li tassew ħaqqu kull tifħir.

Fit-Tabella qiegħda tingħata l-Kodiċi għas-silta meħuda mir-rumanz, imqassma skont l-Elementi ewlenin kostituttivi tal-Ilsien Malti.

It-Termini ta' nisel Semitiku b'lewn aħmar
Ta' nisel Rumanz b'lewn aħdar
Ta' nisel Ġermaniku b'lewn ikħal

"Kienet ilha s-snin, bejn il-Milied u l-Ewwel tas-Sena tmur għand in-nanniet. Il-ġirien kollha tal-familja Ward kienu jafuh dan."
"Imma, Sir, l-istramberiji l-oħra kollha marbutin ma' Samson Segal donnhom japplikaw għalih biss, u għal ħadd iżjed."
"Trid tgħid li kien qed jimmaġina li Gillian kienet ser tkun weħidha d-dar? U ddeċieda li jidħol għandha bil-forza u joqtolha? Lil dik l-istess mara li hu tant kien jadura?"
"Imma li ma kinitx tkellmu," kompliet Christy, "anzi lanqas biss tagħti kasu. Barra minn hekk, ma ddefenditux meta żewġha għamel għalih bl-ikrah. Kien qed iħoss *li kienet qed iġġib ruħha miegħu bħallikieku kien xi demel*; fil-fatt dan hu dak li kiteb dwarha fin-notamenti fil-kompjuter; hekk iddeskrivieha. U b'dan il-mod kien qed jesprimi l-mibegħda kollha li kien qed iħoss lejha. Xi darba kien aduraha, imma issa kollox kien spiċċa fix-xejn. U kien qed iħossu ddiżappuntat għall-mewt minnha."
Fielder mexxa jdejh it-tnejn ma' wiċċu kollu. Kien għajjien mejjet u fuq kollox kien qed iħossu jitlef il-paċenzja, apparti li kien qed iħoss l-effett tax-xampanja li kien xorob il-lejl ta' qabel.
"U kif ser norbtu l-każijiet ta' Anne Westley u Carla Roberts ma' din it-teorija, eh? Waħda maqtula f'Hackney u l-oħra Tunbridge Wells?"
"Elementari, Sir. Għandu l-karozza. M'hemmx xi distanzi ta' barra minn hawn bejn iż-żewġ postijiet."
"Imma kieku, ngħid jien, ma kienx isemmihom ukoll fin-notamenti tiegħu fil-kompjuter? Le, Surġent," qalilha hu u jxengel rasu, "hemm wisq affarijiet li m'għandhom x'jaqsmu xejn ma' xulxin. B'hekk saħansitra t-teoriji mhux għalkollox sodi li konna qed naħdmu fuqhom qed nindunaw li mhumiex ta' min jorbot fuqhom aktar. Biss, irnexxielna għall-anqas niskopru xi ħaġa komuni bejn Anne Westley u Carla Roberts: it-tnejn li huma kienu jgħixu għalkollox weħidhom u, mindu ħadu l-pensjoni, ukoll iżolati għalkollox minn kollox u minn kulħadd. Mill-banda l-oħra Gillian Ward, miżżewġa, għandha tifla u taħdem."

Ta' min jinnota hawnhekk l-użu ta' għadd preponderanti ta' kliem ta' nisel Semitiku, fatt li jirrifletti r-realtà li fil-Malti l-lessiku marbut mal-ħajja bażika u kwotidjana, aktarx ikun ta' dan in-nisel. Il-lessiku ta' nisel Rumanz fil-Malti jegħleb fil-għadd lil dak Semitiku, imma l-frekwenza tal-użu tal-Malti Semitiku f'sitwazzjonijiet ta' kuljum, anke msieħba mill-fatt li l-bażi morfoloġika hi fil-qofol tagħha Semitika bil-prefissi u s-suffissi li tinvolvi, tirrendi lill-Malti jinħass u jinstema' qisu Għarbi f'ċirkostanzi relatati mal-ħajja 'ordinarja'.

Interessanti nsemmu wkoll dawk il-każi fejn Scalpello jirrikorri għal idjomi jew espressjonijiet fissi Maltin, bil-għan li jikkomunika l-istess sens espress fil-Ġermaniż, sabiex tinżamm dik il-laqta lokali u b'hekk il-qarrej ikun jista' jirrelata aktar, u jġarrab affinità aħjar, mad-dinja tat-test.

Din li ġejja hija tabella b'lista ċkejkna misluta minn għadd tassew kbir ta' idjomi u/jew espressjonijiet fissi li timmanifesta dan li qiegħed ngħid.

Paġna	Idjoma/Espressjoni fissa Maltija	Sens (ta')	Verżjoni litterali bil-Ġermaniż	Idjoma ekwivalenti bil-Ġermaniż
70	"kien jaqbdu l-bard meta jiftakar"	'tkexkix'	'erschrak'	"gruselte es ihn bei der Vorstellung"
149	"kienet minnufih iddawwar denbha u titlaq"	'irtirar' /'iddabbar rasek'	'kehrte zurück'	"auf dem Absatz kehrtgemacht"
277	"ma jibqagħlux ħajta fi lsienu"	'espressjoni bla lġiem'	'losredet'	"Den Mund nicht mehr hält"
314-5	"dan hu kien diġà xammu"	'induna'	'Verdacht'	"schon gespürt"
314	"jidħol fil-kredu"	'involviment (involontarju)'	'auch verwickelt werden'	"Auch in Schwierigkeiten geraten"
317	"dahru mal-ħajt"	'restrizzjoni' (qawwija)	'Zwischen zwei Stühlen'	"In der Not frisst der Teufel Fliegen" (*beggars cannot be choosers*)
378	"nies bħalu qatt ma niżluli għasel"	'antipatija'	'erwiderlich sein'	"Solche Menschen waren mir noch nie sympathisch"
380	"f'din il-biċċa hemm xi ħaġa tinten"	'suspett'	'etwas klingt sehr verdächtig'	"Da stinkt etwas gewaltig!"
637	"issaffar l-Aida"	'ma tista' tagħmel xejn'	'bekam keine Hilfe'	"Beide haben sich komplett herausgehalten"
676	"waqgħu fil-muta"	'sikta'	'schwiegen'	"Sie schwiegen beide ein paar Augenblicke"

References

Link, C. (2016). *In-Nemmies*. Scalpello, A., translation of **Der Beobachter** (2011), Malta: Horizons.

Bio-note

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Abortion: Breaking the Barriers of Patriarchy

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Abstract

Abortion in Malta is a taboo. Abortion in Malta is a crime. Abortion in Malta is a sin. Women who perform abortion in Malta are breaking barriers, the barriers of patriarchy.

Historically, birth control has always been socially regulated. Radical feminists have indeed emphasised the control of women's reproductive role and how this is defined and controlled as being the root of patriarchal oppression. Since the emergence of the feminist movement, the right of access to effective and safe contraception, including the right to abortion on demand, has been a focal point around which many campaigns have been fought.

There has however been strong resistance to demands for women's right to control their own bodies, with abortion on demand as of right. Traditionally, the state, religion, and the medical profession have been pivotal agents in controlling access to safe abortion and instilling the discourse that it is criminal, sinful and abnormal. Nonetheless, women have always performed abortions by any means necessary regardless of restrictive legislation, religious dogma, and medical provision, often at considerable risk to their own health and lives.

Consequently, this paper will provide an analysis of the social control of abortion in Malta through examining the medico-legal-moral discourse on the issue and the experiences of women who defied and broke through the barriers of this patriarchal control.

Keywords: Feminism, Abortion, Power, Social Control

Introduction: The nature and scope of barriers

Barriers can take many forms. They can be cultural, legal, and moral. They impact on access to rights and services. They frame values, discourse, power and knowledge. They define what and when something is right or wrong. They differentiate between good and bad, us and them, what is acceptable and what is not. Barriers also have a functional role; they provide a safety net, offering a protective barrier against the unknown, a barrier against potential trajectories which may implode the status quo into a new cultural, legal and moral order. Through their 'regimes of truth' abetted

by normalising 'gazes', 'panoptican' surveillance and 'disciplinary power' (Foucault, 1980; 1973; 1977), they thus justify the status quo, hegemonise it and reproduce it.

Breaking barriers is not easy. It comes with a price, and a very high one at that. Those who have broken barriers or even attempted to do so, have often been oppressed, excluded, stigmatised and ridiculed. Yet, history has often proven them right and when triumphant they have managed to share new visions, instil alternative discourses and institute varying degrees of accepted 'truths'.

Abortion in Malta is a taboo. Abortion in Malta is a crime. Abortion in Malta is a sin. Women who perform abortion are breaking barriers, the barriers of patriarchy.

The barriers of patriarchy

> Patriarchy is the power of the fathers: a familial-social, ideological, political system in which men-by force, direct pressure, or through ritual, tradition, law, and language, customs, etiquette, education, and the division of labor, determine what part women shall or shall not play, and in which the female is everywhere subsumed under the male. (Rich, 1977, p.21)

Feminists, particularly radical feminists have emphasised the view that contemporary Western society is primarily patriarchal; it is dominated and ruled by men, in a way that men are the ruling class and women the subjugated class. This social control "assumes many forms, it may be internal or external, implicit or explicit, private or public, ideological or repressive...It may also not even be perceived or experienced as control" (Smart & Smart, 1978, p.2). Patriarchal institutions and discourses impose legal, cultural and moral norms which reduce the opportunity for women to make genuine choices about the way they may want to live their lives, including the ability to exert control over their own bodies.

Barriers to reproductive control

Since the emergence of the feminist movement in the late 1960's, the female body has been a focal point around which many campaigns have been fought. The right to the autonomy of the female body has indeed been argued in relation to effective and safe contraception, abortion and birthing methods (Gatens, 1996).

Radical feminists have emphasised the control of women's reproductive role and how this is defined and controlled as being the root of patriarchal oppression. Mitchell (1971) identified reproduction as one of four structures of women's oppression, the others being production, sexuality and the socialization of children. Firestone (1971) argued that women's oppression is a direct consequence of child-

bearing. Thus, reproduction is a source of power, which women should control, for as long as reproductive technology is controlled by men it will be utilized, not to empower women, but to consolidate patriarchal control (Rich, 1977).

Birth control has always been socially regulated (Ehrenreich & Deidre, 1978; Petchesky, 1990). Indeed, "almost all extant cultures regulate women's procreation, through regulating marriage or women's sexuality or both" (French, 1986, p.27). This is because through regulating sexual activity and population size birth control is pivotal for societal development. "Birth control bears, too on a third social phenomenon: the role of women" (Albury, 1999, p.3). Besides, it touches on the most intimate of human relations and the power sharing within those relationships. Women who can control their reproduction are women who are "less dependent, more self-assured, more active" (Huston, 1992, p.5). However, this "spectre of independent women brings fear to the hearts of those who would maintain their power and privilege" (Hudson, 1992, p.5).

Systems of sexual control change with women's social status, in a way that they both reflect and affect one other. There has been an especially strong causal connection between the subjection of women and the prohibition of birth control; whereby the latter has been a means of enforcing the former (Albury, 1999; Huston, 1992; Chalker & Downer, 1992).

As a result, the question of who controlled birth-control technology has always been at issue. Biologically, it is 'natural' for women to control reproduction. In fact, birth control has always been a 'women's liberation' issue, "developed by women and handed down from generation to generation" (Albury, 1999, p.27). However, "once men discovered their role in conception, they assumed control by exercising their general control over when, how often, and with whom women could have sexual intercourse" (Albury, 1999, p.4).

Historically, control over reproduction has often operated through repressive forces such as for example, through the use of chastity belts, confinement to the home, chaperoning and making birth-control, such as abortion, illegal. Although such visible mechanisms are still widely used today, they have been accompanied and/or replaced, particularly in Western cultures by more subtle and less visible mechanisms of control.

Such strong controls, according to Hutter & Williams (1981) suggest that, the attempt of women to liberate themselves from their subjugated position, poses a particularly strong threat to the existing social order. Indeed, there has been strong resistance to demands for women's right to control their own bodies, such as for example the liberalisation of abortion legislation, with abortion on demand as of right. All sorts of arguments were and are used to resist social change:

> Family planning pioneers were accused of promoting promiscuity, of being unpatriotic, of questioning God's will, of distributing pornography and of encouraging pre-marital sex. Motherhood was endorsed as the supreme role of women, children acclaimed as 'gifts

from God', treasures of the family and nation...Some expressed their
fears more candidly: "What impertinence on the part of women to
claim their rights when they are under men's perfect protection"
(Huston, 1992, p.5).

Nonetheless, the prohibition of birth control required constant reinforcement
since women have always performed abortions by any means necessary, regardless
of restrictive legislation, religious dogma, and medical provision. Induced abortion
is indeed one of the most performed medical interventions worldwide. Around
25% of all global pregnancies are terminated, resulting in around 56 million
induced abortions per year. This accounts for more than half (56%) of the 99
million unplanned annual pregnancies[1] (Guttmacher Institute, 2018). There is good
evidence that when abortion is not legally available, women will often resort to
illegal means even at considerable risk to their own health (Callahan, 1970). Indeed,
abortion rates are relatively equivalent, irrespective of a country's legal status.[2] The
Guttmacher Institute (2018) estimates that 45% (25 million) of abortion interventions
are performed under unsafe conditions and in an adverse social and legal climate.
This results in the avoidable death of around 68,000 women per year, apart from
various other underlying health complications and morbidity[3] (Grimes et al., 2006,
p.1908). Unsafe abortion as a result has been deemed as "a persistent, preventable
pandemic" (Ibid., 2006, p.1908) arising from "apathy and disdain toward women"
(Ibid., 2006, p.1908).

While legal prohibition and sanctions could suppress medical access, control
could more effectively be sustained by persuading individuals that abortion was
morally wrong. As a result, women's attempts to assert the right to terminate
pregnancy have often involved direct defiance of religious teachings on reproduction
and birth control. The right to abortion on demand has also involved struggles
between feminists and the medical profession, who often controlled access to birth
control services. Besides, the "meaning of the early women's liberation slogan, 'the
personal is political', took on an added and unwelcome dimension when acts that
women saw as personal choices were forbidden or penalized by the state" (Gatens,
1996, p.49).

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1   Data on pregnancies occurring between 2010 and 2014.

2   In countries where abortion is legal and without any restrictions, the abortion rate is 34
    per 1,000 women, while it is 37 per 1,000 in countries where it is prohibited or restricted
    only to save the woman's life (Guttmacher Institute, 2018).

3   Such data may be under-estimated, particularly in countries where abortion is illegal
    (Grimes et al., 2006).

Legal, Religious and Medical Barriers

The state's subjugation of women is best examined in terms of its legal frameworks since the "Law is a reflection and a source of prejudice" (Schulder, 1970, p.139). Despite the fact that abortion can prevent the "unnecessary suffering and death of women" (Women on Waves, 2003), in several countries, including Malta[4], it remains a criminal offence, in violation of "women's human rights based on agreements made at the UN International Conference on Population and Development in Cairo, the Fourth World Conference on Women in Beijing and the Universal Declaration of Human Rights" (Women on Waves, 2003). Even in countries where abortion is legal, access was granted "as a private privilege, not as a public right" such that often "women got control over reproduction...controlled by 'a man or The Man'" (MacKinnon, 1989, p.192). Being subject to a variety of state restrictions regarding consent provisions and availability of public funding (Nicholas, Price Rubin, 1986), abortion was thus not so much decriminalised as it was legalised (MacKinnon, 1989). Though through law reform[5] in various countries, the content of legislation has become less obviously chauvinist, the social control of women is mediated through various other agencies which, "may ultimately have the backing of law but which, in appearance, are far removed from legal institutions" (Hutter & Williams, 1981, p.43).

Apart from accessibility, women's choices are also highly affected by what they have come to know and feel about abortion. Religion, often acting as the state's critical conscience, plays a powerful role in this respect via its teachings on abortion as morally wrong and sinful. Indeed, the "fundamentals of the three great contemporary monotheistic religions...are all opposed to contraception, abortion, and the sexual autonomy of women" (Paris, 1992, p.14). For example, Church

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4   Abortion in Malta constitutes a criminal offence in all circumstances, including where the woman's life is at risk. Under Article 241, 'Of Abortion, of the administration or supplying of substances poisonous or injurious to health, and of the spreading of disease', the Criminal Code specifies that "any woman who procure her own miscarriage, or who shall have consented to the use of the means by which the miscarriage is procured" shall be subjected to a term of imprisonment from 18 months to 3 years. The same punishment is meted out to "whosoever, by any food, drink, medicine, or by violence, or by any other means whatsoever, shall cause the miscarriage of any woman with child". Article 243 specifies that "physicians, surgeon, obstetricians, or apothecaries, who have knowingly prescribed or administered the means whereby a miscarriage is procured", shall be subjected to a term of imprisonment from 18 months to 4 years, and to perpetual interdiction from the exercise of one's profession.

5   In 1973, in Roe vs. Wade and Doe.V. Bolton, the US Supreme Court declared that the Constitution of the US protected a woman's right to terminate an early pregnancy (with doctor's consent).

teaching[6] suggests that life begins at conception, thus abortion is a hideous sin which results in the killing of innocent people. Pro-choice feminists however have argued that abortion need not be illegal, since "a sin is not a crime" (Kenyon, 1986, p.72).

Apart from religious dogma, patriarchy is also sustained through scientific discourse and truth-claims. This is evidenced by the medicalisation of pregnancy and childbirth which "re-defines control of birth...as the property of doctors" (Oakley, 1984, p.276). On the issue of abortion, physicians asserted both moral stature and technical expertise, by claiming that abortion is wrong but that they also have the right to declare it necessary, thus determining whether, or on what grounds, women can perform an abortion. They sought thus "to regulate abortions, thereby serving their own professional goals" (Luker, 1984, p.32).

The ability of women to determine and transform their realities is hence impeded by various powers, in a way that "Women's unjust legal, political, economic and social powerlessness explains much unsafe motherhood and maternal mortality and morbidity" (Cook & Dickens, 2002, p.64). Medico-legal moral control on abortion can be seen as part of this larger pattern of patriarchal control.

Methodology

Consequently, this paper inquires into the nature of social control carried out on women by the medico-legal-moral power elite[7] in Malta, a country where abortion is still a taboo. Besides it is illegal, unavailable by mainstream medical means and considered a grave sin by Catholic Church teachings.

In the recognition that abortion is a controversial issue upon which several truths are constructed and 'discursive' power exerted, the study is based on two types of data; discourse content analysis of the power elite's positions, policies and statements, and intensive interviewing with ten Maltese women who have themselves experienced abortion. While content analysis was upheld to analyse the prevailing ideologies that shape the present public discourse on abortion, intensive interviewing enabled the extrapolation of first-hand personal accounts in contrast to the dominant world view. In view of this, the research poses two main questions: is power and control exerted by the medico-legal-moral power elite? And, are women who perform abortion breaking the patriarchal barriers of medico-legal moral control?

The underlying methodological ideology of the study engages with critical social science research by linking research with trying to transform society, and standpoint feminist research (Stanley & Wise, 1983) which proceeds from the analysis of

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6   in the Vatican's Charter of Family Rights (1983) and papal encyclical 'Humanae Vitae' (1968).

7   Hereby considered as being; the Catholic Church, the State and the medical profession.

women's experiences to challenge 'malestream' andro-centric research. The main analytical theoretical tools employed are those of Radical Feminism and Foucault in the recognition that; "both feminists and Foucauldians see the body, and more specifically sexuality, as central to the interplay of power and resistance" (Gatens, 1996, p.22).

Discursive Barriers: Different World Views

Malta is the only EU country which entirely outlaws abortion. As a tabooed subject, abortion remains exceedingly controversial, yet under debated and unevenly flanked by the pro-choice and pro-life fronts.

Major differences are observed between the positions upheld by the State, the medical profession and the Catholic Church and that of Maltese women who have experienced abortion. These differences emerge on a number of factors, and arise from, as well as give rise, to different world views. Indeed, what pro-life and pro-choice advocates think about abortion, is merely "the tip of the iceberg" (Luker, 1984, p.159) since different beliefs about personhood, parenthood, the role of the sexes and human nature are all called into play, in a way that, "what is at odds is a fundamental view of reality" (Luker, 1984, p.128).

Public discourse as evidenced from the media content analysis is dominated by pro-life views, which project the issue above all as an ethical-moral one. This discourse largely promoted by the medico-legal moral elite considers abortion as intrinsically wrong because it takes human life, it intrudes on God's will and thwarts traditional gender roles. As articulated in a statement by the Bishops of Malta and Gozo (2008): "Abortion is not a choice but murder; abortion is not a right but a negation of the right to life; abortion is not beneficial, neither for society nor for the mother herself" (Baklinski, 2008). Such a world-view is generally associated with values that promote sexual relations for procreative reasons within marriage whilst viewing childbearing as the supreme role of women. Since these roles have been "satisfying ones for pro-life people, the act of abortion is wrong because it plays havoc with this arrangement of the world" (Luker, 1984, p.162).

In contrast, Luker argues that pro-choice people tend to believe that men and women are considerably equal, "by which they mean substantially similar" (1984, p.176). Thus, gender roles are viewed not as natural occurrences but as potential barriers to full equality. As a result of their strong belief in the rights of the individual, pro-choice people believe that abortion is an individual, private choice, such that it should not be subject to religious or governmental interference.

The women under study owe various similarities to the attributes of pro-choice women referred by Luker, namely that they are; "educated, affluent, liberal, whose lack of religious affiliation suggests a secular, 'modern', or utilitarian outlook on life" (1984, p.198). They adhere to feminist ideology, profess pro-choice views and

feel that the social control on abortion in Malta hinders the protection of their reproductive rights and freedoms and their general quality of life. As recounted by one of the participants, "How society looks at a person who performs abortion, I think that is the most difficult…because people do not accept it …it is still a big taboo". Another participant argued that this experience make you feel as "you are living a lie…because you get the feeling that you have done something wrong when you know that for you it wasn't wrong at all".

As a result, the research substantiates the view that, while the medico-legal-moral elite promote "restrictive policy arguments towards abortion [which] have been connected to the hierarchical cultural bias", the women under study uphold more "permissive policy arguments [that] have been associated with egalitarian and individualistic worldviews" (Stenvoll, 2002, p.287).

Though there are signs that within Maltese society attitudes may be changing, as evident from the pro-choice stance sustained by a number of gender equality and human rights organisations[8], the view of abortion as immoral and criminal remains at the basis of the controversy and the issue is not yet posed as a struggle over ideology and justice. Indeed, Maltese political culture, which lacks a tradition of progressive issue mobilisation and active female participation, remains heavily elitist and patriarchal.

The subject of abortion still does not occupy enough dedicated space in local public discourse and is not judged by the concerned authorities as sufficiently pressing to merit pro-choice action or to be placed higher on the policy-making agenda, suggesting a political expediency in maintaining the present status quo. Given these circumstances, the likelihood is that "a tyranny of silence will continue to envelop the problem of abortion" (Kulczycki 1999, p.44).

Breaking the barriers of patriarchal control

The present 'truth' on abortion resides primarily in the existing ideological structures, whereupon the Catholic Church, the medical profession and the Maltese state, through their complementary discourses and truth-claims generated by religion, scientific knowledge and the law, form a power elite bloc which profess that abortion is "A crime against psychology, a crime against morality and a crime against the law" (Hale, 1867).

As a result, the story of abortion in Malta culminates in a position which can easily be depicted through Althusseran analysis of the ideological and repressive state apparatus (Althusser, 1984). The ideological state apparatus epitomised by the Church and medical profession, and abetted by mainstream media, consolidate the

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8   Such as 'Moviment Graffitti', 'Malta Humanist Association' , the 'Women's Rights Foundation' and the 'Network for Young Women Leaders'.

view that abortion is unnatural and ethically and morally wrong, whilst the law as part of the repressive state apparatus, criminalises abortion and those who attempt to resort to it.

Viewed from a radical feminist perspective, the situation can be attributed as depicting a state of patriarchy, whereby those in power act as a hegemonic power elite bloc, to directly and indirectly control women on and through the issue of abortion, whilst consolidating their vested interests.

However, "Women are controlled, and free themselves from control, in many ways" (Hutter & Williams, 1981, p.9). Indeed, despite this 'tyranny of silence', its unavailability, illegality and 'immorality', abortion is still being performed by Maltese women[9], as evident from the significant yet poorly accounted incidence of 'abortion tourism'[10].

The situation could indeed be depicted from a Foucauldian perspective, whereby despite the exertion of both 'bio' and 'juridical' power (Foucault, 1980) by the medico-legal-moral elite, the act of abortion in itself offers a concrete example of how through 'technologies of the self' (Foucault, 1985) women challenge, resist, and liberate themselves from practices of 'subjectification', and 'disciplinary' control. As "there are no relations of power without resistances" (Foucault, 1980, p.142), the act of abortion by Maltese women in an environment where abortion is illegal, immoral and unavailable by current medical practice presents a strong act of resistance which breaks through the barriers of patriarchal control.

Conclusion: Breaking barriers - An ongoing struggle

Feminists have gone a long way in asserting women's rights and freedoms. Breaking the barriers of patriarchy is still work in progress and will remain so for many years to come. It entails an ongoing and relentless struggle of breaking barriers at all levels and structures of society, one after the other until full equality is achieved and rights and freedoms are restored. It is to thus positively noted that

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9   Mainly women who have the financial means to procure it abroad and possess the opportunity means and know-how of going about the performance of such procedure.

10 There are no reliable figures on the incidence of abortion carried out by Maltese women either locally or abroad. Estimates on the number of abortions carried out in the UK between 1990 and 2000 refer to an average of 57 abortions annually (NSO, 2002). Similarly, estimates for 2001 to 2016 refer to an average of 58 annual cases (Johnston, 2018). However, this data is likely to be an underestimation since it only comprises the number of abortions carried out in the UK and does not include abortions carried out in other countries. Other estimates indeed speak of around 300 annual abortions carried out overseas by Maltese women, presenting an abortion rate of between 3.6 to 4.7 per thousand woman (as compared to an EU average of 4.4) (Cacopardo as cited in Iversen, 2018).

> If patriarchy had a historical beginning, it can also have an historical end…one cannot simply step painlessly and effortlessly outside the web of one's world and begin spinning a new one; such an escape can only be won. Each time, the centre, the nerve of power, is gained only with a meticulous separation of strand after strand until the mechanisms of oppression are finally understood. (Nye, 1988, p.232)

References

Albury, R.M. (1999). *The Politics of Reproduction: Beyond the Slogans*. St. Leonards, N.S.W.: Allen & Unwin.

Althusser, L. (1984). *Essays in Ideology.* London: Verso.

Baklinski, T. M., Abortion is "Murder" and a "Negation of the Right to Life": Maltese Bishops to Council of Europe. Catholicism.org. 15 April 2018. Available at http://catholicism.org/abortion-is-murder-and-a-negation-of-the-right-to-life-maltese-bishops-to-council-of-europe.html [Accessed 20 August 2018].

Callahan, D. (1970). *Abortion: Law, Choice and Morality*. New York: MacMillan.

Cook, R.J. & Dickens, B.M. (2002). The Injustice of Unsafe Motherhood. *Developing World Bioethics,* 2(1), 64-81.

Ehrenreich, B. & Deidre, E. (1978). *For Her Own Good: One Hundred and Fifty Years of the Experts' Advice to Women.* New York: Doubleday.

Firestone, S. (1971). *The Dialectic of Sex: The Case for Feminist Revolution*. New York: Morrow Quill Paperbacks.

French, M. (1986). *Beyond Power: On Women, Men and Morals*. London: Sphere Books.

Foucault, M. (1985). *The History of Sexuality*, *Vol.2*: The Use of Pleasure. New York: Viking.

Foucault, M. (1980). *Power/Knowledge: Selected Interviews and Other Writings 1972-77*. London: Harvester Press.

Foucault, M. (1977). *Discipline and Punish: The Birth of the Prison.* London: Allen Lane.

Foucault, M. (1973). *The Birth of the Clinic*. London: Tavistock.

Gatens, M. (1996). *Imaginary Bodies. Ethics, Power and Corporeality*. London: Routledge.

Grimes, D.A., Benson, J., Singh, S., Romero, M., Ganatra, B., Okonofua, F.E. and Shah, I.H. (2006). Unsafe abortion: the preventable pandemic. *Sexual and Reproductive Health,* 365 (9550) 1908-1919.

Guttmacher Institute. (2018). Induced Abortion Worldwide 2018 Fact sheet. Available at www.guttmacher.org/fact-sheet/induced-abortion-worldwide [Accessed 20 August 2018].

Hale, E.M. (1867). *The Great Crime of the Nineteenth Century: Why is it committed? Who are the Criminals? How shall they be detected?* Chicago: Halsoy, C.S.

Huston, P. (1992). *Motherhood by Choice*. New York: Feminist Press at the, City University of New York.

Hutter, B. & Williams, G. (1981). *Controlling Women. The Normal and the Deviant.* London: Croom Helm Ltd.

Iverson, R. 300 to 400 Maltese Women go abroad for an abortion each year – AD Chairperson. *Malta Independent.* 4 February 2018, Available at www.independent.com.mt/articles/2018-02-04/local-news/300-to-400-Maltese-women-go-abroad-for-an-abortion-each-year-AD-chairperson-6736184440 [Accessed 20 August 2018].

Johnston. R.(2018). Abortion statistics and other data: Historical Abortion Statistics, Malta. *Johnston`s Archive.* Available at http://www.johnstonsarchive.net/policy/abortion/ab-malta.html [Accessed 20 August 2018].

Kenyon, E. (1986). *The Dilemma of Abortion*. London: Faber and Faber Limited.

Luker, K. (1984). *Abortion & the Politics of Motherhood.* California: University of California Press.

MacKinnon, A, C. (1989). *Toward a Feminist theory of the State*. U.S.: Harvard University Press.

Mitchell, J. (1971). *Woman's Estate.* New York: Pantheon Books.

Mohr, J. C. (1978). Abortion in America: The Origins and Evolution of National Policy, 1800–1900. New York: Oxford University Press.

National Statistics Office. (2002). *Children.* Valletta: National Statistics Office.

Nicholas, S. C., Price, A. M. and Rubin, R. (1986). *Rights and Wrongs: Women's Struggle for Legal Equality.* New York: The Feminist Press at the City University of New York.

Nye, A. (1988). *Feminist Theory and the Philosophies of Man*. New York: Routledge.

Oakley, A. (1984). *The Captured Womb: A History of the Medical Care of Pregnant Women*. Oxford: Blackwell.

Parliament of Malta. Criminal Code of the Republic of Malta. (1854 substituted by III.2002.43). *Chapter 9: Sub-title VII: 'Of Abortion, of the administration or supplying of substances poisonous or injurious to health, and of the spreading of disease'*. Laws of Malta.

Paris, G. (1992). *The Sacrament of Abortion*. Texas: Spring Pulications Inc.

Petchesky, R.P. (1990). *Abortion and Woman's Choice: The State, Sexuality and Reproductive Freedom*. Boston: Northeastern University Press.

Rich, A. (1977). *Of Woman Born: Motherhood as Experience and Institution*. New York: W.W. Norton.

Schulder, D.B. (1970). 'Does the Law oppress Women?' In M. Rubin, ed. *Sisterhood is Powerful: An Anthology of Writings from the Women's Liberation Movement,* New York: Random House, pp.153-175.

Smart, C. & Smart, B. (1978). *Women, Sexuality and Social Control.* London: Routledge.

Stenvoll, D. (2002). Norwegian Politics of Abortion: Perspectives, Arguments and Values*. Journal of Comparative Policy Analysis*, 4 (3), 287-304.

Women on Waves. (2013). Abortion Laws Worldwide. *Women on Waves website.* Available at https://www.womenonwaves.org/en/page/460/abortion-laws-worldwide [Accessed 20 August 2018].

Bio-note

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Outcomes of a Research Based Intervention Module on Fluids for Prospective Primary Teachers

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Abstract

The Physics Education Course for prospective primary teachers (PPT) in the University of Udine offers 15 thematic topics integrating disciplinary education, content research path proposals and laboratory activities. This research based model (Michelini, Santi and Stefanel, 2013) engages students in planning and experimenting teaching intervention modules in school. Here, we analyse the learning outcomes on topic of fluids in terms of planned proposals by PPT.

Keywords: Prospective Primary Teachers, Teaching Professional Development, Research Based Module, Proposals on Fluids.

Introduction

Teaching professional development is one of the most important aspects of education (Elbaz, 1983): it is linked to the possibility of improving students' learning, of renewing the implemented curriculum, of introducing teaching and methodological innovation based on the results of the research (Calderhead, 1996; Borko & Putnam, 1996; Park & Oliver, 2008). In the last 20 years, there has been a growing interest in didactic research for teacher training (Michelini, 2004; Cassan & Michelini, 2010).

The results of international surveys, which highlighted worrying educational shortcomings of students, particularly in the scientific field (IJSE, 2011; OECD, 2007; Holbrook & Rannikmäe, 2001), have focused attention on scientific teaching.

The main focus is on the teachers' needs concerning their subject knowledge and pedagogical aspects in trasmissive teaching. The models used in pre-service teacher education, offered as separate formative areas, are called PK (Pedagogical Knowledge) and CK (Content Knowledge), without providing areas for the construction of the PCK (Pedagogical Content Knowledge). In our research, a formative model focused on the construction of the PCK has been studied and tested, containing design and analysis of learning processes skills. The lack of competences in physics (CK) combined with a separate general education on pedagogical knowledge (PK) produce a double challenge in the PPT professional education on scientific field (Michelini & Stefanel, 2015; Fensham, 2001). As a wide research literature documented and underlined

(Shulmann, 1986; Abell, 2007; Berger, Eylon and Bagno, 2018; Borko, 2004), the need of integration of the knowledge areas require specific dedicated time and activities (Michelini, 2004; Ball & Cohen, 1999). The methodology consisted of finding a significant Rubric for this work, selecting and active design of this selected content.

The personal involvement of PPT in planning and analysing research based educational proposal for primary school and in experience practice in school (Ball & Cohen, 1999; Davis & Smithey, 2009; Imperio & Michelini, 2006) is important. We discuss here the theoretical model and the foundation of the implemented design in the case of perspective primary teacher education on fluids and we analyse the learning outcomes on topic of fluids in terms of planned proposals by PPT.

Intervention module on fluids for prospective primary teachers

The research sample

The Physics Education Course is included in the third year of the course of studies in Primary Education at the University of Udine. Of the 120 students enrolled, about 89% are third year attending students. The Course offers 15 thematic topics (fluids, optics, magnetic phenomena, electric phenomena and others) integrating disciplinary education, content research path proposals and laboratory activities. In this study, we analysed the fluid paths planned by 85 PPT. The PPTs worked to identify the concepts considered fundamental and conceptual knots, designed by means of two standard Rubric (S1 and S2). Moreover, the PPTs prepared the proposal of an educational path for the teachers to guide the children. Of these, 26 PPT implemented the intervention proposals in class with 331 school primary children (Tab.1), after discussion and revision, supported by the physics education course responsible. PPT analysed the pupils' learning process by means of different instruments and methods, and encouraged reflection on their own learning (Elbaz, 1983). In this paper, we analyse how students have taken, used and transformed the concepts of physics, the teaching approach and the associated discussions about basic concepts and specific learning difficulties.

Number of interventions	Class	Number of students
18	3^ CLASS	234
3	4^ CLASS	43
1	5^ CLASS	10
1	2^ CLASS	44
23		331

Table 1 - Primary students involved in teaching interventions

Setting of Physics Education Course

The challenge in teaching professional development is to form together the disciplinary and teaching skills competencies. In the Physics Education Course, this is achieved by focusing on the fundamental critical discussion on disciplinary elements in each thematic topic offered. Therefore, the work consists, on one hand, in the deepening of the physical content and, on the other hand, in a training proposal, which translates into a didactic proposal of contextual elements. In this way, a significant design rubric for this reworking, selection and active design of the selected content was found. The course includes, but is not explained in this work, a more detailed design by the students and an educational intervention that they monitor for the analysis of the learning process of children.

Research questions

The research questions focused in this study are:
1. How does PPT select the conceptual elements contained in the educational proposal on fluids and on the subject related reflection?
2. Does the approach by physics education proposals play a fundamental role in building competence in the subject and process of planning, discussing and proposal revising build the professional competences?
3. How does the implementation in class of a planned proposal and relative monitoring of learning by children contribute to a meta-reflection of the professional development?

Tools and methods

The resources for educational discussion were the documented implementation in primary classroom of the same topic (Michelini, 1995; Michelini, 2004), discussed during interactive lecture demonstration. The selected strategies and methods were 'Inquiry Based Learning' and 'Prevision, Experimentation, Comparison'. A conceptual analysis of the physics involved and the goals addressed was performed in parallel with the educational discussion of the topic. The task to prepare tutorials and educational materials for children (Michelini, 1995; Michelini 2004) produce a continue reflection of the choices for the learning environment and of the step by step approach. During the implementation of the proposed activities of the planned path, the PPT activated a meta-reflection on their educational practices. These models have been integrated with the informal learning acquired during the experience and in the research-action process of the teacher who utilises the didactic methods.

S1 and S2 Rubric

Two standard Rubric, S1 and S2, were designed and provided to the PPTs, who have used them in all the topics covered by the course. The S1 Rubric presents concepts and nodes, in which it is required to list the most important concepts on fluids, to identify the critical aspects and to motivate these choices. The S2 Rubric guides the planning of a didactic path through: 1) the sequence of the addressed contents 2) the map of the selected main concepts, 3) the logic of the planned route, 4) the list of concepts focused in accordance with the line of chosen reasoning; and 5) the questions / items / issues for the Inquiry Based Learning strategy and activities to be implemented in the classroom.

Content and research methods

The physics of fluids

The approach to physics of fluids starts with a comparison of the properties of solid, liquid and gas for the state identification of fluid. These are the following characteristics: the flowing because of the absence, or a minimal amount, of the parallel forces to surface, and the absence of the reaction to shear deformations, having high compressibility in the case of a gas and no compressibility in the case of a liquid. This justified the change of shape according to the container. Pressure becomes the needed quantity in describing action on a fluid system. Compressibility is a relevant property of matter in liquids but not in gases, where Boyle's law can be applied. Density is introduced as one of the main properties of the part of the system in a mesoscopic model. The electromagnetic interaction between close neighbours justifies the Pascal principle and the Stevino law. The equilibrium of part of a fluid offers the formal expression of the same Stevino law, applied in the case of the identification of the isobaric surfaces and equipotential free surface of liquids, it is discussed in the dam profile, communicating vessels and hydraulic press. Different kinds of U-tube manometers are used for exercises, for the analysis of siphons and aqueducts. Measurements offer the awareness that different densities distinguish between liquids and gases. Torricelli's barometer and vapor pressure introduce the analysis of atmospheric pressure and its dependence on density and temperature.

Archimedes' law emerges from the review of the equilibrium in liquids within different liquids and solids, to identify the role of the density of materials in the buoyancy processes. Different situations, for example solids in liquids and liquid cocktails, are used to reflect on Archimedes' law, which is then applied to the case of gases for hydrostatic balloons, hot air balloons, airships and two-arm balances. Case studies help the application of concepts in contexts, for example the pressure a giraffe's heart must create to provide its brain with blood, and the story of the crown of King Heron.

The teaching proposal

The educational path discussed is based on the inquiry approach of explorative experiments and offers a simple implemented path in primary school. The first step offers the opportunity to classify, in three boxes, a cluster of objects having different shape, volume and materials, as well as fluids in bottles and gases, to discuss the properties of the solid, liquid and gas states. Perfume collected in a bottle by means of water displacement, together with the vapour of boiling water, help recognizing the gas state and to consider an empty box as actually being a box full of air. Balloons filled with air and with water are pressed in a bowl; the air-filled balloon has its volume reduced, while the water-filled one changes only its shape. The great compressibility of gases is discovered by pressing an equal quantity of water and air in a syringe. Poking holes in a closed water bottle laid on its side produces jets of water on the opposite far side; this is explained by the Pascal principle. In fact, the jets of water produced by a bottle standing regularly are also equal in pressure. The different jet of water produced by poking holes at different heights to the same standing bottle of water introduces the Stevino law. The case of a bobble of air in a syringe of water offers the opportunity to analyse the Pascal principle's role in overcoming the well-known conceptual misunderstandings on the dimension, position and shape of the bubble when the piston is pressed. The concept of pressure is discussed in depth by understanding it as a force distributed on a surface, on the state property of pressure and on the effect of volume change produced by increasing or decreasing pressure. The increase in pressure and compressibility are analysed in relation with the kind of liquid and gases considered. The interpretative plan introduces an objectual model of the mesoscopic fluid model: a water tank is replaced by water balloons (and then, by equivalent foam balls) to represent the mesoscopic portions of the fluid. The equivalent tank of balls is pressed by a piston (Fig. 1) and all the balls appear deformed by the interaction of the close neighbours, showing how the Pascal principle works. So does the foam ball in a lying down tub when we press on one of its sides. Putting the same tube in a vertical position, the balls at the bottom of the tube are deformed more than those above them, in accordance to the Stevino law (Fig. 2).

Figure 1 - The model: the box with pistons and the transmission of pressure

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Figure 2 - The model: the horizontal cylinder - the syringe full of water with the air bubble

In fact, if a person wears a glove and puts his or her hand at the bottom of a tank of water, then the glove is compressed. The hydraulic press is assembled by a syringe of water connected by a little tube to a bag for hot water. By pressing the piston of the syringe, the hydraulic press raises a two-kilogram brick. In a bottle connected to a small tube, an inverted balloon is placed inside the neck of the bottle, which inflates the balloon, showing that it is, in any case, the difference in pressure that inflates a balloon.

A little U-shaped tube becomes a manometer exploring the pressure in the depth of a water pitcher (Fig. 3).

Figure 3- Manometer

The case of the Cartesian devil absorbs the attention of pupils and students in the related problem solving and reinforces the concept of the different compressibility of gases and water.

The buoyancy is explored in three ways: 1) by measuring the length reduction of a spring holding an hanging body; this weight reduction is due to the Archimedes force, depending on the volume of the body and on the liquid density; 2) by exploring the buoyancy conditions of different objects of different materials and plotting the volume against mass of each; and 3) by exploring the buoyancy gradually by weighing small plastic eggs using sand of the same volume and repeating this exploration with eggs of greater volume.

The problem solving for the density of liquids using three different methods offers the opportunity to reconsider the manometer, the density definition and the buoyancy of the bodies, inventing a densimeter done by a drinking straw closed at one end, weighing it down to make it stand upright, and placed vertically inside different liquids to measure how much it sinks.
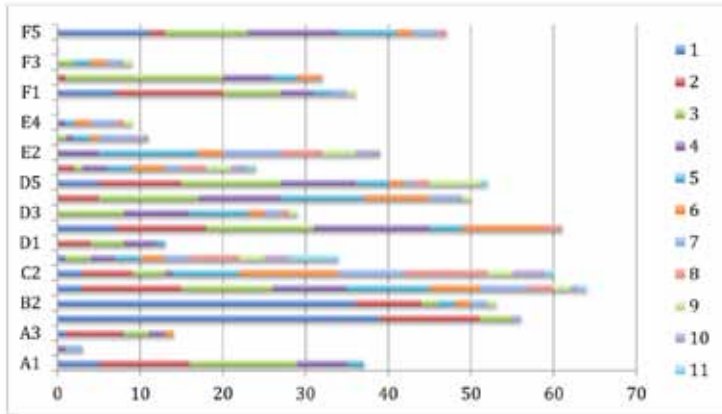
Data analysis

We analysed the S1 and S2 Rubric design of all 85 PPT and the content of the final projects and paths made by 26 of these, using a grid of relevant properties of ideal fluids structured into six areas, as shown in Table 2. The presence of the contents and the order in they were presented in class emerges from the analysis. This offers an insight into how the training intervention is capable of producing disciplinary skills and how these are transformed into professional skills.

Relevant properties of ideal fluids	
A. Properties of ideal fluids	**E. Applications**
A.1 flowing	E.1 communicating vessels
A.2 density	E.2 manometer and U tube
A.3 compressibility	E.3 hydraulic press
B. State properties	E.4 dams
B.1 liquids and gasses	E.5 levels
B.2 solids	**F. Property characteristics**
C. General laws	F.1 viscosity
C.1 Pascal	F.2 surface tension
C.2 Stevino	F.3 capillarity
C.3 Archimedes	F.4 formation drops
D. Quantities and basic concepts	F.5 compressibility
D.1 F//=0 absence, or small value, of the parallel forces to free surface	
D.2 pressure	
D.3 equilibrium properties	
D.4 mesoscopic model	
D.5 density	

Table 2- Grid of relevant properties of ideal fluids

The distribution of content provides information about the contents addressed in the training.

Graphic 1 – Contents of PPTs works

Data analysis shows the type of content and the large number of topics included in the work of the PPT; this emerges from Graphic 1. The topics that were treated the most are the general laws of Pascal and Stevin (first and third place), the pressure and density of the basic concepts and quantities (second and sixth) and the state properties (fourth and fifth). The approach to the topic of fluids is, in order, state properties (B.1 56/85 and B.2 53/85), compressibility (F.5 47/85) and equilibrium properties (D.3 29/85).

In relation to the grid of the properties of the highlighted ideal fluid: the flowing is the most discussed topic; the state properties liquids and gases, followed by solids, are the most presented topics. Among the general laws, Pascal's law is the most treated, followed, in order, by the laws of Stevin and Archimedes. For quantities and basic concepts, pressure is the most treated topic, followed by the density and the mesoscopic model.

The applications are all by Stevino and the most presented are the manometer and the U-tube. Among the characteristics of properties, compressibility is the first topic, followed by viscosity.

Results

1. The conceptual elements selected from PPT, contained in the educational proposal on fluids related to the subject reflection, are the same ones we have proposed with activities during the course, while aspects known as being crucial from the conceptual point of view (flowing and surface tension, for example) are less

evident. Conceptual nodes emerge, that makes it seem like the representation of the concepts considered are important for the teacher and that the teacher fears that they are not learned, rather than the real difficulties that children encounter while trying to learn the concepts.

2. The approach by physics education proposals plays a fundamental role in building competence in the subject. The process of planning, discussion and proposal revision that builds the professional PPT competences re-elaborated the activities in their own path, in the light of:

    a) critical observations of the teacher and of the primary training students involved;

    b) preparation and development of materials necessary for educational intervention;

    c) planning of differentiated tools and methods for the collection of learning data during the intervention (with the qualitative analysis methods, monitoring of the Etkina type discussions, which is never summative).

    The proposal and the discussion of didactic paths during the course have implemented the activities with the children on the same topic. These models have been integrated with the informal learning acquired in the experience, in the research-action process of the teacher who utilises these teaching methods.

3. The implementation in class of a planned proposal and relative monitoring of learning by the children contributes to a meta-reflection of the professional development; in fact, PPTs have learned to examine many aspects related to children's learning.

    The experimentation in class of a planned proposal and the related monitoring of children's learning contribute to a meta-reflection of professional development. Graphic 2 presents the aspects that the PPT considered important in their class experience. The PPTs have reflected on the learning of children and on what they have learned themselves during their teaching experience (Graphic 3).
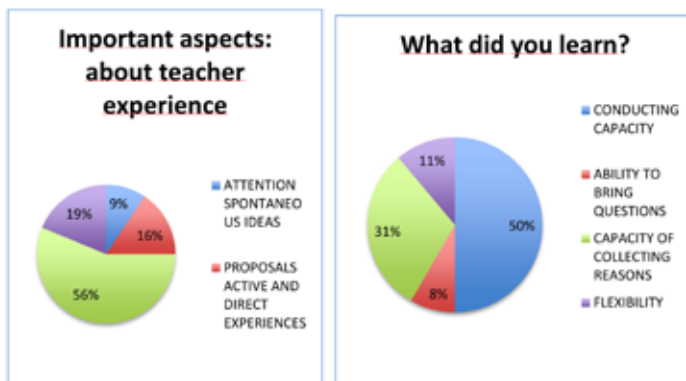
Graphics 2 and 3 – Relevant aspects of PPT meta - reflection

Conclusions

The analysis of this project provides a relevant indication regarding the way in which the PPT uses the subject knowledge and how they fit it into the projects and to what extent they are able to reuse the teaching and laboratory activities they have experienced directly in the educational proposal.

It also offers the possibility of comparing the consistency between the planning and the implementation of educational paths. The analysis of the reports highlights the ability of PPTs to collect children's spontaneous ideas through meaningful questions, to analyse learning data and to represent them, which, consequently, results in the understanding of the learning processes during the meta-reflection phase.

We have seen that the students have been able to apply the skills acquired in other contexts, when it comes to design skills and monitoring of learning.

References

Abell, S. (2007). Research on science teachers' knowledge. In S.K. Abell & N.G. Lederman (Eds.), *Handbook of research on science education*, Mahwa: Erlbaum, pp. 1105-1149.

Ball, D. L., & Cohen, D. K. (1999). Developing practice, developing practitioners: Toward a practice-based theory. In L. Darling-Hammond & G. Sykes (Eds.), *Teaching as the learning profession:* (pp. 3-31). S.Francisco: Jossey-Bass.

Berger, H., Eylon, B-S., & Bagno, E. (2008) Professional Development of Physics Teachers. *Journal of Science Education Technology*. **17**, 399–409.

Borko, H., & Putnam R. T. (1996). Learning to teach. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 673–708). New York: Macmillan.

Borko, H. (2004). Professional development and teacher learning. *Educ. Res. 33*(8), 3–15.

Buckberger, F., Campos, B.P., Kallos, D. and Stephenson, J. *Greenpaper on teacher education in Europe*, TNTEE-European Commisssion, 2000, (DG XXII).

Calderhead, J. (1996). Teachers: Beliefs and knowledge. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology*, New York: Macmillan, pp. 709-725.

Cassan C., & Michelini M. (eds.) (2010). *ESERA10 Summer School, section E and F,* booklet of Esera 2010 Summer School, University of Udine and ESERA. In http://www.fisica.uniud.it/URDF/Esera2010/booklet.pdf.

Davis, A. & Smithey J. (2009). Beginning Teachers Moving Toward Effective Elementary Science Teaching. *Science Education*, **93**(4), 745–770.

Duit, R., Gropengießer, H., Kattmann, U. (2005), Towards science education research that is relevat for improving practice: the model of educational reconstruction. In H.E. Fischer (Ed.), *Developing standards in research on science education,* London: Taylor & Francis, pp. 1-9.

Duit, R. (2006), *Science Education Research,* ESERA Summer School, Braga, July 2006, http://www.naturfagsenteret.no/esera/summerschool2006.html.

Duit, R. (2008), Physics Education Research – Indispensable for Improving Teaching and Learning, in R. Jurdana-Sepic et al. (Eds.), *Fronters of Physics Education*, Rijeka, Zlatni, (pp. 2-10).

Elbaz, F. (1983), *Teacher thinking: A study of practical knowledge*, New York: Nichols, p. 11.

Fensham, P. (2001), *Science content as problematic-issues for research*, in Behrendt, H., Dahncke, H., Duit, R., Graber, W., Komorek, M., Kross, A. and Reiska P., (eds.), *Research in Science Education* (pp. 27-41), Dordrecht, Kluwer.

Imperio, A., & Michelini, M. (2006) *I fluidi in equilibrio: una proposta didattica basata su un percorso di esperimenti*, Forum, Italy [ISBN: 88-8420-371-6].

Imperio, A., Michelini, and M., Santi, L. (2006) *I fluidi in equilibrio: catalogo di esperimenti*, Forum, Udine, Italy [ISBN: 88-8420-361-9]

Michelini, M., Stefanel, A. (2015). Research based activities in teacher professional development on optics, In Fazio, C. & Sperandeo, R.M. (Eds.), *Proceedings of Girep Conf, Palermo 2015*, Palermo, pp.853-862.

Michelini, M., Santi, L., and Stefanel, A. (2013) La formación docente: un reto para la investigación, *Revista Eureka sobre Enseñanza de las Ciencias*, **10**, 846-870.

Michelini M., (2004) Physics in context for elementary teacher training. *Quality Development in the Teacher Education and training, GIREP book of selected papers,* Forum, Udine, 389-394.

Michelini, M. (2004) *Quality Development in the Teacher Education and Training,* Girep book of selected papers, Forum, Udine.

Michelini, M. (2004) *L'educazione scientifica nel raccordo territorio/università a Udine,* Forum, Udine.

Michelini, M. (1994), *Games, Experiments, Ideas – From low cost materials to computer on-line,* Forum, Udine.

Michelini, M. (1995) *Giochi, Esperimenti, Idee – Dal materiale povero al computer non-line: 120 esperimenti da fare, non solo da guardare,* Catalogo della mostra GEI, Università di Udine, Arti Grafiche Friulane.

Michelini, M. (2004) *L'educazione scientifica nel raccordo territorio/università a Udine,* Forum, Udine.

Park S., & Oliver J. (2008). Revisiting the conceptualisation of pedagogical content knowledge (PCK): PCK as a conceptual tool to understand teachers as professionals. *Research in Science Education, 38*(3), 261-284.

Shulman L. S. (l986). Those who understand: knowledge growth in teaching. *Educational Researcher* 15 (Z), 4-14.

Bio-notes

Emanuela Vidic has been a primary school teacher at the Istituto Comprensivo di Faedis (Udine-Italy) since 2008 and has been part of the school management team since 2016. Under the guidance by professor Michelini, she has been involved with the Research Unit in Physics Education at the University of Udine since 2007 where she participated in a number of initiatives in the field of pre-service and in-service teacher professional development. She has also co-

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Marisa Michelini is Full Professor in Physics Education at Udine University, where she is rector delegate for Didactic Innovation. She manages the Research Unit in Physics Education. She is president of the International Research Group in Physics Education (GIREP), director of the Italian University Consortium on Education and Guidance, committee member of the Multimedia Physics Teaching and Learning, board member of the EPS-PED division and honorary member of the Italian Association for Physics Teaching. She founded the Centre for Research in Education, the Lab Centre for Physics Education, the Centre for Guidance, the Research Unit in Physics Education. She has published extensively in her field of expertise.

Rita Maurizio has been a kindergarten teacher since 1977. She was part-time supervisor for pre-service primary teachers at Udine University between 2006 and 2010 and part-time coordinating tutor since 2017. She also forms part of the Research Unit in Physics Education for research on informal learning, early year learning in scientific education and prospective primary teacher education.