An Applied Digital Competences Curriculum for the Secondary Schools

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A dissertation presented in the
Faculty of Education at the University of Malta
for the degree of
Master of Education in Computing Education

June 2020

ABSTRACT

This study explored the design, part-implementation, and evaluation of an Applied curriculum programme in Digital Competences at secondary level. Such a programme does not discriminate between students but empowers those who are perceived as low-achievers in the one-size fits all system, who may struggle within the traditional schooling system. It strived to show how such programme addresses student participants' needs, helps them overcome difficulties, and acts as a catalyst in developing their skills. This study aimed to equip secondary school students with digital competences in an applied learning approach as envisaged for the comprehensive schooling system My Journey, whilst raising the bar in digital competences as targeted in Education Strategy for Malta 2014-2024. By collecting data through semi-structured interviews with two key educational stakeholders, systematic classroom observations and a focus group interview with ten students, the researcher gained insight of measures that are in place and others that can be implemented in an applied approach. It also explored how the comprehensive system can encompass a wider number of students who are brimmed with untapped abilities and strengths. This study showed that the applied learning approach focuses on learning by doing, which although surrounded by various challenges, yet, it results in certain benefits, particularly to the students. The applied learning programme designed to equip students with digital competences has shown that digital competences are necessary skills for one's own life, employability, and life-long learning. In this regard, this study recommends that this curriculum is blended with the academic, applied and vocational subjects as proposed in My Journey. The last part of this study focused on the implications of its results and recommendations on related future research about enhancement of digital competences and implementation of the applied learning approach in Maltese secondary schools.

M.Ed. (Hons.)

June 2020

KEYWORDS: **ICT** **DIGITAL SKILLS** **DIGITAL LITERACY** **DIGITAL COMPETENCES** **APPLIED LEARNING PROGRAMMES** **APPLIED LEARNING**

Author's declaration of authenticity

I, the undersigned, Gianella Mifsud ( ), do hereby declare that I am the author of the dissertation entitled *An Applied Digital Competences Curriculum for the Secondary Schools*, being presented for the degree of Master of Education in Computing Education at the University of Malta. I further confirm that this dissertation is an original and unpublished work.

Gianella Mifsud

I dedicate this dissertation to my husband, my family and friends for their endless encouragement and support

Acknowledgments

This research would not have been possible without the support given by various people. I wish to thank in particular my supervisor, Dr Leonard Busuttil, lecturer in Computing Education at the Faculty of Education, for his continuous support and advice.

I also wish to thank the Head of school who gave me permission to conduct this research at the school, as well as the educational stakeholders and students who accepted to participate in this study.

I am also grateful to Ms Maria Azzopardi (FCCA), Mr Steven Mifsud (B.A. Hons.), and Ms Anabel Grech (M.Ed. SEBD) who proof-read this dissertation.

Last but not least, a special word of thanks goes to my husband, my family, and friends for their constant patience and support throughout this period.

Table of Contents

List of Figures

List of Tables

List of Photos

List of Abbreviations and Acronyms

CAD	Computer-Aided Design
DDLTS	Directorate for Digital Literacy & Transversal Skills
DESI	Digital Economy and Society Index
DQSE	Directorate for Quality and Standards in Education
ECDL	European Computer Driving License
EO	Education Officer
ESL	Early School Leaving
EU	European Union
FREC	Faculty Research Ethics Committee
HOD	Head of Department
ICT	Information Communication Technology
IT	Information Technology
LSE	Learning Support Educator
MEDE	Ministry for Education and Employment
MQF	Malta Qualifications Framework
NCFHE	National Commission for Further and Higher Education
NGO	Non-Governmental Organisation
PSCD	Personal, Social and Career Development
SEAC	Secondary Education Applied Certification
SEC	Secondary Education Certification
VET	Vocational Education and Training
3D	Three-Dimensional

Chapter 1

Introduction

1 Introduction

1.1 Rationale of this study

The Maltese educational system envisages in providing the current generations and those ahead with skills and attitudes that are vital for employment and for being active citizens. The Ministry for Education and Employment (MEDE) accentuates the need to contribute to an educational framework, namely, the Framework for the Education Strategy for Malta 2014-2024 (MEDE, 2014) which focuses on offering high quality educational programmes tailored to individual capacities. Such framework highlights that these programmes shall offer equal "opportunities for all students" (MEDE, 2017, p. 1) and shall not discriminate those coming from different backgrounds. This framework outlined four targets, one of which being "reduce the gaps in educational outcomes between boys and girls and between students attending different schools, decrease the number of low achievers and raise the bar in literacy, numeracy and science and technology competence, and increase student achievement" (p.3).

To this end, two years after such framework had been published, MEDE (2017) proposed a "new secondary schooling system" (p.6) - My Journey – Achieving through Different Paths. My Journey, one of the reforms in the Maltese educational policy frameworks, has replaced the "one-size-fits-all schooling system" (p.6) with an "inclusive and comprehensive secondary school" (p.6) system that provides "equitable quality learning" (p.1) to all students through the provision of personalised, relevant and quality programmes. This comprehensive system offers "general academic education, vocational education and training (VET), as well as applied learning" (p. 6) programmes in various subjects including Information Technology (IT), all leading to Malta Qualifications Framework (MQF)[1] Level 3 qualification (National Commission for Further and Higher Education Malta [NCFHE], 2016). The latter programme focuses on "hands-on learning in a dynamic and progressive learning environment" (p.8).

In accordance with the previously mentioned target of the Framework for the Education Strategy for Malta 2014-2024 and for providing equal opportunities for all students through personalised, relevant and quality programmes, this study aims to

[1] MQF is a tool of reference to facilitate the understanding of the reference levels (from Level 1 to Level 8) of the Maltese qualifications (NCFHE, 2016).

design a curriculum for the IT applied route in secondary schools, to equip students with digital competences, and to trial and evaluate a subset of this curriculum with a class of students.

1.2 The Importance of this Study

For the past nine years, the researcher has been teaching in a school that provides a supportive learning environment to its students to prosper both academically and socially. The school environment where the researcher teaches, creates a family ambience where students and staff collaborate towards reaching one goal, that of empowering students with a meaningful life-long educational journey.

Throughout these years, the researcher has witnessed students who feel like failures in the one-size-fits-all educational system, not due to skills deficiency but at times they feel detached from the educational process, notwithstanding the fact that they are brimmed with untapped abilities. The researcher, throughout this teaching experience, dedicated considerable time in planning lessons with the aim of empowering the students who are so keen to become more digital literate regardless of their different abilities and needs. The pedagogical model of hands-on learning through real-life experiences has taught the researcher that students with various abilities and needs are empowered to actively engage in the learning process. Through this teaching experience, the researcher realised how beneficial it would be in designing an Applied Digital Competences Curriculum programme tailored for students, who usually are labelled as low achievers in the one-size fits all education system. In line with what is envisaged in the previously mentioned framework for the education strategy, where the acquisition of "knowledge, key skills, competences and attitudes" is highly emphasised for students throughout (MEDE, 2014, p. 2), this curriculum will include 'knowledge', 'skills' and 'responsibilities' learning outcomes to be implemented in an applied approach as much as possible. Provided that this applied curriculum will be accredited by the Accreditation Unit of the DQSE as MQF Level 1 and MQF Level 3, it will hopefully motivate students to pursue their studies post compulsory schooling while equipping them with employability skills as targeted for the applied strand of My Journey. Thus, the researcher believes that it is beneficial if this Applied Digital Competences Curriculum is blended with the academic, applied and vocational subjects as proposed in My Journey (MEDE, 2017).

1.3 Theoretical Perspective of Influence

The core of applied learning is rooted (Oliver, 2016; Trust et al., 2018) in constructivism and constructionism which are of high influence and guidance to the researcher in this study.

1.3.1 The Constructivist Theory

Jean Piaget, one of the earliest supporters of the constructivist theory, has spoken from the heart the crux of such theory "when you teach a child something you take away forever his chance of discovering it for himself" (Tarp, 2017, p. 22). The researcher's pedagogy is influenced by this theory as explained below.

The following principles which were described by Savery and Duffy (1995), and which were derived from constructivism, affected the work and effort of the researcher throughout her teaching experience. The researcher highly believes that all learning activities shall be clear to the learner and shall be perceived as relevant to task and/or problem in question. Moreover, as a teacher, the researcher believes that apart from supporting the learner to own the problem and/or task in question, she ensures that the educators and learners share the same goals. This theory helped the researcher to appreciate that an authentic learning environment allows "cognitive demands" (Savery & Duffy, 1995, p.4) where the learner is not passively learning by memorising content, or by doing tasks as dictated, but by engaging in "scientific discourse" (Bereiter et al., 1997, p.6) and in problem-solving which all assist the learner to become an effective thinker as well as support him/her to construct his/her learning (Savery & Duffy, 1995).

John Dewey (1916) is quite inspirational as he convincingly states that learners learn best when learning appears to be meaningful and important to them. The researcher has also tried to put to practice Lev Vygotsky's assertion, that providing support and opportunities to students to actively engage in tasks to help them develop new "meta-cognitive skills" (Chu et al., 2016, p.6) within their "zone of proximal development" (Vygotsky, 1978, p. 95), is of utmost importance. Bruner's Theory of Scaffolding, which was particularly influenced by Vygotsky has also continually inspired the researcher's teaching practice. For Bruner, the concept of scaffolding of learning, a key concept in constructivist learning theories, enables a child to learn new concepts by being actively supported by teachers and other adults. At first, students are dependent

on this support, but ultimately, as the students become increasingly independent in terms of acquiring new skills, thinking and knowledge, the support will gradually reduce (Wood et al., 1976). The educator's role, apart from supporting the learner in owning the problem and/or task, the educator provides the learner an opportunity in owning the learning or problem-solving process as well. In dictating the problem-solving process, students will not engage in authentic thinking. Thus, the teacher shall challenge the learner's thinking as per Vygotsky and other constructivist theorists. As Fostnot claims (as cited in Savery & Duffy, 1995), the teacher will be inquiring the student at the "leading edge of the protégé's thinking" (p.5). The resources and learning material which the researcher develops serve as aid for inquiry-based learning – an opportunity for learners to tackle and find solutions for real-world problems while also develop important skills. The concept of a "learning community" (as cited in Savery & Duffy, 1995, p.6) where discussion of ideas and enriched understanding are vital in an effective learning environment. Collaborative learning strategies have always been important for the researcher to integrate in the curriculum, since as Savery and Duffy (1995) mention, these are effective in forming a learning community. The researcher, being a teacher, highly believes in another instructional practice of constructivism, being that of helping students develop soft skills like self-reflecting on what has been learnt and on the learning process.

1.3.2 The Constructionist Theory

It is nearly impossible to conduct a study on the basis of learning through discovery and "learning-by-making" (Papert & Harel, 1991, p. 1) without being inspired by Seymour Papert's and other collaborators' legacy namely, the constructionist theory.

The teaching experience of the researcher has been highly influenced by the significance of the constructionist theory, where students are urged to take responsibility of their learning and a culture of learning through making is promoted. As Papert (1993) explains, "produce the most learning for the least teaching" (p. 139). While this may be confusing to understand, Papert explains further his theory by giving the example "if a man is hungry you can give him a fish, but it is better to give him a line and teach him to catch fish himself" (Papert, 1993, p. 139). The researcher's teaching experience taught her that there may be instances when it is difficult to overcome old habits and we end up 'feeding the fish' to the students. Students shall be encouraged to venture out of their

comfort zone, and we as educators, shall encourage the students to discover on their own the knowledge they need for themselves, putting the constructionist theory into practice. Through Papert's theory, the researcher understands that the best kind of knowledge that students can have is the one which helps them build more knowledge.

The way that Papert (1980) has excitedly described his childhood memories in *the Gears of my childhood*, whereby he discovered things by himself, has influenced a lot the way that the researcher prepares the resources and the vast range of lessons activities. From a constructionist point of view, the resources available for students affect 'what' and 'how' students learn. Throughout the teaching experience, the researcher realised that students' abilities and needs differ and thus it is of utmost importance for her to ascertain that the resources and activities during lessons, offer the students the same opportunity to discover and build their knowledge.

The notion explained by Papert, whereby, experience is something personal, has been appreciated by the researcher ever since she became interested to pursue her career in teaching. While the researcher was reading her degree in Computing Education, she invested time in helping children who came from a low socio-economic background to enhance their reading and writing literacy, numeracy skills, and social skills, mostly through play. At first, she was not aware that their disadvantaged background and the baggage they carry can highly influence their learning experience. Through play, they discovered that they have much potential which they can use to their advantage. It was very evident that all that they needed was to be appreciated by someone who loves and respects them and who supports them to discover new knowledge and build on it. Though, at that time the researcher was not familiar with Papert's work, she could already recognise and appreciate the fact that children can learn through discovery and can experience it in a personal way. Reading Papert's work, the researcher appreciated more his theory and influenced her a lot in her teaching practice.

The researcher owes her dedication to constructivists and constructionist theorists who have inspired much of her work, as well as to students who are much grateful for the support they are given. While effort is made to scaffold students' learning and plan hands-on lessons to promote learning through making, it is also important for the researcher to be

reflective on what she does in the learning environment as this helps her improve gradually. Each student is unique, hence it is of utmost importance for the researcher to reflect on her practice and ascertain that the constructivism and constructionism practices previously mentioned, are practiced as much as possible so that each student prospers both academically and socially.

These theories are much influential to the researcher and gave her a chance to move forward in her career. This helps her to keep humble and to ensure that she will not forget the true meaning of her profession - her calling.

1.4 Research Questions

The rationale and the importance of this study as described above, triggered the following list of research questions on which the inquiry of this study was guided:

1. According to literature, what makes learning applied? Does it correlate with participants educational stakeholders' perceptions?
2. What are the benefits and challenges of applied learning?
3. How can a curriculum be designed to equip students with digital competence skills in an applied approach?

The research hypothesis of this study is to establish whether an applied curriculum programme can help students who are usually labelled as low achievers in the one-size fits all education system to develop their digital competences.

1.5 Aims and Objectives

To reach the aim of this study, a list of the main objectives of this research study were identified, namely:

- To research about, the meaning of, the benefits and challenges, the pedagogical methodologies and activities, and the assessment practices of applied learning in order to understand how a curriculum can be designed in an applied learning approach.
- To research the studies and reports relating to digital competences and to analyse existing frameworks and curricula to help designing a digital competences curriculum in an applied approach.

- To identify research participants that can help in designing and evaluating the curriculum designed for this study.
- To seek for approval from the Faculty Research Ethics Committee (FREC) to undertake research involving the research participants.
- To carry out semi-structured interviews with educational stakeholders after obtaining research ethics clearance, and to analyse the data that will emerge from these interviews using NVivo.
- To design an Applied Digital Competences Curriculum and engage in talks with the Accreditation Unit of the DQSE to start the accreditation process of the curriculum.
- To recruit and obtain official permission from the Head of School to carry out the study and to consult with him the best timing to conduct this research.
- To decide which part of the curriculum will be implemented.
- To put to trial and evaluate a subset of the curriculum with a class during the researcher's teaching after recruiting the school, the critical friend and students' participants.
- To make this curriculum available to other schools to blend it with the academic, applied and VET subjects as proposed in My Journey (MEDE, 2017).

1.6 Structure of the Dissertation / Document Structure

The other five chapters are briefly discussed hereunder.

The second chapter reports the research carried out on the applied learning approach. It starts by discussing whether knowledge should be transmitted or actively constructed. After that, the key features of an applied framework follow. The meaning of applied learning as defined in literature, with reference to influential theories of such approach followed by pedagogical methodologies of applied learning will be discussed. Various benefits of such approach have been reported in this chapter along with the challenges resulting from such approach. This chapter concludes with a rich menu of applied learning activities that have been reported by studies as well as best assessment practices for such approach.

The third chapter of this dissertation describes the design of this curriculum to equip students with digital competences in an applied learning approach that has been discussed in the previous chapter. It reports an analysis of studies, statistical data as well as European and Maltese plans and initiatives with regards to the enhancement of digital literacy, digital skills, digital citizenship, and digital competences. Through an analysis of referred frameworks and applied curricula, this chapter presents the designing of such curriculum. Competences of the frameworks and curricula which the researcher deemed as important have been included in this curriculum. Based on the research done by the researcher on the applied learning approach and digital competences, the researcher highlighted other competences and skills which were either not included in the frameworks or curricula or if included, no emphasis has been put thereupon.

The fourth chapter presents the epistemologies adopted. Followed by a brief discussion on the qualitative methodology and the research design, namely, action research with a case. A description of the participants, research site and the venues of the research and the recruitment process are discussed. Since this study included an evaluation of the designed curriculum, the time-period and the competences and learning outcomes which were chosen for evaluation are highlighted and justified. The procedural and relational ethical considerations of this study are outlined. This chapter concludes by describing how the data was collected and analysed during this study.

The fifth chapter reports the results and analysis of the data that resulted from the data collected. These findings are discussed in terms of literature which was discussed in the second and third chapter of this document.

The last chapter discusses how this study addresses the research questions of this study. This chapter highlights the implications of the results and makes recommendations for future research and discusses the limitations of this study.

Chapter 2

Applied Learning

2 Applied Learning

2.1 Introduction

The research questions discussed in the previous chapter were raised from the need to shift from the "one-size-fits-all schooling system" (MEDE, 2017, p.6) to a more "inclusive and comprehensive" (p.6) one, and to improve students' digital competences. Malta's educational system is aspiring for more "equitable quality learning" (p.6) experiences for all students in the three routes, namely, general academic, VET, and applied. Since this study aimed at designing a digital competences curriculum for the applied route, then, this chapter will focus on the applied learning approach accordingly.

This chapter provides the key features of an applied learning framework (refer to Figure 1). It highlights the symbiosis of: applied learning as defined in literature in light of influential learning theories; implementation of pedagogical methodologies and activities of applied learning; highlight of the benefits, challenges and barriers that are brought forth by this approach; employment of assessment practices of applied learning; and an applied curriculum which enables scaffolding to employability and further education. The latter will be delved into in the next chapter, explaining the designing of a digital competences curriculum in an applied approach.

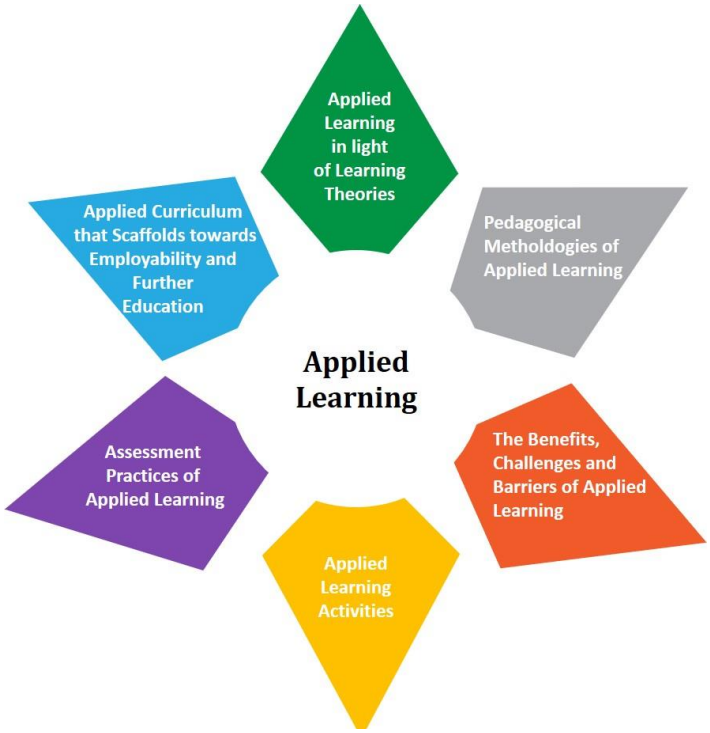

Figure 1 Key Features of an applied learning framework (adapted from Lim et al., 2020)

2.2 Learning as transmission of knowledge or as an active construction?

In our modern times, knowledge is a more important means for economic development, alongside the eminence on the active role of individuals in forming such knowledge and for the sake of social prosperity (Sharma & Bhadauria, 2017). Ever since one could find unlimited online information on any possible topic, educators started losing their value as the main "source of knowledge" (Kudryashova et al., 2016, p. 460). Educational practices have also started being triggered by the societal, academic, and industrial community demands (Kudryashova et al., 2016; Selevich et al., 2015). Education is a permanent process during which an individual "acquires and develops new knowledge, skills, abilities and attitudes" (Chodasová et al., 2015, p. 3170). To keep pace with the progressive trends in the modern world, it is inevitable that education adapts promptly to the global development conditions (Sharma & Bhadauria, 2017). In this manner, education, rather than preparing an individual to make use of "obtained knowledge" (Kudryashova et al., 2016, p.1), s/he will be well prepared for the world of work and skilled to further improve his/her knowledge. An individual shall be prepared to practice leadership, make decisions and be responsible in finding, analysing and processing information (Chodasová et al., 2015; Kudryashova et al., 2016).

Whilst employers in the competitive labour market seek competences and personal traits in their prospective employees, the traditional assessment system was only analysing students' educational achievements. Thus, a change in the methodology of assessing students' competitiveness and abilities was an immediate matter that needed to be addressed for improving "students' competitive advantage in the world educational market" (Selevich et al., 2015, p.1). The field of education was highly impacted by the rapid change, explosion of knowledge and the revolution of technology (Acharya et al., 2018; Sharma & Bhadauria, 2017); provoking awareness for revision of pedagogical, content and learning approaches including the Applied Learning approach. This paradigm shift gave learners a new role to actively construct their knowledge rather than the knowledge being transmitted by their teacher (Thakur, 2016).

2.3 What does the term 'applied' mean?

Though the term 'applied' seems to lack a common definition in the context of teaching and learning and in spite of its frequent appearance in educational literature, it has always been equated to 'real-world experiences', 'hands-on learning' and 'learn-by-doing'. According to the State University of New York (SUNY), "applied learning refers to a hands-on, real-world approach where students learn by doing" (SUNY, 2016, p. 2). Applied learning, therefore combines the teaching of skills and knowledge in the context of real-life experiences (Lim et al., 2020; Victorian Curriculum and Assessment Authority [VCAA], 2020). Radu (2019) expounds that applied learning is an educational approach where students explore content and directly apply skills, theories, and models. She further explains that "students apply knowledge and skills gained from traditional classroom learning to hands-on and/or real-world settings, creative projects or independent or directed research, and in turn apply what is gained from the applied experience to academic learning" (p. 1). Such a pedagogical method "places students in experiences requiring them to integrate theories, ideas, and skills they have learned in new contexts, thereby extending their learning" (Pemberton et al., 2017, p. 209). Choy and Delahaye (as cited in Dekkers et al., 2014) claim that since youth may not have the relevant life experience to relate their learning to when they are presented with adult learning principles, applied learning is the key to provide a practical or 'hands-on' experience to which youth can relate their learning to. However, applied learning should remain as a harmonizing element to other pedagogical methods that foster effective learning rather than as a replacement. The various pedagogical practices that are manifested by applied learning, includes: active-learning; experiential-learning; project-based learning; and service-learning (Lim et al., 2020; Pemberton et al., 2017) amongst others which will be discussed further in Section 2.4.

For learning to be successful, it should be active, engaged and collaborative (Lim et al., 2020). Acharya et al. (2018) explain that the learner should not be "a passive recipient of knowledge but is a proactive personality in the entire learning process" (p. 3). Vitorino et al. (2020) describes the relationship between "passive methodologies, where the teacher is the active subject in the teaching-learning process, for example, the traditional method (TM), also known as didactic lecture" (p. 1) and "active methodologies, where the student is the active subject in the teaching-learning process

and the teacher acts as a facilitating agent, guiding the students to seek and generate their own knowledge, for example, the constructivist method (CM)" (p. 1). Passive methodologies, which are also referred as "traditional teaching as lecturing" by McCarthy and Anderson (as cited in Kudryashova et al., 2016, p. 1), imply that the student will be passively absorbing pre-processed information which will later be recited it in periodic assessments and the main role of the teacher will be that of transmitting and assessing such knowledge. Such pedagogical approach will not allow students to learn deeply and thus, does not fit the modernization of the educational environment and goals.

2.3.1 Applied Learning in the Maltese Educational System

As outlined in My Journey, MEDE (2017) explains the aims of the three "equitable learning programmes" (p. 8), namely, general academic, VET, and applied learning programmes. By referring to the aim of the latter mentioned programme, one can get an idea of what is meant by applied learning in the Maltese educational system. Its aim is that it:

> provides practical hands-on learning in a dynamic and progressive learning environment. It falls under the qualification stream which gives students employability skills necessary for the world of work whilst allowing them the option to progress to post-compulsory educational institutions providing programmes at MQF levels 1-3 as may be required or to higher programmes at MQF 4 (and possibly eventually even higher). (p.8)

2.3.2 Constructivism and Constructionism as Theories for Applied Learning

The core of applied learning stems from the constructivist and constructionist approaches to learning (Oliver, 2016; Trust et al., 2018). The roots of constructivism, a learning theory that recognizes that learner build or actively construct their knowledge (Bozkurt, 2017) can be attributed to the work of Jean Piaget who is regarded as one of the most early supporters of such theory. As for teaching, he believed that "when you teach a child something you take away forever his chance of discovering it for himself" (Tarp, 2017, p. 22). Vygotsky, who is credited with the development of the social constructivist theory (McDonough, 2017), believed that knowledge is co-constructed, and individuals learn through interactions with others. He believed that learners must actively engage in the learning process, with the assistance of other people to help them

develop new "meta-cognitive skills" (Chu et al., 2016, p. 6) within their "zone of proximal development" (Vygotsky, 1978, p. 95).

Research often associates various active learning methods with constructivism (Kudryashova et al., 2016). Since a number of scholars believe that active learning should be referred to as constructivist learning, Kudryashova et al. (2016) deem appropriate that the educator's role in active learning must be fundamentally based on the constructivism philosophical paradigm.

The theory of constructivism emphasises that the "concepts follow the action rather than precede it and that new experience builds on an already existing knowledge" (Ho, 2019, p. 1; Brainerd & Piaget, 2003). Thus, the idea of constructivists led to the below four principles of active learning (Kudryashova et al., 2016, p.461):

1. **"Learners construct their own meaning"** – rather than being passive knowledge recipients, learners should make knowledge significant and useful in future situations.
2. **"New learning builds on prior knowledge"** – making sense of knowledge by combining old and new information.
3. **"Learning is enhanced by social interaction"** – by first engaging in small group tasks followed by discussions with the whole class, learners learn how to resolve conflicting ideas in social settings.
4. **"Learning develops through "authentic" tasks"** – activities should replicate those that are likely to be experienced in real life.

Following these four principles influenced by the constructivist approach, for applied learning to be effective, the teacher should not be the "source of knowledge" (Kudryashova et al., 2016, p.461). Rather, an environment where both students and educators work together as co-creators of knowledge should be created (Christersson & Staaf, 2019).

Further emphasis on the strength of constructivism vis-à-vis the concept of applied learning is that it asserts that learners learn by actively challenging and critiquing the concepts that are developed through their own or others' experience. Ideally, this is done under the supervision of an educator to guide through the necessary cognitive conflict (Carr et al., 2015). From the social constructivist viewpoint, interactions such as

those achieved through class discussions and collaboration, "mechanisms for enhancing higher-order thinking" ensue (Lim et al., 2020; Palincsar, 1998, p. 357). There are various ways in which interactions and collaboration might happen. Group work offers a context in which students work on tasks and allows them to engage in discourse with one another as they begin to form a learning community. Tasks which encourage students to learn collaboratively, lets students share understandings and construct content, which would have been more difficult to do on their own (Lim et al., 2020). A broader discussion of applied learning activities will ensue in Section 2.7.

Constructionism (Papert, 1993) is the legacy of Papert and other collaborators, who gave a twist to the constructivist model. From a constructionist attitude, Papert (1993) explained that the goal should be to teach in ways that "produce the most learning for the least teaching" (p. 139). "If a man is hungry you can give him a fish, but it is better to give him a line and teach him to catch fish himself" (Papert, 1993, p. 139). He explains that traditional education tends to codify what it thinks citizens need to know, and hence ends up 'feeding this fish' to children. This theory is built on the assumption that ideally learners discover for themselves the knowledge that they need for themselves. The best kind of knowledge for them is the one that will help them get more knowledge. Besides knowledge, learners also need resources and the development of a wide range of activities. Papert (1980) explained the notion of resources and activities for learning through his essay *The Gears of my childhood*. Recalling the discovery of "cause and effect" (p. vi), Papert explains that he remembers "quite vividly my excitement at discovering" (p. vi). What someone can learn and how this is learnt, depends on the resources one has available. Piaget influenced much of his work, however, while Piaget supports the cognitive aspects of assimilation, Papert claims that there is also an affective component. Papert's discovery of gears tells us that experience is not something that can be reduced to just cognitive aspects. Experience is something which is personal, and one cannot assume that others will have the exact same experience. Papert describes this in such an emotional way: "thus every child might have the experience I had. But to hope for this would be to miss the essence of the story. I fell in love with the gears" (Papert, 1980, p. viii). If we go forward with the assumption that every person must have the same experience, we will be stealing the joy of learning and discovery from our students.

Programmes that have at heart the theory of constructionism emphasise that 'making' education have much potential to students (Blikstein et al., 2019). Making is an interest-based practice where the learners take responsibility of their own learning. A culture of making disseminates a positive attitude towards learning since the acquisition of knowledge is aimed at creating something which is meaningful and shareable, hence a knowledge building community is created (Tesconi, 2017). A maker-centred constructionist learning environment is an efficient way of creating a more inclusive and learner-centred learning environment. In such learning environment, students build meaningful and shareable artefacts that are significant to them by using technology. Thus, learning is an active process in which the learner is motivated to construct meaning. From a constructionist perspective, instead of giving instructions and following a fixed curriculum, an educator should facilitate the learners' learning process (Tesconi & Arias, 2015). The core of applied learning lies with individuals having hands-on experience; hence constructionism is the approach that should be taken to inspire learners and strengthen their commitment towards learning (Tesconi, 2017).

2.3.3 People learn from doing things

Experience-based education promotes learning by doing. It is a process during which students benefit from discoveries and experiments as they build knowledge and develop skills through real-world experiences. Learners are engaged in activities which allow them to "reflect, analyze and that brings higher level of awareness and/or changes in behaviour" (Massari et al., 2018, p. 9). The urge of implementing innovative educational practices with the aim of preparing young learners to be creative, flexible, able to analyse, think critically etc." (Massari & Miron, 2016), has risen from the need to meet the modern world's requirements (Massari et al., 2018). This section will strive to show the meaning of 'making' in the below mentioned programmes. The intellectual roots of such programmes extend to affluent educational pioneers like Papert, a pioneer in the educational technological field who believed "that the best learning takes place when the learner takes charge" (Papert, 1993, p. 24); Paulo Friere, a scholar pioneer who has always highlighted the importance of culture, equity, and social justice in education; and Dewey who also believed that "the student learns by doing" (Austin & Rust, 2015, p. 144).

The constructionist perspective of Papert, that building artifacts and sharing them with peers is the most effective way for children to learn, is at the heart of FabLearn Labs

program (Blikstein et al., 2016). FabLearn labs, originally known as FabLab, are physical markerspaces in K-12 schools across the globe. FabLearn Fellows program brings together educators from all over the world. These educators act as research contributors towards constructionist learning, maker education, and digital fabrication in schools, and an open-source library of curricula and best practices is created through such programmes (Bilkstein et al., 2019). In Meaningful Making and Meaningful Making 2 (Blikstein et al., 2016; Blikstein et al., 2019), FabLearn compiled various works, including: articles regarding making and fabrication in various learning spaces; a wide range of ideas for projects, reflections, strategies for curriculum integration, and much more.

The Clubhouse Network is another global community having more than one hundred clubhouses in twenty countries whose vision is to offer "a creative and safe out-of-school learning environment" (The ClubHouse Network, 2020, p. 1) for more than twenty-five thousand youth per year. Through the various programmes that this global community work on every year, youths are supported by mentors to help them search for new ideas, develop new skills and feel confident in their actions via use of technology. Creativity, diversity, equal opportunity, positive relationships and 'hard fun' where learners engage in meaningful exploration, inventions, self-discovery and collaboration, are the core values of this global community (The ClubHouse Network, 2020). Kafai et al. (2009) explain that beyond learning how to make things and program, youth learners learn other hard and soft skills. These include teamwork, designing products, managing projects, marketing, and communication amongst others which are highly sought by prospective employers. The marvellous work of these Clubhouses shall be very worth looking at by policymakers who want to seek new ways of maximising learners' full potential. Computer Clubhouse embodies the idea of constructing knowledge through hands-on activities. The project making by these Clubhouses, carries over the term coined by Papert "objects-to-think-with" (as cited in Kafai et al. 2009, p.3). A constructionist learning environment (Lennex & Fletcher Nettleton, 2015) requires learners to be engaged with the digital world, solve problems, and express their constructed knowledge artistically. Rusk, Resnick and Cooke (2009) propose the four principles that led to the development of the Clubhouses that may inspire us how we can create a learning space for youth, not just for them to have access to technology but to creatively develop projects of interest to them:

1. Supporting learners' experiences which draws on Papert's constructionism on the basis that rather than supporting learners to get ideas, they should be supported to make them
2. Rather than having educational systems dictate what and how to teach, they should examine what students really would like to learn
3. Encourage collaboration between students through groupwork and leave space for students to circulate around the room
4. For the other three principles to be effectively implemented, a culture of respect and trust is of utmost importance

Mitchel Resnick, co-founder of the Computer Clubhouse project, developed innovative technologies such as the Scratch programming software, so that learners are engaged in a world in which they can prosper, achieve and contribute (ISTE, 2020; Mit Media Lab People, n.d.).

It is hard to read about making and not seeing the legacy of Papert, the "father of the maker movement" (p. 21) as referred to by Libow Martinez and Stager (2013) in *Invent to Learn*. This book embraces the meaning of making through numerous examples of how educators and schools can connect the outside world with the school through project-learning.

Randall Library has been utilizing the applied learning method for years to engage students through experiential learning. The students' projects are to identify and solve the needs of the library which they are than assessed upon. Among other projects and campaigns, the library partnered with various classes, including typography and English to promote applied learning opportunities. Students applied the skills learned in these classes and applied them in a real-world situation by developing various products including: brochures to outline certain service points in the library; videos illustrating the services for prospective students; instructional posters on library technology; concept papers which included pictures of the library together with a list of typefaces that they recommend, materials to be used, and ideal colour scheme selection. This campaign was considered a success because the students applied their skills in a real-world situation, while the library received substantial products (Pemberton et al., 2017).

2.4 Pedagogical Methodologies of Applied Learning

Through the application of research, educational institutions have increasingly implemented learning approaches that are based on best practices for students learning and on developing methodologies that emphasize learners' active immersion and participation (Leal-Rodríguez & Albort-Morant, 2019; Austin & Rust, 2015). To improve the learning process in education, various streams of research includes active learning, experiential learning, service-learning, and project-based learning.

2.4.1 Active Learning

In their seminal work, Bonwell and Eison (1991) suggested ways for the promotion of active learning. These include encouraging students to take a pro-active approach rather than just listening and doing as dictated. One should place more emphasis to develop students' skills rather than just pass onto them the information, as well as to involve the students in higher-order thinking activities such as analysing, synthesising and evaluating. Given such characteristics, Bonwell and Eison said that active learning can be defined as the process of involving "students in doing things and thinking about the things they are doing" (p .19) and is often associated with experiential learning, learn by doing, service learning, peer-to-peer learning, lab work, role-playing and case studies (Carr et al., 2015) . They deduced that various activities fall under the spectrum of active learning which will be further discussed in Section 2.7.

Christmas (as cited in Acharya et al., 2018) expounds that active learning takes place when the student recognises link between existing knowledge and new knowledge. Carr et al. (2015) asserts that having students sitting down listening to teachers and trying to memorise content is not an effective way of learning. Promoting effective learning entails bringing the real world into the classroom. Thus, there is an absolute need to shift from the traditional educational pedagogies and approaches to the applied learning approach. The latter will promote students' active engagement with the course content and help them in apprehending knowledge and skills and ultimately using them meaningfully (Kudryashova et al., 2016; Acharya et al., 2018).

2.4.2 Experiential Learning

From the final decade of the twentieth century, it is evident that the interest in experiential learning has increased, and it has been marked as a modern form of

education ever since. During this time, experiential learning has been given a wide range of definitions (Massari et al., 2018). This section provides a definition of experiential learning and experiential education. Kolb's Experiential Learning Theory will be used to explain an experiential learning cycle.

2.4.2.1 Experiential Learning and Experiential Education Defined

The crux of experiential learning lies with an individual actively "constructing knowledge and meaning from real-life experience" (Goldman et al., 2020, p.6). As Salas, Wildman and Picolo (2017) reported, under an "experience-based learning" approach (Leal-Rodríguez & Albort-Morant, 2019, p.1), it is noticeable that students show more responsibility towards their learning, whereby their learning experience and reality are strongly related. Ting et al. (2019) and Hodges (2018) have highlighted these positive impacts exerted by such highly engaging learning approaches (Leal-Rodríguez & Albort-Morant, 2019). It is important to highlight the difference between experiential learning and experiential education since at times these are mistakenly used interchangeably (Massari et al., 2018).

The Association for Experiential Education explained experiential education as "a philosophy that informs many methodologies in which educators purposefully engage with learners in direct experience and focused reflection in order to increase knowledge, develop skills, clarify values, and develop people's capacity to contribute to their communities" (Cargas, 2020, p.104). The overarching philosophy of experiential learning reveals how experiential education has formed as a cycle, with neither a beginning nor an end, and focuses mainly on the "concepts of experiencing, reflecting, make meaning/conceptualizing and acting/experimenting" (Boschman et al., 2019, p.1; Kolb & Kolb, 2017). Massari et al. (2018) explain that the methodology of experiential learning asks for teachers intentionally being engaged with students in direct experiences and their reflection is focused on "raising knowledge, developing certain skills, and highlighting values" (p.14). The learners' engagement in direct experiences includes "interdisciplinary exploration, collaborative activity, field-based opportunities, reflection and self-assessment" (p.14). Being that teaching and learning are interdependent, the focus in experiential learning is the child where learning is entirely dependent on the child's degree of involvement in activities. Moreover, it is also stipulated that for such

experience to be truly beneficial, it should engage learners in holistic education (Hayden & McIntosh, 2018).

Cargas (2020) pointed out that various pedagogical activities exist and fall under the heading of experiential learning. These range from various type of active learning to problem-and project-based and service learning. With regards to service learning, a fundamental outcome of experiential learning is to "develop people's capacity to contribute to their communities" (p.105). A review of literature with regards to the above-mentioned pedagogical activities are discussed in Sections 2.4 and 2.7.

2.4.2.2 Kolb's Experiential Learning Theory

The theory of experiential learning is based on prominent twentieth century scholars' work, namely, John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire, Carl Rogers amongst others (Kolb & Kolb, 2005), who highlighted experience as a central role in their theories of human learning and development (Austin & Rust, 2015; Kolb & Kolb, 2005, p. 194). A remarkable model of experiential learning is Kolb's Experiential Learning Theory (Leal-Rodríguez & Albort-Morant, 2019).

Kolb and Kolb (2005) identified experiential learning as most of all "a philosophy of education" (p. 193) based on what the philosopher John Dewey referred to it as a "theory of experience" (p.193). Dewey claimed that while traditional education needed little theory since practice was established more by tradition, the new experiential approach needed sound theory of experience in order to guide it (Kolb & Kolb, 2005). This relates to how David Kolb defines experiential learning as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p.38). David Kolb's work also draws on Kurt Lewin's work. Kurt Lewin has always highlighted the importance of integrating theory and practice in his work. This is echoed in probably his well-known quotation "there is nothing so practical as a good theory" (Lewin, 1943, p.169). In his work, *Towards an Applied Theory of Experiential Learning,* Kolb (1974) referred to the work of Lewin's and his associates, namely, the experiential learning model and the action research method. The latter, according to Kolb "has proved to be a useful approach to planned changed interventions" (p. 33) and such "methodology forms the cornerstone of most organization development efforts" (p. 33).

Kolb's work (1984), *Experiential Learning: Experience as the Source of Learning and Development*, highlights that definition of learning underlines several points of the learning process. Firstly, one shall emphasise on the way of adapting and learning rather than on the content or outcomes. Secondly, it is important to note that knowledge is a transformation process that needs to be constantly built upon. Thirdly, learning changes experience into objective and subjective forms. Lastly, in order to understand learning, one needs to understand the nature of knowledge.

A deeper insight of the experiential learning theory is provided by Kolb and Kolb (2005) through the following six quoted propositions that are shared by scholars on which the experiential learning theory is built:

1. "Learning is best conceived as a process rather than in terms of outcomes" (p.194).
2. "All learning is relearning" (p.194).
3. "Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world" (p.194).
4. "Learning is a holistic process of adaptation to the world" (p.194).
5. "Learning results from synergetic transactions between the person and the environment" (p.194).
6. "Learning is the process of creating knowledge" (p.194).

2.4.2.3 The Cycle of Experiential Learning

McLeod (2017) explains how Kolb's theory of experiential learning discloses four different learning styles, based on a four-stage learning cycle (*See* Figure 2) which Kolb (1974) referred to as an "integrated process" (p. 33). This integrated process, in which the learner "touches all the bases" (McLeod, 2017, p. 2), begins with *concrete experience* where the learner encounters a new experience or reinterprets an existing one. This is followed by collection of data for *observations and reflections* about that experience which leads to the *formation of abstract concepts* (analysis of data) and *generalizations* (conclusions of the analysis). These are then used for *active experimentation* to test hypothesis in future situations, which in turn guiding new experiences.

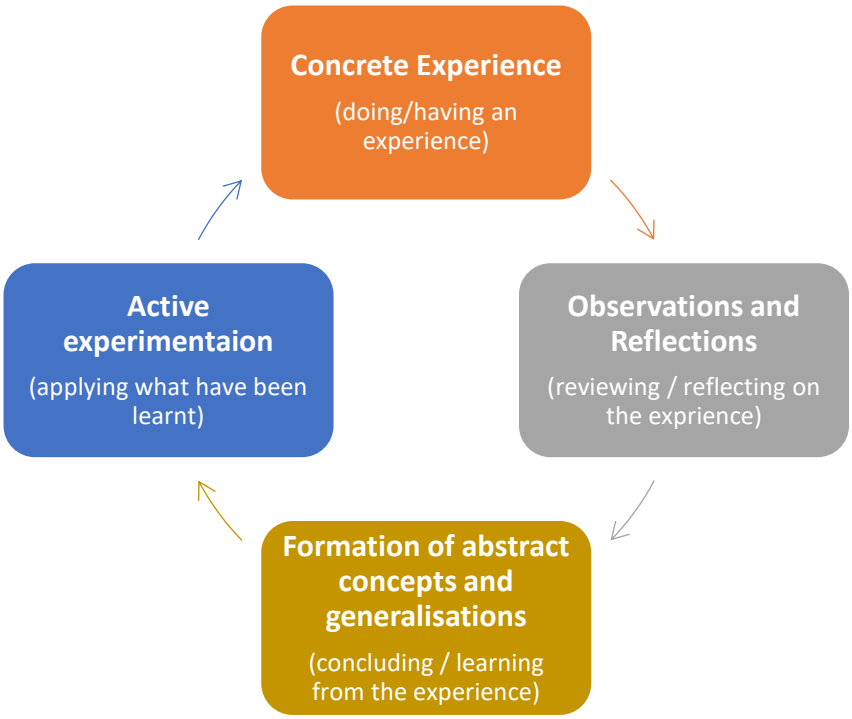

Figure 2 Kolb's Experiential Learning Cycle (adapted from Kolb, 1974)

The cycle is an iterative process, thus portrays that learning is a continuous lifelong process (Kolb, 1984). Kolb (1974) explains that it is possible to enter the cycle at any stage and then follow it through sequentially. However, it is important that one completes the entire cycle as no one stage can lead to effective learning by itself.

Though experiential learning is popular among students due to the fun element, more in depth "when compared to didactic approaches" (Wurdinger & Allison, 2017, p. 15) and employers seek to employ students with experiential learning experience, research shows that the implementation of experiential learning in education still lacks in this regard. The cause of such limited implementation may be due to the obstacles that research shows including classroom layout, classes with a large number of students, limited time, challenge to cover the entire curriculum, and school resistance (Wurdinger & Allison, 2017).

2.4.3 Project-Based Learning

In project-based learning methodology, students' learning is guided within Kolb's experiential learning framework (Wrye et al., 2019). The core idea behind project-based learning is to increasingly engage students (Dekkers et al., 2014; Ma, 2019), to capture their interests and to incite serious thinking through real-world problems as they will be

acquiring and applying new knowledge in a problem-solving context (Dio, 2015). This requires students to actively participate and be responsible in their own learning (Dekkers et al., 2014). The teacher's role in such context involves: facilitating the students and working with them to form questions; implement meaningful activities; support the development of knowledge and social skills; and carefully assess students' learning (Dio, 2015).

Projects need to be carefully designed and implemented, otherwise these can frustrate learners and yield disappointing results. This is why Larmer and Mergendoller, back in 2010 have published the *7 Essentials for Project-Based Learning* which have been later revised as a more comprehensive, research based model which they have called the "*Gold Standard PBL [Project Based Learning]*" (Larmer & Mergendoller, 2015, p. 1). This model highlights the "Essential Project Design Elements" as shown in Figure 3 and as explained hereunder.

Boss and Larmer (2018) explain that the project should start with a *challenging problem or question* which is neither be too difficult nor too easy but puts learners at the edge of their comfort zone. Open-ended questions and ill-structured problems give space for various possible answers or solutions. Throughout the project, a *sustained inquiry* is important as it allows learners to make their own meaning. Thus, they will need to ask questions, conduct research, carry out investigations, and discuss how to find answers by weighing evidence. *Authenticity* has to do with how connected to the real-world the project is. This means that the project must have a real-world context. The tasks learners undertake, the tools they use and the quality standards that they refer to must reflect to how people solve problems and generate solutions in the real world. Learners must see the impact of their work due to their made effort, and the project must be connected to their personal interests, concerns, and identities. Allow students to *voice and choice* so that they can make some decisions, express and defend their opinion. Time should be allowed for *reflection* since it is important for them to think on what and how they are learning. This prompts them to consider any obstacles that they are finding, challenges they have overcome, and their quality of work. Cycles of *critique and revision* allow students to give and receive feedback to improve their work and deepen their learning. At the end of the project, students share their *public product* to the public audience that extends beyond the classroom. Their work may be shared with an audience in various

authentic ways, such as: online; demonstrations; hard copy; and like. Motivation to produce high-quality work is instilled in students when they know that their work will have a good impact.

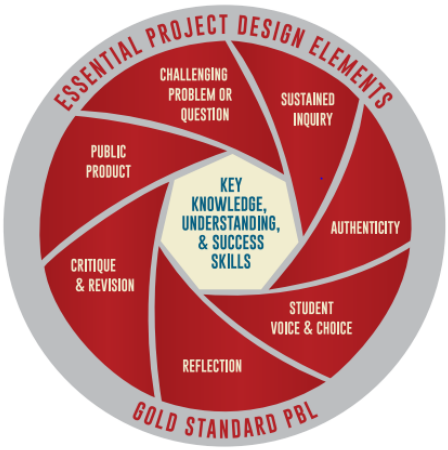

Figure 3 Essential Project Design Elements, (Larmer & Mergendoller, 2015)

Research (Smith & Gibson, 2016; Wrye et al. 2019) shows that project-based learning not only engages Millenial students' learning preferences, but also provides them with highly sought soft skills, which prospective employees most often lack. Research (Turner & Mulholland, 2017; Wrye et al. 2019) shows that skills, such as managing projects, communicating, thinking creatively, solving problems, and leadership, are acquired through the exposure of risky and real-world problems. Such initiatives which are referred to as "real-world business engagement" (Wrye et al., 2019, p. 608), allow learners to learn-by-doing, do mistakes and learn from during their learning process. Students must be given the opportunity to "exchange, experiment, positive mistake-making, calculated risk-taking, creative problem-solving and interaction with the outside world" (Jones & Iredale, 2010, p. 12; Wrye et al. 2019, p. 608)

Through careful design, students may work on projects in groups. The collaborative nature of project-driven group work encourages peer learning (Ma, 2019) as well as provides an opportunity to students to experience replicated real-world activities and responsibilities (Jazwa, 2017; Wrye et. al, 2019).

This shows that project-based learning is an excellent way for students to learn through a 'hands-on' approach (Smith & Gibson, 2016). According to Austin and Rust (2015) experiential learning is simply defined as hands-on learning. Applied learning

provides a valuable opportunity to students to learn skills through experiential, participative and collaborative learning. Through hands-on learning, students can understand real-world challenges and apply their knowledge to find the best possible solutions for such challenges (Godihal & Gopalakrishnan, 2020).

Jazwa (2017) highlights that for a hands-on learning project to positively contribute towards students' education, it is important to establish well-defined goals. These include reinforcing essential research skills for the project and distributing unique tasks in a way that students will shoulder equal amount of work is important. Students will then appreciate that their individualised role in the project which requires collaboration and participation, will result in a successful project.

Like any other pedagogical methodology, project-based learning has its challenges (Wrye et al., 2019). Turner et al. (2018) therefore encourage educational institutions to have a coherent strategy towards learning and not just simply integrate pedagogical methodologies into curriculum in an unplanned manner.

2.4.4 Service Learning

Research also suggests that among other pedagogical methodologies, service-learning, which is also situated within and informed by experiential learning (Dewey 1938; Faber & Bishop, 2018; Kolb, 2015; Wrye et al., 2019), also helps in developing employability skills and social skills while also allows students to feel that they are "making a contribution to their community" (Wrye et al., 2019, p. 610). Faber (2017) explains that service learning "is a teaching and learned tool that shows promise in engaging, motivating, and empowering early adolescents" (p. 1). According to Kids Involved Doing Service Learning consortium (as cited in Faber, 2017), service learning provides students the opportunity to look into the problems and needs of the school or the community, and discuss plans to find solutions accordingly. Research (Faber, 2017; Faber & Bishop, 2018) suggests examples of how service-learning can be integrated in curricula through projects. Faber and Bishop (2018) examined students' experience of a service-learning class and highlighted the importance of: a culture of 'doing'; curricula based on problem-solving within a caring culture; a joyful environment to learn in and opportunities for students to be competent and independent. The positive impacts that have been yielded on students who engaged in service-learning projects while giving

them the opportunity to reflect on their work included: enriched personal growth (Bringle et al., 2016; Sanders et al., 2016; Saelee-Hiraoka, 2019); improved parental communication (Farber, 2016); and helped students feel more interested in other subjects as well (Faber, 2017; Faber & Bishop, 2018). Livingston (2018) highlighted that "service learning is a high-impact teaching practice that provides an environment where students can engage in active learning" (p. 217), thus integrating service learning into applied learning curricula is a worthwhile endeavour.

Pedagogical methodologies like internships, service-learning and project-based learning and their individual ability in developing the above-mentioned skills among students, have shown positive results for students, educational stakeholders and even employers. Moreover, Wrye et al. (2019) highlighted the effectiveness of embedding the above-mentioned pedagogical methodologies into a student-centred framework. Such effectiveness includes students' workforce preparedness, their development of social skills and their contribution towards society. According to the authors of this study, implementing these three pedagogical methodologies will enhance optimization and reinforcement of learning around the four stages of Kolb's Experiential Learning Cycle (Kolb, 1974), which is explained in detailed in Section 2.4.2.3.

2.5 The Benefits of Applied Learning

Since learning is more effective when the learner actively participates in the entire learning process (Acharaya et al., 2018; Lim et al.; 2020), studies across the globe have shown that applied learning can bring a host of advantages to the learners, community, and industry among others. When applied learning is incorporated in curricula, students can better link the skills and knowledge to their current and future prospects. This section will therefore highlight several benefits of applied learning and its practices which have been remarked in these studies.

2.5.1 Increased students' engagement results in long-lasting positive effects

Students' engagement in the learning process is acknowledged as key in improving students' learning and outcomes (Callingham, 2017) and thus, it is deemed "of primary importance to succeeding in school" (Lamb et al., 2015, p. 53). This study reported that when students feel disengaged, it will have long-lasting effects on educational, career and related outcomes. When the National Survey of Student

Engagement (NSSE) and the Australasian Survey of Student Engagement defined active learning as "students efforts' to actively construct their knowledge" (Brame, 2016, p. 1), they've remarked that ultimately students learn more as they are deeply involved in their own learning (Carr et al., 2015). Furthermore, research shows that students who feel personally engaged in the learning process, are more likely to be academically persistent (Pemberton et al., 2017). As research points out (Hodges, 2015; Kober, 2015; Felder & Brent, 2016) active-learning approaches encourage learners to apply and process ideas rather than just listening. These studies have shown that the active learning approach has shown better results in students' learning outcomes and more positive students' attitudes. Pemberton et al. (2017) also remark the improvement in students' learning outcomes while also notes that applied learning gives students the opportunity to grow professionally and personally.

2.5.2 Improves students' performance

The meta-analysis of research which was conducted by Freeman et al. (2014) to compare the design of class sessions with some active learning and traditional lecturing, reported that students following traditional lessons were 1.5 times more likely to fail in exams than students in active learning courses. The data reported in this study showed that while active learning improved students' performance on exams and other assessments, lecturing increased failure rates. Authors of this study reported that such increase in achievement holds for all class sizes, course types and course levels. Further, they found that active learning is especially beneficial in small groups and "at increasing performance on concept inventories" (p. 3). The positive impact of active learning pedagogies was so clear that the authors proposed that rather than pursuing the comparison of traditional form of learning with active learning, research should be more focused on how and for whom active learning would be more effective (Hodges, 2018). Studies reported in Pemberton et al. (2017) confirm that opportunities for students which are designed to increase students' engagement, such as service-learning, internships and studying abroad, provide the most value, citing benefits of: improved attitudes towards self, school and learning; civic engagement; and improved social skills and academic performance. Kuh et al.'s study (as cited in Pemberton et al., 2017) supports this claim as they reported that when comprehensive programmes which are designed to

increase engagement, in particular mentioning service-learning opportunities, these are likely to positively impact students' grades and retention.

2.5.3 More inclusive classrooms

Besides the notable evidence that active learning promotes learning for all students (Christersson & Staaf, 2019; Hall, 2019), there is also evidence that the applied learning approach is an effective tool in making classrooms more inclusive. Callingham (2016) investigated the barriers faced by students coming from an economic disadvantage background which hinder their full participation in education and negatively impact their learning experience. Research also shows that when students do not feel a sense of belonging at school, or reject school values, they struggle to succeed (Lamb et al., 2015). These studies and my own research paper (Mifsud, 2019) have shown that when students' needs are not met by the educational system, they will be more at risk of dropping out of school. These studies explore how applied learning practices help in re-engaging students who are at risk of leaving school early (Callingham, 2016; Dekkers, 2014; Mifsud, 2019; Pemberton et al., 2017) and/or without skills (Mifsud, 2019). To counter this trend, effective interventions include hands-on learning, a whole-school initiative to engage all students (Callingham, 2016), implementation of more meaningful and tailored experiences for students, while also providing opportunities to students to grow professionally and personally (Pemberton et al., 2017; Mifsud, 2019). Schools should be given more autonomy with regards to curriculum development to offer the most suitable solution for the students' needs. Engaging and stimulating curricula with strong focus on formative assessment, will facilitate the attainment of knowledge and the development skills and competencies to the best ability of the learner. Additionally, giving learners the opportunity to make a link with real-life and let them feel a sense of belonging and motivation through active participation in their school life, not only improves students' learning experience but is also a preventive measure for early school leaving (European Commission, 2015; Mifsud, 2019).

2.5.4 Applies learning to real-world situations

Active learning strategies have empirically proven to have several advantages. Case studies which are based on real-life situations is one of them, particularly those which includes role-playing. A broader discussion on role-playing will follow in Section 2.7.2. Such strategy gives students the opportunity to vicariously experience situations

that students might face in the future, which will help them recognising the link between theory and practice. The decision-making process in such strategy both encourages higher order thinking and help students realise that problems in real-life situations have no 'right' or 'wrong' answers (Bonwell & Eison, 1991). Bonwell and Eison (1991) highlight that since one will be dealing with human emotions through the situations described in such case studies, students' interests are captured and highly motivates them. For them, the most important advantage of such strategy is the "change in attitudes" (p. 53), though little evidence exists on such claimed benefit. Some other studies remarked other benefits of applied learning including boost in students' self-confidence, enhance their motivation and commitment as programmes are tailored to suit the individual needs and interests of the students (Dekkers et al., 2014; Lim et al. 2020; Pemberton et al., 2017; VCAA, 2020).

2.5.5 Provides a context in which students can develop highly sought and crucial skills

Applied learning also provides a context in which students can develop generic skills, soft skills, practical skills and theoretical concepts and helps smoothen the transition between schooling and subsequent levels of education and training or work (Dekkers et al., 2014; Downing, 2017; Lim & Lim, 2016; Lim et al, 2020; Mifsud, 2019; Nelson-Hurwitz & Tagorda, 2015, Pemberton et al., 2017; VCAA, 2020). Work placements have shown to smoothen such transition. According to Dekkers et al. (2014), "work placement takes students out of their comfort zone" (p. 6) which allows students learn informally from experience. Having students work in unfamiliar environments, may contribute to their professional employment in their future prospects. Work placements have shown an improvement in transferable skills, allow students to have 'real-word' experiences which help better link theory with practice and have also shown enhanced maturity and motivation (Ceschin et al., 2017). As pointed out by Ceschin et al. (2017), for certain programmes, the skills and experience which are gained during work placements are more directly beneficial. This is the case for applied programmes where students may have the opportunity to fine tune the skills which have been learnt in an academic setting at work placement and community organizations (VCAA, 2020; Wrye et al., 2019). Such skills are difficult to be learnt without practical applications, thus having students carrying out tasks where they can apply skills and knowledge in practice is

crucial. Thus, since learning by doing is the core of applied learning, it would be highly beneficial if students have a 'real-world' experience in the field as students will not only be better equipped to master the taught concepts, but also be better prepared for their future in workforce as they gain skillsets while still being a student. The latter would ultimately help smoothen the transition from being a student to a prospective employee (Hasan & Tan, 2019).

2.5.6 Bridges the gap between education, employability, and lifelong learning

In addition to the evidence that applied learning is positively linked to job placements (Dekkers et al., 2014; Pemberton et al., 2017; Wrye et al., 2019), it is well established in studies (Arantes do Amaral & Matsusaki, 2017; Voss et al., 2015) that partnerships between educational institutions and community organisations, results in enhanced student learning and employability. Especially since, studies (Moore & Morton, 2017; Webb & Napier, 2015; Wrye et al., 2019) remarked about the skills shortages that the industry was facing with new recruits and for students who wanted to progress to subsequent levels of education (Webb & Napier, 2015). According to these studies, the educational system must work harder to prepare students with skills that are crucial for the world of work and for lifelong learning. To counter such "skills gap" (Moore & Morton, 2017, p. 604) that exist, these studies have highlighted the so-important task of educational stakeholders to incorporate generic skills, which are also referred to as soft skills or 21st century skills (Moore & Morton, 2017) and employability skills into curricula. The broad set of such skills includes amongst others: communication; critical thinking; creativity; problem-solving (Moore & Morton, 2017; VCAA, 2020); project-management, responsibility, confidence (Arantes do Amaral & Matsusaki, 2017); cultural humility (Sabo et al., 2015); negotiation, compromise, teamwork (Moore & Morton, 2017; VCAA, 2020); leadership (Wrye et al., 2019); personal responsibility (VCAA, 2020); and the like. The process of learning by doing, the key component of applied learning where students are given the opportunity to build knowledge from experience (Kolb, 1984), articulates around the student-centred learning approach. As Wrye et al. (2019) pointed out, when such approach is operated within the experiential learning framework, for which one may find a broader discussion in Section 2.4.1, let students develop these highly sought employability skills. Wang (2015) reported similar perceptions, suggesting

that the experiential learning model helps in narrowing the gap between classroom and the real-world.

2.6 The Challenges and Barriers of Applied Learning

There is no single educational strategy or approach that is perfect and without any critiques. Whilst the applied learning approach brings forth many benefits in its various practices, there lie some challenges and barriers that need attention.

Due to the nature of active learning activities, the teacher must be willing to relinquish a certain degree of control in the classroom though old habits are hard to break. The emphasis placed on students' active involvement may be frustrating for some students when they are asked to present their opinions and work in an articulated fashion and when they listen to others'. The lack of rigid structure in the learning environment and the inherent ambiguity may also be uncomfortable for some to adapt (Bonwell & Eison (1991).

Vitorino et al. (2020) demonstrate that a combination of passive and active methodologies should be utilised in teaching. In this study, it was highlighted that although active methodologies provide various benefits, most of the participating students preferred the traditional method over the constructivist method. The reason pointed out was that while in traditional method, the responsibility to process the appropriate content comes from the teacher, the constructivist method generates a degree of insecurity in students as they must develop autonomy of study. It was also pointed out that since some students find it more difficult to adapt to new teaching approaches, it was recommended that they should first be introduced to active methodologies before these are implemented in class.

Christersson and Staaf (2019) identified three main challenges of active learning. Such challenges are: students should be encouraged to become active participants in learning, even though some educators may still find it difficult to shift their role; curricula, teaching approaches and learning environments should be re-innovated and analysed from time to time; and educational institutions should appreciate and expand the concept of active learning by recognizing the fact that they form part of a learning community. To meet such challenges, which should not be understood separately but intertwined, they drafted the following recommendations.

Both students and educators should be recognised as co-creators of knowledge where focus should be more on the learning process rather than only on the outcome. Giving students the opportunity to explore their role of constructing their own knowledge through problem-solving, inquiry-based learning, participating in decision-making processes which concerns learning and assessment methods is vital. This should provoke awareness that pedagogical approaches should proceed from reality to abstraction, where one may start with real-life tasks and ultimately work in collaboration with other stakeholders such as non-governmental organisations and industry. Students may also be invited to evaluate their curriculum while teachers' embrace the need of prospering their knowledge through professional development. Assessment practices should be more formative because students not only need to "learn to pass exams, but to gain valuable professional and transversal skills for life-long learning" (Christersson and Staaf, 2019, p. 6). Peer- and self-assessment are highly emphasised following alternative assessment methods such as feedback-oriented projects, providing "credits for internship experiences and through individual research projects" (Christersson and Staaf, 2019, p. 6).

Re-innovation of the learning environment for active learning is also important to support both formal and informal learning spaces. Technology should be utilised as a form of a learning space, so that when schools are faced with physical space limitations, online platforms can be creative and flexible ways to use. Both when redesigning the physical space and even when new technology is going to be utilised, as co-creators, students may provide a creative and functional solution.

Educational institutions should acknowledge that they form part of the broader learning communities. Schools shall establish that they are "learning organisations involving multiple internal stakeholders, especially students" (Christersson and Staaf, 2019, p. 7). Continuous professional development and the educational institution's role in facilitating life learning are crucial in such context. Educational institutions must review their role within other networks, including those with a higher stake in education. They must re-highlight their role at a cross-section with society by having on-going communication with national and international communities.

2.7 Applied Learning Activities

Active learning activities focus on students' use of "higher-order thinking" to accomplish tasks (Freeman et al., 2014, p. 5). Though active learning activities may sometimes involve technology such as simulations, games, and classroom-based devices such as smartphones (Carr et al., 2015), active learning can also be accomplished without using any technological equipment at all. However, according to the VCAA (2020), the design of any applied learning activities asks for taking into consideration the following aspects. One should start examining where the students are at. Negotiating and engaging in dialogues with students about the curriculum and recognising the knowledge that students have brought to the learning environment is important. Through such activities one should feel resilient, confident and self-worth. In real-life situations, we use various skills and knowledge, thus learning shall replicate the same processes that occur in real-life situations, while giving time and space to connect with communities. It is also very important to acknowledge that everyone learns differently due to the diverse learning styles, hence requiring to adopt different teaching and learning approaches. However, experiential learning and practical ways of learning should be given importance in applied learning. Finally, assessing appropriately is crucial, hence it is highly emphasized to use assessment methods that best adapts to the learning content.

Research provides a rich menu of active learning activities as alternatives to traditional ones that can be employed in the repertoire of pedagogical methodologies discussed in Section 2.4. These include experience-based practices, simulations (Bonwell & Eison, 1991; Leal-Rodríguez & Albort-Morant, 2019), group work activity (Hodges, 2018; Leal-Rodríguez & Albort-Morant, 2019), jigsaw activity, collaborative learning, peer discussion, peer-led team learning (Hodges, 2018), cooperative learning, peer teaching, problem solving (Bonwell & Eison, 1991; Hodges, 2018), debates, drama, role-playing, and games (Bonwell & Eison, 1991).

A combination of the above-mentioned applied learning activities is going to be cross-referenced in the 'Results and Analysis' Chapter. A brief description of some of the above-mentioned applied learning activities, which have a jargon and broad element will follow.

2.7.1 Unplugged activities

Living in the "digital age" does not only require students to "learn to speak, write, or develop specific skills" (Conde et al., 2017, p. 1). They must also be "successful in their context" (p. 1), and one way of achieving this is by "developing the computational thinking" (p. 1). The concept of computational thinking goes back to Papert's (1980) work where he described it as "a way of thinking deeply about the abilities of a computer to work and solve problems" (Harris, 2018, p. 7). It has been more recently popularised by Jeannette Wing, in her seminal article that sought to identify "a universally applicable attitude and skill set everyone, not just computer scientists, would be eager to learn and use" (Wing, 2006, p. 33). Computational thinking has become a crucial skill for someone living in the digital society to increase the individual's success, performance, and employability (Conde et al., 2017). Various approaches have been explored to promote computational thinking (García-Peñalvo, 2016; Conde et al., 2017) in curricula, one of which is unplugged computing (Bell & Lodi, 2019; Conde et al. 2017; Harris, 2018). The term 'unplugged' in this context refers to learning computer concepts through constructivist, usually kinaesthetic, activities away from computers or digital devices of any kind (Bell & Lodi, 2019; Conde et al., 2017). The wide range of unplugged activities includes games and puzzles that use cards, string, crayons, and physical movement (CS Unplugged, 2020). Research shows that unplugged activities have proven to be helpful for students to develop computational thinking skills and to boost their interest in computer science (Brackmann et al., 2017).

2.7.2 Role Playing

As an active learning technique, role playing requires a high level of participation from students (Barnabe, 2016; Tabak & Lebron, 2017). Role playing facilitates a group activity where a person assumes a different role in a given situation (Gaab & Vogel, 2018), aiming to acquire a learning experience. The preparation part of the role play is important as it requires to establish the roles' descriptions and the participants' criteria. Observations and acting out the parts during the role play have shown to facilitate learning (Acharaya et al., 2018). Besides the fact that role playing supports language learning (Yang & Quadir, 2018), students also learn other skills, namely, "speaking, writing, critical thinking, problem solving, leadership, and teamwork" (Gaab & Vogel, 2018, p. 8). Sauser and Sims (2018) claim that role playing may also be beneficial to learn

about business ethics. Through role playing, students learn to "understand the feelings, values, attitudes and body language" (Acharya et al., 2018, p. 299).

2.8 Assessment Practices of Applied Learning

Assessment is sometimes perceived as a dreaded term for both educators and students. For many years, several educational systems have shown that accountability can only be demonstrated through data. Countless of colourful graphs and charts presenting data generated by constant cycles of summative assessment through standardised testing, unit testing, spelling tests, and anything that can generate data which can be used as a 'stick' in attempt to drive student attainment (Pearce, 2016). Summative assessment, an approach which has been widely adopted by curricula through tests and examinations (Oyinloye & Imenda, 2019), occurs "at the end of the instructional process or of the learning period" (Directorate for Learning and Assessment Programmes, 2018b, p. 2), to evaluate students' learning through a mark or grade. Its aim is to compare this mark or grade against some standard or benchmark to ascertain whether and to what extent have the students shown understanding of such learning (Directorate for Learning and Assessment Programmes, 2018a; Directorate for Learning and Assessment Programmes, 2018b). Such "backward-focused" assessment (Pearce, 2016, p. 1), neither drives students' achievement nor does it take into account the weaker students' learning needs who find it difficult to learn at the same pace or timeframes as others (Oyinloye & Imenda, 2019). This assessment of learning is 'done to' students, rather than 'for' or 'with' students (Pearce, 2016).

Nonetheless, assessment is an important aspect of school life and when used effectively, it can drive students' achievements and ensures that educators and students can plan the learning journey; one that suits the students and that can safeguard students' progress. This section defines and highlights the features of authentic assessments in applied learning through the application of assessment for learning, an approach which is intended to inform planning and meet the learning needs of all students. It also strives to show various items that research highlights as measures of active learning.

2.8.1 Assessment for Learning

A succinct definition of assessment for learning which have been widely adopted and often quoted is "the process of seeking and interpreting evidence for use by learners

and their teachers to decide where the learners are in the their learning, where they need to go and how best to get there" (Assessment Reform Group, 2002, p. 2). Pearce (2016) highlights such approach as one form of formative assessment.

Before getting a deeper insight of assessment for learning, it is important to highlight the meaning of formative and continuous assessment in addition to the previously defined summative assessment. The Directorate for Learning and Assessment Programmes in Malta (2018a; 2019b) distinguishes summative assessment, formative assessment and continuous assessment. Formative assessment is part of every lesson where through formal or informal procedures, the educator and students interact verbally or through assigned tasks. Through such procedures, the educators and students gather information and feedback about the students' progress and adapt teaching and learning accordingly to meet students' needs. Provided feedback to students serves as scaffolding to enhance learning (Directorate for Learning and Assessment Programmes, 2018a; Directorate for Learning and Assessment Programmes, 2018b). On the other hand, ongoing assessment or as also referred to continuous assessment, occurs several times over a period as part of their classwork through various forms of assessment. These include assessing students by observing and listening while they are carrying out tasks which may involve doing something, and by taking into consideration how they ask and respond to questions. This assessment information is used by educators so that students may "plan the next steps in their learning" (Directorate for Learning and Assessment Programmes, 2018b, p. 2). Such periodical assessment may include "projects, investigations, case studies and/or tests" (Directorate for Learning and Assessment Programmes, 2018b, p. 2). Judgement results in a level of achievement of a criterion and/or a mark or grade (Directorate for Learning and Assessment Programmes, 2018a).

Students' involvement is the key for assessment for learning. Based on the theory that students construct their knowledge and learning, students can determine what they need to "continue the construction" (Pearce, 2016, p.2) through their own assessment. Since the student is the heart of assessment for learning, the teacher must adapt any planned work to meet students' needs. Anything which comes from assessment for learning must be used to change groupings; offer support; scaffolding; tasks; lesson and unit outcomes, to ensure that all students succeed to their best ability. It is our job to make sure that they are given the opportunity to "learn how to learn" (Pearce, 2016, p.2).

Research has shown that assessment for learning enhances classroom practice, contributes to personalised learning approach whereby active learning is highly encouraged, and boosts students' confidence to undertake self and peer assessment. Further to that, research also suggests that due to the twenty first century demands, teachers should be given more autonomy in determining the type of assessments to be implemented with students. This also means that they have to shoulder greater responsibility and should be accountable for their actions (Varatharaj, 2018).

2.8.2 Assessment for Learning Strategies

Oyinloye and Imenda (2019) highlight that the key strategies revolve around three elements: "where the learner is right now" (p. 4); "where the learner is going" (p.4); and "how to get there" (p. 4). Oyinloye and Imenda (2019) provide the following strategies of assessment for learning under these three elements:

1. Learning intentions and "criteria for success" (p. 4) should be clarified.
2. Plan "effective classroom discussions, questions, and learning tasks" (p. 4) that shows "evidence of learning" (p. 4).
3. Give "feedback that moves learners forward" (p. 4).
4. Motivate students as instructional resources for their peers.
5. Motivate students to own their learning.

Pearce (2016) also highlights that effective success criteria is the best way to help students scaffold their learning and should allow them to determine their next steps. Self and peer assessment give students a voice. Giving them an opportunity to assess themselves, let them be heard while they explain their understanding and train them to assess their peers effectively is invaluable. When assessment for learning are planned into plenaries, reflection and insight into students' understanding follow.

2.8.3 Authentic Assessments for Applied Learning

From the familiar meaning of authentic which means 'real', 'real-world' and 'real life', one can infer what authentic assessment means. In authentic assessments, "students are asked to perform real-world tasks that demonstrate meaningful application of essential knowledge and skills" (Brown, 2019, p. 13). The tasks are replicas of faced situations by adult citizens, consumers and professionals in the field.

Authentic assessments are seen as direct assessments (Brown, 2019) or as direct measures (Lim et al., 2020) since they directly observe the performance unlike objective type tests which assume competency from cognitive measurement of ability. The kinds of authentic assessment which portray the constructivist nature of learning and offer multiple paths to the demonstration of learning (Mueller, 2018) includes "performance assessment, project or problem-solving, essay, self-evaluation, and portfolios" (Brown, 2019, p. 15).

2.8.4 Features of Authentic Assessments

Research (Lim et al., 2020; Mueller, 2018) highlights the following four features of authentic assessment which offers experience and outcome:

1. Built upon a 'real-world' situation
2. The connecting and applying of different perspectives. In an applied learning environment, perspectives in understanding of theory may differ due to individuals' interpretations and personal experiences
3. The allowance to explore different solutions and expect a variety of outcomes.
4. The opportunity to collaborate and reflect

One must carefully plan such types of assessments by referring to the above strategies and features of assessment before implementing them.

2.8.5 Measuring Active Learning

The AUSSE uses various items to measure active learning. The array of items includes students working with other peers on projects during lessons, designing and giving a presentation, asking questions, participating in class or online discussions, volunteering in community projects as part of the course, and peer-tutoring. One may encourage students to work on assignments with other students not in their class. Sharing ideas gained from course readings with other people such as family members, students outside of class, friends might also be considered (Carr et al. 2015).

2.9 Chapter Overview

It is empirically evident that the applied learning approach, which focuses mainly on learning by doing, provides the opportunity to students to apply knowledge and skills in real-life situations. Through various pedagogical methodologies such as active

learning, experiential learning, project-based learning, and service learning, the learner is the "active subject in the teaching-learning process" (Vitorino et al., 2020, p. 1). Rather than passively absorbing knowledge, learners are guided and facilitated by the teacher to build and actively construct their own knowledge through making – an approach which stems from the constructivist and constructionist approaches to learning. The applied learning approach have shown increased students' engagement with long-lasting positive effects, improves students' performance, and makes classrooms more inclusive as it promotes learning for all students, which can ultimately also be a preventive measure for ESL. In addition to the benefits of giving students the opportunity to apply learning to real-world situations, such approach has shown to give students highly sought and crucial skills for employability, life and lifelong learning. Applied learning helps smoothens the transition between compulsory schooling, the world of work and subsequent levels of education and training. This comes with its barriers and challenges that need attention and presented recommendations to meet them.

Through a vast range of active learning activities which may or may not involve technology, students' higher order thinking to accomplish tasks is the main focus. Having insight of "where the learner is" (Oyinloye & Imenda, 2019, p. 4), "where the learner is going" (p. 4), and "how to get there" (p. 4), is a widely adopted approach of formative assessment which has many benefits. Through authentic assessments, students are presented with real-world situations in which they can apply their knowledge and skills.

Since this study aimed at designing an Applied Digital Competences Curriculum, this chapter explains how a curriculum can be designed to equip secondary school students with digital competences in an applied approach. The next chapter starts off by discussing the concepts of digital competences and then discuss how such curriculum was developed. The backbone of such curriculum and an analysis of different referred curricula will be discussed. The layout of this curriculum and the process of accrediting it conclude this chapter.

Chapter 3

Designing the Applied Digital Competences Curriculum

3 Designing the Applied Digital Competences Curriculum

3.1 Introduction

"Active learning begins with the design of a curriculum that is student-centred, and that draws on students' intelligences and on their prior knowledge and experience in determining how students should demonstrate their understanding of course content" (Christersson & Staaf, 2019, p. 3). This quote mirrors the thoughts of the researcher who aimed at designing a digital competences curriculum in an applied approach.

This chapter looks at what does it really mean for someone to be digital literate and why research highlights its importance. A look at the level of digital skills at global and national level and the national plan and initiatives to enhance the digital skills and the digital citizenship of citizens will then be looked at. The final part of this chapter delves into defining digital competence with particular reference to European reports and frameworks as well as the curriculum approach that education systems might to take to equip citizens with digital competence. Finally, the Applied Digital Competences Curriculum framework, designed for this dissertation, will be discussed along with an analysis of the referred frameworks and curricula which inspired the design of this curriculum. Since two programmes from this curriculum have been accredited, the process of accrediting them will be explored.

3.2 What does it mean to be digital literate and why does it matter?

The perceptions and behavioural differences of people who grew up in the digital world and those who were not and have later adopted and acquired familiarity with new technology respectively, have provoked a change in the way we teach today's generation, that is the Generation Z (Turner, 2015). Without generalising, today's generation engage with any technological thing effortlessly since they have been living in an interactive "on demand digital culture" (elearning, 2015, p.6; Farahin et al., 2017, p.17) since they were born. Access to media anytime and anywhere media through instant messaging, sharing of photos, texting, social networking, video streaming, mobile internet, and more, brought new ways of how youth engage online. Further to that, nearly all students need access to a computing device as part of their studies as well, and so technology is nowadays seen as an essential component even for the learning environment (Farahin et al., 2017).

However, though it is true that most of our young people do not need to be coaxed to take up technology, and the time they spend 'glued' to what they love doing swiftly improves their skills more than their elders (elearning, 2015; Mediasmarts, 2018), veils a potential problem. Sadly, research shows that young learners still do not really know how to take advantage of technology (elearning, 2015) and their level of factual knowledge and digital literacy is still inadequate and immature (Hang et al., 2018). Without any form of formal guidance, students are likely to remain "amateur users of ICT" (Mediasmarts, 2018, p.3) which raises concerns about today's generation of students who are not fully digital literate and whose digital skills are low (Chaudron, 2015), yet are profoundly absorbed in cyberspace (Mediasmarts, 2018). Nonetheless, formal guidance necessitates that digital literacy is well defined and understood since several education systems have established numerous initiatives to equip learners with 21st century literacies, but most of these "may bear very little relationship to curricular guidance, practice, and assessment" (Burnett & Merchant, 2015, p.271 ; Petrov, 2017). Indeed, to be digital literate in today's media-rich environments, requires young citizens to develop knowledge, values, and a wide range of critical thinking, communication, and information management skills for the digital age (Mediasmarts, 2018). The overarching goal is to equip all students with opportunities and skills to be active 21st century creators. As once said by Jan Holmevik "the student of the future is what we call a maker, somebody who needs to be able to not just critically understand the problem, but also produce solutions to problems" (as cited in Alexander et al., p.3). Thus, as highlighted in the previous chapter, students should move beyond being merely consumers of knowledge and become active producers of knowledge. This notion feeds into the concept of digital literacy which means that the young citizen will be able to sift through the unlimited information found on the web, understand it, and use effective means to communicate it to others in a format which they feel is most suitable (eLearning, 2015). Thus, digital literacy is more than just knowing how to use technology. It is about citizens knowing how to critically use the technology. They must be able to use it imaginatively to create, collaborate, communicate, work ethically, and understand when, if and how it should be used to perform a task or produce something, hence reaching efficiently an objective.

Sefton-Green et al. (2016) referred to digital literacy as the digital competences that may be acquired by young and adults through digital technologies. Digital literacy

practices involve reading, writing and "multimodal meaning-making" (p.15) by use of a wide-range of digital technologies. According to Zittoun and Brinkmann (2012) "meaning making designates the process by which people interpret situations, events, objects, or discourses, in the light of their previous knowledge and experience" (p. 1809). However, as Burnett and Merchant (2013) said, integrating digital literacies in forms that better build on the opportunities offered for meaning making by means of new technologies, demands for knowing further about the opportunities and risks related to the engagement that young have with digital texts and also the skills and understandings related to them.

Since businesses and other services, including those governmental are increasingly migrating online, "citizens who lack digital literacy skills" (Mediasmarts, 2018, p. 3)are at risk of being disadvantaged in accessing "healthcare, government services, and opportunities for employment, education and civic participation" (Mediasmarts, 2018, p. 3). Though digital literacy should not be confined solely to curriculum subjects that traditionally deal with technology (eLearning, 2015; MediaSmarts, 2018), the Applied Digital Competences Curriculum aims at facilitating students who are keen to become digital literate, thus equipping them with a set of life skills to complement and further the skills and knowledge of other curricula subjects.

The next two sections provide research statistical data with regards to the citizen's digital skills level, both globally and locally.

3.2.1 Level of Digital skills indicator – A global and national statistical analysis

The lack of digital literacy skills is common, both globally and locally. In February 2020 US has published a study where it showed that at least a third of the population lack the digital literacy skills needed to engage in a digital environment (Tomer et al., 2020). In 2019, the Digital Economy and Society Index (DESI), a composite indicator that gives a summary of pertinent indicators regarding Europe's digital performance, demonstrated a digital performance improvement by all EU countries. Figure 4 illustrates the digital performance ranking scores of all EU countries for 2019. However, though some countries charted the highest digital performance score, and thus are among the

strongest digitalisation leaders among the EU member states, other countries are far behind, and the EU in general must improve in this regard.

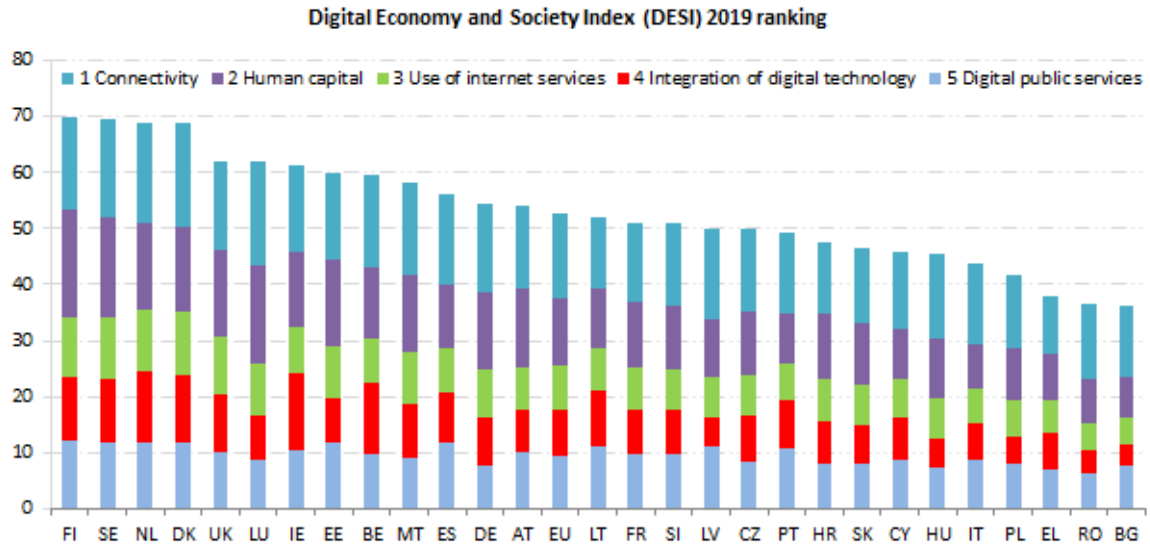

Figure 4 Digital Economy and Society Index (DESI) 2019 ranking (European Commission, 2019d)

Figure 5 illustrates statistical data by Eurostat of individuals with at least basic digital skills in 2019 at European Level. The unit of measure in this illustration is percentage of individuals aged between 16 and 74. Eurostat explains that individuals who have been using internet for the last three months are given a score on the four digital competences domains, namely, information, communication, content-creation and problem-solving, which will be highlighted in Section 3.3.3. The scores in each of the above domains are basic, above or below basic. Persons who do not use internet are regarded as people without digital skills. For someone to be classified basic or above basic on the overall indicator, the individual must have basic or above basic skills in all of the above-mentioned digital competences domain. As shown in Figure 5, Malta scored 55.8% of individuals with at least basic digital skills. The next section will focus on Malta's plan and initiatives to enhance the digital skills among its citizens.

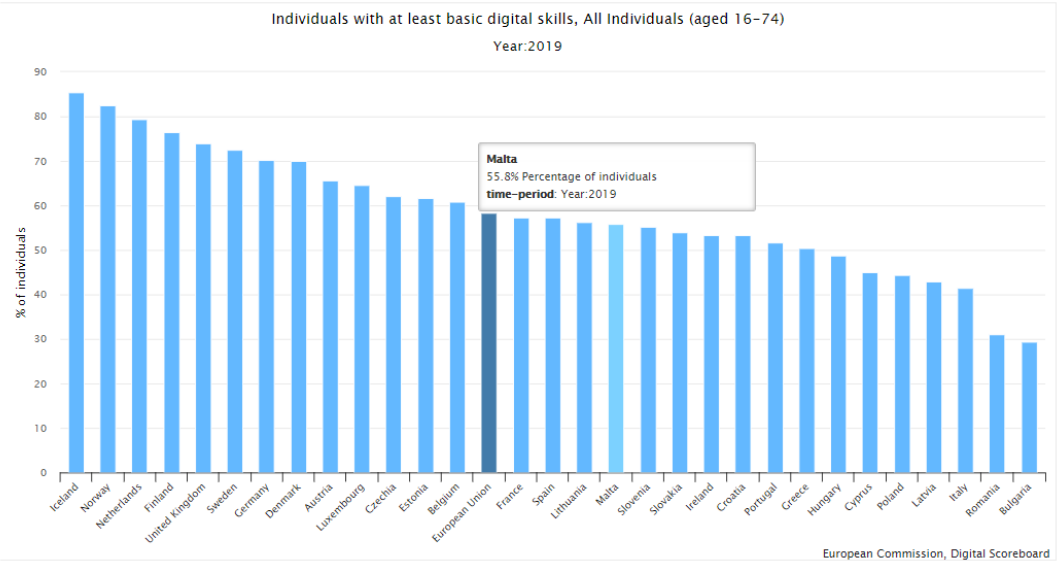

Figure 5 Individuals with low level of digital skills for the year 2019 (European Commission, 2019a)

3.2.2 Malta's plan and initiatives to enhance digital skills among its citizens

According to Malta's report in relation to the "monitoring progress in national initiatives on digitising industry" (European Commission, 2019b, p. 1), one of the main challenges that Malta needs to address as part of the national digital agenda is to enhance the citizens' digital skills. The national SWOT analysis on digitalisation showed that the increase of digital skills was not progressing fast enough. The major barrier of digital improvement is related to the low rate of individuals equipped with e-skills (European Commission, 2019b). The European e-skills Forum (as cited in eskills, 2019) has formulated a definition for e-skills which covers the following three main categories:

1. **"ICT practitioner skills"** (p.12) – the capabilities to research, develop, design, plan strategically, manage, produce, consult, market, sell, integrate, install, administer, maintain, support and service ICT systems.
2. **"ICT user skills"** (p. 12) – the capabilities required by the individual to effectively apply ICT systems and devices
3. **"E-business skills"** (p. 12) – the capabilities required to utilize opportunities offered by ICT, especially the internet.

To address the previously mentioned challenge in relation to the enhancement of digital skills, a number of national strategies have been developed by the Maltese government in collaboration with national authorities, namely, the Digital Malta Strategy, the National eCommerce Strategy, Malta.AI, and the National eSkills Strategy 2019-2021. The visions for implementing such strategies include increasing digital skills and competences among Maltese citizens (European Commission, 2019b) as well as enabling the digital citizenship as part of the National Education Curriculum (eskills, 2019). A more detailed discussion on Malta's vision for digital citizenship will follow in Section 3.2.4.

All of the above-mentioned initiatives are based on the Digital Education Action Plan (European Commission, 2018) which provides actions to facilitate EU member states in meeting the challenges and opportunities in education that are brought forth in the digital age. These actions aim at supporting technological use and at developing digital competences by citizens. Some of the above-mentioned strategies are specifically focused on enhancing digital skills in Malta, for which a brief description will follow.

The main objective of the National eSkills Strategy 2019-2021 is to expand and improve the digital skills among Maltese citizens (European Commission, 2019b). The sectors being targeted by such strategy include education, the labour force, the citizen, and ICT professionals (European Commission, 2019b).

Among the several initiatives for the development of digital skills in Malta, is the implementation of the e-Competence Framework. One of its primary objectives is the provision of "a common language to describe digital competences" (European Commission, 2019b, p. 20), including skills and knowledge requirements as ICT professionals. This also helps matching the requirements of the ICT industry with the workers' competences.

Digital skills have also been invested through ICT infrastructure in classrooms. All Year 4 to Year 6 students and their respective educators of all schools benefited from the One Tablet Per Child scheme. Through the provision of such educational tool, students are facilitated to deepen their learning in various areas, including digital literacy. Apart from the additional benefit that they can learn anytime and anywhere, Malta's report (European Commission, 2019b) remarked that it also facilitates the digital citizenship. This report remarked that the tablet has strengthened the digital skills of primary school

students, which was one of the primary aims of such scheme. Further to the enhancement of competences of students, all students are given a fair and equal opportunity of being closer to technology. Nonetheless, due to the rapid evolvement in digital literacy, new pedagogical approaches and educators' digital literacy development are also necessary (Burnett & Merchant, 2015).

MEDE (European Commission, 2019b) has also seen the importance of investing in digital skills for lifelong learning through compulsory education curricula along with the provision of teachers' professional development. In this regard, the Directorate for Digital Literacy & Transversal Skills (DDLTS) in Malta aims at empowering learners to be successful global digital citizens (MEDE, 2019). A more thorough description of digital citizenship and Malta's vision for digital citizenship will proceed in the following section.

3.2.3 Digital Citizenship

Digital Citizenship refers to the way someone should act while making use of digital technology. Further to being competent in engaging positively, critically and competently in the digital environment; communicating effectively and creatively; and participating socially is the duty of any digital citizen, to respect human rights and dignity by using technology responsibly (Gerhard, 2017; Richardson et al., 2017). Experts suggest (as cited in Richardson et al., 2017) nine aspects which involve digital citizenship, namely, "digital access, digital consumerism, digital communication, digital literacy, digital etiquette, digital law, digital rights and responsibilities, digital health and wellness, and digital security" (Richardson et al., 2017, p. 108).

3.2.4 Malta's strategies and initiatives for digital citizenship

Digital Malta, the national ICT strategy for 2014-2020, aims for "a digitally-enabled country empowering its people, communities and entrepreneurs through the intelligent and universal use of ICT" (Government of Malta, 2019a, p. 1). It is about advancing the nation's digital economy to improve the quality of citizens' lives, to improve community services, and allow businesses to prosper and become more competitive through ICT. Such vision explains how ICT offers limitless opportunities in education and training, inclusion and participation, jobs, and citizenship. To meet such vision, Malta needs to address the most important strategic issues and capitalise on digital opportunities.

As illustrated in Figure 6, the Digital Malta strategy sets out three strategic themes, namely, digital citizen, digital business, and the digital government. These three strategic themes are supported by three strategic enablers which are: regulation and legislation, infrastructure, and human capital. A number of actions for ICT, which will be referred to further on in this section, have been set out for each strategic theme for the utilisation of the socio-economic development. This strategy highlights the positive impact of ICT on the economy, employment, industry, and small businesses and how it can be utilised for the country's benefits, citizens empowerment and government transformation (Government of Malta, 2019b).

Figure 6 Digital Malta - National Digital Strategy 2014-2020 (Government of Malta, 2019b)

The Digital Malta strategy highlights the importance that all Maltese citizens should nurture digital citizenship. This includes having the rights, duties, and skills for accessibility and use of ICT. Through digital technologies, the quality of all people's lives can be enhanced. The digital skills aim to empower citizens to take advantage brought forth by technology and digitisation. Affordability, security, and accessibility of digital

services are aimed for all citizens, irrespective of skills and economic means (Government of Malta, 2019a).

Among other actions which have been proposed for Digital Business and Digital Government, the Digital Malta strategy proposed eleven actions for Digital Citizenship which have also been referred to by the National eskills Strategy 2019-2021 (eskills, 2019; Government of Malta, 2019b). The first action that have been put forward aims for a basic level of ICT competence through the launching of an education and awareness programme at community level, especially for vulnerable groups, to enhance ICT competences, media literacy, and feel confident in their ability to use internet critically and safely. This strategy also strives to empower young people to keep safer online by allowing digital citizenship to be part of the National Education Curriculum, equipping them with skills for safe and intelligent use of the internet. Such action will encourage youth to produce creative online content, empowers them and helps in creating a safer environment for them. Through the support of competent authorities, such measure may also help in combating cyber child abuse and exploitation. All citizens, particularly the ageing and vulnerable, will be supported to use ICT through the creation of an ongoing programme. Accessible and assistive technology set up through local communities will surely help in supporting this programme. Other actions include promoting NGA (Next Generation Access) networks and providing free wireless internet access in public spaces around Malta. Amongst other propositions, such strategy proposes citizen engagement through mobile apps and social media sites, the promotion of innovative ICT applications for the enhancement of citizens' daily activities including shopping, banking, commuting, and entertainment. A programme will be launched for the development of online content that is appealing, educational and cultural. The government's vision for supporting the use of the Maltese language for teaching and learning leading to the widening up of ICT in the Maltese language is through the development of language tools.

As remarked in the National eSkills Strategy 2019-2021, digital technologies have become universal and thus there is an increasingly expectation for citizens to have easier access to ICT, including a wider range of online communication channels to use and to be equipped with digital competences today more than ever (eSkills, 2019).

Through the mainstreaming of the European Digital Competence Framework, also known as DigComp, the DDLTS focuses on the digital literacies and the 21st century competences that are needed by students to critically use technology and better participate in an online society (European Commission, 2019b; MEDE, 2019). Therefore, the next section will define digital competences, will look at the different approaches taken up by countries to equip their citizens with digital competences and what are the competence areas of digital competences. It will later analyse the programmes and frameworks that have been referred to for the design of the Applied Digital Competences Curriculum proposed in this study and will outline the structure of such curriculum.

3.3 Digital Competences

The European Council's Strategic Agenda for 2019-2024 established priority areas to direct the work of the same council and other EU institutions (European Council, 2019). One of the six commission priorities for this five-year span is *Europe Fit for the Digital Age*. Such priority strives to empower people through innovative generation of technologies (European Commission, 2019e). *Shaping Europe's Digital Future,* an approach for such priority, highlights how the EU digital strategy is beneficial for businesses, the planet, and for every European citizen. As aimed in one of the three pillars to support such approach, "technology that works for people", the EU digital strategy aims to make an investment in digital competences for all European citizens (European Commission, 2019f; European Commission, 2020, p.1).

In the next two sections, digital competence will be defined, followed by different curriculum approaches for the development of digital competences.

3.3.1 Digital Competence defined

Digital competence has initially appeared amongst the eight key competences that need to be further developed by all citizens throughout life since the 2006 European Recommendation publication. The latest revision published in May 2018, has defined digital competence as the "confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society" (Council of the European Union, 2018, p. 9). It has similarly been defined in the Digital Education Plan (European Commission, 2018). The Digital Competence Framework for Citizens, DigComp, which was originally published in 2013 and which has later been revised,

describes digital competence more in depth. This framework, which has become a popular reference tool for developing and planning digital competences initiatives (Vuorikari et al., 2016) both at European and national level, describes digital competences in terms of five areas. These five areas include "information and data literacy, digital content creation, communication and collaboration, safety, and problem solving (Council of the European Union, 2018; European Commission, 2019c, p. 10). A thorough discussion on these competence areas and the latest revision of such framework, DigComp 2.1, will follow in Section 3.3.3.

While several European countries refer to the above-mentioned European digital competence definition, other countries have exclusively formed and only use their own national one, and other countries including Malta use both the European and the national definition of digital competence. In general, these national definitions are originated in curricula or strategies developed by top-level authorities (European Commission, 2019c). Malta's National eSkills Strategy 2019-2021 (eSkills, 2019) has defined digital competence as "not just digital skills, but a set of skills, knowledge, and attitudes concerning the nature and role of information technologies and the opportunities they offer in everyday contexts, as well as the related legal and ethical principles" (p. 13).

Digital competence is something that citizens need to contribute and take advantage of digital opportunities as well as to lessen risks (Vuorikari et al., 2016). Worryingly, the European Commission (2018) indicated that several youths have insufficient digital competencies. It has also reported that 44% of the EU population has low digital competences or none at all (19%). One of the outlined measures for supporting schools in digital education development, digital leadership in schools, notes that it is not the sole responsibility of the teacher to deliver digital competence. Rather that, a whole school approach is needed for encouraging and sustaining changed and innovative teaching and learning (Cachia et al., 2010; European Commission, 2019c).

3.3.2 Digital Competences Curricula Approaches

Some educational systems are more decentralised than others; hence schools have more autonomy on curricula (European Commission, 2019c). Thus, this section will first delve into an overview of centralised and decentralised curricula followed by different

curricula approaches that may be adopted by countries to develop learners' digital competences.

Highly prescriptive central curricula can help in promoting effective pedagogies and enhanced curricula to be implemented by schools and educators (Kärkkäinen, 2012; OECD, 2013). However, since such curricula may not be ideal for certain schools' realities, educators might not feel a sense of ownership and find it challenging to shift their pedagogies. Conversely, curricula which are highly decentralised, give a chance to teachers and schools to try and develop curriculum adaptations that seem relevant to their school. In several education systems the national curriculum gives the main objectives and then the school develops more tailored targets, content of curricula and assessment practices accordingly. The intentions of giving such autonomy to schools are to allow for local interpretations and adaptations while also allowing for a sense of ownership of the teaching programme. Allowing for curricula to be open for the teachers' professional judgements and innovations is important, however this may bring concerns due to unclear targets that need to be reached by students. Inequivalent and unfair educational opportunities for students at country level may pursue due to the varied schools' approaches in implementing the curriculum and assessment practices. Unclear and non-specific goals, might be a challenge for educators to plan lessons, establish learning goals and implement assessment strategies that meets the national expectations (OECD, 2013).

Chile reported that in high-centralised educational systems, whereby the curricula design is of a "top-down" (Isaacs, 2018, p. 8) approach, this leads to a "standardised approach" (p. 8) whereby subject differences are not taken into account. Conversely, in low-centralised educational systems like Brazil, where almost all the curriculum design is the responsibility of local schools and the central government's involvement in it is limited, the importance of "empowering local stakeholders" was emphasized (Isaacs, 2018, p. 8).

Brazil and other Canadian provinces reported success in their efforts in individual schools working with NGOs (Non-Governmental Organisations) when developing the curriculum to conform with the national targets and to support the curriculum implementation (Isaacs, 2018).

Nearly all European education systems have digital competence incorporated in primary and secondary curricula. Countries may take different approaches to incorporate digital competence in curricula namely, cross-curricular in subjects where all educators need to develop learner's digital competence in every subject; as a separate subject where digital competence is developed in a separate subject like any other traditional subject or; integrated in the curriculum or learning areas of other subjects.

As published by Eurydice (as cited in European Commission, 2019c), in Malta digital competences are developed in a separate subject which is compulsory for all students at lower and upper secondary levels, and as optional at upper secondary level. At both lower and upper secondary levels, the teaching of digital competences is integrated into other optional subjects. Malta's educational system also addresses digital competences as a cross-curricular topic at primary, upper and secondary levels. Though Applied IT subject is not listed in the table below, it also addresses digital competences skills. Table 1 further illustrates Malta's curriculum approaches to digital competence teaching at all three educational levels.

Curriculum approaches	Subjects/Learning areas	ISCED levels
Malta		
Cross-curricular theme	Cross-curricular learning outcomes in ISCED 3 will be introduced in October 2020.	ISCED 1-3
Integrated into other optional subjects	Computing, design and technology	ISCED 2-3
Compulsory separate subject	ICT	ISCED 2-3
Optional separate subject	VET IT	ISCED 3

Table 1 Malta's curriculum approaches to digital competence teaching at all three educational levels (adapted from European Commission, 2019c)

Further to the development of digital competences through Malta' school curricula at all three levels, it was seen beneficial and essential to design a separate subject curriculum programme to help students, who usually are labelled as low achievers in the one-size fits all education system in order develop their digital competences. The Applied Digital Competences Curriculum programme, which is tailored to the needs and individual capacities of the students, would be beneficial to be blended with the academic, applied and VET subjects as proposed in My Journey (MEDE, 2017).

As will be discussed in the following section, the Applied Digital Competences Curriculum was mainly inspired by the DigComp 2.1 framework. This section will also

highlight why it seemed important to use the DigComp framework as the backbone of such curriculum. An analysis of such framework and other applied curricula that were referred to for mapping out the learning outcomes of the Applied Digital Competences Curriculum will follow.

3.3.3 Analysis of Referred Frameworks and Applied Curricula

Since its first publication in 2013, DigComp served as a reference tool for EU member states to plan and develop digital competence initiatives (Ferrari et al., 2013). This framework introduced the five areas and the twenty-one competences. Due to the rapid digitalisation, the concepts and vocabulary needed to be revised and thus in 2016, DigComp 2.0 presented the updated list of the twenty-one competences known as the conceptual reference model (Vuorikari et al., 2016). The latest version DigComp 2.1 was subsequently developed on the preceding framework where eight proficiency levels and examples of use were presented. The five digital competence areas and the twenty-one competences of the DigComp 2.1 framework are presented in Table 2.

Competence Areas	Competences
Information and data literacy	1.1 Browsing, searching, filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3 Managing data, information and digital content
Communication and collaboration	2.1 Interacting through digital technologies 2.2 Sharing through digital technologies 2.3 Engaging in citizenship through digital technologies 2.4 Collaborating through digital technologies 2.5 Netiquette 2.6 Managing digital identity
Digital content creation	3.1 Developing digital content 3.2 Integrating and re-elaborating digital content 3.3 Copyright and licences 3.4 Programming
Safety	4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment
Problem Solving	3.1 Solving technical problems 3.2 Identifying needs and technological responses 3.3 Creatively using digital technologies 3.4 Identifying digital competence gaps

Table 2 The Digital Competence Framework for Citizens (DigComp 2.1) (adapted from Carretero et al., 2017)

DigComp 2.1 was used as a reference tool for the design of this curriculum as it is an effective tool to enhance the digital competence of all citizens (Carretero et al., 2017). Most of the education systems in Europe have used the DigComp competence areas as reference for the learning outcomes in curricula. According to the EU Science Hub (2020),

the DigComp framework can be beneficial for both citizens and policymakers. It can help citizens to self-evaluate their level of digital competence in the five areas of DigComp. Through another online tool, citizens may test their digital competence level as established in the DigComp framework and thus giving them an opportunity to discover opportunities for training. The DigComp framework also helps in monitoring the digital skills of citizens and in supporting the development of curricula. Among the several indicators offered by DESI for measuring Human Capital, is the digital skills indicator. Such indicator, which is vital for benefiting from a digital society, also uses the DigComp framework. This gives policymakers a good indication of the citizens' digital competences at country level. Therefore, DigComp is an effective tool for the planning of education and training opportunities. It was highly emphasized by Pérez-Escoda & Fernández-Villavicencio (2016) to utilize the DigComp framework as much as possible even in higher education. DigComp has also been a reference model for other frameworks, namely, the Digital Competence Framework for Consumers and the Digital Competence Framework for Teachers. Since DigComp takes into consideration the needed digital competences that results from the digital transformation (Pérez-Escoda & Fernández-Villavicencio, 2016) and since it is consistent with the European Council's Strategic Agenda for 2019-2024 priority areas (as discussed in Section 3) and with Malta's strategies and initiatives for digital citizenship (as discussed in Section 3.2.4), it was seen beneficial that DigComp forms the backbone of the proposed curriculum in this study.

Since this curriculum was designed for the applied strand as proposed in My Journey (MEDE, 2017), it was necessary to examine other existing applied IT curricula. One of these curricula was the ICT 2019 v1.0 Applied Senior Syllabus of Queensland (Queensland Curriculum and Assessment Authority, 2019). Due to its applied nature, this curriculum strives to equip Year 11 students with ICT knowledge and help them understand how to apply it in real-world settings. It also aims to help students in acquiring the essential skills to generate solutions for simulated situations that may be encountered in industry, education, government, and during leisure activities. This curriculum highlighted that applied syllabi cover the five underpinning factors that were listed in such curriculum, namely, "applied learning, community connections, core skills for work (CSfW), literacy, and numeracy" (p. 5). Following this programme, students may further their education and career pathways in various fields, especially the ones related

to ICT. This curriculum addresses knowledge, understanding and skills related to the main topics of hardware, software, and ICT in society. The main topics are incorporated in the elective contexts that suits the vast range of students' interests and abilities. This programme comprises of four units, where the aim of the first two units is to engage students with the course content and the last two units are more focused to consolidate students' learning. Course content, experiences and assessments become more complex as one progresses from one unit to another and students become more independent of their own learning. Four to eight modules are done throughout the programme. Each module covers one to three electives and includes a process of problem-solving.. Figure 7 further illustrates the programme layout and the range of available electives. This curriculum outlined two assessment techniques, the project and extended response techniques with a detailed description of how these can be implemented.

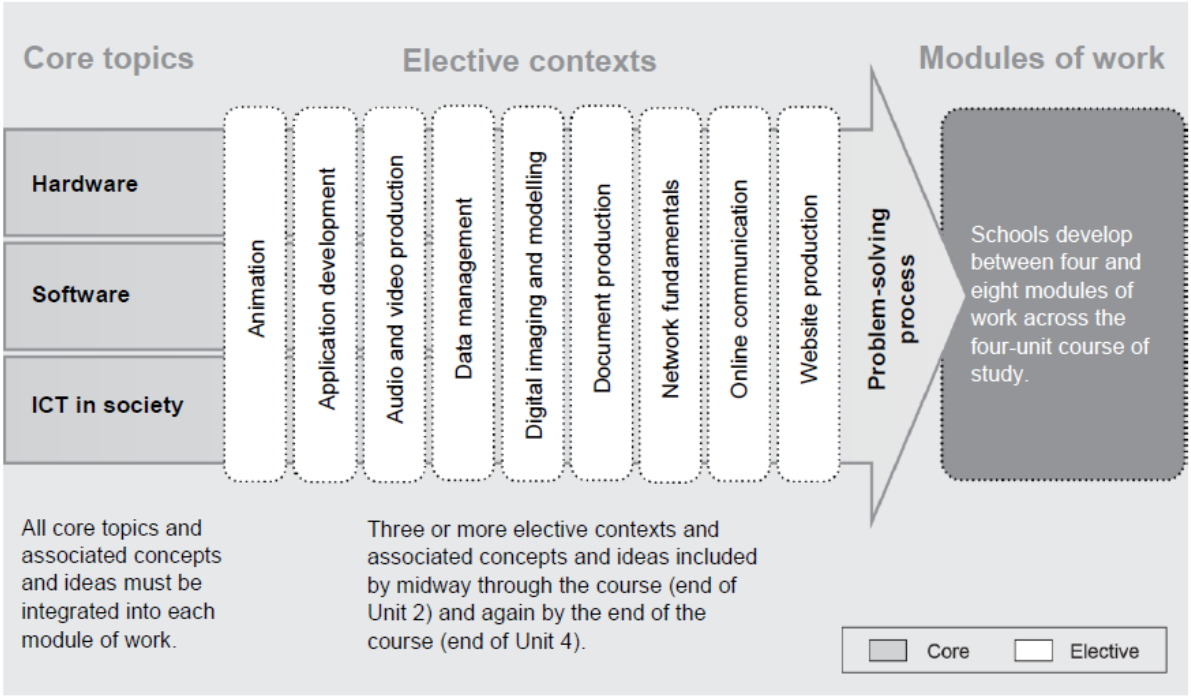

Figure 7 The Course study plan of the ICT 2019 v1.0 Applied Senior Syllabus of Queensland (Queensland Curriculum and Assessment Authority, 2019)

Another curriculum programme that was examined is the Leaving Certificate Applied (LCA) published in Dublin (Professional Development Service for Teachers, 2016). Such programme which is tailored for students whose needs have not been met by other programmes, aims to prepare students for their future life and employment and

for furthering their education and training. Students' talents are recognised irrespective of their abilities, needs, and interests. This programme, which is mainly based on active learning, aims to offer students the opportunities to be more responsible, enhance their self-esteem and self-knowledge, and be better equipped with communication and decision-making skills. At the end of this programme, students are certified with a Level 4 Certificate according to the Irish National Framework of Qualifications. The main methodologies include collaborative learning, cooperative learning, and inquiry-based learning. In such programme, ICT forms part of the vocational specializations. The modules covered include Introduction to the Computer, Word Processing, Spreadsheets, Databases, Desktop Publishing, the Internet, and Text Entry.

The Australian Curriculum (Australian Curriculum, Assessment and Reporting Authority, 2019) aims to help students use the knowledge, skills, and confidence to better use ICT at school, home, and community. It is a non-fixed programme which gives space to adapt according to technological advancements and to the way students change in constructing their own knowledge. This includes accessing, creating, communicating information and ideas, solving problems, and working in collaboration with others. Students will be facilitated in developing the capabilities to use ICT confidently, in a respectful and responsible manner, understand the possibilities, limitations and the impact it can have on people. Figure 8 illustrates the main ideas of such programme.

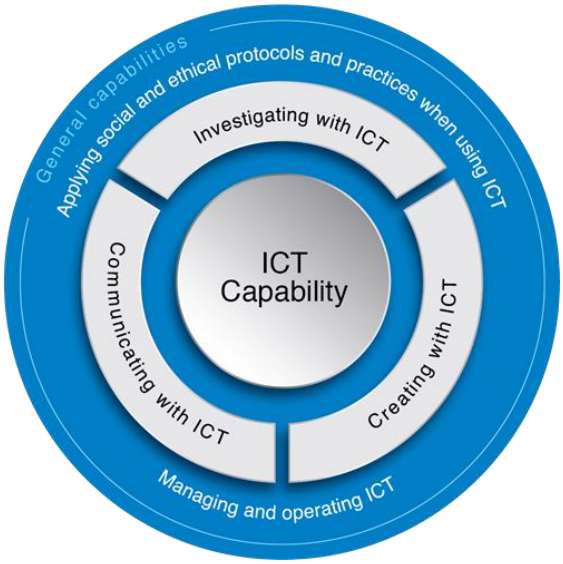

Figure 8 Elements of the ICT Capability learning continuum (Australian Curriculum, Assessment and Reporting Authority, 2019)

3.3.4 The Design of the Applied Digital Competences Curriculum

In this section, the Applied Digital Competences Curriculum, which was designed as part of this study, will be further discussed. This curriculum is built upon the previously mentioned framework and curricula, but these were not taken in their entirety. Therefore, this section will examine how the design of this curriculum and its learning outcomes are related to the previously mentioned framework and curricula. It will also highlight any aspects which were not included or not given enough focus in the previously mentioned framework and curricula and which were ultimately included in this curriculum. The structure and layout of this curriculum will be explained thereafter.

The learning outcomes of the Applied Digital Competences Curriculum were mainly inspired by the five digital competence areas and the twenty-one competences of the DigComp 2.1 framework. These were blended into the learning outcomes of the four modules of this curriculum, which were carefully designed to be implemented as much as possible in an applied form in the learning environment. While thoroughly analysing such framework, it was realised that DigComp did not put enough focus on ethical and legal obligations when one interacts and shares through digital technologies. Though DigComp highlighted the importance of protecting the data of one's own and others from potential danger in digital environments, more emphasis was placed on understanding "how personal data is used in digital services" (Carretero et al., 2017, p. 37). One of the examples drawn in DigComp 2.1 was the creation of a video. It would have been valuable to highlight the importance of the citizen's duty to act with respect towards others when creating videos or other digital material, which is the main highlight of digital citizenship as explained in Section 3.2.3. However, credit should be given to the emphasis on copyright and licences competence in DigComp. Therefore, an effort was made to underline the practice of ethical and legal measures in this curriculum, related to one's own and others' personal data, digital material, digital rights, and also plagiarism. Netiquette, which is one of the outlined competences in DigComp, highlighted the importance of recognising inappropriate behaviour. DigComp 2.1 only drew examples of how this can be implemented at high levels of proficiency levels. It was realised how beneficial it would be for learners to also know how to respond to such inappropriate behaviour. Thus, the skill of identifying how to "respond to inappropriate sites and

offensive online behaviour" (Queensland Curriculum and Assessment Authority, 2019, p. 29) was seen as valuable to be included in this curriculum.

The applied nature of the Applied ICT Queensland curriculum and the LCA programme are in line with the purpose of the proposed Applied Digital Competences Curriculum, and so the design of these programmes has influenced the design of the proposed curriculum. The knowledge, understanding and skills of the Applied ICT Queensland curriculum and the learning objectives of the ICT capability learning continuum had been used as a point of reference for mapping out the learning outcomes of the proposed curriculum. When these were examined, they were not taken in their entirety, but the learning outcomes were reshaped and re-designed in a manner that matches with the competence areas and competences outlined in the DigComp framework and keeping in mind Malta's national strategies and initiatives in this regard.

While designing this curriculum, the realisation came that the above-analysed curricula left out or did not put enough focus on some important aspects, and thus it was seen advantageous for these to be included in this curriculum. Since e-commerce and e-payments are growing at unprecedented pace (Srinivas & Rajeshwar, 2020), practice of identifying and purchasing an online given product or service using the appropriate means of payment was included along with its safety and secured measures. Another aspect which was included is how to keep up with areas of computer applications in the industry and society and thus promoting the idea of continuous learning. This was inspired by 'identifying digital competence gap' since it is not only important to be informed on technological advancements but also about the opportunities that the digital society can provide. Since the Digital Malta National Strategy (Government of Malta [Digital Malta], 2014) aims at making "online government services" (eSkills, 2019, p. 27) more accessible on "smart devices and mobile-friendly applications" (p. 27), learning outcomes related to online governmental services have also been incorporated. In line with the competence of protecting the environment, ways of how one can dispose of technological equipment was also included. Moreover, it was seen as important that this curriculum aims to equip learners with the competences 'managing digital identity' and 'identifying digital competence gaps' at both levels of this curriculum, since Malta's school curricula have learning outcomes related to these two competences at primary and lower secondary education level (European Commission, 2019c). Since soft skills is part and

parcel of this curriculum, the importance of self-reflection was seen as important, thus maintaining an updated portfolio is part of every module in this curriculum. Due to the applied learning approach of this curriculum, each module is built on project-based assessment through hands-on practice and thus, since students may or may not work in teams it was seen important that students know the main characteristics of different roles in a team.

The design of the learning outcomes formed the backbone of the four modules of this curriculum. These four modules are presented in Figure 9, where they are described through the learning outcomes associated with knowledge, skills, and responsibilities in Appendix 2. Since the core concept of this curriculum is about making and to equip learners with digital competence skills, an effort was made to write the learning outcomes in context of the corresponding modules and to be implemented in an applied manner as much as possible.

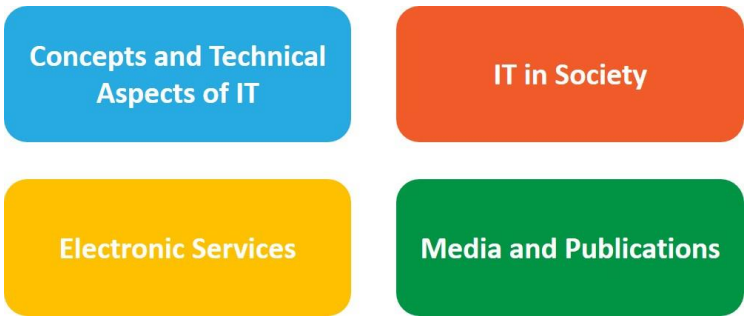

Figure 9 The Four Modules of the Applied Digital Competences Curriculum

The curriculum was designed at two levels, Level 1 and Level 3 where the former level is a programme based on two years and targeted for students at Year 7. Level 3 is based on three years and is targeted for students who are interested in following the applied IT programme and have completed Level 1 or a comparable assessment. Learning from one level to another increases in complexity and allows learners to work more autonomously. As shown in Table 3, the learner will be certified with an *Applied Award in Introduction to Digital Competence (MQF 1)* after completion of the Level 1 programme, and then certified with an *Applied Award in Digital Competence (MQF 3)* after completion of the Level 3 programme. The two programmes found in Appendix 2 present this curriculum in further detail along with the number of hours of total learning at both levels which is based on the number of credits for each module.

Introduction to Digital Competence (MQF 1)	*Digital Competence (MQF 3)*
Introduction to Concepts and Technical Aspects of IT	**Concepts and Technical Aspects of IT**
Introduction to IT in Society	**IT in Society**
Introduction to Electronic Services	**Electronic Services**
Introduction to Media and Publications	**Media and Publications**

Table 3 The Modules of the Applied Digital Competences Curriculum at Level 1 and Level 3

In the following section, the procedure that was followed to accredit the two programmes will be discussed.

3.3.5 The Accreditation Process of the Applied Digital Competences Curriculum

Back in September 2018, our school had an informative meeting with two representatives from the Accreditation Unit of the DQSE explaining the process of accrediting formal educational programmes up to the quality standards of the DQSE. A one-to-one meeting with these two representatives was held in early December 2018 to discuss the formation of the IT programme. Later that month the first draft of the learning outcomes of these two programmes were discussed. The writing of the application for accrediting these two programmes was drafted and amended between January and March of 2019. During this period, the two representatives helped in brushing off the terms that had to be used according to the programmes' levels and in stipulating the duration of the programmes and the number of hours of total learning according to the total number of credits of these two programmes. After months of thorough research, the application was finalised and was sent to the Accreditation Unit of the DQSE in August 2019. The two programmes namely, *Applied Award in Introduction to Digital Competence (MQF 1)* and *Applied Award in Digital Competence (MQF 3)* programme along with the associated modules have been accredited at Level 1 and Level 3 of the MQF respectively in October 2019 (refer to Appendix 3).

3.4 Chapter Overview

This curriculum designed as part of this study aims to equip students with digital competence skills and facilitate them in becoming more digital literate notwithstanding

their abilities and needs. Since the core concept of this curriculum is about making, this curriculum would blend perfectly with the applied, VET, and academic subjects as proposed in My Journey (MEDE, 2017).

Following the discussion of how this curriculum has been designed and accredited, the next chapter describes the procedure of evaluating it.

Chapter 4

Methodology

4 Methodology

4.1 Introduction

This chapter describes the epistemologies adopted and their salience in relation to the research questions. A brief overview of the methodology adopted – the qualitative methodology and its merits is provided. This chapter delves into an account of the research design, followed by an overview and the recruitment of the research site and the participants. The time-period chosen for conducting the part-implementation of the curriculum and the chosen subset of this curriculum will be explained thereafter. An account of the procedural and relational ethical considerations pertaining to this study, followed by how data was collected and analysed, with a brief discussion on the analytic method that was employed, conclude this chapter.

4.2 A mix of the two epistemologies adopted

Methodology assumptions are the reflections of the ontology and epistemology assumptions as claimed by Waring (2017). Cohen et al. (2005) explains that it helps us to understand not the products of scientific inquiry but the process itself. Waring (2017) describes it as "what procedures or logic should be followed?" (p.16). Under a realist ontology/positivist epistemology, nomothetic and experimental methodology follows: an approach design to discover general laws (Cohen et al. 2005). Under a constructivist or relativist ontology/interpretivist epistemology, idiographic, dialectical, and hermeneutical methodology follows: an approach to understand individual behaviour as claimed by Kirk and Miller in Cohen et al. (2005).

As a researcher of my study, after considering the above-mentioned points, interpretivism epistemological position was deduced as appropriate as my intention was to seek subjective knowledge. Thus, as a social constructivist, it is of utmost importance to understand the participants' views, otherwise the phenomena being studied cannot be properly understood. However, positivism epistemological position was also deduced as appropriate since my insights as an analyst were also taken into consideration. My research included both the analysis of referred frameworks and curricula, as well as the resulting participants' perceptions thereupon, this necessitated the adoption of both the interpretivism and positivism epistemological positions.

4.3 A qualitative methodology

Creswell (2014) outlines three methodological traditions, namely, qualitative, quantitative and mixed methods.

Creswell (1998) describes qualitative inquiry as research that is undertaken in the "natural setting" (Cohen et al., 2005, p. 119), where the researcher is the main research instrument collecting data and focusing on the meaning attributed to phenomena by participants. This data is described and interpreted by the researcher, typically through language or visual modes. The perspective is founded on philosophical and sociological traditions such as phenomenology and symbolic interactionism. Qualitative methodology provides the researcher with flexibility to know 'why' and 'how' it happened. Furthermore, it is good for both complexity and context (Cohen et al., 2000). However, collecting data is more time-consuming since the researcher must be on site more often. Data analysis is also more time-consuming and less straight-forward to analyse. Since the researcher has to rely on the availability of third parties, this type of approach also leads to a level of uncertainty.

Though the quantitative approach is an efficient method of collecting data with clear focus, however it is relatively inflexible as the researcher might realise that another question could have been asked after data collection. Creswell (2014) highlighted that the mixed method approach gives a more complete understanding of a phenomena being studied than using the quantitative or qualitative approach on their own. It starts with a broad survey to generalise results and then focuses qualitatively to collect in-depth data to help explain in more detail.

Knowing these merits, for my type of research questions, qualitative was the best approach. To support this, Trow claimed that (as cited in Atkinson, Coffey, & Delamont, 2003) "the problem under investigation properly dictates the methods of investigation" (p.99). Thus, as stated earlier, an interpretivist and positivist qualitative approach was adopted based on the following reasons (as stated in Cohen et al., 2005):

- The researcher who engages in interpretive understanding (verstehen), seeks to make sense of the phenomena being investigated by looking for the perspective from the participants' world view. Engaging in law-

governed explanation (erklären), the researcher seeks to make explanatory sense of the phenomena by finding the law that governs it.

- The researcher seeks subjective knowledge where experiences, feelings and interpretation of the participants being involved in the study are the main focus. The researcher also seeks objective knowledge in addition to that of the participants.
- An inductive theory approach allows for observations (what seems to work and not) to formulate hypothesis. Additionally, a deductive theory allows for the testing and confirmation of hypothesis.

4.4 Research Design

The type of qualitative research adopted is action research with a case, as outlined below.

4.4.1 Design – Action Research with a case

As cited in Creswell (2014), Denzin and Lincoln refer to research designs as strategies of inquiry where various approaches are available for qualitative inquiry, one of which being action research.

An action research where the case is the Applied Digital Competences Curriculum development within a policy framework (bounded and focused) was proposed for this study. According to Hine (2013) "action research enables researchers to develop a systematic, inquiring approach toward their own practices oriented towards effecting positive change in this practice, or within a broader community" (p. 1). In such case, the researcher had a dual role both as researcher and as an implementer. Stringer describes action research as a helix which is usually referred to as the "Look, Act, Think" model (as cited in Hine, 2013, p. 3) as shown in Figure 10Figure 10. According to Hine (2013), in the initial stage the researcher gathers information by observing, then analyses it and finally uses the articulated information to design solutions for the investigated situation.

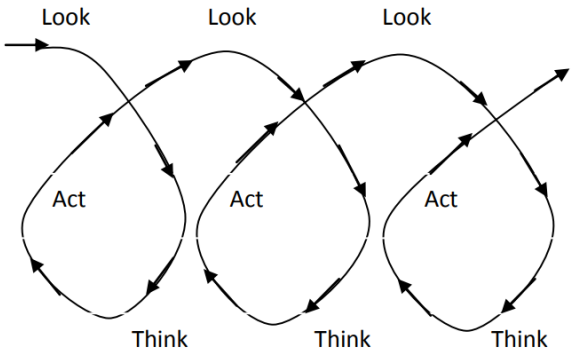

Figure 10 Stringer's adapted Action Research Helix (Hine, 2003)

4.4.2 What is the case?

In the proposed study, the case was the design of a Digital Competences curriculum for the IT Applied Strand as referred to in My Journey (MEDE, 2017), which was partly-implemented in a small school (bounded) whereby the participants' natural setting was a boys' secondary school. A subset of this curriculum was tried and evaluated in an applied learning approach with the Year 9 class by the same researcher. This was also a study of policy (Denscombe 2010), that is the development of a new curriculum. The researcher analysed frameworks and literature to establish how the applied learning approach can be adopted to equip students with different abilities and needs with digital competences.

Denscombe (2010) points out that a case is not randomly selected but on the basis of known attributes. In this case, the above-mentioned school was selected on the basis of the researcher's teaching experience in this school. Being it an action research, the researcher is doing the research on her own practice.

4.5 Participants and Research Site

This section gives details about the participants and the school, recruitment of the participants and the school, and the research site.

4.5.1 The Participants

Denscombe (2010) explains that purposive sampling works best when the researcher knows something about the participants and states also that they are more likely to provide valuable data. The researcher has been teaching in this small school setting for a couple of years, and thus has the privilege of knowing the students well. Since

the Level 1 programme is targeted for students enrolled at Year 7, this has the limitation of students still settling in the new school environment and the implementation of another curriculum subset may interrupt their settling down process. Hence, the researcher chose the next programme level - Level 3 which is mainly targeted for students enrolled at Year 9. The only Year 9 class in this school was chosen for my research. The number of participants was 10 students. Knowing the students for more than two years, gave the researcher the privilege of knowing better students' wide cross-section of different abilities and needs.

Since this is action research, a critical friend was suggested to come in class and provide feedback and make sure that the researcher is not biased.

Two educational stakeholders namely, the EO of Vocational and Applied IT Education and the Director General for Curriculum, Lifelong Learning and Employability, participated in separate semi-structured interviews. These two participants were chosen so the researcher could understand what is expected in the Applied Strand of the new schooling system in general, as well as from the IT perspective. From this point onwards, these two participants will be referred to as Ms Jones and Mr Smith, respectively.

4.5.2 Background of the School

Right after the researcher finished her degree in Computing Education, she applied for the post of ICT teacher at this school and has been teaching there ever since. When she applied, little did she know that at this small school setting she was going to find an integrating force that gave her life a sense of direction, a meaning and newfound energy. She found a family within which values circulate and are transmitted from one another freely in a bright, festive, and healthy environment - a family within which she feels loved, appreciated, and accepted. She is forever grateful and as a family, the school tries to nourish these values to its beloved students. The mission of this school is about offering a sound and sustainable way of educating its students for life. All parents/guardians and educators are faced with the challenge of understanding the young as well as offer a successful experience to them.

This boys' secondary independent school welcomes students from Year 7 to Year 11. ICT is the sole IT subject and compulsory, with three lessons a week. Year 7 to Year 8 students follow a programme which the researcher has drafted and kept updating it for

the past years, while Year 9 to Year 11 students follow the ECDL[2] Core and Advanced programmes and other ICT related topics which are of interest and beneficial for the students.

The following sections describe how the school and participants were recruited. A description of the research venues, the computer lab and the PSCD[3], is given. The subset of the curriculum that was implemented during the research will be discussed.

4.5.3 Recruiting the school

The Head of School has been approached informally to request unofficial permission to carry out this research. The aims of the research and the methods of data collection were explained. To help mitigate against bias, since the researcher was also the teacher, the researcher asked for permission of having an SMT member acting as a critical friend observing the lessons to be conducted. The researcher gave a detailed permission letter (refer to Appendix 1) to the Head of School after obtaining research ethical clearance. The Head of School gave the researcher a printed permission letter (refer to Appendix 1). The Head of School distributed the Information letters, Consent and Assent forms to parents/guardians and the students during the Parents' Day (refer to Appendix 1).

4.5.4 Recruiting the critical friend

An SMT member was approached and asked whether she would act as a critical friend, be present during the data collection with students and completes the observation protocol sheet (refer to Appendix 4) after each visit. This SMT member is also a teacher in the same school but since her area of specialisation is not IT-related, she was in a position to better provide her "objective perspective" (Villalobos, 2014, p. 3). She has been informed that as a critical friend, she shall observe and protect the students' interests and shall ensure that no undue pressure is exercised on them. After being given a detailed information letter and consent form (refer to Appendix 1), she accepted to act as a critical friend and signed the Form accordingly.

[2] ECDL (European / International Computer Driving License) is a computer skills certification programme.

[3] PSCD refers to the Personal, Social and Career Development subject

4.5.5 Recruiting the students

The Year 9 students were gathered in the computer lab in a circle and informed about the aim of this research. Students have been informed that they had to attend for and participate in the lessons irrespective of whether they decide to opt to participate in this study or otherwise. This being due to the fact that the lessons are an integral part of the school IT Curriculum. They have also been informed that, participation in this study, gives the students an anonymous and voluntary opportunity to have a voice about the effectiveness of the applied learning approach. The researcher explained the content of the information letter and assent forms (refer to Appendix 1). Parents/guardians handed in the signed consent forms and students returned the signed assent forms. All students have participated in this study.

4.5.6 Recruiting the educational stakeholders

The researcher asked Ms Jones in person whether she was willing to participate in this study after being given a detailed information letter and consent form (refer to Appendix 1). The interview was conducted at her office. The researcher informed via email Mr Smith about the study, asking him whether he was willing to participate in this study. A detailed information letter and consent form (refer to Appendix 1) were duly signed by him. The interview was conducted at his office.

4.5.7 The venue of the lessons

ICT lessons are held in the school's computer lab. As the ICT teacher of this school, the researcher manages the computer lab's layout and design, organised in an embellished and welcoming environment. On the walls there is a display of former and current students' certificates of achievements and participation in ICT-related projects, competitions, and community engagement activities. These walls attract the attention of students as well as school visitors. These depict unforgettable memories of students' enjoyment and self-satisfaction. The researcher endeavours to celebrate each success achieved as she believes that this has a ripple effect on self-empowerment and self-belief.

Since students per class are of a relatively concise number, this provides the opportunity of working collaboratively on various activities including discussions and hands-on experiences. Using the installed interactive whiteboard facilitates interactive discussions and encourages visual and tactile learning (Busuttil, 2011). Fourteen

computers are set up in a U-shape around the computer lab, leaving ample space in the middle of the lab which provides ideal room for teamwork, unplugged activities and role plays. A few dismantled computers are held safely in the computer lab, for demonstration purposes during lessons and to encourage students' participation through curiosity questioning. The lessons related to the part-implementation of the curriculum were held in this computer lab.

4.5.8 The venue of the Focus Group Interview Set-Up

The focus group interview with students was held in the school activity room where the PSCD lessons are held. The researcher conducted this focus group interview in a circle setup, same as in PSCD lessons. An audio recorder was placed in the middle ensuring capturing of all students' input. The researcher, being the moderator of the interview and their ICT teacher, formed part of this group whilst the critical friend did not.

4.6 Part-implementation of the curriculum

Here is a description of the curriculum programme subset being chosen for implementation and the implementation thereof, and the period of implementation.

4.6.1 The time-period

It was agreed with the Head of School, that for the best interest of the students, this research would not be conducted during the exams period. It was concluded that the best timing would be that after the Easter holidays, with students returning to school ready and eager for a new experience.

4.6.2 Subset: Competences and Learning Outcomes

Certain factors were taken into consideration when deciding which part of the curriculum to be implemented.

Interestingly, before even starting the implementation, certain students started asking for more knowledge about computer specifications as well as factors to be considered when purchasing a computer. A student unexpectedly brought with him a few computer flyers from a computer shop. This triggered more interest in the class and led to further discussions on the subject.

The second chapter of this writeup provided the researcher with lessons ideas of how the above-mentioned students' interest could be addressed in an applied learning approach. Furthermore, the knowledge being sought for by the students was undoubtedly in total sync with part of the learning outcomes of the Applied Digital Competences Curriculum designed for this study.

Also, as shown in Table 4, numerous learning outcomes and soft-skills that form an essential part of this curriculum, could be learned through various project-based activities. The researcher's aim was to carry out a hands-on project with students, serving as a real-life problem-solving scenario - *'Choosing the appropriate computer, software and other peripheral devices for a given scenario'*. This implementation of this subset of the curriculum of the Level 3 programme could be implemented during the stipulated timeframe. The lesson plans and respective resources are set out in Appendix 5.

Table 4 lists the planned digital competences and soft skills in the form of learning outcomes. However, as discussed in the 'Results and Analysis' chapter, in addition to the planned learning outcomes, other learning outcomes raised by the students have also been tackled.

1. Title of the module/unit:
Applied Award in Concepts and Technical Aspects of IT (MQF 3)
2. Competencies of the module:
- *Choose appropriate computer, software and other peripheral devices for a given scenario*
3. Learning Outcomes:
3.1 Knowledge – at the end of the module/unit the learner will have acquired the practical and theoretical understanding to:
- *Explain the use of different computer components and software for a given scenario* - *Explain different types of software including freeware, shareware, open source* - *Explain key terminology associated with the subject* - *Explain the main characteristics of different roles in a team*
3.2 Skills – at the end of the module/unit the learner will have gained the expertise to:
- *Practice using a computer in an appropriate way to ensure user's wellbeing for example ergonomics, good environment* - *Simulate good health and safety practices with limited guidance* - *Distinguish parts of a computer, software and their use* - *Choose the appropriate type of software for a given scenario* - *Practice using Windows, Microsoft Office, or equivalent for set tasks under guidance.* - *Practice using a computer prevention of loss of data*
3.3 Responsibility and autonomy – at the end of the module/unit the learner will have acquired the responsibility and autonomy to:
- *Responsible to implement preventive measures against loss or corruption of data* - *Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario in autonomy* - *Make appropriate use of equipment, procedures and techniques while working with computers to ensure user's health and safety wellbeing in a classroom setting.* - *Able to work in a team* - *Able to adhere to timeframe* - *Give and receive appropriate feedback with limited prompting* - *Able to demonstrate creativity and innovation under limited guidance* - *Able to solve a problem in a real-life scenario with prompting* - *Able to share ideas and listen to others' ideas*

Table 4 The Planned Implementation of Subset of the Applied Digital Competences Curriculum

Planned learning outcomes *Other learning outcomes tackled*

4.7 Procedural and Relational Ethical Considerations

In every type of research, it is critical to consider and address ethical issues. Cohen et al. (2005) claim that researchers should be aware of the participants' moral issues and meet the obligations with respect to the subjects involved or affected by the study. Firstly, the researcher followed the procedural ethics – being the process of applying for ethics review, abiding with legal requirements to ensure certain standards are met especially when working with humans. More importantly the researcher shall follow the relational ethics – what the researcher actually does in practice. These are discussed further hereunder.

4.7.1 Procedural Ethics

On the 22nd June 2018, the researcher sought approval from the Faculty Research Ethics Committee (FREC) to undertake research involving the previously mentioned participants. FREC has accepted the Research Ethics Proposal on 31st October 2018, subject to obtaining and submitting gatekeeper permission, in this case the Head of School. Such permission was submitted to FREC and on the 19th November 2018, the researcher was given the go-ahead to start collecting the data (refer to Appendix 1). UREC approval was not needed, as FREC acceptance was enough. The relational ethics pertaining to this study are discussed below, highlighting how attention has been given to autonomy, beneficence, and justice.

In this study, participants did not risk any harm. To avoid any stigmatisation and labelling, particular attention was given to the language used in the information letters, consent and assent forms, focus group and interview questions, and all other supporting documentation. Subjects were not deceived in any way during this study. To ensure anonymity, pseudonyms were used instead of real names of the participants. Though the real names of the two-mentioned educational stakeholders are not mentioned in this study, yet still the interviews held are attributable to them, as agreed by them in the signed consent forms (refer to Appendix 1).

4.7.2 Lesson Observations and Focus Group Interview

Through information letters, consent and assent forms and verbal communication, the participants were informed that they were free to participate in the

study and refusal to participation would have not affected their learning in class or other activities during the course of study.

Even if the parents/guardians gave their consent to this study, the researcher continuously sought to obtain the students' assent.

Since focus group interview is one of the main methods of data collection, during the ground rules part at the commencement of the focus group interview, participants were informed to protect third party confidentiality (Krueger & Casey, 2009). The focus group interview took place in the school activity room as this room is usually used for PSCD lessons where students tend to be more relaxed and encouraged to express themselves freely (Krueger & Casey, 2009). Students were encouraged to give honest critical feedback about the lessons even if their feedback was not positive. The researcher told them that there was no right or wrong answer but only different points of view. The researcher followed Krueger's and Casey's (2009) suggestions for a successful interview, namely:

- ask questions that were clearly understood by students
- set up an environment which encourages honest feedback
- ask questions that students are capable of answering
- encourage students to speak out their views
- ensure that students' answers are understood

As suggested by Krueger and Casey (2009), as a moderator, the researcher gave attention to when encourage students to answer the questions and to when to ask probing questions. To make sure that the researcher clearly understood the students' feedback, she confirmed with them what they really wanted to convey.

For the beneficence principle, since this curriculum shall affect the future education, the researcher informed the participating students that they might feel empowered with regards to the fact that:

- they could give feedback on the lessons delivered
- they could give feedback on the activities that they would participate in
- they were following a different curriculum, something new in line with what is being proposed in the new schooling system

- they could provide recommendations

Students were informed that when this study will be completed, a copy will be available at the school library so that they can review at their convenience.

4.7.3 Semi-structured Interviews

Through information letters, consent forms and verbal communication, the educational stakeholders were informed that they were free to withdraw at any time without having to explain why and without suffering any consequence.

4.8 Data Collection

The following sections explain how data was collected during this study. All the recorded data was kept secured. This data will be deleted once this research is completed.

4.8.1 Video Recording the Systematic Observations of Lessons

All students opted in to participate in the research and were video recorded during ten ICT lessons which the researcher delivered. The duration of each lesson was about thirty-five minutes long. These were then observed by the researcher. The method of recording the lessons was through two video recorders – one at the back and one at the front of the classroom. A blind spot (an area where both cameras did not record video), was intentionally created. Participants who opted not to join the research but had to follow the lesson would have been placed in this blind spot. The reason of using such tool was that since the researcher and the teacher were the same person, important details would have been missed if relied only on the pen and paper observation. Right after each lesson, the researcher took notes to help during the data analysis phase.

The researcher agreed with the critical friend beforehand, to write anecdotal narratives describing the lessons and then to complete the observation protocol sheet after each visit.

4.8.2 Audio Recording the Focus Group interview

A focus group interview took place once a subset of the curriculum was put to trial with the same class (nine students, since one was absent on the day). The focus group interview was recorded by an audio recorder and with written notes taken by the moderator (me as the researcher) and assistant moderator (a critical friend). This recording was later transcribed.

The notes provided by the assistant moderator were taken to ensure that there was no interference between recording the spontaneous comments of the focus group interview and the flow of the focus group. The note-taking process was essential in case the audio recorder stopped recording. The use of the audio recorder was mentioned at the beginning of the focus group session and introduced as a device to help in capturing everyone's comments. The focus group interview lasted for about half an hour. The questions asked during the focus group interview are set out in Appendix 4.

4.8.3 Audio Recording the Semi-structured Interviews

The two semi-structured interviews were audio recorded and later on transcribed. The duration of each interview took around half an hour. The questions asked during the semi-structured interviews are set out in Appendix 4.

4.9 Data Analysis

Willig (2013) highlights the different methods of analysing data, one of which is thematic analysis, which was used in this study. The reasons for choosing this method and how data was analysed are described below.

4.9.1 Why Thematic Analysis?

Thematic analysis is a method of identifying and organising common themes that have emerged from multiple types of data. Braun and Clarke (2006) highlighted that such approach is flexible since it can be applied within the essentialist and constructionist paradigms. It can also be applied within a variety of theoretical and epistemological approaches. Given that such approach offers flexibility and is a valuable research tool, a comprehensive account of data can hypothetically be provided by thematic analysis. Braun and Clarke (2006) point out comprehensively of how one can carry a very good thematic analysis. The six-phase guide provided by Braun and Clarke (2006) was followed.

4.9.2 The six-phase guide of Thematic Analysis by Braun and Clarke (2006)

During the first phase, the researcher transcribed the data and to further familiarise herself with the data, she read them for several times and added personal side-notes accordingly. All transcriptions have been imported in NVivo software. Such software is a very efficient tool to analyse qualitative data and to use for data

management and data organisation (Paulus et al., 2017). In this regard, it has also been used for the literature review.

Phase two dealt with the organisation of related participants' data into codes. During the third phase, the researcher extracted themes resulting from these codes. In phase four, she reviewed these themes. An ongoing analysis for refining the themes was necessary. In the fifth phase, naming/renaming of themes was done in the fifth phase. During the final phase, the researcher did a complete final analysis of these themes, and constant review of the selected extracts. The researcher then moved on to the write-up of the results and analysis thereof.

4.9.3 Semi-structured Interviews

The audio recordings of the interviews were transcribed and coded into existing or new themes using NVivo. While transcribing, the researcher used pseudonyms for educational stakeholders' names to ensure anonymity while using this data in the 'Results and Analysis' chapter.

4.9.4 Systematic Observations

The observation notes and related comments of the video recorded lessons were coded into existing or new themes in NVivo after reviewing the existing themes. The anecdotal narratives in relation to the lessons and the remarks made by the critical friend on the observation protocol sheet, were also transcribed and coded into existing or new themes. Both English and Maltese languages were used during the lessons. In this respect, translation was done accordingly.

4.9.5 Focus Group Interview

The audio recording of the focus group interview was transcribed and coded into existing or new themes using NVivo. While transcribing, the researcher used pseudonyms for students' names to ensure anonymity while using this data in the 'Results and Analysis' chapter. The Maltese language was used during the focus group interview. Translation of these transcriptions was done accordingly.

4.10 Chapter Overview

This chapter provided a thorough overview of the research approach, highlighting the epistemologies, qualitative methodology and the research design adopted. The

participants and the location of research of this study were discussed followed by an analysis of the subset of the curriculum that was implemented. The ethical considerations of this study were described. The methods of data collection and data analysis were explained.

The next chapter describes in detail the findings emerging from this study along with its analysis of evaluation of the proposed curriculum and the implications of applied learning and digital competences in secondary schools.

Chapter 5

Results and Analysis

5 Results and Analysis

5.1 Introduction

After a detailed discussion on how the data was collected and analysed for this study, this chapter describes the results that have emerged from this study along with a corresponding analysis, supported and cross-referenced with other research.

The main and sub themes that have emerged from the thematic analysis of the data collected are illustrated in the web chart as shown in Figure 11 on the following page.

The themes shown in yellow have emerged from part (not all) of the data collection methods as explained in their respective section.

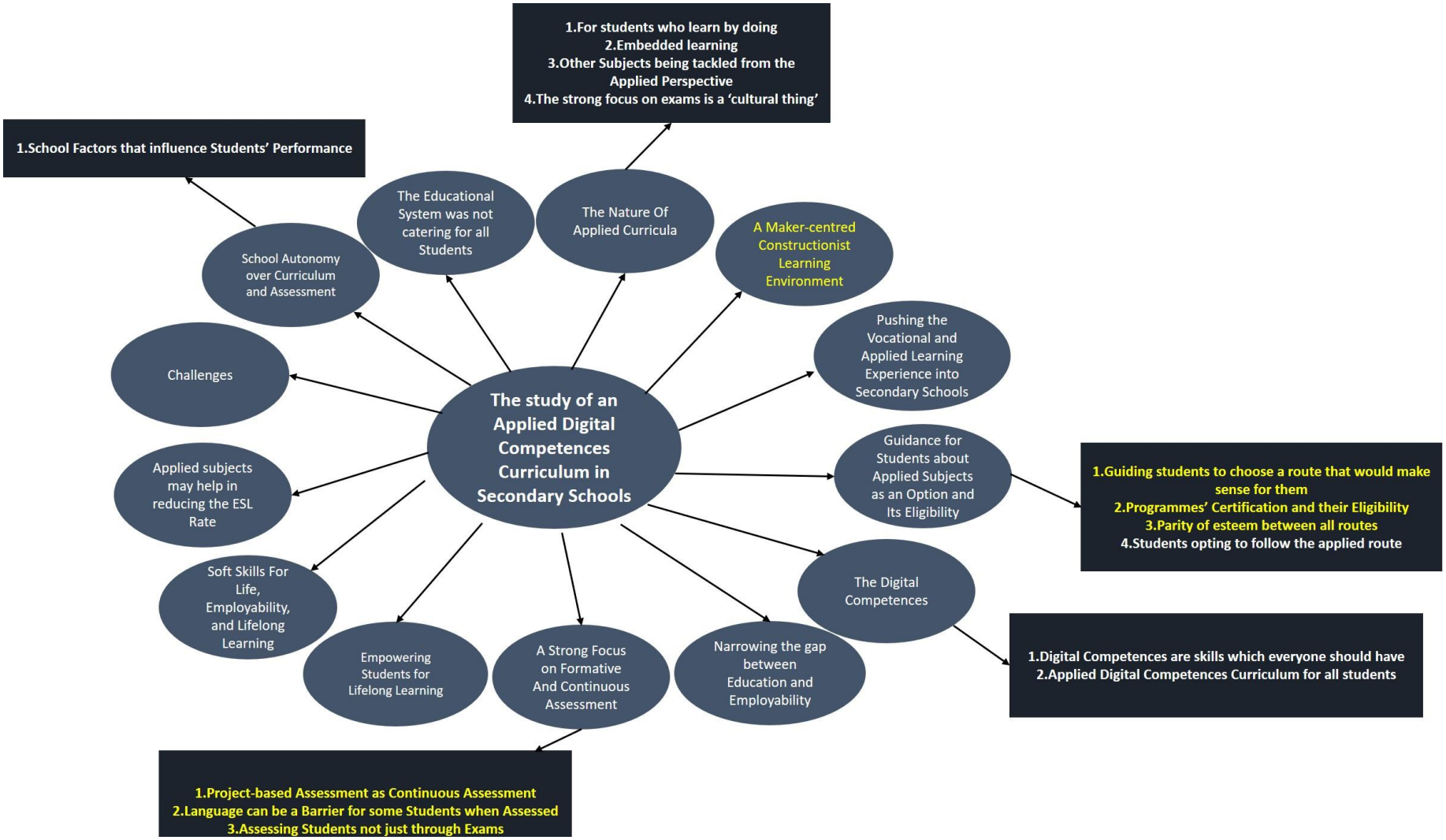

Figure 11 A summary of the themes that have emerged from the thematic analysis of the data collected

5.2 School Autonomy over Curriculum and Assessment

During the semi-structured interview with Mr Smith, he expressed his hopes that in the future, schools will be given more autonomy with regards to curriculum development which makes sense for them in their reality. He claims that this is something that we struggle with in Malta, where everything is expected to come from a centralized place and slowly they [referring to MEDE] are striving to empower schools to develop and adapt according to their [referring to the school community] needs. Mr Smith claimed that schools have different realities, and it would be interesting to hear different realities because some solutions in some schools may make sense for other schools as well. It would be interesting for the Maltese reality to work with NGOs on the issue of diversity and to adopt the "train the trainer model" (Isaacs, 2018, p. 7) so that teachers coming from similar realities may support each other. As Mr Smith claimed, the design nature of "top-down" (Isaacs, 2018, p. 8) curriculum where the design of curriculum is the responsibility of the central government and the implementation is the responsibility of the schools, need to change as this may lead to a number of issues as reported by a number of highly centralised educational systems as discussed in Section 3.3.2. These issues include different interpretation of the curriculum, how this curriculum is taught and implemented. Rather than seeking for advice from the Ministry of Education, teachers are encouraged to seek advice and support from other fellow teachers within the same or similar specialisation area and adapt according to their realities.

Brennen (2002) remarked that schools should neither be totally decentralised nor totally centralised. Though a certain degree of curriculum decentralisation is necessary, highly decentralised curriculum would not accomplish cohesiveness among schools. Finding the right balance between both is needed since the extreme of centralisation leads to extreme control, while on the other may lead towards inconsistency between schools at the same level. This may involve establishing national parameters while allowing space for individual schools to adapt to meet the needs of their school reality.

In another interview, Ms Jones has explained that teachers are nowadays being empowered when it comes to assess students in VET and applied subjects. Teachers can choose the modes of assessment that best fit the learners and are encouraged to be as creative as possible when assessing students.

Prior research (OECD, 2011) shows that students are more likely to perform better when schools are given more autonomy on what is taught in their school, in resource allocation and how the students are assessed. In countries where schools are given more autonomy, schools have more freedom of choice when it comes to assessment practices, what courses they offer, and the curriculum material. This research also outlines that when schools are more accountable to students: meaning posting achievement data publicly, while also being granted more autonomy as mentioned above; the average students' performance is higher than it would have been in cases where schools were either granted greater autonomy or more accountable to students. The bottom line is that autonomy and accountability policies go hand in hand to improve student performance.

For the last nine years, the researcher has been tailoring the curriculum programme and assessments according to the reality of the school. In a nutshell, the school has given the autonomy to the researcher to plan curricula and assessments according to the needs of the students. Thus, it was seen vital and beneficial, that the development of this Applied Digital Competences Curriculum of this study, will be tailored according to the needs and abilities of the students while equipping them with the digital competences discussed in Chapter 3 that many youth lack as reported by the European Commission (2018). During the part-implementation period of this study, the researcher adapted the planned work as seemed appropriate and beneficial to the students.

During the focus group, students claimed that they felt more motivated to learn and showed more commitment to the subject. Since the researcher knew well the students, it was easier to plan and adapt according to their abilities and needs and this correlates with the students' feedback from the focus group, they said that they would not have changed anything from the programme to make it better and that it suits their needs. Furthermore, after the part-implementation of the study, Harry claimed that he wished that his class will pursue the Applied Digital Competences Curriculum programme rather than the previous one. Students expressed that this applied programme is much more relevant to them and useful for their prospects in work, studies, and life.

5.2.1 School Factors that influence Students' Performance

Since autonomy and accountability should be combined for better students' performance (OECD, 2011), the researcher was curious if these two combined could have any positive impact or challenges during the part-implementation of this curriculum. It was not possible to proof if these two combined resulted in better students' performance vis-à-vis their achievement results since this was the first time that this curriculum was put to trial and could not compare with previous results. However, it seemed interesting to analyse any school factors that can influence students' performance when posting students' assessment on the webquest's website and being autonomous on what is taught and on assessment practices. This was observed through the systematic-observations of lessons.

A fair and just grading and evaluation system – Before and during this part-implementation of this study, it was realised that for educators to evaluate whether students have learnt a concept or achieved a learning objective, it is very important that they implement proper grading and evaluation systems: ones that are fair and just. All students should be equally considered and must not be discriminated on factors such as socio-economic background (Kapur, 2018). It is vital to put into practice creative modes of assessments beyond the traditional pen-and-paper tests. The various plentiful and exciting ways to assess students which include among others: role-playing, unplugged computing (as explained in Section 2.7), problem-solving case scenarios, webquests, and others which were implemented during the lessons delivered for this study; can show different things of 'how' and 'what' the students have learned. In addition to that, the educator can fairly assess students whose reading and writing is challenged by the language and the development to show off what they have learned (Peterson, Ponzio, Castori & Galloway, 2006). This correlates with Ms Jones's view that teachers should be as creative as possible when assessing a student, keeping in mind students' abilities.

It was first discussed with students if they wished to have the groups' achievement results posted publicly on the webquest's website, to which they all have assented to[4]

[4] All participating students assented to have any of their work and its results be anonymously published and can be used to draw conclusions in this study. This has been agreed in the Ethics form (refer to

both written and verbally. After the webquest was finished, students were eager to see their performance results online. This shows that while it is important to tailor curricula according to their needs and abilities, it also felt important for students to view their results online and it was realised that in actual fact it does not only improve the students' performance but also the commitment towards their work in class. Participating students claimed that they have never done a webquest before and at first, they found it a bit hard to understand their role in the webquest. As was suggested by the critical friend, they were given more than one example for each part of the webquest. The webquest was one of the modes of assessment used. Although it was successful, especially in the light of taking on different roles, the researcher thinks that time could have been managed better other than familiarizing oneself to this process. This also shows the importance for teachers to be allowed to decide which mode of assessment to use when assessing students since what works for one reality does not necessarily works for other realties.

5.3 The Educational System was not catering for all Students

When the Applied Digital Competences Curriculum was being planned and designed, the initial focus was on hands-on digital skills and soft skills which in turn guides the theoretical aspects of these skills. Participating students noted that even the mode of teaching is different from other IT related subjects and they expressed that this curriculum is broader and more tailored to their needs. One student in particular highlighted that *'qabel ma dħalt hawnhekk ma kontx inħobbu s-suġġett tal-kompjuter. Hekk iktar jogħġobni bil-proġetti u hekk'* [Prior attending this school, I did not like the computer subject. It is more enjoyable for me with projects and stuff like that]. As European and national policies have long acknowledged, digital competence is one of the key competences that must be further developed by all students (Council of the European Union, 2018), thus this curriculum was designed to equip all students with the digital competences.

When Mr Smith was asked about the nature of Applied curricula, he remarked that after a number of years that trade schools have been phased out, it was realised that the needs for a particular cohort of students were not being met by the system. Thus, VET

Appendix 1).

subjects were reintroduced into secondary schools and the biggest change that brought most of the success was the change in assessment. Assessment was then divided between 60% continuous-school based assessment and 40% exam-based to form a global mark. Mr Smith remarked that this was introduced very well and to date people have not challenged and said that this is not credible.

However, Mr Smith claimed that after VET subjects were reintroduced, the system, was only catering for 64% of the students. Both Mr Smith and Ms Jones claimed that this could be due to the strong theoretical aspects of the VET subjects. Despite the importance of the theoretical aspect, even more for a Level 3 syllabus (referring to MQF Level 3 syllabus), it was felt that syllabi which focus more on learning by doing were needed. Stirred by an increased concern of "global inequities" (Care et al., 2018, p.4) and lack of fairness, new imperatives have been brought into educational practices in the 21st century. Replacing existing curricula and shifting educational paradigms, is a national (MEDE, Malta, 2017) and global concern "to be at level with developed nations worldwide" (Varatharaj, 2018, p.105).

5.4 The Nature of Applied Curricula

This section explains the sub-themes that have emerged from the data collection process, being grouped under this main theme.

5.4.1 'For students who learn by doing'

Both Mr Smith and Ms Jones referred to applied curricula as programmes that are targeted for students who learn by doing, who find it challenging to sit down, listen, take notes and then apply what they have learnt in workshops. Applied syllabi are more practical in nature – students who choose the applied route will first engage in hands on-activities, and then the theory underpinning the practical follows. This meaning of applied is in line with the description of applied learning in literature which echoes constantly 'hands-on learning', 'learn-by-doing' and 'real-world experiences'. Research emphasises that through an applied learning approach, students apply the skills and knowledge learnt to new situations and real-life situations, which helps them in furthering their knowledge (Lim et al., 2020; Pemberton et al., 2017; SUNY, 2016; VCAA, 2020).

Ms Jones specifically described that applied subjects are more targeted toward students who 'don't like to learn from books and papers, hate reading and writing nonetheless some of them are very good students' However, she said that though reading and writing may be 'boring' and difficult for some students, they can still be implemented in a 'fun' way and at the same time, these students will be mastering such important skills. The ICT 2019 v1.0 Applied Senior Syllabus of Queensland which was analysed for designing the proposed curriculum, also highlighted that one of the factors covered by applied syllabi is literacy (Queensland Curriculum and Assessment Authority, 2019). However, research did not specifically mention that applied subjects target a specific cohort of students.

This intrinsic motivation was exceptionally felt during the part-implementation of this curriculum and was also observed by the critical friend. Students asked to go in further detail in certain areas for example the internal memory, storage and the processor of chosen embedded systems[5]. The researcher did not feel any pressure to move on quickly to finish what was planned. On the opposite, students were encouraged and were taught how to research other embedded devices that they own and others that they plan to buy. Radu (2019) explains that in an applied learning approach, students shall explore content and apply the skills learnt in class through independent or guided research. Since the skill of researching products well before buying was listed as a skill in this curriculum, is one of the competences of DigComp framework (Carretero et al., 2017) and since it seemed very important to them, more time has been spent on such skill. Jack in fact claimed that *'Li meta jkolli bżonn nixtri kompjuter, inkun naf x'inhu li qed infittex u nistaqsi, imma dan għaliex se nużah jiena? U liema nieħu tal-4 gig jew tat-2 gig RAM?'* [When I need to buy a computer, I will know what I am looking for and ask myself, for what am I going to use this? And which RAM should I buy, a 4 gig RAM or a 2 gig RAM?]. As Bonwell and Eison (1991) explained in their seminal work, it was seen important to engage students in activities which required higher-order thinking, in this case analysing, synthesising and evaluating, rather than transmitting information. The process of installing RAM on desktop computers was another activity which took longer than planned. It was not the

[5] Embedded systems (also referred to embedded devices) refer to the hardware, software and other additional parts, designed for performing a particular task unlike a personal computer (Barr & Massa, 2006).

installation per se that took most of the lessons time, but the discussion of cases 'when' and the 'feasibility of upgrading the device' that took most of the time. In fact, this was the learning objective of this activity, and since this was something that they were eager to discuss, they were motivated to use this knowledge to read further online about the devices that they own. For active learning to be promoted, students should be involved in doing and exploring things more than just listening (Bonwell & Eison, 1991). As cited in Wan Zi Shan (2014), Allen found that when teachers implement hands-on tasks with students who usually disrupt lessons, their behaviour improved extremely (Wan Zi Shan, 2014).

It was realised in this activity and also during the focus group, that students who usually get bored easily, were those who participated during this activity and were the ones who wanted to do further online research, notwithstanding their literacy difficulties. Harry, a participating student that has literacy difficulties, expressed his enthusiastic willingness to search the web to help him learn more. He said '*kemm tikteb l-affarijiet li trid u ssibha…tkun vera helpful*' [You just search for the stuff you want and you will find it…it's really helpful]. This relates to what research (Christersson & Staaf, 2019; Hall, 2019) shows that applied learning encourages all students to learn and effectively promotes more inclusive classrooms.

Ms Jones also conveyed that for Secondary SEC[6] applied subjects, hands-on tasks are given 50% weight which is much more than the 30% given for SEC VET subjects. She also surmised that even when teachers are trained to teach applied subjects, they should be given the perception of 'let's move on for a more hands-on approach as much as we can'.

5.4.2 Embedded learning

During the part-implementation period of the Applied Digital Competences Curriculum, the researcher planned embedded learning IT lessons with other subject teachers, namely, the English language and the Design and Technology teacher. One of the main challenges that Christersson and Staaf (2019) presented for promoting active learning which is important to tackle for provoking a cultural shift in education, is to work

[6] SEC refers to Secondary Education Certification issued by MATSEC and replaced the traditional O'Level

collaboratively with other stakeholders (Christersson and Staaf, 2019). The collaborative work that was made with the teachers, hopefully will help to combat this challenge and have a ripple effect on other educators, as well as showing students the importance of communicating and collaborating with others which is one of the five areas of the European DigComp framework (Council of the European Union, 2018; European Commission, 2019c).

For this part, students were asked to write down justifications of choosing a particular type of computer for the chosen scenario. Then, they were asked to write a dialogue during the English lessons which had to include the justifications mentioned earlier. Two of the team members were then asked to do the role-play where one person had to act the part of the person wanting to purchase the computer as per scenario while the other was the one giving suggestions. Role-playing was chosen as an activity since as discussed in Section 2.7.2, it is an active learning activity which necessitates extensive students' participation (Barnabe, 2016; Tabak & Lebron, 2017) and facilitates groupwork (Gaab & Vogel, 2018). The role-play was performed during the following IT lesson. Following such activity, participating students appraised the importance of mastering the communication skills. Specifically, they mentioned that good communication skills are needed when communicating with shop attendants when buying something, working with colleagues at the place of work and maybe when talking with clients as employees. The students' opinion correlates with research evidence that role-playing facilitates language learning (Yang & Quadir, 2018), and other skills including "speaking, writing, critical thinking, problem solving, leadership, and teamwork" (Gaab & Vogel, 2018, p.9).

Participating students emphasized that when the English lesson was embedded with the IT lesson, they realised that they did not only find the lesson more fun but also realised the importance and relevance of mastering the English language skills. Jack added '*U peress li għamilna d-dialogue u xi ħadd isaqsini x'jaqbillu l-iktar, inkun naf xi rrid ngħidlu. Mhux just ngħidlu din l-aħjar li għandi imma ngħidlu bonġu u nispjegalu għaliex din l-aħjar...inkun naf inkellmu u nispjegalu għaliex'* [And since we've done the dialogue, when someone will ask me what suits him most, I will know how to reply. Not just tell him that this is the best option but I say good morning and explain why it suits him most… I will know how to speak to him and explain why].

During the other embedded lessons which were done collaboratively with the Design and Technology teacher, students in each group where asked to think and discuss a 3D (three-dimensional) object that will be useful for the user in the chosen scenario. It was observed that although the majority of students have come up with many ideas which they initially sketched on paper, it was a bit challenging for some students to think creatively and share their ideas. It is clear from research that youths should be more prepared and skilled to be more creative, and able to think critically (Massari & Miron, 2016). However, it was noticed that the group dynamics helped in encouraging all students to participate in one way or another. This finding supports Ma's (2019) study reporting that collaboration in group while working on a project, motivates peer learning. Harry and Ben, two students with literacy difficulties, worked very hard on this project which was focused on learning by doing and making, and they have supported Tyler who was in the same group because he could not come up with any ideas at first. Due to the adopted constructionist learning approach which is based on 'making' education, brings forth much potential for students (Blikstein et al., 2019) since students will be using knowledge to create something which is meaningful and shareable (Tesconi, 2017). The three of them have shown appreciation of this lesson as they said '*huwa wieħed mill-iżjed suġġetti li jogħġobni għax meta nagħmlu attività bħalma għamilna, hekk jogħġobni lili. Nieħu pjaċir. Is-suġġett tad-Design jogħġobni ħafna lili'* [it is one of the most subjects that I like because when we do an activity like we did, this is how I like it. I enjoy myself. I really like the Design subject], '*U iktar sabiħa li għamilnieha flimkien ma' tad-Design* [referring to the Design and Technology subject]' [And the fact that we did it together with the Design, it was nicer], *'Iktar jaqblu Computer u Design flimkien*' [Computer and Design go more together].

Though nearly all students were not familiar in using a 3D CAD (Computer-Aided Design) software, they sought help from the Design and Technology teacher and myself. All groups have finished their design, though it took more time than planned due to the unfamiliarity with the software. Finally, these 3D objects were printed in class, were students could observe the initial process of printing.

The critical friend also remarked that working with the English teacher and the Design and Technology teacher was an innovative idea, one that students enjoyed and left the desired outcome.

Mr Smith also added that they (referring to MEDE) extrapolated that in order to offer the whole package 'to this type of students' (referring to the students were not yet being met by the system), an applied version of the Core subjects[7] was also important to develop. It was felt that if a student is encouraged to further his/her studies, become employable, read manuals, and keep updated with technological advancements and current news, the student needs the whole package. As observed during the lessons and as suggested by research (Christersson and Staaf, 2019), it would be good practice for teachers to work collaboratively with each other when offering this whole package to students.

At the time of conducting the semi-structured interview with Mr Smith, he claimed that Applied Core subjects were to be phased-in later due to issues that were being discussed with the unions on the matter.

5.4.3 Other Subjects being tackled from the Applied Perspective

Though not all subjects are offered in the applied route, Ms Jones convincingly said that these subjects can still be tackled from the applied perspective. While Mr Smith believes that there is nothing wrong for the so-called academic subjects to be applied, he ponders that one must first investigate the logistics of such matter. Ms Jones added that even if certain tasks may seem more theoretical, the teacher can still adopt a more hands-on pedagogy and find alternative ways (rather than the traditional pen and paper method) for lessons to be as applied as possible. As discussed in Section 2.7, various applied learning activities may be adopted as alternatives to traditional ones, while acknowledging the varied learning styles of students (VCAA, 2020). Ms Jones strongly believed that when tasks are more hands-on 'most probably, students put more, learn more and remember more. And I believe that all or most academic subjects can be applied'. Ms Jones's claim regarding the benefit of hands-on tasks, corresponds with the numerous benefits of applied learning approach as shown by research in Section 2.5, one of which is the resulting of positive effects due to increased students' engagement. Research has shown that education systems have increasingly been implementing learning approaches for enhancing students' learning and on pedagogical methodologies, as discussed in Section 2.4, which focuses on students' active involvement and participation (Austin & Rust, 2015; Leal-Rodríguez & Albort-Morant, 2019).

[7] Core subjects are Mathematics, Maltese, English and Science subjects.

One of the lessons' objective was put to trial was to identify the internal memory and storage size of a computer system and thus we delved into the 'units of storage' topic. At the time of data collection, such topic was part of the Computing academic subject and as Ms Jones said, teachers sometimes tend to teach such topics using traditional means. However, the researcher took this opportunity to adopt an unplugged activity where dominoes were used as an active learning activity to introduce the fundamentals of units of storage. When students were asked during the focus group if they could recall a particular activity that was done in class, more than one student mentioned this activity. Alistair conveyed '*Hadt gost f'tad-dominoes u fhimt*' [I enjoyed the dominoes activity and I understood] and Jack added that he would find this topic relevant when buying a technological device in the future as he can compare the internal memory and storage space of devices. Other activities were mentioned and all of them were practice-based. A very interesting observation was that they could recall specific details when mentioning such activities. This correlates with Ms Jones's claim and the observation made above that they when tasks are more hands-on, they remember more: '*Meta ftaħna l-kompjuter, rajna x'fih id-desktop u kif tneħħihom il-parts tal-kompjuter*' [When we opened the computer, we saw what's inside the desktop and how to remove the computer parts], '*tal-proċess tar-RAM, CPU, il-hard drive'* [the one regarding the process of RAM, CPU, hard drive]. The latter mentioned activity was another unplugged activity through role play where students were facilitated to learn about the basic computer system.

5.4.4 The strong focus on exams is a 'cultural thing'

Mr Smith remarked that although from 2020/2021 all academic subjects will also include school-based assessments, the summative exam will still carry the biggest weight. Since an education system entangled with an exam-oriented system, barely focuses on students learning (Varatharaj, 2018), strong focus should be placed on continuous assessment to counter the prominence given to summative exams while shifting the focus on the enhanced development and learning of the student rather than merely on the student's grades (Md-Ali, Veloo & Krishnasamy, 2015). He said that it is a 'cultural thing'; professions being obsessed over the years "in an effort to meet awarding body requirements" (Jones, 2005, p. 1); which is not easy to change and added that our problem is that we prepare students just for the exams where unfortunately students do not really show what they really know in exams. Mr Smith remarked that he is in favour of

continuous assessment and strongly opposes the argument that such assessment helps the so-called 'weak' students. He strongly believes that through 'real-good school-based assessment', even the 'high-flyers' can benefit more since students will be learning much more deeply and presumably learn more effectively. Continuous assessment leaves space for 'assessment for learning' (Varatharaj, 2018) to take place. Apart from supporting educators and enabling them to focus on the students' learning, assessment for learning allows educators to provide "quality feedback" (Jones, 2005, p.6) to students which evidently "can and do promote increased learning progress" (Jones, 2005, p.6; Oyinloye & Imenda, 2019). In his own words 'it is very unfair that summative exams penalise primarily the weak students' since for him, summative exams are the worst way for such students to show what they really know. Most probably these students have strengths which can be shown through other means of assessment. Summative exams, or as referred to as 'assessment of learning' (Pearce, 2016, p.1), deprive the students from the opportunity of getting feedback with the intention of improving their work. An exam-oriented system barely gives the chance to students to enhance their learning or to increase their learning potential (Jones, 2005; Varatharaj, 2018).

Mr Smith emphasised that the strong focus on exams is a 'cultural thing' among all stakeholders [he specifically mentions parents and teachers] and remarks that it is time to change this mentality. Introducing nine new subjects as from scholastic year 2019/2020, was at the time deemed to be a 'big change' where hopefully this will help in changing this mentality. Optimistically, in the future the applied version of other subjects may be developed to keep on challenging such mentality and offering students alternative paths tailored to their needs.

When students were asked to voice their opinion about the activities that were done in class as part of the assessment, Albert claimed that the most effective way for one to learn is by doing. Albert underlined his opinion as he said '*Meta tiktibhom ma jfissirx li ser titgħallimhom*' [When you write them down it does not mean that you are going to understand them]. Others favoured his opinion and Harry added '*Jiena rajt li ħafna aħjar tagħmilhom l-affarijiet milli tiktibhom għax li tiktibhom fuq karta mhux se tkun qed tieħu pjaċir, u t-tieni, ma jfissirx li vera fhimthom billi tiktibhom*' [I realised that it is better doing things rather than writing them down because there is no pleasure in writing them down and secondly, by writing them down it does not mean that you have really understood

them]. As Selevich et al. (2015) point out, we should focus more on assessing students' competitiveness and abilities to be better prepared for the world educational market. Thus, an effort was made to offer them support, and scaffolded learning through the planned activities and through the provided feedback which was mostly verbal, to help them succeed to their best ability as much as possible (Directorate for Learning and Assessment Programmes, 2018a; Directorate for Learning and Assessment Programmes, 2018b; Pearce, 2016).

5.5 A Maker-centred Constructionist Learning Environment

This theme emerged from the systematic-observations.

At the beginning of the part-implementation of the Applied Digital Competences Curriculum, the researcher presented the concept of applied learning and discussed with the students what does it mean to be digitally competent, and gave them a brief overview of the digital competence skills in this curriculum. Though it is more important that applied learning should be practiced rather than talked about, the researcher still felt that this was a good introduction for students to understand the importance of carrying out this study. Those students who usually struggle in the traditional classroom setting, were curiously asking how applied learning could be practiced in class. It was explained to them that as their teacher, rather than providing them with new knowledge, they will be presented with conditions to learn and helping them in finding the solution to problems. During the focus group, Tyler remarked *'aħjar infittxu aħna'* [it's better that we do the research ourselves]. As their teacher, instead of stealing the joy of learning and discovery from students, let them experience the "excitement at discovery" (Papert, 1980, p. vi).

The researcher discussed with the students that they will be working on a project. The digital competence skills that were planned to be developed by students during the implementation of the subset of the curriculum were briefly highlighted. Since students were going to be asked about other digital competences that they think will be helpful for life skills and future prospects, the researcher did not want to influence their opinion, thus this part was kept to a minimum. A discussion on the participants' views will be outlined in Section 5.8. It was also discussed with them that they were going to do various hands-on tasks including the design of a 3D item that relates with the chosen scenario. When they started to design and making this 3D item, there were varied views and

opinions. To encourage a constructionist learning environment, we have discussed that no one is going to have the same experience as others (Papert, 1980), hence varied views will ensue.

It did not take a long time for them to realise that they were going to spend great part of the lesson doing hands-on tasks. Having realised that they could own the problems and that they were going to be creative, analysing possible solutions, and think critically (Massari & Miron, 2016), the students could not wait to start working on the project that was very briefly discussed during the introductory lesson. Eagerly they started to ask many relevant questions. Students asked questions and contributed to class discussions throughout the whole process, which is also another way of measuring active learning according to the AUSSE (as cited in Carr et al. 2015).

The students were presented with quotes by Dewey, Papert and Einstein during this process. Although a few have heard of any or all of the three pioneers, they curiously asked about them and the researcher felt that it was the right opportunity for her to confer passionately about constructivism and constructionism and that this was the backbone of a meaningful learning experience for them. As soon as the introduction lesson came to an end, Juvi (a student who lacks self-confidence when asked to work on non-usual activities), approached the teacher's desk to tell her that he was very looking forward to start working with his classmates and voiced his impression '*hekk togħġobni ħafna l-lesson*' [I really like the lesson this way].

During another activity, the students were asked to go through the chosen scenario and choose a type of computer that they think is most suitable. Giving them an opportunity to choose the scenario that they wished to work on, did not only support the students to own the problem, but also gave them the opportunity to own their learning and the problem-solving process too (Savery & Duffy, 1995). However, they did not only have to choose a type of computer but give at least four justifications for their decision. The idea was to use previous knowledge and other tools to solve a problem in a real-life scenario with limited prompting to build new knowledge which is one of four principles of active learning (Ho, 2019; Brainerd & Piaget, 2003), and as their teacher, facilitate them in their learning process (Tesconi & Arias, 2015). Working in teams, the researcher could notice that many of them were able to give and receive appropriate feedback with limited

prompting. The group work offered a context where students worked on tasks and engaged in discourse as they started to form a better learning community (Lim et al., 2020). There was at least one student from each group that encouraged all teammates to share ideas. Jack did his utmost to involve Matteo (an Italian student who has very good level of English but still finds it difficult to understand Maltese) in the group's discussion notwithstanding that Jack had literacy difficulties and struggled to translate and communicate the group's ideas to Matteo. Activities that promotes collaborative learning, give students the opportunity to understand and build content, which may not have been an easy task if done individually (Lim et al., 2020).

The students got so involved in the 3D design activity that they researched online, discussed, and delved into other topics that were not yet even mentioned, like ergonomics and health and safety while working on a computer. From a constructionist perspective, as Papert (1980) believed, this is the best kind of knowledge, one that help construct more knowledge.

The photo below shows a 3D object designed and printed by the students after research conducted by them about ergonomics.

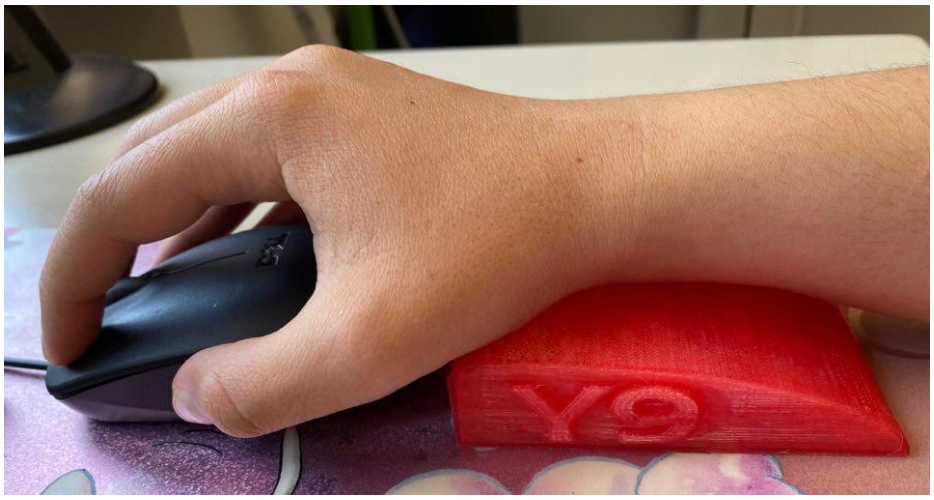

Photo 1 A 3D mouse wrist rest designed and printed by students

The following pictures show two other 3D objects designed and printed by the students in line with the project.

Photo 2 A 3D keychain for tying earphones around it (left picture) and a 3D tablet holder/stand (right picture) designed and printed by students

When students know that their opinion is valued and that they are constructing their own knowledge, they are not only enjoying what they are doing but are more eager to learn and experiment without having to constantly help them to focus. Such learning experience showed that student-centred lessons will surely boost students' active engagement in activities, increase their motivation and help them excel in assigned activities tasks more than one can ever expect.

5.6 Pushing the Vocational and Applied Learning Experience into Secondary Schools

Project-based learning and working on real-life scenarios were among the most techniques that participating students felt that increased their motivation to work. In line with literature, project-based learning enhances students' engagement (Dekkers et al., 2014; Ma, 2019), captures students' interests and stimulates students' thinking through real-world situations (Dio, 2015). Learning of students is driven by Kolb's experiential learning framework in project-based learning, (Wrye et al., 2019).

Since this curriculum is more focused on hands-on learning, these lessons led to a discussion during one of the lessons as they were overwhelmingly expressing how much more interesting the lessons would be if they were more hands-on. This has also been said by Smith and Gibson (2016) that project-based learning is exceptionally good for hands-on learning.

Some of the students have never mentioned whether they will further their studies after compulsory schooling. This might be due to various reasons which include being bored in a traditional classroom setting. After this experience, some of these students expressed their eagerness to pursue their education in post-compulsory institutions that offer hands-on learning. Ben highlighted that *'qabel ma dħalt hawnhekk ma kontx inħobbu s-suġġett tal-kompjuter. Hekk iktar jogħġobni bil-proġetti u hekk'* [Prior attending this school, I did not like the computer subject. It is more enjoyable for me with projects and stuff like that]. Students were asked what would encourage them to further their studies after compulsory education. Though Ben claimed that he did not yet know what he wanted to further his studies in, he showed an interest into furthering his digital competences that were covered during the part-implementation of this curriculum. Others said '*Jiena wkoll nixtieq nistudja l-ICT. L-affarijiet li qed tagħmel inti Miss kollha sbieħ'* [I would also like to further my knowledge in ICT. I really like the stuff that you are doing Miss], '*nagħmlu iktar proġetti*' [we do more projects], '*is-scenarios interessanti ħafna*' [the scenarios are really interesting]. This shows that besides equipping the students with the so important digital competences, the applied learning approach has instilled further motivated them to further their studies.

Hands-on learning activity is not a new phenomenon, nor are project-based assessments and active learning activities. Subjects which are academic can still be adapted in a way that are more hands-on in practice. Pushing the vocational and applied learning into schools is a very good proposal as expressed by Mr Smith. He added that students' achievement may be positively impacted, and more motivation may be instilled in them to work and ultimately will encourage them to further their studies in their areas of interests after compulsory schooling. However, this could also be a matter of maturity. As Ben said, though he was motivated to further his studies, he was still unsure of which studies to pursue in the future.

As was articulated during the semi-structured interviews, applied and VET subjects should not be seen in a vacuum but part of the whole system to meet the needs of all students. At the time of the data collection in 2019, Mr Smith was concerned that while the educational system was catering for 64% of the students who get at least five

SEC O'Levels[8], the majority of the 36% further their studies in post-compulsory institutions like MCAST and 55% of them who read a Level 1, 2 or 3 course achieve a Level 3. He explained his concern regarding the irony of the situation since these students who achieve a Level 3 in MCAST, would be repeating what they should have already done in secondary schools. Therefore, he believes that we must push such experience of vocational and applied learning into secondary schools through these syllabi.

5.7 Guidance for Students about Applied Subjects as an Option and its Eligibility

This section explains the sub-themes that have emerged from the data collection process, being grouped under this main theme. The first three sub-themes emerged from the semi-structured interviews, whilst the fourth one emerged from all data collection methods.

5.7.1 Guiding students to choose a route that would make sense for them

In March 2019, guidance sessions were held for both parents/guardians and students who were doing their option choice in secondary schools said Mr Smith. In these sessions, parents/guardians and students were informed that the structure and certification of the Applied subjects are different from those of the other routes.

Mr Smith explained that in contrast with applied subjects, academic subjects such as Chemistry are theoretical in nature and ask students to learn by heart, although the latter subjects have 15% of the global mark as school-based practical assessment. He added that academic subjects have been like this for several years. Lim et al. (2020) claimed that effective learning should be active, engaging, and collaborative, where the students is not "a passive recipient of knowledge" (Acharya et al., 2018, p.3).

He further explained that applied subjects were advertised as subjects the focus of which is on hands-on work while practicing and learning in workshops. If a student is good at a particular subject but s/he have certain difficulties such as literacy difficulties, then it would make more sense if s/he opts for the applied route since his/her potential to achieve a certificate in that subject is higher. VET subjects were referred to as 'the middle way' by Ms Jones since they are targeted for students who are good at academic

[8] SEC O'Level exams are set by the University of Malta

subjects but would like a more hands-on approach. However, Ms Jones finally added that both the academic and VET subjects can both have a hands-on element just like the applied subjects. Mr Smith added that this does not exclude that someone who is academically strong might opt for the applied route. Though the applied learning approach may help in re-engaging those students whose learning experience has been negatively impacted due to various barriers (Callingham, 2016) and who are at risk of leaving school early, Callingham, 2016; Dekkers, 2014; Mifsud, 2019; Pemberton et al., 2017), research provides evidence that this approach promotes learning for all students (Christersson & Staaf, 2019; Hall, 2019).

Mr Smith's concluding statement was that options are so open, guiding students to choose a route that make sense for them was deemed very important due to challenges that will be further discussed in Section 5.14.

5.7.2 Programmes' Certification and their Eligibility

With regards to the certification, it was also made clear to parents/guardians and students that while those who opted for academic and vocational route will be awarded with a SEC certificate, others who opted for the Applied route will be awarded with a SEAC[9] certificate. Parents/guardians and students were informed that while the SEC certification makes students eligible to Junior College, MCAST, ITS, Higher Secondary, Gozo sixth form, and private sixth forms, the SEAC certification makes students eligible only to MCAST and ITS. Having all the above-mentioned institutions also recognising the applied subjects' certification, was supported during the semi-structured interviews. However, it was also stated that, the scope of the accreditation of applied subjects was always for those students who want to further their studies in post-secondary vocational educational institutions. Thus, they have not gone yet into 'a big debate that SEAC should be eligible to enter Junior College, especially when we went for the Core subjects…since it would have created a big polemic'.

As discussed in Section 3.3.4, the Applied Digital Competences Curriculum was designed at two levels where the student will be awarded with the *Applied Award in Introduction to Digital Competence (MQF 1)* certificate after completing the Level 1

[9] SEAC refers to Secondary Education Applied Certification – a new certification issued by MATSEC

programme, and with an *Applied Award in Digital Competence (MQF 3)* certificate after completing the Level 3 programme. The certifications' eligibility differs from the SEC and SEAC certifications. As described in the accredited programmes (refer to Appendix 3), to guarantee the progression of the candidate in education, a memorandum of understanding is required.

5.7.3 Parity of esteem between all routes

It was conveyed during the semi-structured interviews that even though SEAC is not recognised in all post-secondary institutions, both certifications have been approved by the Senate of the University of Malta, certified by MATSEC and a Level 3 in both certifications is the same, which shows that it is parity of esteem.

With regards to the perceived quality of applied subjects since they are not recognised in all post-compulsory institutions, Ms Jones believes that it all boils down to the society's mentality. A study conducted in South Devon showed that, although qualifications in certain subjects have been revised to establish more parity of esteem, employers still seek to employ people certified in particular areas (Hayes, 2017; Watkin, 2016). Ms Jones supported her argument by adding that our society needs to have a blend of routes to work. She said that the industry does not only need students who read a course at a University level but also those who are practical and choose to read vocational and applied courses at other institutions. People who are more-hands on are as valuable as academic persons, she added. Successful vocational educational systems, including the Finnish, have parity of esteem and recognise that all qualifications intended for students with varied learning styles and job prospects, own the same value and status (Hayes, 2017).

Both interviewees agreed that society is still a bit biased regarding certification and that we must keep challenging such mentality that the applied route 'should not be of lesser quality [value]. It is different but it should not be of a lesser quality [value].'

5.7.4 Students opting to follow the applied route

The hands-on experience that the students had during this study, has constantly been positively mentioned during the focus group interview. They have remarked '*Lezzjonijiet sbieħ u huwa wieħed mill-iżjed suġġetti li jogħġobni għax meta nagħmlu attività bħalma għamilna, hekk jogħġobni lili'* [Pleasant lessons and it is one of the most

subjects that I like because when we do an activity like we did, this is how I like it], *'ħekk iktar jogħġobni bil-proġetti u ħekk*' [It is more enjoyable for me with projects and stuff like that], '*tinvolvi iktar lilek innifsek*' [involving yourself more]. The students' positive engagement was evident during the lessons, thus the teaching of digital competences through an applied learning approach has shown positive impacts on these students. The benefits of the applied learning approach discussed in Section 2.5, corroborates with the students' views.

During one of the semi-structured interviews, it was explained that if the student does well in academic subjects but would like a more hands-on approach since it is a 'much more fun way to learn', the student should opt for the vocational route since its certificate is recognised in more institutions than that of the applied route. On the other hand, if the student does not do well in the academic subjects but learns more through a hands-on approach (and as explained by Mr Smith, his/her needs are not yet being met by the system), the student should opt for the applied route. As specifically confirmed by Ms Jones, applied subjects are targeted towards students who will not make it in the traditional, or the so-called academic subjects. Nonetheless, Mr Smith believes that the applied route is not a route for those students who would fail in the academic subjects, but rather to a route that values the strengths of the students who choose it.

Mr Smith emphasized that this was made very clear to students especially the ones whose needs were not yet being catered for by the system. With satisfaction he said that they have received very good feedback from parents especially the ones who were not doing well at school. Ms Jones claimed that students were guided to choose a route that is a good match for their needs by their guidance teachers who better know the students. As a matter of fact, Mr Smith remarked that the broad number of students who have chosen the Applied route indicates that the guidance was done very well since the students who could benefit the most from the Applied route have in fact chosen such route. Dr Frank Fabri, Permanent Secretary at the Ministry for Education and Employment, was thrilled to see that more than half of those in Year 9 chose applied subjects (Times of Malta, 2019) and added "it is the children themselves who confirmed there was a need for the change. I get shivers down my spine when I see the numbers" (p. 1).

5.8 The Digital Competences

This section explains the sub-themes that have emerged from the data collection process, being grouped under this main theme.

5.8.1 Digital Competences are skills which everyone should have

Throughout the part-implementation of the Applied Digital Competences Curriculum, a point was raised by the students about digital competences that these skills need to be tackled further. Also, during the focus group, participants mentioned several digital competences as they believe that these are skills which everyone should have, some of which have been partly tackled throughout the part-implementation of this curriculum. Enhancing the digital skills of all citizens is one of Malta's challenges that must be dealt with as part of the national agenda (European Commission, 2019b) as well as a European priority (European Commission, 2019d). The following were among the most mentioned digital competences by students: knowing better how to do online search for jobs, courses and leisure activities; being aware of how to stay safe online and how to recognise safe and secured websites; evaluating online content; knowing how to manage one's own online identity; knowing how to make online bookings when planning a vacation; using apps to locate places when travelling; e-commerce; applying for online courses; and using e-government services. The digital competences mentioned by students form part of the proposed curriculum as discussed in Section 3.3.4.

From the feedback that the researcher got from the semi-structured interviews and the focus group, digital competences are skills which every digital citizen must have. Though some students claimed that they do not have the above-mentioned digital skills, they said that they need these skills at present and in the future. All citizens need to develop digital competences for lifelong learning (Council of the European Union, 2018). Moreover, research shows that besides being competent in making good use of digital technology, a digital citizen should act responsibly while using it and act with respect towards others (Gerhard, 2017; Richardson et al., 2017).

5.8.2 Applied Digital Competences Curriculum for all students

Mr Smith claimed that digital competences are skills that should be offered to all students and should be taught as applied as possible. He was interested to see how to implement such curriculum in a way that makes sense for all students. Pearce (2016)

emphasized the importance of providing support and scaffolded learning to all learners to make sure that they all succeed to their best ability. Ms Jones added that, as for all applied subjects, focus should still be on learning by doing while students are actively engaged in 'real-life situations which they can find at home, life and at the place of work in the future' as will be further highlighted in the following section. Another remark was that IT has a big advantage due to the 'wow factor' of technology and acts as a motivator for all students. Juvi said that he would recommend other students to choose this subject '*għax titgħallem ħafna affarijiet differenti*' [because you will learn lots of different things].

Another statement was that 'we should distinguish between IT as an option at Form 3, 4, 5 where the students show interest to specialize in this area, and basic general ICT skills for all students which I think should be as applied as possible in that respect and this is the distinction between those two types of syllabi. But it would be interesting how to develop these types of syllabi in a way which makes sense for all students in that respect'. Thus, it was suggested that the broad digital competences will be included in a compulsory subject for all students and was reinforced by Ms Jones when she said that 'such competences should be in the compulsory subjects rather than in an option subject in order to cater for each and every student'.

While the IT related subjects offered by MATSEC including Computing, VET IT and Applied IT are offered as option subjects from Year 9 to Year 11, the Digital Competences curriculum was designed to be offered to all students from Year 7 to Year 11 in the Secondary Schools. While Applied IT certified by MATSEC gives 'a taste in three different areas and hopefully the students continue to further their studies and specialize in one of these particular areas' as remarked by Ms Jones, the Applied Digital Competences Curriculum is targeted for all students and not just those who wish to specialise in IT or those who wants to further their studies in a particular institution after compulsory school. Though a memorandum of understanding with other post-compulsory institutions will give the students an opportunity to progress in education, this curriculum still helps in equipping students with the so important digital competences as highlighted in previous sections.

5.9 Narrowing the gap between education and employability

While designing the curriculum and part-implementing it, the researcher kept in mind the applicability of the digital skills with the skills that they might find useful at present and in the future. Research (Lim et al., 2020; VCAA, 2020) highlighted this as an opportunity for students to link real-life situations to what is being learnt in class

Students were reminded that their job was to propose a computerised system to someone as per the real-life scenario while keeping with the budget. After a thorough online research and discussion, students were asked to use either a free online tool to help them budgeting or else use Excel (pre-installed spreadsheets programme). Tyler was amazed how such tool can help in the future as employee '*L-Excel huwa bżonjuż ukoll fil-ħajja għax jekk ikollok ħanut bilfors ikollok bżonn l-Excel. Eżempju jiena użajtu. Tfajt oġġett, tfajt kemm hu u jgħidlek kemm fadallek bilanċ. Jgħinek fil-flus għall-budgeting'* [Excel is also useful for everyday life because if you have a shop, you will definitely need Excel. For example, I used it. I inputted an item; I inputted its price and it will give you the remaining balance. It helps with money budgeting]. The critical friend also noted that during this activity, students were motivated, focused and worked very well as a team, just like they might be doing at the place of work. Moore & Morton (2017) highlighted the importance of bridging the gap between education and employability by incorporating employability and soft skills in curricula as highlighted in Section 2.5.6. Research (Dekkers et al., 2014; Pemberton et al., 2017; Wrye et al., 2019) evidently showed that applied learning, which has always been equated to real-life experiences (SUNY, 2016), is positively linked with employability.

Though students might not be asked to propose a computerised system at the place of work, they were still given the opportunity to practise the skill of researching and evaluating products or services while taking into account others' views before making a decision. Jack added '*għax xi darba aħna ħa jkollna l-flus tagħna, se jkollna budget u rridu nkunu nafu xi rridu nagħmlu*' [because one day we will have our own money, we will have a budget and we need to know what to do'] and explained that he is now more aware of how to search better deals and that he feels more in control of how much money he spends. Choy and Delahaye (as cited in Dekkers et al., 2014) conveyed that since young learners might not have enough experience to relate their learning to situations which are usually experienced in adulthood, applied learning offers the

students a great hands-on experience for students to relate real-life situations to what is being learnt at school.

During the past few years, a lot of effort has been made to organise frequent visits in the industry and encourage students to participate in projects related to what is done in class. Four years ago, a group of students from this school, an independent secondary school and the Students Advisory services from the University of Malta in collaboration with an IT company from Malta, developed a KREATTIV[10]-funded web-based application. The University of Malta asked for this application to aid students exploring course options at the University of Malta. This application generates a personalised list of courses based on the student's specific subjects and grades. Such activity helped students connect what they have been doing in class to what is happening at the workplace, while mastering their soft skills. Additional tutorials from people working in the IT industry were an asset. Inviting speakers to talk about current topics such as Artificial Intelligence and organising outings within the industry so that students can observe and relate to what is being done in school, is also encompassed in this curriculum. Such and similar activities are the best way for learners to perceive the curriculum as attractive and relevant to the world of work and in line what Mr Smith and Ms Jones have said. It has been well established in studies that partnerships between schools, the industry and community organisations, enhances students' learning and employability (Arantes do Amaral & Matsusaki, 2017; Hasan & Tan, 2019; Voss et al., 2015). It would not only be beneficial for students to have a hands-on experience in the industry as they can master their skills, but also help in buffer the transition between schooling and employability as they would have gained vital skills before they become employable (Hasan & Tan, 2019).

As remarked by Mr Smith, in contrast to certain subjects like Hospitality which lend themselves for students to learn directly within their industry, for other subjects it is more problematic to make this kind of arrangements. The reason being is that some industries are much more fragmented and companies being smaller in size. Thus, Ms Jones argued that due to these logistic barriers and challenges, it boils down to the school's and teacher's initiative to make arrangements with the industry so at least

[10] KREATTIV funding programme unites educators and creative practitioners to work collaboratively and promotes students' and educator's further engagement within the creative sector (Arts Council Malta, n.d.)

students can make observations or attend to talks at the practice placement. It was remarked that a lot of effort is being made to make such arrangements so that students can get hands-on practice at the place of work as they believe it is the most ideal way for a student to relate schooling and employability.

5.10 A Strong Focus on Formative and Continuous Assessment

This section explains the sub-themes that have emerged from the data collection process, being grouped under this main theme. The first two sub-themes emerged from the systematic observations and the focus group interview, whilst the third one emerged from the semi-structured interview.

5.10.1 Project-based Assessment as Continuous Assessment

"As part of the ongoing learning process" (Trach, 2018, p.1), project-based assessment was implemented as continuous assessment during the part-implementation period of this curriculum. From the students' positive feedback, this project was carefully designed, otherwise it could have been a frustrated experience for the students (Larmer & Mergendoller, 2015).

Such form of assessment was seen vital to help in addressing the challenge of preparing students to: identify problems, plan, apply, produce, and evaluate solutions. The entire focus was put on engaging students in problem-solving and exploring various solutions. Using projects as part of the continuous assessment, brings with it some challenges, including: the teacher must be willing to be flexible (Trach, 2018) and amend as needed along with the lack of students' involvement in "team-focused environment in the past" (McKay, 2017, p.1). This was particularly felt for instance when the students worked on the webquest and due to lack of engagement in such and similar activities where they had different roles, many of them struggled to understand their role in a team environment. Therefore, as was also suggested by the critical friend, students were given more than one example and outcome for such activity. As Pearche (2016) highlights, since the learner is at the heart of assessment for learning, it was seen important to adapt the planned work according to the students' needs throughout the entire learning process. Since many of them struggled to understand the different roles in their team, as Gaab and Vogel (2018) suggest, their role description was clearly described.

To make the project-based assessment more "personally meaningful" (Trach, 2018, p.1) to the students, they were allowed to choose the real-life scenario, that is, the problem that they had to propose a solution for. This was done to give students an opportunity to own the problem and problem-solving process as well (Savery & Duffy, 1995). Through observations, it was noted that students could critically analyse the problems and propose solutions accordingly. The plentiful activities which were implemented as part of the project-based assessment, allowed students to apply what they have learnt in class, than they would have in the traditional form of assessment, which as Radu (2019) explains, it is the main aim of applied learning approach. During the focus group, students mentioned several activities that they enjoyed and learnt from during the part-implementation of the curriculum. The activities were built upon each other as Kolb (1984) highlighted that knowledge should be continuously built upon.

5.10.2 Language can be a Barrier for some Students when assessed

When students were assigned tasks, it was noted that sometimes language can be a barrier. Some participating students also claimed such challenge which they must face when being assessed. They suggested that both English and Maltese should be allowed to be used in class and assessment '*għax skont il-persuna kif tkun komda*' [depending on how comfortable the person feels]. Though students were not bound to use a particular language to discuss or work on tasks, online content was entirely in English. The fact that some students have literacy difficulties and one of the students (Matteo) is Italian, it did not discourage them from working on their tasks. On the opposite, asked their peers, teacher and LSE[11] to help them. Students remained active subjects throughout this learning experience, while the teacher and LSE acted as facilitating agents throughout this process (Vitorino et al., 2020). From a constructionist point of view, seeking and sharing with peers is an effective way for students to learn as also envisaged by FabLearn Labs (Blikstein et al., 2016). Moreover, one of the key strategies of assessment for learning is motivating students to be instructional resources for their peers (Oyinloye and Imenda , 2019).

[11] LSE refers to Learning Support Educator where one of his/her duties is to work collaboratively with the class teacher in assisting students in class, in particular those with special educational needs, to ensure that their learning needs are catered for (MEDE, 2018).

The dialogues that students wrote during the English lesson as a preparation of their role-play, were handed over neatly in the following IT lesson. Matteo asked his group to be in charge of writing the dialogue neatly even though he did not speak fluently in English nor having very good English language writing skills. Matteo took the writeup at home with him, typed it on his computer and used an online translation tool to translate the dialogue into Italian so that he could understand perfectly what his peers were discussing. Such and similar hands-on activities not only result in better learners' development, but also increases students' intrinsic motivation that encourages them to take initiative to learn further. Students who cannot fully participate in education, can have their learning experience negatively impacted (Callingham, 2016).

For assessment purposes, students who chose the applied route can now answer assignment questions in English or in Maltese unless specified otherwise, depending on the nature of the assessed criteria (MATSEC, 2019).

5.10.3Assessing Students not just through Exams

The importance of continuous assessments in schools was constantly emphasised by Mr Smith during his interview. As observed by Varatharaj (2018) assessment for learning improves classroom practice, provides a personalised learning approach and improves confidence of students. While Mr Smith mentioned that the assessment model for the VET subjects was a big step forward, he explained that it seemed also important to give more weight on continuous assessment in applied subjects. During the data collection period, it was proposed that for applied subjects, 70% will be allotted for continuous assessment and the remaining 30% for summative exams. Mr Smith was asked about the possibility of removing the summative exams completely for the applied subjects. Though he claimed that this could be explored in the future, he felt that the system has already gone many steps ahead in the way students are assessed. In light of recent development (MATSEC, 2019), the summative exams have been removed completely for the applied subjects and were replaced with controlled assessments[12] which may include written and/or practical tasks.

[12] Controlled Assessment is set by MATSEC and may include written and/or practical tasks depending on the subject's syllabus criteria. This assessment can be given as a homework task or to be carried out under controlled conditions (MATSEC, 2019).

Ms Jones believes that continuous assessment encourages teachers to be creative in the way they assess students 'even the parts which could be easily assessed through a written task, it is up to the teacher to decide what approach s/he would take'. Varatharaj (2018) has also conveyed that teachers should be autonomous to determine which type of assessments are best to implement with students. Various modes of assessing students were mentioned during the semi-structured interviews including video recording, interviews, reporting, practical sessions in the workshop and project-based. All this depends on the different areas being assessed and, on the verb (such as describe) being used to assess students. Ms Jones insisted that 'the teacher could tell the student to describe something and video record himself describing this item for example', so not necessarily writing it down.

During the part-implementation of this curriculum, the project-based assessment served as authentic assessment (as described in Section 2.8.3). Brown (2019) explained that through authentic assessments, students apply knowledge and skills while working on activities that resembles real-world life situations. As discussed in Section 2.8, research recommends strong emphasis on formative and continuous assessment within the "zone of proximal development" (Vygotsky, 1978, p.95) of the students. Eventually, this can enrich the learning experience of students notwithstanding their abilities and needs, improves students' engagement in the classroom and their motivation to work while instilling in them interest to learn further on the subject.

5.11 Empowering Students for Lifelong Learning

The idea behind the new secondary schooling system, as remarked by Mr Smith, is not solely to prepare students to go in the world of work but to let them feel that they are successful in what they do. Participating students' commitment and work during the part-implementation period showed hard work and enthusiasm while perceiving it was as fun and beneficial for the future. These are students' views in this regard: '*Nieħu pjaċir u jista' jkun jgħinuni 'l quddiem'* [I enjoy myself and this [referring to the programme] may help me in the future'], '*Hekk iktar jogħġobni…nerġgħu nagħmluha għax interessanti'* [It is more enjoyable for me... let's do it again because it is interesting].

It was also added by Ms Jones that the idea is to give students the opportunity 'to get real-life situations that they can find at home or at the place of work'. Students' views

are very much alike since they brought forth various examples of how the curriculum that was partly implemented in class is going to help them at the place of work and for life. This corroborates with MEDE's vision with respect to helping students develop the necessary values, attitudes, and skills for life, employability, lifelong learning, and to better prepare students to be active citizens (as cited in MEDE, 2014; MEDE, 2017). Rather than always catching on their weaknesses (referring to students) or what they are not capable of as the system has done for many of the students', Mr Smith emphasized the importance of recognising students' strengths, build on that, help them develop their strengths and reward them. As proposed in My Journey, the comprehensive schooling system aims at providing programmes tailored to the students' abilities, learning styles and needs and supporting lifelong learning opportunities for all students (MEDE ,2017).' Both Mr Smith and Ms Jones are hopeful that the above will be a strong motivator for students to keep on learning. Research (Kudryashova et al. 2016; Moore & Morton, 2017; Webb & Napier, 2015; Wrye et al., 2019) emphasised that the educational system must better prepare students with important skills not just for employability but also for lifelong learning.

Participating students were asked what they would change in the IT curriculum that will encourage them to further their studies after compulsory schooling. Two students claimed that project-based learning and real-life scenarios made the subject more interesting in the previous weeks. This is in line with research which highly promotes project making as students are given "objects-to-think-with", as Papert said (as cited in Kafai et al. 2009, p.3), for students to engage with the digital world, solve problems through the real life scenarios, and express their constructed knowledge creatively.

Juvi has also disclosed his interest in reading for an IT course since he really enjoyed doing the activities during the part-implementation period as he said '*l-affarijiet li qed tagħmel inti Miss kollha sbieħ*' [Miss, the things you are doing are all nice]. An interesting finding was, that Ben, who is regularly absent from school, claimed that he really enjoyed himself checking if the computers were upgradable, upgrading the computer's RAM, and participating in the embedded lessons with other subjects. He said that he enjoyed himself so much that his interest in reading other courses are much higher, though he claimed that he is not sure which area interests him most. Thus,

through programmes that are tailored to their needs and through tasks which they can accomplish to their best ability, might really be strong motivators for them to further their learning after compulsory schooling.

They were also asked if and how IT can help them to further their studies or for career prospects. Some claimed that through the digital competences; some of which have been practised in class and previously mentioned ones which have been disclosed during the focus group; they are more eager to further their knowledge even on non-school related matters. Ben showed interest in reading online courses '*Jiena nixtieq nistudja fuq l-internet, nistudja online eżempju biex inġib xi liċenzja*' [I would like to follow an online course, for example to obtain a license]. Other interests were '*titgħallem flok l-affarijiet tagħmilhom fuq il-karta, tagħmilhom fuq il-kompjuter*' [learn doing things on a computer, instead of on paper] and '*il-kompjuter jista' jgħinek biex issib job...tara x'jobs hawn bħal fuq Maltapark*' [the computer be a means of job hunting... for example looking for a job on Maltapark']

Thus, through subjects like the Applied Digital Competences Curriculum, as Mr Smith claims that 'the focus is to do something that they enjoy and hopefully that motivator will also motivates students in other subject', is a big step forward towards empowering students for lifelong learning. This correlates with Ms Jones's vision that students will be given a taste in certain subject areas which hopefully results in students being motivated enough to further specialise in an area that interests them most. This also underpins the students' views that have been earlier highlighted. Along with this, even though not all students will read courses in post-compulsory institutions, the common view of the students was that they want to keep up-to-date and want to expand their knowledge in areas that interest them.

Though not all students who read a Level 1, 2 or 3 course will achieve a Level 3 certificate, Mr Smith claims that at least nowadays there is the possibility of quantifying what the students have learnt, even if it is a Level 1 or Level 2. Therefore, truly giving justice to the students and presenting them with a certification of their skills. He re-emphasised the importance of the applied core subjects so that students are motivated as much as possible within the whole system. By 'achieving something from school'

students are instilled with motivation and this is 'the most important thing in all option subjects'.

5.12 Soft skills for Life, Employability, and Lifelong Learning

Participants educational stakeholders convincingly said that soft skills, which were discussed in Section 2.5.6, are highly sought by employers and is something which all students must have irrespective of the route they choose to study. As claimed by these participants, studies (Moore & Morton, 2017; Webb & Napier, 2015; Wrye et al., 2019) reported that there is a "skills gap" (Moore & Morton, 2017, p. 604) between schooling, employability and further learning due to lack of such skills by students who wants to become employable or to further their learning. The Clubhouse Network (2020) and various studies (Moore & Morton, 2017; Webb & Napier, 2015; Wrye et al., 2019) articulated that these skills are important both for employability and for lifelong learning. To counter such "skills gap" (Moore & Morton, 2017, p. 604) research showed that it is of utmost importance for educational stakeholders to include these skills in curricula.

In line with this research and the above articulation of participants educational stakeholders, the Accreditation Unit of the DQSE has also emphasised that soft skills should form part of each module in this curriculum. Therefore, it was deemed important to apply some of these skills during the part-implementation period. These include: able to work in a team; able to adhere to timeframe; give and receive appropriate feedback with limited prompting; able to demonstrate creativity and innovation under limited guidance; able to solve a problem in a real-life scenario with prompting; able to share ideas and listen to others' ideas.

Even students conveyed how beneficial these skills are, both for their life and when they become employable, where the latter correlates with Ms Jones's statement that 'these are skills which yes, once they become employable, they will find this very very useful'. Students' claims where noted through the systematic observations as they passed positive general comments every now and then in view of teamwork, the notion of sharing ideas while receiving feedback from their peers and how they feel so involved in solving the problem for the case scenario. The students' reflections on how soft skills might help them were remarkably noted during the focus group as they mentioned several skills and their importance. These include '*il-ħiliet ta' kif taħdem fi grupp, li tkun*

responsabbli u żżomm mal-ħin se jgħinuk 'il quddiem', [groupwork skills, being responsible and adhering to time will help you in the future], '*tkun responsabbli tal-affarijiet tiegħek għax 'il quddiem ħa tkun responsabbli fuq ix-xogħol*' [being responsible because in the future you are going to be responsible at the place of work], '*jekk tkun* teacher *eżempju*' [being a teacher, for example], ''*il quddiem ħa taħdem ġo grupp fuq ix-xogħol. Jekk eżempju jkollok familja, se taħdem ġo grupp*' [in the future, you will be working in a group at the place of work. If for example, you have a family, you will be working in a group], '*meta ħa nsiefru ma' tour u ma tantx inkun naf kif immur ma' grupp daqshekk, hekk inkun naf nitkellem iktar*' [I will know better how to communicate with the group when going on a vacation with a tour group] and '*importanti ħafna li żżomm mal-ħin*' [it is very important to adhere to time]. It was remarkably noticed that even when students were asked to voice their opinion about the effectiveness of embedded lessons, they felt the need of mentioning soft skills and their benefit. Juvi said '*din teamwork*' [this is teamwork] and Jack added that now he realises the importance of communication skills as he referred to this as '*titgħallem iktar kif tagħmel konverżazzjoni* [you will learn more how to make a conversation]'. It was astounding when students were asked if there was anything else that they wished to say at the end of the focus group interview and a student looked in my eyes and asked '*Kif ħassejtek inti wara li għamiltilna dawn il-lessons inti miss?*' [Miss, how did you feel after delivering these lessons?]. Honestly, it was a surprise hearing this and at the same time satisfied that such soft skills are really making a difference in everyone's life.

An Early School Leaving Strategy for Malta (Ministry of Education and Employment, 2012) recommends a collaborative holistic approach in developing life and problem-solving skills. An applied learning technique that was implemented during the part-implementation phase was problem-solving. Different real-life scenarios were presented to students from which each group had to choose one scenario and ultimately provide a solution. They were asked to choose the appropriate computer, parts of a computer, peripheral devices and software for the chosen scenario. Through various hands-on activities including: webquest, unplugged computing activities, online search on the specifications of currently available technologies, dismantling and upgrading computer machines, dialogue speech which was prepared with the English language

teacher and 3D design and printing which was done with the Design and Technology teacher; students worked in teams to provide solutions.

The general view of the students was that through the above-mentioned activities, they have developed life and problem-solving skills among others which they are going to find useful when they further their studies, at work and also in their everyday life. This is in line with research which shows that when a student-centred learning approach within the experiential learning framework is adopted, where students mainly learn by doing to build knowledge from experience (Kolb, 1984), the development of the highly sought employability soft skills ensue (Wrye et al., 2019).

One student in particular said that such skills are going to help make better decisions in life as he said '*inkun naf x'inhu li qed infittex u nistaqsi, imma dan għaliex se nużah jiena?* [I will know what I am looking for and ask myself, for what am I going to use this?]. The critical friend remarked that students made strong and critical arguments and got so involved in the scenarios, as if the problems were their own. Feedback from participating students and the feel that the researcher got show that it helped in developing life and problem-solving skills. This correlates with Ms Jones's statement that through an applied IT subject, students may not only get knowledge on certain technical aspects (she mentioned the hardware as example), but they will also get problem-solving skills to comprehend a situation and try to find a solution for that. She added that the soft skills and the 21st century skills can be achieved through applied subjects as she believes that students can achieve additional skills through hands on-tasks than they would achieve from the theoretical aspect. A dominant paradigm that has brought global attention in education, is the need of acquiring and mastering such 21st century learning skills, which has also brought with it challenges that stakeholders in general particularly educators must face (Varatharaj, 2018).

Other students had to be encouraged a bit more to express their views in light of soft skills, and this shows that more focus should be placed on soft skills when designing and implementing curricula.

Mr Smith expressed his concern that many students lack soft skills. He said that the main problem is that many times students either resist schools and so they switch off from schools or at best they quietly go to school and leave school without any

qualifications. Convincingly he said that if students are motivated through relevant subjects, ultimately this will have a spill-over effect and students will become more motivated towards school and willing to achieve good skills through the above-mentioned soft skills. Ms Jones hopes that these skills will work as a motivator for students to further their studies after compulsory schooling.

5.13 Applied subjects may help in reducing the ESL Rate

Mr Smith is hopeful that in the long run, a number of students will achieve a Level 3 qualification through applied subjects; something which they would not have been able to achieve through other syllabi he claimed. If not, at least they are motivated to keep on studying at post-secondary level and in turn would help in reducing the ESL rate. 'Having these subjects which are not the traditional academic subjects' will help in reducing the ESL rate since 'most of the early school leavers, leave because they get bored at school' is what Ms Jones argued when she was asked whether applied subjects would help more in reducing ESLs. She explained that through applied subjects, students will be motivated to go to school as they will know that they are going to do something that they enjoy. This relates to what has been highlighted by the European Commission (2015) where, one of the school factors that contributes to ESL is the teaching pedagogies adopted and their effect on learners' motivation and commitment towards education. Also, as has been articulated in research (European Commission, 2015; Mifsud, 2019), it is very important for students to feel a sense of belonging and motivation through their active participation in school.

The fact that they can be creative, that they are going to be assessed through different modes of assessment and the fact that the end of year mark is going to reflect the work that have been done throughout the year, will ultimately help out to diminish ESL. The European Commission (2015) has also reported that allowing for various forms of teaching, learning and assessment styles to take place, is one of the key conditions to combat ESL. This correlates with what have been found out from the focus group with students. Though other subjects can still be tackled from the applied perspective, the Applied Digital Competences Curriculum trial, changed some of the students' perspective of the IT subjects as some students were in favour of Ben's statement '*qabel ma dħalt hawnhekk ma kontx inħobbu s-suġġett tal-kompjuter. Hekk iktar jogħġobni bil-proġetti u hekk*' [Prior attending this school, I did not like the computer subject. It is more enjoyable

for me with projects and stuff like that]. The general view was that they are now more encouraged to read a course at post-compulsory institutions and pursue a career, following this hands-on experience and various activities in class through which they have been assessed.

They referred to the lessons that were put to trial as '*lezzjonijiet sbieħ u huwa wieħed mill-iżjed suġġetti li jogħġobni għax meta nagħmlu attività bħalma għamilna, hekk jogħġobni lili...U meta jkollna dawn l-attivitajiet bħalma qed ikollna mal-Miss tal-kompjuter fejn noqogħdu nżarmaw il-kompjuter, nagħmlulu r-RAM, inżidulu iżjed RAM pereżempju kien 4 ntuh 4 ieħor, nieħu pjaċir*' [pleasant lessons and it is one of the most subjects that I like because when we do an activity like we did, this is how I like it...And when we have these activities like the ones we are having with the Computer teacher, where we dismantle the computer, install RAM, add more RAM, for example the RAM was 4 and we install another 4, I enjoy myself]. Aside from motivating students to do what they enjoy doing while they master their digital competences, students were intrigued by the idea of cooperating through the embedded lessons with other subjects. Many agreed with Tyler that they perceive the curriculum more relevant to them as he said '*iktar jaqblu Computer u Design flimkien*' [Computer and Design go more together]. Such cooperation and networking with other stakeholders was encouraged by the European Commission (2015) for learners to perceive the curriculum attractive and relevant to the world of work. Hands-on tasks like '*sewwejna l-kompjuter*' [fixed the computer], projects and real-life scenarios were among the most gears that students mentioned when asked how this subject might help them to further their studies after compulsory secondary school or to become employable.

5.14 Challenges

Since schools cannot have a surge in the number of students who choose the applied subjects due to workshops space limitations, Mr Smith claimed that it was extremely important to guide students in a manner to choose wisely the appropriate route. Therefore, everyone was guided in a manner that best fit the students. Christersson and Staaf (2019) recommended that in order to meet such challenge of space limitations, online platforms may serve as creative and flexible options to use. Moreover, they said that since students are encouraged to be co-creators in an applied learning approach, they may provide creative and functional solutions when redesigning the physical space.

Though all participants in this study remarked that digital competences are skills which everyone should have, participating students remarked that they lack some of the skills mentioned during the focus group and needs to be tackled further. Research have also shown a lack of digital skills, both locally and globally as discussed in Section 3.2.1 and highlighted that the enhancement of the digital skills of all citizens is part of the European and national agenda.

The perceived quality of all routes is another challenge which we are still facing according to the participants educational stakeholders. This has been also reported by other countries (Hayes, 2017; Watkin, 2016), although parity of esteem has been established between different certifications. Mr Smith strongly believed that applied subjects 'should not be of lesser quality. It is different but it should not be of a lesser quality.' Through pedagogy and the attitude towards students, he believes that together we shall fight such challenge. Ms Jones feels that society's mentality is changing, but still there are some parents who tell their children 'no don't go for the vocational because it is '*tas-snajja*' (something which is considered of a lesser quality) but strictly speaking it is not'.

Mr Smith recognises the fact that some people look at the applied route as a route for those students who would fail in the academic route. However, these students have other strengths which must be valued more or as remarked by Hayes (2017) who acknowledges and emphasises that varied qualifications exist for students with varied learning styles and future prospects. Due to the fact that the Senate of the University of Malta approved applied subjects and since these were certified by MATSEC, gives out the message that there is a parity of esteem between all routes. Yet, Ms Jones deemed that people are still a bit biased with regards to the certification 'if it is behind an MCAST stamp or University of Malta' but still believes that the society's mentality is changing. We must keep pushing forward and challenge such mentality.

Mr Smith acknowledges that certain subjects' practical sessions are more difficult to do due to practicality. Since teachers have to monitor while assessing students and given the available time to do so, may create logistic issues. Still, he believes that this is an interesting challenge and yet, he is still in favour of continuous assessment and the fact that we have moved away from just the summative exams which have let down quite a

number of students in the past years. He claimed that unfortunately, there is still some resistance from teachers about moving away from summative exams. As Bonwell and Eison (1991) have underlined with regards to challenges of applied learning approach, is that certain old habits are difficult to break.

With regards to assessment, Ms Jones expressed her concerns that teachers nowadays have more work to do. She said that sometimes it is a 'hassle on the teacher' and 'quite more hectic to assess'. Assessment is becoming more time-consuming but at the same time more beneficial for the students. As reported by Wrye et al. (2019), project-based learning may bring its challenges. Further to the lack of engagement in similar activities, it would have been more beneficial if students could see how the 3D product which they designed was being printed layer on layer. However, due to the time constraints they only could see the initial process of printing. Moreover, not all groups had enough time to produce a leaflet or any other publication for their proposed solution. This correlates with Turner et al.'s claim (2018) that pedagogical methodologies, in this case project-based learning, should be carefully integrated in the curriculum.

During the part-implementation of the curriculum, it was noted that sometimes students found it difficult to comprehend online content. When students worked in a group, students helped each other to overcome the language barrier. However, when they had to work individually, students had to be given a lot of guidance. During this period, students were highly encouraged to speak and write in English so that they will not only enhance their English language skills but also for the foreign student to feel included. When students struggled to communicate in English, they were supported to express their views and their findings in a language that they feel confident to use, even for assessment purposes. Such matter was also pointed out during the focus group, and though they feel that both English and Maltese (their mother language) should be used, the general view was that sometimes they should be given the opportunity to use a language that they feel confident to use. As highlighted by Bonwell and Eison (1991) students get frustrated themselves when asked to verbally demonstrate their views and work in a spoken way. This might explain why students were in favour of articulating their view or work in a language they feel more comfortable in. As highlighted in this chapter, for SEAC subjects, students may opt to answer questions in Maltese or English, unless specified otherwise (MATSEC, 2019).

5.15 Chapter Overview

The results that have emerged from the thematic analysis of the data collected in this study have been described and analysed with cross-reference to research that have been discussed in Chapter 2 and Chapter 3. Some of the themes have emerged from all the data collection methods, while others, emerged from certain data collections as highlighted in this chapter. The findings in this chapter show the need of planning, designing and implementing programmes to be adopted in an applied learning approach, and to equip students with digital competences, particularly those in secondary schools.

The next chapter describes in detail the evaluation of the research questions that pertain to this study, recommendations for future research and limitations of this study.

Chapter 6

Conclusion

6 Conclusion

6.1 Introduction

The results and analysis of this study with reference to literature, have addressed the research questions and research hypothesis of this study.

This final chapter presents an evaluation of the research questions based on the findings and analysis of this study, as well as literature. It also includes a discussion on the recommendations for future research relating to this study and also on the limitations of this study.

6.2 Research Questions' Evaluation

The rationale and the importance of this study as described in Chapter 1, triggered the following list of research questions on which the inquiry of this study was guided:

1. According to literature, what makes learning applied? Does it correlate with participants educational stakeholders' perceptions?
2. What are the benefits and challenges of applied learning?
3. How can a curriculum be designed to equip students with digital competence skills in an applied approach?

The research questions' evaluation proved the research hypothesis, that the proposed applied curriculum can better equip students with digital competences, notwithstanding their different abilities and needs.

These questions will now be evaluated based on the findings and analysis of this study.

6.2.1 Research Question 1

According to literature, what makes learning applied? Does it correlate with participants educational stakeholders' perceptions?

The aim of this question was to establish whether there exists a correlation between the meaning of applied learning as described in literature and the perceptions of the educational stakeholders. It also aims to establish whether there is a correlation

between the pedagogical approaches and assessment practices that research features for applied learning with the ones mentioned by the educational stakeholders.

This question was targeted to be analysed by the educational stakeholders' perceptions, since these two stakeholders have a key role in the Maltese educational system with regards to curriculum development. Moreover, students' perceptions could not inform the answer to this question since their contribution in this research was more focused on their feedback regarding the applied learning approach and digital competences.

6.2.1.1 The meaning of applied learning

A summary of the meaning of applied learning as thoroughly discussed in Chapter 2 (refer to Section 2.3), is that students learn by doing where they explore content and apply the knowledge and skills learnt in hands-on and real-world settings. Such approach gives students the opportunity to relate their learning to real-life situations, through which they can extend their learning. The action of making is the core of applied learning stems from the constructivist and constructionist approaches to learning, providing students the opportunity of building or actively constructing their own knowledge and discovering for themselves the knowledge that they need for themselves. Rather than being transmitted knowledge as passive learners, students are active learners being facilitated by their teacher to seek and build knowledge, hence placing learners at the centre of learning.

During the interviews, educational stakeholders have also equated applied learning as an approach where students learn by doing, engage in hands-on activities and being provided with opportunities to relate their learning to real-life situations. Both educational stakeholders and literature emphasised learners to be active rather than passive learners. The main different views outlined by the educational stakeholders and literature is that while literature did not specifically relate learning by doing to a specific cohort of students, the educational stakeholders relate learning by doing to students who struggle in the traditional classroom. Yet, it was later claimed by an educational stakeholder that an applied learning approach can still be implemented with other students who choose subjects not in the applied route and are more theoretical in nature.

6.2.1.2 Pedagogical Approaches of Applied Learning

During the literature research that was carried out as part of this dissertation, it was observed that a number of applied learning pedagogical methodologies and activities have been constantly referred to by research. These pedagogical approaches, which have been thoroughly discussed in Chapter 2 (refer to Sections 2.4 and 2.7), include active learning, experiential learning, project-based learning, service learning along with a rich menu of applied learning activities.

Overall, the educational stakeholders have referred to the general characteristics that are often associated with the strategies of the previously mentioned pedagogical approaches except for the service-learning pedagogical approach. Through the service-learning approach, students explore the problems and needs in their school or community and develop plans to find solutions accordingly. Though educational stakeholders agreed that community engagement with schools is envisaged through the applied route, both interviewees have only commented about engagement with the industry, but have not remarked about students contributing to their community even though have been specifically asked through a probing question. This shows a gap between literature and educational stakeholders' perceptions of community engagement.

6.2.1.3 Assessment Practices of Applied Learning

Both literature and the educational stakeholders perceive summative assessment as an approach which deprives the students from the opportunity to improve their learning potential. Summative assessments, or as referred to assessment of learning, penalise mostly the weak students since they may struggle to learn at the same pace as others and unfortunately these students cannot really show what they really know in exams. As stated in literature (refer to Section 2.8), the educational stakeholders believe assessment for learning is the best way to ensure that all students can succeed to their best ability through formative and continuous assessments. The key of assessment for learning is the involvement of students. Through various forms of formative and continuous assessments, such as projects, investigations, and case studies; students receive quality feedback from their teacher in order for them to enhance their learning. Active learning may not necessarily be measured through written tasks but may be done even through questioning and contributing to discussions with the class. Giving teachers more autonomy in choosing the modes of assessment, the teacher can adapt any planned

work to better meet the needs and abilities of the students. As discussed above, both literature and the educational stakeholders' perceptions are in line with each other with regards to assessment for learning practices for applied learning. However, literature has also presented authentic assessment forms (refer to Section 2.8.3) that portray the constructivist nature of learning where students work on real-world tasks to apply meaningfully the knowledge and skills learnt. Though the educational stakeholders have mentioned that students are provided with opportunities to get acquainted to real-world situations, they have not mentioned authentic assessments practices for the applied route.

6.2.2 Research Question 2

What are the benefits and challenges of applied learning?

This research question was aimed to reveal the benefits and challenges of applied learning that have emerged from this study. The evaluation of the subset of the proposed curriculum, the critical friend's feedback and students' and the educational stakeholders' perceptions informed the answer to this research question. This study revealed only benefits for students whereas the challenges that have emerged were for students and the educational system.

6.2.2.1 Benefits of applied learning

This study showed that giving schools and teachers more autonomy with regards to assessment practices and curriculum development and implementation, results in increased students' commitment towards their work and increased students' motivation to learn. Indeed, educational stakeholders are in favour and hopeful to grant more autonomy to schools and teachers in this regard as they feel it is beneficial for students to adapt to the school's reality and to learners' abilities and needs. Literature (refer to Section 3.3.2) also showed that when schools are given more autonomy on school curricula and are more accountable to students, the students' performance increases.

Students' perspective towards the subject have positively changed as they liked better the teaching mode of the applied learning approach and felt that curriculum is broader and more tailored to their needs. They believe that the applied programme is more relevant to them and they might find it useful for their future work, life, and learning prospects.

Through the various applied learning activities, students who struggle with reading and writing, could be fairly assessed, and could show what they have learned in class. Educational stakeholders conveyed that through a hands-on approach, students who usually get bored of reading and writing, will also be mastering their literacy skills as these skills can still be implemented in a fun way. As observed by the critical friend, students felt intrinsically motivated to do further research on what has been done in class. Thus, as research shows when students are involved in making things rather than just listening and giving them the opportunity to apply their knowledge and skills, will ultimately improve their learning and their positive attitudes towards the subject.

Research and students showed that as a result of students' engagement in the learning process, they become more academically persistent. As one of the educational stakeholders convincingly said, if students are motivated through subjects which they feel that are relevant to them, it will ultimately have a spill-over effect and the students will also become motivated towards school. As studies show, applied learning promotes learning for all students. When students' needs are met by the educational system through stimulating and engaging curricula, together with a sense of belonging, will also help in re-engaging students who are at risk of leaving school early. The educational stakeholders are hopeful that through the active involvement and assessment practices which reflect their work and strengths rather than their weaknesses, students' motivation and commitment towards school is likely to increase, thus will help in diminishing the ESL rate. The general view of the students was that following the hands-on experience and the various applied learning activities, particularly the project and the real-life situation for which they had to propose a solution, they are more motivated to further their studies in post-compulsory institutions and to pursue a career.

This study and literature showed that applied learning offers an environment that helps in bridging the gap between the world of education, the world of work and lifelong learning. Research and participants conveyed that through applied learning, students can develop soft skills which are highly beneficial for students' life, employability, and lifelong learning. It was astounding how students talked about the benefits of such skills for their prospects. Educational stakeholders claimed that these soft skills are beneficial for every student, irrespective of the route they choose to study. Students were much in favour of including soft skills in curricula, same as being suggested by literature. Work placements

are highly recommended both by literature and educational stakeholders since it offers a good opportunity for students to gain and master soft and practical skills. Thus, it was highly recommended by educational stakeholders and literature to include work placements in applied learning programmes for students to relate what is being done at school to the world of work.

6.2.2.2 Challenges of Applied Learning

Like any other educational approach, this research showed that an applied learning approach brings forth some challenges that need attention.

One of the educational stakeholders claimed that, though MEDE is trying to empower schools to develop curricula that would make more sense for their reality, Malta is still struggling in this regard. In Malta, everything is expected to be centralized and thus it is more difficult to adapt the curriculum according to the diverse needs and abilities of the students. Students participants highly emphasised the importance of tailoring curricula according to their needs. Educational stakeholders are hopeful to grant greater autonomy to schools in this regard.

This research showed that due to the unfamiliarity with applied learning activities, students found it initially challenging when given certain autonomy and roles while working on tasks. During the part-implementation period and as recommended by research, it would help students who find it challenging to adapt to a different learning approach, to make a strong introduction of the applied learning activities before implementing them in class. Due to a certain degree of autonomy while working on tasks, students felt a bit insecure at times and needed further assistance to keep on going.

It was observed that sometimes it may be challenging for the educator to relinquish a certain degree of control during the implementation of applied pedagogical approaches in the learning environment. Recognising that both educators and students are co-creators of knowledge, helps in highlighting the students' active role in an applied learning approach.

The educational stakeholders also claimed that sometimes old habits are difficult to break and they still find some resistance from teachers with regards to assessment

practices. Some teachers still find it difficult to accept moving away from summative assessment even though it has let down quite a large number of students in the past years.

With regards to assessment, it was revealed in this study that language can be a barrier for some students when being assessed. Students recommended that they opt to choose either Maltese or English when being assessed. It may be frustrating for some students to present their work or articulate their opinion in a language that is not their native language.

One of the concerns that was shared during this study was that although assessment for learning practices are more beneficial for the students to increase their learning potential, it is becoming more time-consuming for teachers to plan and assess students. An observation from this study was that certain applied learning tasks can take much more time than planned, which may be due to students' lack of familiarity to engage in similar tasks.

According to the educational stakeholders, though the mentality of society is changing, applied learning programmes' certifications are still perceived of a lesser quality than other certifications. Some parents/guardians still look at the applied route as a route for students who would fail in academic subjects, thus they discourage their children from choosing subjects in the applied route. Parity of esteem between subjects has been reported as a challenge in other studies as well.

Another challenge which was articulated by educational stakeholders was that due to workshop space limitations, students must be guided in a manner to choose wisely the route that is most appropriate for them. Students who struggle in academic subjects due to their strong theoretical aspect and who learn mostly by doing, are encouraged to choose the applied route as their potential in achieving a certificate in applied subjects is much higher. However, both educational stakeholders claimed that both VET and academic subjects still can be implemented in an applied approach.

Though practice placements at the place of work are highly recommended for applied learning for students to relate their learning to, educational stakeholders claimed that for certain subjects is considerably more challenging to make arrangements with the industry. Due to logistic barriers and challenges, it boils down to the school's and teachers' initiatives to plan with the industry for observations or practice placements.

6.2.3 Research Question 3

How can a curriculum be designed to equip students with digital competence skills in an applied approach?

The aim of this research question was to show that the Applied Digital Competences Curriculum was designed in an applied approach as recommended by the educational stakeholders inclusive of various benefits as highlighted by both literature and the participants of this study. Such approach was adopted to equip students with digital competences that literature and participants of this study foresee as essential for all citizens throughout life.

6.2.3.1 The importance of incorporating digital competences in the Applied Digital Competences curriculum for students with different abilities and needs

From this research, it has become apparent that students yearn to be equipped with digital competences as they believe that these skills are essential for life, employability, and lifelong learning. From the discussions that the researcher had with students in class about digital competences, and from their feedback during the focus group interview, it was evident that certain digital competences need to be tackled further with them. Following the implementation of a number of digital competences in class to help enrich students' digital literacy, students suggested several digital competences to be included in curricula. Such competences include: online job hunting, courses and leisure activities; being aware of how to stay safe online and how to recognise safe and secured websites; evaluating online content; knowing how to manage one's own online identity; knowing how to book online when planning a vacation; using apps to locate places when travelling; e-commerce; applying for online courses; and using e-government services. In line with the EU digital strategy and Malta's digital agenda in the enhancement of digital skills, educational stakeholders and students felt strongly that digital competences are skills which every citizen must have. A strong stance that emerged from students' feedback was that, besides from being competent in using digital technology, they deem it as important to them to know how to use technology responsibly and act with respect towards others. Incorporating the digital competences and the soft skills (the latter for the various benefits as

highlighted in Research Question 2), in curricula, as done in the Applied Digital Competences Curriculum, is highly beneficial for empowering learners to be successful digital citizens and to become more digital literate.

6.2.3.2 The Applied Learning Approach for equipping students with the digital competences

Stemming from the educational stakeholder's perceptions, the digital competences should be implemented in the learning environment in an applied manner as much as possible. For this reason, they emphasised the importance of placing focus on learning by doing where students engage in real-life situations which they can find at home and in their future prospects. Introducing digital competences through an applied approach, in this case through project-based learning while students actively engage in a variety of applied learning activities to propose solutions for real-life problems, students remarked that it was significantly advantageous for them. Besides the fun element, they have remarked that the applied approach, which they referred to as a different mode of teaching, can help them the most in acquiring the digital competences. This made them feel somewhat more digitally competent in their endeavour to practice digital skills now and the future.

As anticipated, students were highly motivated and encouraged to learn digital skills in such exciting manner, however through the observations and as remarked by the critical friend, they found it a bit challenging at times to take control of their learning. This research has shown that the teaching approach of spoon-feeding knowledge to students needs to change and instead help students in constructing their knowledge.

Educational stakeholders saw an advantage in implementing this curriculum that makes sense for all students and one of them was very intrigued to see how the Applied Digital Competences Curriculum can be implemented in a way that caters for the various needs and abilities of students. It was emphasised by educational stakeholders to distinguish the IT subjects which are offered as an option for Year 9 to Year 11 students who wish to further their specialisation in IT or in a

particular institution after compulsory schooling, and a digital competences curriculum for all students. In this respect, they deemed important to include the broad digital competences of this curriculum in an applied compulsory subject for all students rather than as an option to ensure that every student is catered for equipping these skills in our educational system. This research has shown that through an applied approach, students who are usually labelled as low-achievers in the one-size fits all system, can develop digital competences, and become more digital literate notwithstanding their different abilities and needs. All students in this research study agreed that the opportunity given to acquire the digital competences through applied learning approach, was a serendipitous experience for them.

6.3 Implications of the Results and Recommendations on Future Research

This study shed light on recommendations to stakeholders, particularly educational policymakers, especially if the implications of the results will be supported by future research which extends this study.

Due to the various benefits of the applied learning approach, this study showed that educational programmes need to adopt more such learning approach. Thus, it is recommended to develop more curricula programmes in an applied approach while giving autonomy to educators and schools to adapt curriculum according to the needs and abilities of students and to the school's reality.

This study showed that community engagement with schools need to be further explored. More community engagement in curricula through service learning which is informed by experiential learning is encouraged.

In this study it was revealed that the educational system should better prepare students with the highly sought soft skills for employability and lifelong learning. Therefore, it is recommended that educational stakeholders incorporate more of these soft skills in curricula.

Since the designed curriculum for this study was only partly implemented and evaluated, it would be a beneficial research to evaluate the two programmes that have

been accredited and put forward recommendations for improving this curriculum. As highlighted in literature, it is important to analyse and improve curricula programmes from time to time.

This study showed that it is important to include the broad digital competences of this curriculum in an applied compulsory subject for all students. Thus, it is recommended to engage in talks with educational policymakers to blend the curriculum designed for this study with the academic, VET and applied programmes as proposed in My Journey.

The applied learning route as proposed for the new schooling system in Malta has not been in implementation for long. It would be beneficial to evaluate current applied curricula. Thus, it would be ideal to research:

- **The educators' views**: One may evaluate educators' views to study to what extent can they creatively assess students through formative and continuous assessments through the decentralisation of curricula and assessment practices. What are teachers' perceptions of the applied approach? Does their perception correlate with the participants' educational stakeholders as envisaged for the new comprehensive schooling system and with literature? How are they assessing students who have struggle in reading and writing? Are these assessment practices catering for students with different abilities and needs? Are they finding it difficult to adapt the curriculum and assessment due to the nature of how the curriculum is worded?
- **The students' view**: Evaluate students' perspectives with regards to applied learning programmes to establish to what extent current applied curricula programmes are providing them with opportunities and skills to further their learning or help them become employable.

Literature and participants in this study emphasized that Malta needs to address the enhancement of digital skills as part of its national digital agenda. Since research and the participants conveyed that digital competence is a key competence for all citizens and students participants of this study claimed that they need their digital competences to be tackled further, it would be ideal to further enhance these skills at an earlier stage. Malta

is already addressing digital competences as a cross-curricular theme at primary level (refer to Section 3.3.2). However, it would be beneficial to design a separate compulsory Applied Digital Competences Curriculum programme for the primary level so that students are provided with further opportunities to enhance their digital skills in an applied approach. This may also help students to be familiar with applied learning activities at an earlier stage.

6.4 Limitations of this study

Like any other study, this research has its own limitations which will be discussed hereunder.

Having students presenting a reflective work on the project that they have worked in class, including the 3D model, would have been beneficial both for students and also to understand deeper their perceptions of this study. However, students' reflections on their learning process during the part-implementation period were highly encouraging during the lessons and during the focus group interview as has been also noticed by the critical friend. As recommended by literature, it is good practice and beneficial for students that they understand the core idea behind reflective work before they actually present a reflective work. Due to time-constraints during the part-implementation period, regrettably this had to be left out. Yet, maintaining and updating a portfolio has been put in the curriculum as part of the 'Responsibility' section of each module, so that in the future, students will have the opportunity to reflect on their own work. Research shows that maintaining a portfolio is a type of authentic assessment within the applied learning approach.

The module 'IT in Society' of the designed curriculum for this study would have better been named 'ICT in Society', so that it would include the Communications aspect. However, as remarked by the Accreditation Unit of the DQSE, it was not possible due to potential conflict with other existing programmes.

It would have been beneficial to evaluate the perceptions of teachers who are teaching subjects pertaining to the applied route. However, since at the time of research, applied subjects were introduced, it would have been too early to evaluate teachers' perceptions.

Since this study was an action research, where according to Stringer the aim is to investigate issues to have an element of change (as cited in Hine, 2013), the researcher wanted to evaluate part of the designed Applied Digital Competences Curriculum and amend as needed in order to find ways to help students be equipped with digital competences through an applied approach. The researcher would not have obtained the same analysis if the research had been carried out by an outsider. When one researches his own framework, it is not without criticism. An outsider might have interpreted students' data differently since the researcher was familiar with students in her class. However, the anecdotal narratives describing the lesson and any other remarks on the observation protocol sheet filled out by the critical friend, helped in this regard. Moreover, the recording and observation of the lessons helped make a distinction of the dual role of the researcher, that of researcher and teacher.

6.5 Chapter Overview

The final chapter commenced with an evaluation of the research questions followed by recommendations for future research and limitations of this study.

This research shed light on recommendations for future research that can help the Maltese educational system to flourish and better meet the needs of citizens, particularly students with diverse learning styles and abilities. At the end of this chapter the limitations of this study are mentioned.

The evaluation of the research questions pertaining to this study showed that the meaning of applied learning as exhibited in literature correlates to a high extent to the meaning as perceived by educational stakeholders. Having said that, research did not specifically mention that applied subjects target a specific cohort of students, while educational stakeholders see fit such approach for a cohort of students who struggle in the traditional classroom. The general characteristics of various applied learning pedagogical methodologies and activities that have been referred to by literature, have been mentioned by educational stakeholders as envisaged for the applied route of the new schooling system. Yet, community engagement with schools where students contribute more to schools and community need to be further explored. Both literature and educational stakeholders advocate assessment for learning practices, but authentic

assessment forms seem like they need to be considered further for the applied route of My Journey (MEDE, 2017).

With respect to the various benefits of applied learning that have been cited by literature and by the participants of this study, it is necessary that educational programmes adopt a more applied learning approach. In view of the various challenges revealed by this study, it is important that stakeholders at large contribute towards overcoming such challenges.

In accordance with the educational stakeholders belief that the Applied Digital Competences Curriculum shall be offered for all students at large, then, it is seen as beneficial to blend this curriculum with the academic, applied and VET subjects as proposed in My Journey (MEDE, 2017). From this study it has also transpired that students believe that digital competences shall apply to all students. While trusting that this curriculum will better equip students with digital competences, the researcher believes that it will optimistically help in enhancing the digital skills of citizens as envisaged at European and national level.

7 Publications from this research

Mifsud, G. (2019, Nov 27-29). *An Applied Digital Competences Curriculum to help reduce early school leavers and/or students without skills* [Conference Paper]. Early Leaving from Education and Training – The Way Forward, MEDE, Malta.

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Appendix 1

Research Ethics Approval and Documentation

Research Ethics Approval

FRECEDU-1718_102

L-Università ta' Malta

University of Malta
Research Ethics and Data Protection
Self-Assessment Form

PART 1: INTRODUCTION

In line with the University of Malta's Research Ethics Review Procedures, if you are a University of Malta member of staff, student, or anyone else planning to carry out research under the auspices of the University, you must complete this form.

The first step is to read the University of Malta's Research Code of Practice and Research Ethics Review Procedures (both documents are available from https://www.um.edu.mt/urec) and make sure you understand them. Once you have done this, you should complete the self-assessment exercise that is contained in this form.

PART 2: PRINCIPAL INVESTIGATOR AND RESEARCH PROJECT DETAILS

FROM: (*name, address for correspondence*) [redacted]	TITLE OF RESEARCH PROJECT: An Applied ICT curriculum to reduce early school leavers and/or students without skills
TELEPHONE: [redacted]	
EMAIL: Click here to enter text.	
STUDENT NUMBER: 05032847	
COURSE AND YEAR: Master of Education in Computing Education Year 2017-2020	
FACULTY/CENTRE/INSTITUTE/SCHOOL: Faculty of Education	
PROPOSED DATA COLLECTION START DATE: November 2018 - January 2019	SUPERVISOR'S NAME, EMAIL & TELEPHONE NUMBER: Please use University of Malta email address Dr Leonard Busuttil
PROPOSED PROJECT END DATE: June 2020	email: [redacted] tel: [redacted]

ANTICIPATED FUNDING SOURCE (If applicable): *(Include grant or contract number if known)* Endevour Group A - 3rd call Scholarship Agreement Number: 1065/2017/727

Please give a brief summary of the purpose of the research, in non-technical language. Various local and international studies have shown that the early school leaving rate is the current challenge of the country at present. The target is to reduce the early school leaving rate less than 10% by 2020. To this end, the Ministry for Education and Employment proposed a 'new secondary schooling system' in myjourney framework which shall provide general academic, vocational and applied programmes in various subjects including in Information Technology (IT). This study aims to propose an ICT curriculum for the IT Applied Strand and to trial and evaluate a subset of this curriculum with a Year 9 class. A qualitative approach is proposed in this study since systematic observations, semi-structured interviews and focus groups interviews with students are the main

methods of data collection of this action research. The curriculum that will be developed will combat with early school dropouts since one of the four major targets of the proposed myjourney is an effective and well-thought transitions in formal education which will help reduce the risk of early school leavers and dropouts in the education system.

PART 3: RESEARCH ETHICS AND DATA PROTECTION SELF-ASSESSMENT FORM

Please consider your research proposal very carefully and check which sections are relevant in your case. If you are advised that you also need to complete Form B, this is available for download from https://www.um.edu.mt/urec/notices/fullresearchproposalform

Any breach of the Research Code of Practice or untruthful replies in this form will be considered a serious disciplinary matter.

ANSWER ALL QUESTIONS IN THE SECTIONS THAT ARE RELEVANT TO YOUR RESEARCH
All researchers to complete Section D

Research that involves primary data collection from human participants or their tissues	Complete Section A
Research that involves primary data collection from animals* or their tissues *non-human vertebrates (including independently feeding larval forms and foetal forms of mammals as from the last third of their normal development) & cephalopods	Complete Section B
Research involves use of Secondary Data	Complete Section C
All research	Complete Section D

NOTE:
Primary data collection - gathering information (data) directly (e.g., through measurement, observation, asking questions) for your research.
Secondary data - using data already published or collected by somebody else

SECTION A | Research involving PRIMARY DATA from HUMAN PARTICIPANTS		YES or UNSURE	NO
A.1	Will your participants be harmed in any way?	[ ] In addition to this form, you also need to fill in & submit Form B to your FREC. GO TO A.2	No GO TO A.2
A.2	Are any of your research participants children, persons in institutions, persons with disability, victims of crime or abuse, substance abusers, or economically or educationally disadvantaged persons?	Yes In addition to this form, you also need to fill in & submit Form B to your FREC GO TO A.3	[ ] GO TO A.3
A.3	Are the participants in your research identifiable in some way? Choosing "No" means that all the data from your research are anonymous or have been anonymised and that there is little risk that the data can be de-anonymised and linked with identifiable individuals.	[ ] GO TO A.4	No GO TO A.5

SECTION A | PRIMARY DATA from HUMAN PARITICIPANTS continued		YES or UNSURE	NO
A.4	Do you plan to collect personal data which reveals race or ethnic origin, political opinions, religious or philosophical beliefs, membership of a trade union, health, sex life, sexual orientation, genetic data, or biometric data for the purpose of uniquely identifying a natural person?	[ ] In addition to this form, you also need to fill in & submit Form B to your FREC GO TO A.5	[ ] GO TO A.5
A.5	Do you plan to employ deliberate deception (actively providing false or misleading information or passively withholding information with the intention of misleading subjects about the research)? Note: Incomplete disclosure (providing general but accurate information to participants in order to avoid the potential for biased results) DOES NOT constitute deliberate deception in terms of this question.	[ ] In addition to this form, you also need to fill in & submit Form B to your FREC GO TO A.6	No GO TO A.6
A.6	Do you need permission from a cooperating institution(s), school, hospital, organization, prison, or other relevant organization or another ethics committee?	Yes In addition to this form, you also need to fill in & submit Form B to your FREC. GO TO NEXT RELEVANT SECTION	[ ] GO TO NEXT RELEVANT SECTION

SECTION B | Research involving PRIMARY DATA from ANIMALS

Note: For the purposes of this section "animals" means non-human vertebrates (including independently feeding larval forms and foetal forms of mammals as from the last third of their normal development) & cephalopods.

B.1	Are you working with dead or live animals?	**If dead** GO TO B.4	**If alive** GO TO B.2
B.2	Will the animals in your research be harmed*? *killed or cause the animal a level of pain, suffering, distress or lasting harm equivalent to, or higher than, that caused by the introduction of a needle in accordance with good veterinary practice.	**YES or UNSURE** [ ] Complete the rest of this form and seek advice from your FREC. GO TO B.3	**NO** [ ] GO TO B.3
B.3	Will the animals remain in their natural habitat in the course of your research?	**YES** [ ] You may stop filling in this section and GO TO NEXT RELEVANT SECTION	**NO or UNSURE** [ ] GO TO B.4
B.4	Will the animals be acquired legally[1] or from a legal source[2]? [1]If working with protected species, all necessary permits need to have been obtained. [2]Legal sources may be licensed commercial outlets, donations by persons or institutions who have themselves obtained the animals legally and who are authorised to donate them.	**YES** [ ] GO TO NEXT RELEVANT SECTION	**NO or UNSURE** [ ] Complete the rest of this form and seek advice from your FREC

SECTION C | To be completed by those collecting SECONDARY DATA		YES	NO or UNSURE
C.1	Have the secondary data you are going to use been published?	[ ] GO TO SECTION D	[ ] GO TO C.2
C.2	Do you have the written permission of the owner of the data that you may use the data for your research?	[ ] GO TO C.3	[ ] Complete the rest of this form and seek advice from your FREC
C.3	Have the data you are going to use been collected from human participants?	[ ] GO TO C.4	[ ] GO TO SECTION D
C.4	Have you obtained a copy of the consent form signed by the participants where secondary use, communication and subsequent sharing of data collected is expressly provided for?	[ ] GO TO SECTION D Consent forms need to be sent to FREC before data collection starts with the other research materials as per Note 1 on page 5	[ ] Complete the rest of this form and seek advice from your FREC

SECTION D | TO BE COMPLETED BY ALL		YES or UNSURE	NO
D.1	Is there significant foreseeable risk that your research can cause physical or psychological harm to people or harm to the environment or be misused by terrorists or military organisations?	[ ] In addition to this form, you also need to fill in & submit Form B to your FREC GO TO D.2	No GO TO D.2
D.2	Is there any conflict of interest - financial or non-financial - that could benefit you or a relative or friend or business associate?	[ ] In addition to this form, you also need to fill in & submit Form B to your FREC GO TO D.3	No GO TO D.3
D.3	Is there significant foreseeable risk to you as the principal investigator?	[ ] Complete the rest of this form and seek advice from your FREC	No GO TO D.4
D.4	Is there any aspect of the proposed research which might bring the University of Malta into disrepute?	[ ] Complete the rest of this form and fill in & submit Form B to your FREC	No Sign this form, ask your supervisor to sign it (if applicable), and submit to your FREC for filing. YOUR RESEARCH NEEDS NO FURTHER APPROVAL **HOWEVER SEE NOTE 1 BELOW[1]**

[1]**NOTE 1: BEFORE STARTING DATA COLLECTION, copies of relevant research materials, including research proposal, consent forms (if used), copies of research materials such as questionnaires, discussion guides, stimuli, etc. need to be submitted to FREC for filing and audit purposes.**

PRINCIPAL INVESTIGATOR:	SUPERVISOR
I hereby confirm that I have read and understood the University of Malta Research Code of Practice and the University of Malta Research Ethics Review Procedures and further declare that the information provided above is truthful.	*I have reviewed the research proposal and hereby confirm that it abides by the University of Malta Research Code of Practice and that the answers to the questions above reflect the contents of the research proposal.*
	
Copy of Signature may be pasted in here	Copy of Signature may be pasted in here
SIGNATURE OF PRINCIPAL INVESTIGATOR	SIGNATURE OF SUPERVISOR
DATE Click here to enter text.	DATE Click here to enter text.

FREC EDU_1718_102

UNIVERSITY OF MALTA

UNIVERSITY RESEARCH ETHICS COMMITTEE

Check list to be included with UREC proposal form

Please make sure to tick **ALL** the items. Incomplete forms will not be accepted.

		YES	NOT APP.
1a.	Recruitment letter / Information sheet for subjects, in English	✓	
1b.	Recruitment letter / Information sheet for subjects, in Maltese	✓	
2a	Consent form, in English, signed by supervisor, and including your contact details	✓	
2b	Consent form, in Maltese, signed by supervisor, and including your contact details	✓	
3a	In the case of children or other vulnerable groups, consent forms for parents/ guardians, in English	✓	
3b	In the case of children or other vulnerable groups, consent forms for parents/ guardians, in Maltese	✓	
4a	Tests, questionnaires, interview or focus group questions, etc, in English	✓	
4b	Tests, questionnaires, interview or focus group questions, etc, in Maltese	✓	
5a	Other institutional approval *for access to subjects*: Health Division, Directorate for Quality and Standards in Education, Department of Public Health, Curia...		✓
5b	Other institutional approval *for access to data*: Registrar, Data Protection Officer Health Division/Hospital, Directorate for Quality and Standards in Education, Department of Public Health...		✓
5c	Approval from person *directly responsible for subjects*: Medical Consultants, Nursing Officers, Head of School...	✓	

Received by Faculty office on	22/06/18
Discussed by Faculty Research Ethics Committee on	26/09/18
Discussed by university Research Ethics Committee on	

UNIVERSITY OF MALTA

Request for Approval of Human Subjects Research

Please type. Handwritten forms will not be accepted
You may follow this format on separate sheets or use additional pages if necessary.

FROM: *(name, address for correspondence)*	PROJECT TITLE:
Gianella Mifsud Ta' Ninu, Kitba Street, Fgura FGR2110	An Applied ICT curriculum to reduce early school leavers and/or students without skills
TELEPHONE: [redacted]	
E-MAIL [redacted]	
COURSE AND YEAR: Master of Education in Computing Education	
DURATION OF ENTIRE PROJECT: from Oct 2017 to June 2020	FACULTY SUPERVISOR'S NAME: Dr Leonard Busuttil

ANTICIPATED FUNDING SOURCE: Endevour Group A - 3rd call Scholarship
(include grant or contract number if known)

1. Please give a brief summary of the purpose of the research, in non-technical language.

Various local and international studies have shown that the early school leaving rate is at present one of the main challenges of the country . The target is to reduce the early school leaving rate less than 10% by 2020. To this end, the Ministry for Education and Employment proposed a 'new secondary schooling system' in myjourney framework which shall provide general academic, vocational and applied programmes in various subjects including in Information Technology (IT). This study aims to create an ICT curriculum for the IT Applied Strand and to trial and evaluate a subset of this curriculum with a Year 9 class.

2. Give details of procedures that relate to subjects' participation
(a) How are subjects recruited? What inducement is offered? *(Append copy of letter or advertisement or poster, if any.)*

According to the myjourney plan, Applied IT will be implemented in years 9, 10 and 11 of the secondary school. This study will target students from a Year 9 class. The plan is to apply action research and conduct the study in the school where I currently teach. In order to help mitigate against bias since I will be a researcher and a teacher in my class, a critical friend will be recruited to observe the lessons I conduct. An Information Letter and Consent form shall be given to the critical friend by hand. Information Letters, Consent and Assent forms to the students in my class shall be distributed through the Head of School. Participants will be allowed to opt in and participate in this study. Students will need to participate in the lessons even if they do not take part in this study since the lessons are an integral part of the school IT Curriculum, however by participating in this study the students shall have the opportunity to have their voice about the effectiveness of the pedagogy applied heard anonymously and voluntarily. An Information Letter and Consent Form to the EO of ICT will be sent by email.

(b) Salient characteristics of subjects—number who will participate, age range, sex, institutional affiliation, other special criteria:

Number of participants: around 10 students
Age range: 13-14 years
Sex: male
Institutional affiliation: 1 Boys' Secondary Independent School

Semi-structured interview with the Education Officer (EO) of ICT in Malta

(c) Describe how permission has been obtained from cooperating institution(s)—school, hospital, organization, prison, or other relevant organization. *(Append letters.)* Is the approval of another Research Ethics Committee required?

The Head of School has been approached informally face to face to request unofficial permission. Formal permission shall be obtained once research will get ethical clearance. This shall be done via Information and permission letters to the Head of School (the gatekeeper).

(d) What do subjects do, or what is done to them, or what information is gathered? (Append copies of instructions or tests or questionnaires.) How many times will observations, tests, etc., be conducted? How long will their participation take?

Students will participate in class following the normal lessons. Students who opt in to participate in the research shall be video recorded during some ICT lessons (around 7 lessons) which I will be delivering so that I can later observe the lessons through the video recordings. During these lessons, the critical friend shall be observing the class to make sure that there is no undue pressure on any student in class. The critical friend may write an anecdotal narrative describing the lesson and then complete the attached observation protocol sheet after each visit.
A focus group interview shall take place once a subset of the curriculum will be put to trial with the same class (around 10 students). The focus group interview shall be recorded by an audio recorder and with written notes taken by the moderator (me as the researcher) and assistant moderator (a critical friend).
Notes will be taken by the assistant moderator. This will be done to ensure that there is no interference between recording the spontaneous comments of the focus group interview and the flow of the focus group. The note taking was seen essential in case the audio recorded stops recording. The researcher shall be the moderator. The use of the audio recorder shall be mentioned at the beginning of the focus group session and introduced as a device to help in capturing everyone's comments.

The focus group shall take place in the school activity room as this room is usually used for PSCD lessons where students tend to be more relaxed and encouraged to speak the way they feel. Students will be encouraged to give honest critical feedback about the lessons even if their feedback is not positive. The focus group interview shall take place around January 2019 and will last for about one hour.
A semi-structured interview will be conducted with the EO of ICT so that the researcher may understand what is expected in the Applied Strand of the new schooling system.
Please refer to the attached sheet for additional information.

(e) Which of the following data categories are collected?

Data that reveals – race or ethnic origin	YES / NO
political opinions	YES / NO
religious or philosophical beliefs	YES / NO
trade union memberships	YES / NO
health	YES / NO
sex life	YES / NO
genetic information	YES / NO

3. How do you explain the research to subjects and obtain their informed consent to participate? (If in writing, append a copy of consent form.) If subjects are minors, mentally infirm, or otherwise not legally competent to consent to participation, how is their assent obtained and from whom is proxy consent obtained? How is it made clear to subjects that they can quit the study at any time?

Through Information letters, consent and assent forms and also through verbal means during the study, participants of this study will be informed that they are free to participate in the study and refusal to participate in the study shall not affect any learning in class or other activities that may be held during the course of study.
Though parents/guardians are not participating in this study, an information sheet and consent form is also prepared for them so that they give the consent to their children. Even if the parents/guardians give consent, the researcher shall seek and continuously renegotiate the child's assent.

4 .Do subjects risk *any* harm—physical, psychological, legal, social—by participating in the research? Are the risks necessary? What safeguards do you take to minimize the risks?

In this study, participants do not risk any harm.
Attention has been given to the language used in the information letters, consent and assent forms, focus group and interview questions and all other support documentation attached with this form to avoid any stigmatization and labeling.

The researcher shall seek permission from someone in the SMT to act as a critical friend to observe and protect the interests of pupils and to ensure that there is no undue pressure on children to participate.0

Since focus groups is one of the main methods of data collection, participants will be asked to protect third party confidentiality during the ground rules part at the commencement of the focus group interview/s. The focus group shall take place in the school activity room as this room is usually used for PSCD lessons where students tend to be more relaxed and encouraged to speak the way they feel. Students will be encouraged to give honest critical feedback about the lessons even if their feedback is not positive. I will be telling them that there is no right or wrong answer but only different points of view.

5. Are subjects deliberately deceived in *any* way? If so, what is the nature of the deception? Is it likely to be significant to subjects? Is there any other way to conduct the research that would not involve deception, and, if so, why have you not chosen that alternative? What explanation for the deception do you give to subjects following their participation?

Subjects will not be deceived in any way during this study.

6. How will participation in this research benefit subjects? If subjects will be "debriefed" or receive information about the research project following its conclusion, how do you ensure the educational value of the process? *(Include copies of any debriefing or educational materials)*

Since this curriculum shall affect the future education, participating students may feel empowered that:

- they can give feedback on the lessons delivered
- they can give feedback on the assessments that they would do as part of the curriculum
- they are following a different curriculum, something new in line with what is being proposed in the new schooling system
-they can provide recommendations

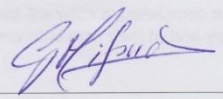
They will be informed that when this study will be completed, a copy will be available at the school library so that they can look for it freely and at their convenience.

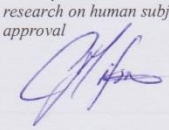
TERMS AND CONDITIONS FOR APPROVAL IN TERMS OF THE DATA PROTECTION ACT

- Personal data shall only be collected and processed for the specific research purpose.
- The data shall be adequate, relevant and not excessive in relation to the processing purpose.
- All reasonable measures shall be taken to ensure the correctness of personal data.
- Personal data shall not be disclosed to third parties and may only be required by the University or the supervisor for verification purposes. All necessary measures shall be implemented to ensure confidentiality and, where possible, data shall be anonymised.
- Unless otherwise authorised by the University Research Ethics Committee, the researcher shall obtain the consent from the data subject (respondent) and provide him with the following information: The researcher's identity and habitual residence, the purpose of processing and the recipients to whom personal data may be disclosed. The data subject shall also be informed about his rights to access, rectify, and where applicable erase the data concerning him.

I, the undersigned hereby undertake to abide by the terms and conditions for approval as attached to this application.

I, the undersigned, also give my consent to the University of Malta's Research Ethics Committee to process my personal data for the purpose of evaluating my request and other matters related to this application. I also understand that, I can request in writing a copy of my personal information. I shall also request rectification, blocking or erasure of such personal data that has not been processed in accordance with the Act.

Signature: 

APPLICANT'S SIGNATURE:	FACULTY SUPERVISOR'S SIGNATURE
I hereby declare that I will not start my research on human subjects before UREC approval	I have reviewed this completed application and I am satisfied with the adequacy of the proposed research design and the measures proposed for the protection of human subjects.
	
DATE 18/06/2018	DATE 25/10/2018

Return the completed application to your faculty Research Ethics Committee

To be completed by Faculty Research Ethics Committee

We have examined the above proposal and advise

Acceptance **Refusal** **Conditional acceptance**

For the following reason/s:

UNIVERSITY OF MALTA
Faculty Research Ethics Committee
FACULTY OF EDUCATION

Signature

Date 19 Nov 2018

To be completed by University Research Ethics Committee

We have examined the above proposal and grant

Acceptance **Refusal** **Conditional acceptance**

For the following reason/s:

Signature

Date

PERMISSION LETTER TO HEAD OF SCHOOL
Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

Dear (Name),

I am Ms Gianella Mifsud, the ICT teacher at the same school. Currently I am reading for a Masters of Education in Computing Education with the University of Malta.

As part of this course, I am carrying out a research study where the main aim is to propose an ICT curriculum for the IT Applied Strand (as proposed in *My Journey* framework) and to trial and evaluate a subset of this curriculum with the Year 9 class. I am doing this research under the supervision of Dr Leonard Busuttil, lecturer in Computing Education at the Faculty of Education.

In this respect, I would be grateful if you were to accept that I carry out this research with the Year 9 class. I am asking for your permission so that I can video record around 7 ICT lessons which I will be then observing after the lessons through the recordings. Thereafter, a focus group interview will be conducted with the same class which should not take more than one hour. Around 10 students will take part in the focus group interview which will be audio recorded and will be held during school hours. Kindly note that as the teacher, I will be assessing all students' work, even of those who do not participate. I would be grateful if you give me permission to use any of the students' work and their results to draw conclusions about the effectiveness of the proposed curriculum in this study. This work and its result might afterwards be published without the students' names being mentioned.

I would also like to ask the Assistant Head of School to act as a critical friend to observe and protect the interests of pupils and to ensure that there is no undue pressure on students to participate since the informants are students who I teach.

I am very willing to answer any questions about the research which you might have. Students and their parents/guardians are free to decide whether or not their son is included in the video recordings and are free to decide whether or not their son participates in the focus group interview which will be audio recorded. The video and audio recordings will be stored securely and will only be accessible to me. All recordings will eventually be destroyed once the research is completed. The school, class and student's names will not be identified in any publication that may result from this study, thus anonymity of data and confidentiality are promised. Students are free to withdraw at any time without having to explain why, without suffering any consequence and refusal to participate in the study shall not affect any learning in class or other activities that may be held during the course of study.

The results of this study will be used in my dissertation in partial fulfilment of the requirements of the University of Malta for the completion of the Masters of Education in Computing Education.

I would be grateful if you would give me permission to conduct my study at this school.
Should you have any questions and wish some explanation about this study and the students' participation in it, please email me on [redacted] or call on [redacted].
Otherwise you can send your queries to Dr Leonard Busuttil on [redacted].

_____
Researcher's signature

Permission letter from the Head of School

[redacted]

[redacted]

October 12, 2018

Faculty of Education Research Ethics Committee
University of Malta
Msida MSD 2080

Re: Ms Gianella Mifsud

I, the undersigned, do hereby authorise to Ms Gianella Mifsud to conduct her research at our [redacted] School as part of the Masters of Education in Computing Education with the University of Malta.

I confirm that I have read the permission letter and I grant all permissions requested.

Should you need further information, please feel free to contact me.

Yours' truly,

[redacted]

[redacted]
Headmaster

[redacted]

CRITICAL FRIEND INFORMATION SHEET
Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

Dear Madam,

I am Gianella Mifsud, the ICT teacher at the same school. Currently I am reading for a Masters of Education in Computing Education with the University of Malta.

As part of this course, I am carrying out a research study where the main aim is to propose an ICT curriculum for the IT Applied Strand (as proposed in *My Journey* framework) and to trial and evaluate a subset of this curriculum with the Year 9 class. I am doing this research under the supervision of Dr Leonard Busuttil, lecturer in Computing Education at the Faculty of Education.

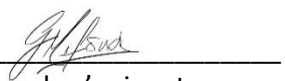
In this respect, I will be video recording around 7 ICT lessons which I will be then observing after the lessons through the recordings. Thereafter, a focus group interview will be conducted with the same class which would not take more than one hour. The focus group interview will be audio recorded and will be held at school during school hours.

Kindly I would like to ask you to act as a critical friend and be present during the video recorded lessons and during the focus group interview and then complete the observation protocol sheets after each visit. This will be done to observe and protect the interests of pupils and to ensure that there is no undue pressure on children to participate since the informants are students who I teach. Prior to the lessons it would be appreciated if you review planning for the lesson. During the lessons, you may write an anecdotal narrative describing the lesson. I would be grateful if you take notes during the focus group interview to ensure that there is no interference between recording the spontaneous comments of the focus group interview and the flow of the focus group.

I am very willing to answer any questions about the research which you might have. Kindly note that participation in this study is voluntary and that you are free to withdraw at any time without having to explain why and without suffering any consequence. The video and audio recordings will be stored securely and will only be accessible to me. All recordings will eventually be destroyed once the research is completed. The school, class, your name and students' names will not be identified in any publication that may result from this study, thus anonymity of data and confidentiality are promised.

The results of this study will be used in my dissertation in partial fulfilment of the requirements of the University of Malta for the completion of the Masters of Education in Computing Education.

Kindly refer to the attached consent form. Should you have any questions and wish some explanation about this study and your participation in it, please email me on [redacted] or call on [redacted]. Otherwise you can send your queries to Dr Leonard Busuttil on [redacted].



Researcher's signature

INFORMATION LETTER TO PARENT/GUARDIAN
Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

Dear Sir/Madam,

I am Ms Gianella Mifsud, the ICT school teacher of your son. Currently I am reading for a Masters of Education in Computing Education with the University of Malta.

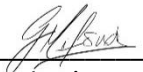
As part of this course, I am carrying out a research study where the main aim is to propose an Applied ICT curriculum and to trial and evaluate part of this curriculum with the Year 9 class. Lately in Malta, a new secondary schooling system *My Journey* was proposed. This new system shall provide different learning programmes in various subjects including in ICT. One of the targets of *My Journey* is to reduce the risk of early school leavers. Therefore, the design of an Applied ICT curriculum shall help in this regard. I am doing this research under the supervision of Dr Leonard Busuttil, lecturer in Computing Education at the Faculty of Education.

I am kindly asking for your permission and that of your son, to video record some ICT lessons (around 7 lessons) which I will be delivering to the Year 9 class. Later, I will be observing the lessons through the video recordings. The method of recording the lessons would be through two video recorders – one at the back and one at the front of the classroom. A blind spot – an area where both cameras will not record video – will intentionally be created. If you and/or your son decide that your son would not like to be included in the video recordings, he will be placed in the blind spot so that he is not visible in the video recordings. Kindly I am also asking whether or not you give permission to your son to participate in a group interview session (a group discussion). The group interview will be held during school hours and will not take more than one hour. The group interview will be audio recorded. Kindly note that as the teacher, I will be assessing all students' work, even those who do not participate in this study. I would be grateful if you give me permission to use any of your son's work and its results to draw conclusions about the effectiveness of the proposed curriculum in this study. This work and its result might afterwards be published without your son's name being mentioned.

I am very willing to answer any questions about the research which you might have. You and your son are free to decide whether or not your son is included in the video recordings and both of you are free to decide whether or not your son participates in the group interview which will be audio recorded. The video and audio recordings will be stored securely and will only be accessible to me. All recordings will eventually be destroyed once the research is completed. The school, class and students' names will not be identified in any publication that may result from this study, thus anonymity of data and confidentiality are promised. Your son is free to withdraw at any time without having to explain why, without suffering any consequence and refusal to participate in the study shall not affect any learning in class or other activities that may be held during the course of study.

The results of this study will be used in my dissertation in partial fulfilment of the requirements of the University of Malta for the completion of the Masters of Education in Computing Education.

Since your son is still a minor, I need your permission for your son's participation in this study. Kindly fill in the attached consent form. Once you agree that your son can participate in this study, I will be also asking him for acceptance to particpate in this study. Should you have any questions and wish some explanation about this study and your son's participation in it, please email me on [redacted] or call on [redacted]. Otherwise you can send your queries to Dr Leonard Busuttil on [redacted].



Researcher's signature

KARTA BL-INFORMAZZJONI GĦALL-ĠENITURI/KUSTODJI
Titlu tal-istudju ta' riċerka: Kurrikulu Applikat għas-suġġett tal-ICT sabiex titnaqqas ir-rata ta' żgħażagħ li jitilqu kmieni mill-iskola jew mingħajr ħiliet

Għażiż Sinjur/Sinjura,

Jiena Ms Gianella Mifsud, l-għalliema tal-ICT tat-tifel tiegħek. Bħalissa qed nistudja għall-*Masters* fl-Edukazzjoni fil-qasam tal-*Computing* ġewwa l-Università ta' Malta.

Bħala parti minn dan il-kors, qed nagħmel studju ta' riċerka fejn l-għan tiegħi hu li nipproponi kurrikulu applikat tal-ICT, u ngħallem parti minnu lill-klassi tal-*Year 9* u nevalwah. Dan l-aħħar f'Malta ġiet proposta sistema ġdida ta' edukazzjoni fil-qasam sekondarju li ġġib l-isem ta' *My Journey*. Din is-sistema ġdida għandha tipprovdi programmi differenti ta' tagħlim f'suġġetti varji, inkluż fl-ICT. Wieħed mill-għanijiet tal-*My Journey* hu li jitnaqqas ir-riskju ta' tfal li jitilqu mill-iskola kmieni. Għalhekk, il-kurrikulu Applikat għas-suġġett tal-ICT għandu jgħin f'dan ir-rigward. Jiena qed nagħmel din ir-riċerka taħt is-superviżjoni ta' Dr Leonard Busuttil, lekċerer fil-qasam tal-*Computing* fil-Fakultà tal-Edukazzjoni.

Ġentilment qed nitlob il-permess tiegħek u ta' ibnek sabiex inkun nista' nirrikordja xi lezzjonijiet tal-ICT b'filmati (madwar 7 lezzjonijiet), li jiena ser inkun qed ngħallem lill-klassi tal-*Year 9*. Wara ser inkun qed nosserva dawn il-lezzjonijiet mill-filmati. Il-metodu ta' kif ser inkun qed nirrikordja dawn il-lezzjonijiet ser ikun permezz ta' żewġ *video recorders* – waħda fuq wara u oħra fuq quddiem tal-klassi. Post mhux viżibbli – post fejn iż-żewġ kameras mhux ser ikunu qed jirrekordjaw filmat – ser ikun qed jiġi maħluq apposta. Jekk inti u/jew it-tifel tiegħek tiddeċiedu li t-tifel tiegħek ma jiġix irrikordjat u inkluż fil-filmati, it-tifel tiegħek ser jiġi mitlub biex isib postu fil-post mhux viżibbli biex b'hekk ma jiġix jidher fil-filmati. Ġentilment qed nistaqsik ukoll jekk tagħtix permess lit-tifel tiegħek sabiex jipparteċipa f'sessjoni fi grupp (diskussjoni fi grupp). Din is-sessjoni ser issir waqt il-ħin tal-iskola u bħala ħin ma tiħux iktar minn siegħa. F'din is-sessjoni ser tkun qed tiġi rrikordjata l-vuċi tat-tfal. Bħala għalliema, jiena ser inkun qed nassessja x-xogħol tal-istudenti kollha, inkluż ta' dawk li jiddeċiedu li ma jipparteċipawx f'dan l-istudju. Inkun grata jekk tagħtini permess li nuża dan ix-xogħol u r-riżultati li joħorġu minnu sabiex inkun nista' noħroġ konklużjonijiet dwar l-effett tal-kurrikulu li ser inkun qed nipproponi f'dan l-istudju. Dan ix-xogħol u r-riżultati li joħorġu minnu, jaf jiġi ppubblikat mingħajr ma jiġi identifikat l-isem tat-tifel tiegħek fl-ebda pubblikazzjoni li tista' tirriżulta minn dan l-istudju.

Jiena lesta li nwieġeb kwalunkwe mistoqsijiet li jista' jkollok dwar ir-riċerka tiegħi. Kemm inti kif ukoll it-tifel tinsabu liberi li tiddeċiedu jekk tixtiqux jew le li t-tifel tiegħek jiġi rrikordjat u inkluż fil-filmati miġbudin waqt il-lezzjonijiet, u kemm inti kif ukoll it-tifel tinsabu liberi sabiex tiddeċiedu jekk it-tifel jipparteċipax jew le fid-diskussjoni fi grupp fejn ser tkun qed tiġi rrikordjata l-vuċi tat-tifel tiegħek. Il-filmati, kif ukoll l-irrekordjar tal-ilħna tat-tfal, ser ikunu qegħdin jiġu miżmuma b'mod sikur u jkunu aċċessibbli biss minni. L-irrekordjar kollu jiġi mħassar hekk kif titlesta r-riċerka ta' dan l-istudju. L-iskola, il-klassi u l-ismijiet tat-tfal mhumiex ser jiġu identifikati fl-ebda pubblikazzjoni li tista' tirriżulta minn dan l-istudju. Għalhekk qiegħda nwiegħed l-anonimità fuq l-informazzjoni u l-kunfidenzjalità. It-tifel tiegħek jinsab liberu li ma jipparteċipax iktar f'dan l-istudju xħin irid mingħajr ma jkollu għalfejn jagħti spjegazzjoni, mingħajr ma jbati xi konsegwenzi u mingħajr ma jiċċaħħad mil-lezzjonijiet jew minn attivitajiet oħra li jistgħu jsiru waqt dan l-istudju.

Ir-riżultati ta' dan l-istudju ser jintużaw fit-teżi tiegħi kif mitluba minni mill-Università ta' Malta għall-*Masters* fl-Edukazzjoni fil-qasam tal-*Computing*.

Peress li ibnek għadu minorenni, għandi bżonn il-kunsens tiegħek sabiex ibnek ikun jista' jipparteċipa f'din ir-riċerka. Jekk jogħġbok imla l-*formola ta' kunsens*. F'każ li inti taċċetta li ibnek jieħu sehem, ser inkun qed nistaqsi wkoll lil ibnek jekk jaċċettax li jipparteċipa fir-riċerka tiegħi. F'każ li jkollok xi mistoqsijiet u tkun tixtieq xi spjegazzjoni dwar dan l-istudju u dwar il-parteċipazzjoni tat-tifel tiegħek fih, ibgħat *email* fuq [redacted] jew ċempel fuq [redacted]. Tista' wkoll tibgħat il-mistoqsijiet tiegħek lil Dr Leonard Busuttil fuq [redacted].

_____

Firma tar-Riċerkatur

STUDENT INFORMATION LETTER

Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

Dear Student,

I am Ms Gianella Mifsud, your ICT school teacher. Currently I am reading for a Masters of Education in Computing Education with the University of Malta.

As part of this course, I am carrying out a research study where the main aim is to propose an Applied ICT curriculum and to trial and evaluate part of this curriculum with the Year 9 class. Lately in Malta, a new secondary schooling system *My Journey* was proposed. This new system shall provide different learning programmes in various subjects including in ICT. One of the targets of *My Journey* is to reduce the risk of early school leavers. Therefore, the design of an Applied ICT curriculum shall help in this regard. I am doing this research under the supervision of Dr Leonard Busuttil, lecturer in Computing Education at the Faculty of Education.

I am kindly asking for your permission with that of your parent/guardian, to video record some ICT lessons (around 7 lessons) which I will be delivering to the Year 9 class. Later, I will be observing the lessons through the video recordings. The method of recording the lessons would be through two video recorders – one at the back and one at the front of the classroom. A blind spot – an area where both cameras will not record video – will intentionally be created. If you and/or your parent/guardian decide that you would not like to be included in the video recordings, you will be placed in a blind spot so that you are not visible in the video recordings. I am also asking whether or not you give permission to participate in a group interview session (a group discussion). The group interview will be held during school hours and will not take more than one hour. The group interview will be audio recorded. Kindly note that as the teacher, I will be assessing all students' work, even those who do not participate. I would be grateful if you give me permission to use any of your work and its results to draw conclusions about the effectiveness of the proposed curriculum in this study. This work and its result might afterwards be published without your name being mentioned.

I am very willing to answer any questions about the research which you might have. You and your parent/guardian are free to decide whether or not you are included in the video recordings and both of you are free to decide whether or not you participate in the group interview which will be audio recorded. You are also free to decide whether or not your work and its result may be used to draw conclusions for this study which may afterwards be published without your name being mentioned. The video and audio recordings will be stored securely and will only be accessible to me. All recordings will eventually be destroyed once the research is completed. The school, class and students' names will not be identified in any publication that may result from this study, thus anonymity of data and confidentiality are promised. You are free to withdraw at any time without having to explain why, without suffering any consequence and refusal to participate in the study shall not affect any learning in class or other activities that may be held during the course of study.

The results of this study will be used in my dissertation in partial fulfilment of the requirements of the University of Malta for the completion of the Masters of Education in Computing Education.

I am asking your permission for your participation in this study. Kindly fill in the attached participant assent form. Should you have any questions and wish some explanation about this study and your participation in it, please email me on [redacted] or call on [redacted]. Otherwise you can send your queries to Dr Leonard Busuttil on [redacted].

Researcher's signature

KARTA BL-INFORMAZZJONI GĦALL- ISTUDENTI

Titlu tal-istudju ta' riċerka: Kurrikulu Applikat għas-suġġett tal-ICT sabiex titnaqqas ir-rata ta' żgħażagħ li jitilqu kmieni mill-iskola jew mingħajr ħiliet

Għażiż Student,

Jiena Ms Gianella Mifsud, l-għalliema tal-ICT tiegħek. Bħalissa qed nistudja għall-*Masters* fl-Edukazzjoni fil-qasam tal-*Computing* ġewwa l-Università ta' Malta.

Bħala parti minn dan il-kors, qed nagħmel studju ta' riċerka fejn l-għan tiegħi hu li nipproponi kurrikulu applikat tal-ICT, u ngħallem parti minnu lill-klassi tal-*Year 9* u nevalwah. Dan l-aħħar f'Malta ġiet proposta sistema ġdida ta' edukazzjoni fil-qasam sekondarju li ġġib l-isem ta' *My Journey*. Din is-sistema ġdida għandha tipprovdi programmi differenti ta' tagħlim f'suġġetti varji, inkluż fl-ICT. Wieħed mill-għanijiet tal-*My Journey* hu li jitnaqqas ir-riskju ta' tfal li jitilqu mill-iskola kmieni. Għalhekk, il-kurrikulu Applikat għas-suġġett tal-ICT għandu jgħin f'dan ir-rigward. Jiena qed nagħmel din ir-riċerka taħt is-superviżjoni ta' Dr Leonard Busuttil, lekċerer fil-qasam tal-*Computing* fil-Fakultà tal-Edukazzjoni.

Ġentilment qed nitlob il-permess tiegħek u tal-ġenitur/kustodju tiegħek sabiex inkun nista' nirrikordja xi lezzjonijiet tal-ICT b'filmati (madwar 7 lezzjonijiet), li jiena ser inkun qed ngħallem lill-klassi tal-*Year 9*. Wara ser inkun qed nosserva dawn il-lezzjonijiet mill-filmati. Il-metodu ta' kif ser inkun qed nirrikordja dawn il-lezzjonijiet ser ikun permezz ta' żewġ *video recorders* – waħda fuq wara u oħra fuq quddiem tal-klassi. Post mhux viżibbli – post fejn iż-żewġ kameras mhux ser ikunu qed jirrekordjaw filmati – ser ikun qed jiġi maħluq apposta. Jekk inti u/jew il-ġenitur/kustodju tiegħek tiddeċiedu li inti ma tiġix irrikordjat u inkluż fil-filmati, inti ser tiġi mitlub biex isib postok fil-post mhux viżibbli biex b'hekk ma tiġix tidher fil-filmati. Ġentilment qed nistaqsik ukoll jekk tixtieqx jew le li tipparteċipa f'sessjoni fi grupp (diskussjoni fi grupp). Din is-sessjoni ser issir waqt il-ħin tal-iskola u bħala ħin ma tiħux iktar minn siegħa. F'din is-sessjoni ser tkun qed tiġi rrikordjata l-vuċi tiegħek. Bħala għalliema, jiena ser inkun qed nassessja x-xogħol tal-istudenti kollha, inkluż ta' dawk li jiddeċiedu li ma jipparteċipawx f'dan l-istudju. Inkun grata jekk tagħtini permess li nuża x-xogħol tiegħek u r-riżultati li joħorġu minnu sabiex inkun nista' noħroġ konklużjonijiet dwar l-effett tal-kurrikulu li ser inkun qed nipproponi f'dan l-istudju. Dan ix-xogħol u r-riżultati li joħorġu minnu, jaf jiġu ppubblikati mingħajr ma jiġi identifikat ismek fl-ebda pubblikazzjoni li tista' tirriżulta minn dan l-istudju.

Jiena lesta li nwieġeb kwalunkwe mistoqsija li jista' jkollok dwar ir-riċerka tiegħi. Kemm inti kif ukoll il-ġenitur/kustodju tiegħek tinsabu liberi li tiddeċiedu jekk tixtiqux jew le li inti tiġi rrikordjat u inkluż fil-filmati miġbudin waqt il-lezzjonijiet, u kemm inti kif ukoll il-ġenitur/kustodju tiegħek tinsabu liberi sabiex tiddeċiedu jekk inti tipparteċipax jew le fid-diskussjoni fi grupp fejn ser tkun qed tiġi rrikordjata l-vuċi tiegħek. Kemm inti kif ukoll il-ġenitur/kustodju tiegħek tinsabu liberi li tiddeċiedu jekk tixtiqux jew le li x-xogħol tiegħek u r-riżultati li joħorġu minnu, jintużaw għal dan l-istudju u jaf jiġu ppubblikati mingħajr ma jiġi identifikat ismek fl-ebda pubblikazzjoni li tista' tirriżulta minn dan l-istudju. Il-filmati, kif ukoll l-irrekordjar tal-ilħna tat-tfal, ser ikunu qegħdin jiġu miżmuma b'mod sikur u jkunu aċċessibbli biss minni. L-irrekordjar kollu jiġi mħassar hekk kif titlesta r-riċerka ta' dan l-istudju. L-iskola, il-klassi u l-ismijiet tat-tfal mhumiex ser jiġu identifikati fl-ebda pubblikazzjoni li tista' tirriżulta minn dan l-istudju. Għalhekk qiegħda nwiegħed l-anonimità fuq l-informazzjoni u l-kunfidenzjalità. Inti tinsab liberu li ma tipparteċipax iktar f'dan l-istudju xħin trid mingħajr ma jkollok għalfejn tagħti spjegazzjoni, mingħajr ma tbati xi konsegwenzi u mingħajr ma tiċċaħħad mil-lezzjonijiet jew minn attivitajiet oħra li jistgħu jsiru waqt dan l-istudju.

Ir-riżultati ta' dan l-istudju ser jintużaw fit-teżi tiegħi kif mitluba minni mill-Università ta' Malta għall-*Masters* fl-Edukazzjoni fil-qasam tal-*Computing*.

Jiena qed nitlob il-kunsens tiegħek sabiex inti tkun tista' tipparteċipa f'din ir-riċerka. Jekk jogħġbok imla l-*formola ta' kunsens*. F'każ li jkollok xi mistoqsijiet u tkun tixtieq xi spjegazzjoni dwar dan l-istudju u dwar il-parteċipazzjoni tiegħek fih, ibgħat *email* fuq [redacted] jew ċempel fuq [redacted]. Tista' wkoll tibgħat il-mistoqsijiet tiegħek lil Dr Leonard Busuttil fuq [redacted].

_____

Firma tar-Riċerkatur

EDUCATION OFFICER (EO) INFORMATION LETTER
Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

Dear Madam,

I am Gianella Mifsud, an ICT teacher at a boys' secondary independent school. Currently I am reading for a Masters of Education in Computing Education with the University of Malta.

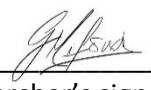
As part of this course, I am carrying out a research study where the main aim is to propose an ICT curriculum for the IT Applied Strand (as proposed in My Journey framework) and to trial and evaluate a subset of this curriculum with the Year 9 class. I am doing this research under the supervision of Dr Leonard Busuttil, lecturer in Computing Education at the Faculty of Education.

In this respect, I would be grateful if you were to accept to participate in this study. Kindly I would like to ask your permission to ask you a set of questions asked directly by myself to you during a semi-structured interview. The session will be carried out at your convenience and will take around 30 minutes. This semi-structured interview is vital at the initial stage of this study so that as a researcher, I can understand what is expected in the Applied Strand of the new schooling system. The session may be audio recorded.

I am very willing to answer any questions about the research which you might have. Kindly note that participation in this study is voluntary and that you are free to withdraw at any time without having to explain why and without suffering any consequence. The audio recordings, notes and correspondence through emails will be stored securely and will only be accessible to me. All recordings will eventually be destroyed once the research is completed. Though your name will not be mentioned in this study, kindly be aware that the interview will be attributable to you as EO of ICT.

The results of this study will be used in my dissertation in partial fulfilment of the requirements of the University of Malta for the completion of the Masters of Education in Computing Education.

Kindly refer to the attached consent form. Should you have any questions and wish some explanation about this study and your participation in it, please email me on [redacted] or call on [redacted]. Otherwise you can send your queries to Dr Leonard Busuttil on [redacted].



Researcher's signature

DIRECTOR GENERAL INFORMATION LETTER
Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

Dear Sir,

I am Gianella Mifsud, an ICT teacher at a boys' secondary independent school. Currently I am reading for a Masters of Education in Computing Education with the University of Malta.

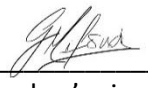
As part of this course, I am carrying out a research study where the main aim is to propose an ICT curriculum for the IT Applied Strand (as proposed in My Journey framework) and to trial and evaluate a subset of this curriculum with the Year 9 class. I am doing this research under the supervision of Dr Leonard Busuttil, lecturer in Computing Education at the Faculty of Education.

In this respect, I would be grateful if you were to accept to participate in this study. Kindly I would like to ask your permission to ask you a set of questions asked directly by myself to you during a semi-structured interview. The session will be carried out at your convenience and will take around 30 minutes. This semi-structured interview is vital at the initial stage of this study so that as a researcher, I can understand what is expected in the Applied Strand of the new schooling system. The session may be audio recorded.

I am very willing to answer any questions about the research which you might have. Kindly note that participation in this study is voluntary and that you are free to withdraw at any time without having to explain why and without suffering any consequence. The audio recordings, notes and correspondence through emails will be stored securely and will only be accessible to me. All recordings will eventually be destroyed once the research is completed. Though your name will not be mentioned in this study, kindly be aware that the interview will be attributable to you as Director General of Curriculum, Lifelong Learning and Employability.

The results of this study will be used in my dissertation in partial fulfilment of the requirements of the University of Malta for the completion of the Masters of Education in Computing Education.

Kindly refer to the attached consent form. Should you have any questions and wish some explanation about this study and your participation in it, please email me on [redacted] or call on [redacted]. Otherwise you can send your queries to Dr Leonard Busuttil on [redacted] .



Researcher's signature

EDUCATION OFFICER'S CONSENT FORM

Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

I confirm that:

- I have read and understood the attached *Participant Information Sheet* for this study.
- I have had the opportunity to ask questions and discuss the study
- I have received satisfactory answers to all my questions, where I have had a query.
- I have received enough information about this study.

I understand that:

- Ms Gianella will ask me a set of questions during a semi-structured interview.

- This session will be audio recorded; the recordings will be accessed by Ms Gianella alone and will be used for analysis and transcription purposes. The recordings will be transferred immediately from the recorders to Ms Gianella's password-protected external hard disk and will be accessed only by herself. All recordings will eventually be destroyed once the research is completed

I voluntarily agree to participate in this study, although I reserve the right to withdraw at any time and for whatever reason without there being any consequences.

_____	_____	_____
Education Officer (EO)'s name	EO's signature	EO's contact email

Date: _____

Please return this completed permission letter to Ms Gianella by 30th March 2019.

Should you have any questions and wish some explanation about this study and the your participation in it, please email Ms Gianella on [redacted] or call on [redacted]. Otherwise you can send your queries to Dr Leonard Busuttil on [redacted].

_____	_____
Researcher's signature	Supervisor's signature

DIRECTOR GENERAL'S CONSENT FORM

Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

I confirm that:

- I have read and understood the attached *Participant Information Sheet* for this study.
- I have had the opportunity to ask questions and discuss the study
- I have received satisfactory answers to all my questions, where I have had a query.
- I have received enough information about this study.

I understand that:

- Ms Gianella will ask me a set of questions during a semi-structured interview.

- This session will be audio recorded; the recordings will be accessed by Ms Gianella alone and will be used for analysis and transcription purposes. The recordings will be transferred immediately from the recorders to Ms Gianella's password-protected external hard disk and will be accessed only by herself. All recordings will eventually be destroyed once the research is completed

I voluntarily agree to participate in this study, although I reserve the right to withdraw at any time and for whatever reason without there being any consequences.

_____	_____	_____
Director General's name	Director General's signature	Director General's contact email

Date: _____

Please return this completed permission letter to Ms Gianella by 30th March 2019.

Should you have any questions and wish some explanation about this study and the your participation in it, please email Ms Gianella on [redacted] or call on [redacted]. Otherwise you can send your queries to Dr Leonard Busuttil on [redacted].

_____	_____
Researcher's signature	Supervisor's signature

CRITICAL FRIEND'S CONSENT FORM

Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

I confirm that:

- I have had the opportunity to ask questions and discuss the study
- I have received satisfactory answers to all my questions, where I have had a query.
- I have received enough information about this study.

I understand that:

- Gianella will be delivering some ICT lessons (around 7 lessons) of the Year 9 class which she will be video recording to observe the lessons thereafter.
- Gianella will be talking to students in a focus group interview for not more than one hour during school hours. I understand that this is not a test. This session will be audio recorded.
- My identity, and the identity of my school and students, will not be revealed in any research reports since Gianella will use fictitious names.
- Gianella will be obtaining the parent's/guardian's consent for their son's participation; she will also be obtaining the students' assent in a manner that is easy for the students to understand.
- My role as a critical friend is to observe and protect the interests of pupils and to ensure that there is no undue pressure on children to participate.
- I can withraw at any time and for whatever reason.
- Any notes taken during the lessons and the focus group interview will be anonymised.

I agree to:

- Review planning for the lesson prior to the lesson
- Write an anecdotal narrative describing the lesson if the need arises
- Take notes during the focus group interview
- Complete the observation sheets after each visit

I voluntarily agree to participate in this study, although I reserve the right to withdraw at any time and for whatever reason without there being any consequences.

_____	_____	_____
Critical friend's name	Critical friend's signature	Critical friend's contact email

Date: _____

Please return this completed consent form to Gianella by 30th November 2018.
Should you have any questions and wish some explanation about this study and the informants' participation in it, please email me on [redacted] or call on [redacted] or send your queries to Dr Leonard Busuttil on [redacted].

_____	_____
Researcher's signature	Supervisor's signature

PARTICIPANT ASSENT FORM

Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

I confirm that:

- I have read and understood the attached *Participant Information Sheet* for this study.
- I have had the opportunity to ask questions and discuss the study.
- I have received satisfactory answers to all my questions, where I have had a query.
- I have received enough information about this study.

I understand that:

- Ms Gianella will be video recording around 7 ICT lessons which she will be delivering to my class.
- If I choose not to be included in the video recordings, I will be placed in a blind spot area.
- Ms Gianella will be observing the lessons through the video recordings.
- Any of my work and its result may afterwards be published without my name being mentioned.
- Ms Gianella will be talking to me in a group interview for not more than one hour during school hours.
- This interview will be audio recorded and accessible only to Ms Gianella. All recordings will eventually be destroyed once the research is completed.
- Since Ms Gianella is my teacher and the researcher at the same time, another member of staff will be present during lesson observations to observe and protect my interests and to ensure that there is no undue pressure on me to participate.
- Those who choose not to participate should not be excluded from any benefit which these lessons may provide.

If you agree, please tick each box with a ✓

☐ I assent to be video recorded during ICT lessons.

☐ I give assent to Ms Gianella to speak to me in one of the sessions and to audio record the conversation.

☐ I give assent to Ms Gianella to use my work and its results to draw conclusions about the effectiveness of the proposed curriculum in this study.

I agree to participate in this study, although I understand I am free to withdraw at any time without having to explain why, without suffering any consequence and refusal to participate in the study shall not affect any learning in class or other activities that may be held during the course of study.

_____	_____	_____
Student's name	Student's signature	Student's contact email

Date: _____

Please return this assent form to your Form Teacher by 30th November 2018.

Should you have any questions and wish some explanation about this study and your participation in it, please email [redacted].

_____	_____
Researcher's signature	Supervisor's signature

FORMOLA TA' KUNSENS TAL-ISTUDENT

Titlu tal-istudju ta' riċerka: Kurrikulu Applikat għas-suġġett tal-ICT sabiex titnaqqas ir-rata ta' żgħażagħ li jitilqu kmieni mill-iskola jew mingħajr ħiliet

Nikkonferma li:

- Jiena qrajt u fhimt il-*Karta bl-Informazzjoni għall-Parteċipanti* għal dan l-istudju.
- Jiena kelli l-opportunità li nsaqsi mistoqsijiet u niddiskuti dan l-istudju.
- Jiena rċivejt risposti sodisfaċenti għall-mistoqsijiet kollha li staqsejt fejn kelli diffikultà.
- Jiena rċivejt informazzjoni biżżejjed dwar dan l-istudju.

Jiena nifhem li:

- Ms Gianella ser tkun qiegħda tirrikordja b'filmati xi lezzjonijiet tal-ICT li ser tkun qed tgħallem lill-klassi tiegħi.
- Jekk niddeċiedi li ma niġix irrikordjat u inkluż fil-filmati, ser niġi mitlub biex insib posti fil-post mhux viżibbli biex b'hekk ma niġix nidher fil-filmati.
- Ms Gianella ser tkun qiegħda tosserva dawn il-lezzjonijiet mill-filmati.
- Ix-xogħol li ser inkun qed nagħmel, u r-riżultati li joħorġu minnu, jaf jiġu ppubblikati mingħajr ma jiġi identifikat ismi fl-ebda pubblikazzjoni li tista' tirriżulta minn dan l-istudju.
- Ms Gianella ser tkun qed tkellimni fi grupp għal mhux iktar minn siegħa waqt il-ħin tal-iskola.
- F'din is-sessjoni ser tkun qed tiġi rrikordjata l-vuċi tiegħi u li ser tkun aċċessibbli biss minn Ms Gianella. L-irrekordjar kollu jiġi mħassar hekk kif titlesta r-riċerka ta' dan l-istudju.
- Peress li Ms Gianella hija l-għalliema tiegħi u r-riċerkatriċi fl-istess ħin, persuna oħra ser tkun preżenti waqt il-lezzjonijiet li ser ikunu qed jiġu rrikordjati sabiex tosserva u tipproteġi l-interessi tiegħi, u taċċerta li ma jkunx hemm pressjoni żejda fuqi biex nipparteċipa fl-istudju.
- Ms Gianella taċċerta li dawk l-istudenti li ma jipparteċipawx m'għandhomx jiġu mċaħħda minn kwalunkwe benefiċċju li l-lezzjonijiet jipprovdu.

Jekk taqbel, jekk jogħġbok immarka kull kaxxa bis-sinjal ✓

☐ Jiena nagħti kunsens biex niġi nidher fil-filmati li ser ikunu qegħdin jiġu miġbudin waqt il-lezzjonijiet tal-ICT.

☐ Jiena nagħti kunsens lil Ms Gianella sabiex tkellimni fi grupp f'waħda mis-sessjonijiet u tirrekordja l-leħen tiegħi f'din il-konverżazzjoni.

☐ Jiena nagħti kunsens lil Ms Gianella sabiex tuża x-xogħol tiegħi u r-riżultati li joħorġu minnu sabiex tkun tista' toħroġ konklużjonijiet dwar l-effett tal-kurrikulu li ser ikun qed jiġi pproponut f'dan l-istudju.

Jiena naqbel li nipparteċipa f'dan l-istudju, għalkemm nifhem ukoll li ninsab liberu li ma nipparteċipax iktar f'dan l-istudju xħin irrid mingħajr ma jkolli għalfejn nagħti spjegazzjoni, mingħajr ma nbati xi konsegwenzi u mingħajr ma niċċaħħad mil-lezzjonijiet jew minn attivitajiet oħra li jistgħu jsiru waqt dan l-istudju.

_____	_____	_____
Isem l-istudent	Firma tal-istudent	Indirizz tal-*email* tal-istudent

Data: _____

Jekk jogħġbok imla din il-formola ta' kunsens u agħtiha lill-*Form Teacher* tiegħek sa mhux iktar tard mit-30 ta' Novembru 2018.

F'każ li jkollok xi mistoqsijiet u tkun tixtieq xi spjegazzjoni dwar dan l-istudju u dwar il-parteċipazzjoni tiegħek fih, ibgħat *email* fuq [redacted].

_____	_____
Firma tar-Riċerkatur	Firma tas-*Supervisor*

PARENT/GUARDIAN CONSENT FORM

Title of research study: An Applied ICT curriculum to reduce early school leavers and/or students without skills

I have read the attached *Parent/Guardian Information Sheet* and understand that:

- Ms Gianella will be video recording around 7 ICT lessons which she will be delivering to my son's class.
- Ms Gianella will be observing the lessons through the video recordings.
- I am free to decide whether or not my son is included in the video recordings. If I decide that my son will not to be included in the video recordings, he will be placed in a blind spot area.
- Ms Gianella will be talking to students in a group interview for not more than one hour during school hours. I understand that this is not a test. These sessions will be audio recorded.
- I am free to decide whether or not to give permission for my son to participate in these sessions.
- Ms Gianella might use use any of my son's work and its results. This work and its result might afterwards be published without my son's name being mentioned.
- I am free to withdraw my consent at any time in the course of the study by emailing Ms Gianella at the address below.
- The video and audio recordings will be stored securely and will only be accessible to Ms Gianella. All recordings will eventually be destroyed once the research is completed.
- The school, class and students' names will not be identified in any publication that may result from this study.
- Since Ms Gianella is my son's teacher and the researcher at the same time, another member of staff will be present during lesson observations to observe and protect the interests of pupils and to ensure that there is no undue pressure on students to participate.
- Those who choose not to participate should not be excluded from any benefit which these lessons may provide.

If you give consent, please tick each box with a ✓

☐ I give consent for my son to be video recorded during ICT lessons.

☐ I give consent to Ms Gianella to speak to my son in one of the sessions and to audio record the conversation.

☐ I give consent to Ms Gianella to use any of my son's work and its results to draw conclusions about the effectiveness of the proposed curriculum in this study.

_____	_____	_____
Son's name	Parent's/Guardian's name	Parent's/Guardian's signature

Date: _____

Please return this completed consent form to your son's Form Teacher by 30th November 2018.
Should you have any questions and wish some explanation about this study and your son's participation in it, please email [redacted].

_____	_____
Researcher's signature	Supervisor's signature

FORMOLA GĦALL-KUNSENS TAL-ĠENITURI/KUSTODJI

Titlu tal-istudju ta' riċerka: Kurrikulu Applikat għas-suġġett tal-ICT sabiex titnaqqas ir-rata ta' żgħażagħ li jitilqu kmieni mill-iskola jew mingħajr ħiliet

Jiena qrajt il-*Karta bl-Informazzjoni għall-Ġenituri/Kustodji* mehmuża u nifhem li:

- Ms Gianella ser tkun qiegħda tirrikordja b'filmati xi lezzjonijiet tal-ICT li ser tkun qed tgħallem lill-klassi tat-tifel tiegħi.
- Ms Gianella ser tkun qiegħda tosserva dawn il-lezzjonijiet mill-filmati.
- Jiena libera/u li niddeċiedi jekk nixtieqx jew le li t-tifel tiegħi jiġi rrikordjat u inkluż fil-filmati miġbudin waqt il-lezzjonijiet. Jekk niddeċiedi li t-tifel tiegħi ma jiġix irrikordjat u inkluż fil-filmati, it-tifel tiegħi ser jiġi mitlub biex isib postu fil-post mhux viżibbli biex b'hekk ma jiġix jidher fil-filmati.
- Ms Gianella ser tkun qed tkellem lit-tfal fi grupp għal mhux iktar minn siegħa waqt il-ħin tal-iskola. Jiena nifhem li dan mhuwiex test. Din is-sessjoni ser tkun qed tiġi rrikordjata l-vuċi tat-tfal.
- Jiena libera/u li niddeċiedi jekk nagħtix permess jew le li t-tfel tiegħi jipparteċipa f'din is-sessjoni.
- Ms Gianella hemm possibbiltà li tuża x-xogħol tat-tifel tiegħi u r-riżultati li joħorġu minnu. Dan ix-xogħol u r-riżultati li joħorġu minnu jaf jiġu ppubblikati mingħajr ma jiġi identifikat l-isem tat-tifel tiegħi fl-ebda pubblikazzjoni li tista' tirriżulta minn dan l-istudju.
- Jiena libera/u li nwaqqa' l-kunsens tiegħi xħin irrid waqt dan l-istudju billi nibgħat *email* lil Ms Gianella fl-indirizz miktub hawn taħt.
- Il-filmati, kif ukoll l-irrekordjar tal-ilħna tat-tfal, ser ikunu qegħdin jiġu miżmuma b'mod sikur u jkunu aċċessibbli biss minn Ms Gianella. L-irrekordjar kollu jiġi mħassar hekk kif titlesta r-riċerka ta' dan l-istudju.
- L-iskola, il-klassi u l-ismijiet tal-istudenti mhumiex ser jiġu identifikati fl-ebda pubblikazzjoni li tista' tirriżulta minn dan l-istudju.
- Peress li Ms Gianella hija l-għalliema tat-tifel tiegħi u r-riċerkatriċi fl-istess ħin, persuna oħra ser tkun preżenti waqt il-lezzjonijiet li ser ikunu qed jiġu rrikordjati sabiex tosserva u tipproteġi l-interessi tal-istudenti, u taċċerta li ma jkunx hemm pressjoni żejda fuq l-istudenti biex jipparteċipaw fl-istudju.
- Ms Gianella taċċerta li dawk l-istudenti li ma jipparteċipawx m'għandhomx jiġu mċaħħda minn kwalunkwe benefiċċju li l-lezzjonijiet jipprovdu.

Jekk taqbel, jekk jogħġbok immarka kull kaxxa bis-sinjal ✓

☐ Jiena nagħti kunsens biex it-tifel tiegħi jiġi jidher fil-filmati li ser ikunu qegħdin jiġu miġbudin waqt il-lezzjonijiet tal-ICT.

☐ Jiena nagħti kunsens lil Ms Gianella sabiex tkellem lit-tifel tiegħi f'waħda mis-sessjonijiet u tirrekordja l-leħen tat-tifel f'din il-konverżazzjoni.

☐ Jiena nagħti kunsens lil Ms Gianella sabiex tuża x-xogħol tat-tifel u r-riżultati li joħorġu minnu sabiex tkun tista' toħroġ konklużjonijiet dwar l-effett tal-kurrikulu li ser ikun qed jiġi pproponut f'dan l-istudju.

_____	_____	_____
Isem tat-tifel	Isem tal-ġenitur/kustodju	Firma tal-ġenitur/kustodju

Data: _____

Jekk jogħġbok imla din il-formola ta' kunsens u ibgħatha mat-tifel tiegħek biex jagħtiha lill-*Form Teacher* sa mhux iktar tard mit-30 ta' Novembru 2018. F'każ li jkollok xi mistoqsijiet u tkun tixtieq xi spjegazzjoni dwar dan l-istudju u dwar il-parteċipazzjoni tat-tifel tiegħek fih, ibgħat *email* fuq [redacted].

_____	_____
Firma tar-Riċerkatur	Firma tas-*Supervisor*

Appendix 2

Applied Digital Competences Curriculum Programmes

Applied Award in Introduction to DIGITAL COMPETENCE LEVEL 1

AUTHOR: GIANELLA MIFSUD

Rationale of the programme

The aim of this programme is to introduce the student to the everyday use of IT in a variety of context and to equip them with digital competences. This programme will be based on a hands-on applied approach and will include activities outside the classroom setting and shadowing.

By the end of this programme, students are expected to have the knowledge, skills and competences to replicate given tasks and to help them advance to Level 3 'Applied Award in Digital Competence'. Students will be introduced to lifelong learning skills.

What is Digital Competence?

It has long been prioritized and acknowledged by European and national policies, that digital competence is one of the key competences that must be further developed by all citizens throughout life. In 2018, the Council of the European Union has defined digital competence as the "confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society" (p.9).

This means that someone who is digitally competent will have competences in the following areas (Carretero et al., 2017):

These five digital competences areas and their associated concepts are integrated into the modules of this programme which are:

01 **Concepts and Technical Aspects of IT**

02 **IT in Society**

03 **Electronic Services**

04 **Media and Publications**

Certification of this programme

After completion of the Level 1 programme, the student will be certified with an **Applied Award in Introduction to Digital Competence (MQF 1)**

Duration of programme and number of educators involved

The duration of this programme shall be **60 weeks**, with a **maximum of 2 years**.

During the two years of this programme, **a minimum of 20 hours of additional activities** outside the classroom, such as outings, shall be dedicated beyond the stipulated contact time.

During this programme, **one educator*** shall assist a **maximum of ten students**.

* Minimum qualification of lecturer/tutor: As per MEDE call in the area and/or the educational institution will ensure that all educators delivering the programme are in possession of an updated individual accreditation letter issued by the competent authority. The minimum formal qualification/s and experience required to deliver this module is a three or more years of experience in the IT field and/ or further qualification in teaching IT

Target Group

This programme is aimed for Secondary school students enrolled at **Year 7**

Module/s offered in this Programme

This programme consists of **one module award** based on two years from commencement of the programme

Number of Credits for this programme

The number of credits for this programme is **6 credits**.

Total Learning Hours of the programme

The following is the number of total learning hours for this programme:

	Number of hours
Hours dedicated to new content	60
Self-Study hours	10
Supervised Practice	75
Assessment hours	5

Special Requirements for this programme

To ensure that students will effectively achieve the Learning Outcomes of this programme, the following are the requirements that the school must have and/or provide:

- Agreement of practicum
- Microsoft Office or equivalent
- Freeware programmes
- Computers
- Internet connection
- Projector and/or interactive whiteboard
- Portfolio
- IT curriculum
- Talk by speaker/s

Assessment Principles

The assessment policy of the school offering this programme shall be followed.

This module shall be assessed through the following assessment practices/s:

- ☐ Project

However, the educator is free to choose other assessment practices in addition to the one/s indicated above to ensure that all students succeed to their best ability. The following are other suggestions:

- ☐ Assignment
- ☐ Fieldwork
- ☐ Logbook
- ☐ Mentoring
- ☐ Ongoing assessment
- ☐ Oral examination
- ☐ Oral exercises
- ☐ Placement
- ☐ Portfolio
- ☐ Practical
- ☐ Presentation
- ☐ Reflective diary
- ☐ Report
- ☐ Transcription
- ☐ Workbook
- ☐ Workshop
- ☐ Written exercises
- ☐ Others (please specify):

Delivery of Module

This module shall be delivered through the following pedagogical methods:

- Hands-on
- Lessons
- Project

However, the educator is free to choose other methods for delivering this module in addition to the ones indicated above. It is at the discretion of the school and educators to choose assessment practices in accordance with the school's reality and to ensure that all students, irrespective of their different abilities and needs, are given the opportunity to actively construct their own knowledge in an applied learning approach as much as possible:

- Discussions
- Fieldwork
- Lectures
- Placement
- Presentations
- Role-play
- Seminar
- Tutorials
- Practicum
- Others (please specify):

Applied Learning Approach

The students will be actively involved in class and/or field hands-on activities to help them understand and gain hands-on and soft skills.

They will be required to complete projects/tasks and maintain an updated portfolio. Thus, adhering to an applied programme principles.

Monitoring procedure

The monitoring procedure shall be carried out as per school policy

Module: Applied Award in Introduction to Digital Competence

By the end of this programme, students shall be competent in each of the following competencies:

Unit 1: Applied Award in Introduction to Concepts and Technical Aspects of IT (MQF1)

- *Apply the basics of IT including health and safety issues*
- *Using a Graphical User Interface in a controlled environment and under guidance and using basic applications effectively*
- *Choose appropriate computer, software and other peripheral devices for a given scenario in a controlled environment*
- *Demonstrate how to stay safe on the internet*
- *Maintain an updated portfolio effectively*

Unit 2: Applied Award in Introduction to IT in Society (MQF1)

- *Follow given ethical principles in the production of their work*
- *Apply safe and secure measures when viewing and/or adding online content*
- *Complete projects/tasks on known topics*
- *Recall basic principles of sustainable living with particular emphasis on disposal of technological components.*
- *Maintain an updated portfolio effectively*

Unit 3: Applied Award in Introduction to Electronic Services (MQF1)

- *Able to use given electronic services under guidance*
- *Complete projects/tasks on known topics*
- *Demonstrate understanding of basic principles and usage of given search engine/s*
- *Maintain an updated portfolio effectively*

Unit 4: Applied Award in Introduction to Media and Publications (MQF1)

- *Practice using animation techniques*
- *Good practice of health minimisation risks*
- *Maintain an updated portfolio effectively*
- *Able to complete and present a given animation/publication for a chosen scenario*

To help in promoting applied learning, the following learning outcomes were designed to be implemented in an applied learning approach as much as possible through learning by doing, making, and bringing the real-world in the classroom. Thus, the educator shall facilitate students to relate their learning with situations that they may encounter at present or in their future prospects. The digital competences outlined through the competences and learning outcomes of this programme shall help students to be more digital literate, thus improving their digital skills.

Though the below learning outcomes must be covered, the educator may add other learning outcomes that deems important for the benefit of the student. The resources and activities planned by the educator shall not be used to teach students. Rather, these should aid learners to tackle and find solutions for real-world problems while also develop important skills

Learning Outcomes

The following is a list of the Learning Outcomes related to the Competencies illustrated above.

Knowledge

By the end of this module, the student shall have acquired the practical and theoretical understanding to:

Unit 1: Applied Award in Introduction to Concepts and Technical Aspects of IT (MQF1)

- *Describe the term Digital Competence*
- List the use of equipment, procedures and techniques while working with computers to ensure user's health and safety wellbeing.
- *List the use of different computer components and software for a given scenario*
- *List and match different types of software including freeware, shareware, open source*
- *Recall the use of a GUI environment in a computer*
- List the use of different safeguard measures in line with secured access to data
- *List different network types including LAN, WLAN, WAN*
- *Recall the importance of keeping the portfolio and the main sections.*
- *List ways to prevent loss or corruption of data*
- *Recall the term malware*
- *Mention the potential danger of malware while connected to a network*
- *Match the use of hardware and software that protects user from potential danger*
- *Describe the importance of internet Safety and Security including phishing and cyberbullying*
- *Describe the importance of setting up privacy settings on social networking sites*

- *Recall how to carry out a plan for solving a problem for a given scenario*
- *Recall key terminology associated with the subject*
- *List the main characteristics of different roles in a team*

Unit 2: Applied Award in Introduction to IT in Society (MQF1)

- *Recall given legal obligations associated with the ethical use of digital products including plagiarism, downloading of files under guidance*
- *List areas of computer applications in the industry and society*
- *Recall key terminology in the area*
- *List the importance of security and safety of user's own data and material including ethical considerations, protecting personal data of others, copyright data, protecting passwords.*
- *Recall ways of disposing of technological equipment*
- *Recall how one can keep oneself updated on technological advancements/trends*
- *Describe the main characteristics of a credible website*

Unit 3: Applied Award in Introduction to Electronic Services (MQF1)

- *Describe the term electronic commerce*
- *List the advantages and disadvantages of buying and selling online*
- *Recall tips for customers when buying online and be aware of the safety precautions*
- *List different types of payments when buying and selling online*
- *Recall the use of electronic mail (e-mail)*
- *Recall parts of an e-mail address including username, sub-domain and top-level domain*
- *Recall e-mail programmes that exist to manage e-mail accounts*
- *Describe the term electronic government services (e-government services)*
- *Recall different given e-government services including electronic identity (e-ID)*

- *Describe the advantages and disadvantages of using e-government services*
- *Recall how given search engine/s work/s*
- *Recall the meaning and use of cookies on electronic services*
- *Recall encryption measures on electronic sites*
- *Recall key terminology associated with the subject*

Unit 4: Applied Award in Introduction to Media and Publications (MQF1)

- *List different ways to import data files including images*
- *Recall basic characteristics of the different types of digital animations*
- *Recall different concept drawings including storyboard, freehand sketches*
- *Name given animation applications*
- *Recall the basic programming constructs which includes sequence, selection and iteration*
- *List potential physical harm related to media applications including volume control*
- *List the basic characteristics of given publications*
- *Recall key terminology associated with the subject*

Skills

By the end of this module, the student shall have gained the expertise to:

Unit 1: Applied Award in Introduction to Concepts and Technical Aspects of IT (MQF 1)

- *Practice using a computer in an appropriate way to ensure user's wellbeing for example ergonomics, good environment under guidance*
- *Simulate good health and safety practices with limited guidance*
- *Identify parts of a computer, software and their use under guidance*
- *Choose the appropriate type computer, parts of a computer, peripheral devices and software for a given scenario in a classroom setting*

- *Log on to a networked computer system and navigate within a GUI environment with limited guidance*
- *Choose a suitable safeguard measure in line with secured access to data under guidance.*
- *Practice using Windows, Microsoft Office, or equivalent for set tasks under guidance.*
- *Match network components and their use under guidance*
- *Build a portfolio to keep a record and for self-analysis under guidance.*
- *Identify malware types and their potential harm on a device*
- *Practice good computer's security measures against malware in a controlled environment*
- *Identify potential cybercrime that may be encountered while using ICT including cyberbullying, identity theft, phishing attempts under guidance in a simulated environment*
- *Identify how to respond to inappropriate sites and offensive online behaviour in a simulated environment*
- *Practice using a computer prevention of loss of data under guidance*
- *Choose suitable privacy settings for social networking sites for a given scenario under guidance*
- *Practice implementation of a plan for solving a problem for a given scenario under guidance*

Unit 2: Applied Award in Introduction to IT in Society (MQF1)

- *Practice good practices to abide by legal obligations and guarantee the ethical use of digital products including plagiarism, downloading of files*
- *Practice abiding to given policies using a given platform related to security and safety of user's own data and material including ethical considerations, protecting personal data of others, copyright data, protecting passwords.*
- *Practice ways of disposing of technological equipment*
- *Identify ways of recognising the credibility of a website*

Unit 3: Applied Award in Introduction to Electronic Services (MQF1)

- *Practice identifying and purchasing an online given product or service used by the community in a classroom setting*
- *Practice use of a given type of payment when buying and/or selling online*
- *Identify potential danger of sending and receiving e-mails including fraudulent and unsolicited e-mails, phishing in a classroom setting*
- *Identify encrypted sites in a classroom setting*
- *Practice using a computer sending and receiving e-mails*
- *Logon to an e-mail service account*
- *Recognise potentially dangerous e-mails in a classroom setting*
- *Practice use of appropriate site/application to complete a given task under guidance*

Unit 4: Applied Award in Introduction to Media and Publications (MQF 1)

- *Practice ways to import data files including images under guidance*
- *Identify different digital animations.*
- *Draw a concept drawing to be later used for a digital animation under guidance*
- *Practice programming an interactive game using a given programming application under guidance*
- *Practice implementation of a given project under guidance*
- *Practice a digital animation using a given animation application under guidance*
- *Simulate physical harm minimisation techniques including volume control*
- *Practice using a computer appropriate ethical and legal measures related to digital rights under guidance*
- *Practice using different given publication tools in a classroom setting under guidance*

Responsibility and Autonomy

By the end of this module, the learner shall have acquired the responsibility and autonomy to:

Unit 1: Applied Award in Introduction to Concepts and Technical Aspects of IT (MQF1)

- *Able to conduct a basic research on a given topic and under guidance*
- *Practice what to do in case of emergency while using a computer in a controlled environment*
- *Make appropriate use of equipment, procedures and techniques while working with computers to ensure user's health and safety wellbeing in a classroom setting under guidance.*
- *Implement preventive measures against loss or corruption of data under guidance*
- *Maintain an updated portfolio with guidance.*
- *Able to work in a team*
- *Able to adhere to timeframe*
- *Able to follow instructions*
- *Able to share ideas and listen to others' ideas*
- *Demonstrate good practices in accessing sites*
- *Discuss alternative problem-solving solutions to consider ways to improve this process in the future in a controlled environment*

Unit 2: Applied Award in Introduction to IT in Society (MQF1)

- *Work on a given practical idea for a given scenario that has a positive impact on society*
- *Practice sustainable living through proper disposal of technological components*
- *Able to adhere to given timeframe on given tasks*
- *Demonstrate continuous learning*
- *Use appropriate referencing on a given research project under guidance*
- *Practice self-confidence*

- *Maintain an updated portfolio with guidance*
- *Able to listen and share ideas in a classroom setting*

Unit 3: Applied Award in Introduction to Electronic Services (MQF1)

- *Manage one's own electronic accounts with limited guidance*
- *Act with respect towards others*
- *Communicate findings in a group in a classroom setting*
- *Practice self-confidence when managing one's own electronic accounts*
- *Demonstrate awareness of given ethical issues in relation to one's own and others' accounts*
- *Maintain an updated portfolio with guidance*

Unit 4: Applied Award in Introduction to Media and Publications (MQF 1)

- *Practice the ability to organise work for a given task under guidance*
- *Complete a given project related to the community under guidance*
- *Discuss challenges encountered while programming the interactive game under guidance in a controlled environment*
- *Maintain an updated portfolio with guidance*
- *Able to adhere to given timeframes*
- *Able to share ideas and listen to others' ideas*
- *Able to present a given idea which includes a creative element*

References

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Accredited programme: Applied Award in Introduction to Digital Competence (MQF 1)
by the Accreditation Unit DQSE
Author of this programme: Ms Gianella Mifsud
2019

Applied Award in DIGITAL COMPETENCE LEVEL 3

AUTHOR: GIANELLA MIFSUD

Rationale of the programme

The aim of this programme is to introduce the student to the everyday use of IT in a variety of context and to equip them with digital competences. This programme will be based on a hands-on applied approach and will include job shadowing and practicum in related areas.

By the end of this programme, students are expected to have the knowledge, skills and competences to perform effectively in entry level jobs related to IT and/or pursuing their studies in a post-secondary institution in IT. Students will also acquire lifelong learning skills.

A memorandum of understanding is required to guarantee the progression of the student in education.

What is Digital Competence?

It has long been prioritized and acknowledged by European and national policies, that digital competence is one of the key competences that must be further developed by all citizens throughout life. In 2018, the Council of the European Union has defined digital competence as the "confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society" (p.9).

This means that someone who is digitally competent will have competences in the following areas:

These five digital competences areas and their associated concepts are integrated into the modules of this programme which are:

01 **Concepts and Technical Aspects of IT**

02 **IT in Society**

03 **Electronic Services**

04 **Media and Publications**

Certification of this programme

After completion of the Level 3 programme, the student will be certified with an **Applied Award in Digital Competence (MQF 3)**

Duration of programme and number of educators involved

The duration of this programme shall be **80 weeks**, with a **maximum of 3 years**.

During the three years of this programme, **a minimum of 80 hours field placement** shall be dedicated beyond the stipulated contact time.

During this programme, **one educator*** shall assist a **maximum of ten students**.

* Minimum qualification of lecturer/tutor: As per MEDE call in the area and/or the educational institution will ensure that all educators delivering the programme are in possession of an updated individual accreditation letter issued by the competent authority. The minimum formal qualification/s and experience required to deliver this module is a three or more years of experience in the IT field and/ or further qualification in teaching IT.

Target Group

This programme is aimed for Secondary school students interested in following the Applied Digital Competence programme and have completed Level 1 or a comparable assessment.

Module/s offered in this Programme

This programme consists of **four stand-alone module awards** based on three years from commencement of the programme

- Applied Award in Concepts and Technical Aspects of IT– Credit Points: 2 ECVET
- Applied Award in IT in Society– Credit Points: 2 ECVET
- Applied Award in Electronic Services– Credit Points: 2 ECVET
- Applied Award in Media and Publications– Credit Points: 2 ECVET

To obtain the full certification 'Applied Award IT in Digital Competence' equivalent to 10 ECVET, students should have completed successfully the stand-alone modules within the three-year period. Students are also expected to participate in a compulsory practicum equivalent to 2 ECVET.

Each stand-alone module constitutes a separate exit point. Students will be assigned the overall MQF level for each module based on the performance in the assessment of the respective module, as per assessment policy.

Students who successfully complete all four stand-alone modules will be assigned an overall MQF level for the certification 'Applied Award in Digital Competence' based on the performance in the assessment, as per assessment policy.

Number of Credits for this programme

The number of credits for this programme is **10 credits**.

Total Learning Hours for each module

The following is the number of total learning hours for each module:

	Number of hours
Hours dedicated to new content	15
Self-Study hours	2
Supervised Practice	30
Assessment hours	3

Special Requirements for this programme

To ensure that students will effectively achieve the Learning Outcomes of this programme, the following are the requirements that the school must have and/or provide:

- Agreement of practicum
- Microsoft Office or equivalent software
- Freeware programmes
- Computers
- Internet connection
- Projector and/or interactive whiteboard
- Portfolio
- IT curriculum
- Talk by speaker/s

Assessment Principles

The assessment policy of the school offering this programme shall be followed.

These modules shall be assessed through the following assessment practices/s:

- ☐ Ongoing assessment
- ☐ Project

However, the educator is free to choose other assessment practices in addition to the one/s indicated above to ensure that all students succeed to their best ability. The following are other suggestions:

- ☐ Assignment
- ☐ Fieldwork
- ☐ Logbook
- ☐ Mentoring
- ☐ Ongoing assessment
- ☐ Oral examination
- ☐ Oral exercises
- ☐ Placement
- ☐ Portfolio
- ☐ Practical
- ☐ Presentation
- ☐ Reflective diary
- ☐ Report
- ☐ Transcription
- ☐ Workbook
- ☐ Workshop
- ☐ Written exercises
- ☐ Others (please specify):

Delivery of Modules

These modules shall be delivered through the following pedagogical methods:

- Hands-on
- Lessons
- Project

However, the educator is free to choose other methods for delivering this module in addition to the ones indicated above. It is at the discretion of the school and educators to choose assessment practices in accordance with the school's reality and to ensure that all students, irrespective of their different abilities and needs, are given the opportunity to actively construct their own knowledge in an applied learning approach as much as possible:

- Discussions
- Fieldwork
- Lectures
- Placement
- Presentations
- Role-play
- Seminar
- Tutorials
- Practicum
- Others (please specify):

Applied Learning Approach

The students will be actively involved in class and/or field hands-on activities to help them understand and gain hands-on and soft skills.

They will be required to complete projects/tasks and maintain an updated portfolio. Thus, adhering to an applied programme principles.

Monitoring procedure

The monitoring procedure shall be carried out as per school policy

Module: Applied Award in Concepts and Technical Aspects of IT (MQF 3)

By the end of this module, students shall be competent in each of the following competencies:

- *Apply the basics of IT including health and safety issues*
- *Using a Graphical User Interface in autonomy and using basic applications effectively*
- *Choose appropriate computer, software and other peripheral devices for a given scenario*
- *Present how to stay safe on the internet*
- *Use portfolio effectively for self-reflection and development*
- *Market a given idea*

To help in promoting applied learning, the following learning outcomes were designed to be implemented in an applied learning approach as much as possible through learning by doing, making, and bringing the real-world in the classroom. Thus, the educator shall facilitate students to relate their learning with situations that they may encounter at present or in their future prospects. The digital competences outlined through the competences and learning outcomes of this programme shall help students to be more digital literate, thus improving their digital skills.

Though the below learning outcomes must be covered, the educator may add other learning outcomes that deem important for the benefit of the student. The resources and activities planned by the educator shall not be used to passively teach students. Rather, these should aid students to tackle and find solutions for real-world problems while also develop important skills

Learning Outcomes

The following is a list of the Learning Outcomes related to the Competencies illustrated above.

Knowledge

By the end of this module, the student shall have acquired the practical and theoretical understanding to:

- *Describe the term Digital Competence*
- *Explain the use of different computer components and software for a given scenario*
- *Explain different types of software including freeware, shareware, open source*
- Link possible troubleshoot problems associated with hardware and software technical issues
- *Explain the use of a GUI environment in a computer*
- *Explain the use of different safeguard measures in line with secured access to data*
- *Explain different network types including LAN, WLAN, WAN*
- *Recall the importance of keeping the portfolio and the main sections.*
- *Identify ways to prevent loss or corruption of data*
- *Describe the term malware*
- *Identify the potential danger of malware while connected to a network*
- *Explain the use of hardware and software that protects user from potential danger*
- *Explain the importance of internet Safety and Security including phishing and cyberbullying*
- *Explain the importance of setting up privacy settings on social networking sites*
- *Explain key terminology associated with the subject*
- *Explain the main characteristics of different roles in a team*

- *Explain the main characteristics of marketing*
- *Explain how to carry out a plan for solving a problem for a chosen/given scenario*

Skills

By the end of this module, the student shall have gained the expertise to:

- *Practice using a computer in an appropriate way to ensure user's wellbeing for example ergonomics, good environment*
- *Simulate good health and safety practices with limited guidance*
- *Distinguish parts of a computer, software and their use*
- *Choose the appropriate type of software for a given scenario*
- *Identify ways to troubleshoot problems associated with hardware and software technical issues*
- *Log on to a networked computer system and navigate within a GUI environment.*
- *Choosing a suitable safeguard measure in line with secured access to data.*
- *Practice using Windows, Microsoft Office, or equivalent for set tasks under guidance.*
- *Distinguish network components and their use*
- *Build a portfolio to keep a record and for self-analysis under guidance.*
- *Distinguish malware types and their potential harm on a device*
- *Practice good computer's security measures against malware*
- *Distinguish potential cybercrime that may be encountered while using ICT including cyberbullying, identity theft, phishing attempts*
- *Identify how to respond to inappropriate sites and offensive online behaviour*
- *Practice using a computer prevention of loss of data*
- *Choose suitable privacy settings for social networking sites for a given scenario*
- *Identify possible target audience to a given idea*

- *Practice market ideas*
- *Practice implementation of a plan for solving a problem for a chosen scenario*

Responsibility and Autonomy

By the end of this module, the student shall have acquired the responsibility and autonomy to:

- *Responsible to implement preventive measures against loss or corruption of data*
- *Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario in autonomy*
- *Choose the appropriate network type, basic components needed to connect to the internet and services for a given scenario in autonomy*
- *Practice what to do in case of emergency while using a computer*
- *Make appropriate use of equipment, procedures and techniques while working with computers to ensure user's health and safety wellbeing in a classroom setting.*
- *Evaluate the problem-solving solutions to consider ways to improve this process in the future in a controlled environment*
- *Responsible to maintain an updated portfolio including appropriate self-reflection in autonomy.*
- *Able to work in a team*
- *Able to adhere to timeframe*
- *Give and receive appropriate feedback with limited prompting*
- *Able to demonstrate creativity and innovation under limited guidance*
- *Able to solve a problem in a real-life scenario with prompting*
- *Able to share ideas and listen to others' ideas*
- *Able to market their creative/innovative idea*

Module: Applied Award in IT in Society (MQF 3)

By the end of this module, students shall be competent in each of the following competencies:

- *Apply ethical principles in the production of their work*
- *Able to use technological advancements for their needs*
- *Apply safe and secure measures when viewing and/or adding online content*
- *Complete projects/tasks on known topics*
- *Use portfolio effectively for self-reflection and development*

To help in promoting applied learning, the following learning outcomes were designed to be implemented in an applied learning approach as much as possible through learning by doing, making, and bringing the real-world in the classroom. Thus, the educator shall facilitate students to relate their learning with situations that they may encounter at present or in their future prospects. The digital competences outlined through the competences and learning outcomes of this programme shall help students to be more digital literate, thus improving their digital skills.

Though the below learning outcomes must be covered, the educator may add other learning outcomes that deems important for the benefit of the student. The resources and activities planned by the educator shall not be used to teach students. Rather, these should aid students to tackle and find solutions for real-world problems while also develop important skills

Learning Outcomes

The following is a list of the Learning Outcomes related to the Competencies illustrated above.

Knowledge

By the end of this module, the student should have acquired the practical and theoretical understanding to:

- *Describe by legal obligations associated with the ethical use of digital products including plagiarism, downloading of files*
- *Describe the term copyright and its application*
- *Explain the term digital citizenship*
- *Identify areas of computer applications in the industry and society*
- *Explain key terminology associated with the subject*
- *Explain the importance of security and safety of user's own data and material including ethical considerations, protecting personal data of others, copyright data, protecting passwords.*
- *Describe the impact of technological equipment and associated material on the environment*
- *Explain how one can keep oneself updated on technological advancements/trends*
- *Explain the main characteristics of a credible source of data, information and digital content*

Skills

By the end of the module, the student shall have gained the expertise to:

- *Identify good practices to abide by legal obligations and guarantee the ethical use of digital products including plagiarism, downloading of files*
- *Identify ways of abiding to policies related to security and safety of user's own data and material including ethical considerations, protecting personal data of others, copyright data, protecting passwords.*

- *Practice using a computer appropriate measures to abide to policies related to security and safety of user's own data and material*
- *Identify sustainable ways to reduce impact of technological equipment and associated material on the environment*
- *Practice using constructivist tools to come up with an innovative idea*
- *Practice providing peer-to-peer feedback with limited guidance*
- *Identify ways of recognising the credibility of the source of data, information and digital content*

Responsibility and Autonomy

By the end of the module, the student shall have acquired the responsibility and autonomy to:

- *Present an innovative and practical idea for a chosen scenario that has a positive impact on society*
- *Able to positively critique theirs' and others' work*
- *Practice sustainable living*
- *Use appropriate referencing on a given research project*
- *Able to adhere to timeframe on given tasks*
- *Able to plan and implement a project*
- *Demonstrate continuous learning*
- *Demonstrate awareness of ethical issues*
- *Take initiative to search for other relevant sources*
- *Demonstrate the ability of self-confidence in relation to digital citizenship*
- *Able to demonstrate creativity and innovation when planning and implementing a project*
- *Demonstrate the ability of how one's own digital competence may be improved or updated*
- *Responsible to maintain an updated portfolio including appropriate self-reflection in autonomy*

Module: Applied Award in Electronic Services (MQF 3)

By the end of this module, students should be competent in each of the following competencies:

- *Able to use electronic services in total autonomy*
- *Able to work in teams*
- *Market a given idea*
- *Complete projects/tasks on known topics*
- *Use portfolio effectively for self-reflection and development*

To help in promoting applied learning, the following learning outcomes were designed to be implemented in an applied learning approach as much as possible through learning by doing, making, and bringing the real-world in the classroom. Thus, the educator shall facilitate students to relate their learning with situations that they may encounter at present or in their future prospects. The digital competences outlined through the competences and learning outcomes of this programme shall help students to be more digital literate, thus improving their digital skills.

Though the below learning outcomes must be covered, the educator may add other learning outcomes that deems important for the benefit of the student. The resources and activities planned by the educator shall not be used to teach students. Rather, these should aid students to tackle and find solutions for real-world problems while also develop important skills

Learning Outcomes

The following is a list of the Learning Outcomes related to the Competencies illustrated above.

Knowledge

By the end of this module, the student should have acquired the practical and theoretical understanding to:

- *Describe the term electronic commerce*
- *Explain the advantages and disadvantages of buying and selling online*
- *Recall tips for customers when buying online and be aware of the safety precautions*
- *Explain the use of electronic mail (e-mail)*
- *Describe how e-mails work*
- *Recall parts of an e-mail address including username, sub-domain and top-level domain*
- *Recall e-mail programmes that exist to manage e-mail accounts*
- *Describe the term electronic government services (e-government services)*
- *Recall different e-government services including electronic identity (e-ID)*
- *Describe the advantages and disadvantages of using e-government services*
- *Explain how a search engine algorithms work*
- *Explain how cookies affect content on electronic services*
- *Explain encryption measures on electronic sites*
- *Explain the importance of identifying target group and appropriate strategies to reach such group*
- *Explain strategies one could use to make teams more productive*
- *Explain key terminology associated with the subject*

Skills

By the end of this module, the student shall have gained the expertise to:

- *Practice identifying an online product or service used by the community with limited guidance*
- *Identify different types of payments when doing online payments and their characteristics*
- *Identify potential danger of sending and receiving e-mails including fraudulent and unsolicited e-mails, phishing*
- *Practice using a computer sending and receiving e-mails*
- *Logon to an e-mail service account while identifying parts of an e-mail address*
- *Recognise potentially dangerous e-mails*
- *Log on using an e-ID to access a governmental online service*
- *Identify and practice use of appropriate site/application to complete a given task*
- *Identify target group and appropriate strategies to reach such group*
- *Practice assuming different roles within a team*

Responsibility and Autonomy

By the end of the module, the student shall have acquired the responsibility and autonomy to:

- *Manage one's own electronic accounts in autonomy*
- *Demonstrate ability to choose the appropriate electronic means to conduct research*
- *Demonstrate ability to use electronic tools ethically including netiquette*
- *Act with respect towards others*
- *Able to analyse outcomes*
- *Able to rank and prioritise findings*

- *Communicate findings in a group*
- *Demonstrate awareness of marketing strategies*
- *Give and receive appropriate feedback with limited prompting*
- *Demonstrate self-confidence when managing one's own electronic accounts*
- *Demonstrate awareness of ethical issues in relation to one's own and others' accounts*
- *Responsible to maintain an updated portfolio including appropriate self-reflection in autonomy*

Module: Applied Award in Media and Publications (MQF 3)

By the end of this module, students should be competent in each of the following competencies:

- *Programme an interactive game using a given programming application under guidance*
- *Able to produce and present a business plan*
- *Able to assume leadership within the committee role assigned*
- *Use portfolio effectively for self-reflection and development*
- *Able to complete and present a publication for a chosen event*

To help in promoting applied learning, the following learning outcomes were designed to be implemented in an applied learning approach as much as possible through learning by doing, making, and bringing the real-world in the classroom. Thus, the educator shall facilitate students to relate their learning with situations that they may encounter at present or in their future prospects. The digital competences outlined through the competences and learning outcomes of this programme shall help students to be more digital literate, thus improving their digital skills.

Though the below learning outcomes must be covered, the educator may add other learning outcomes that deems important for the benefit of the student. The resources and activities planned by the educator shall not be used to teach students. Rather, these should aid students to tackle and find solutions for real-world problems while also develop important skills

Learning Outcomes

The following is *a* list of the Learning Outcomes related to the Competencies illustrated *a*bove.

Knowledge

By the end of this module, the student should have *a*cquired the practical *a*nd theoretical understanding to:

- *Recall ways to import data files including images*
- *Explain the features of different types of digital animations*
- *Explain different concept drawings including storyboard, freehand sketches*
- *Recall animation design software applications*
- *Explain the basic programming constructs which includes sequence, selection and iteration*
- *Explain the main characteristics of a business plan*
- *Explain main characteristics of leadership*
- *Explain potential physical harm related to media applications including volume control*
- *Explain the role of digital rights management in relation to controlled access to animations*
- *Explain ethical and legal issued related to digital rights management*
- *Explain the basic characteristics of given publications*
- *Define the duties of editorial board*
- *Explain key terminology associated with the subject*

Skills

By the end of this module, the student shall have gained the expertise to:

- *Identify and practice ways to import data files including images*
- *Distinguish between different digital animations.*

- *Draw a concept drawing to be later used for a digital animation*
- *Practice planning and implementation of a given project*
- *Practice leadership skills*
- *Create a digital animation using an animation application*
- *Practice programming an interactive game using a given programming application under limited guidance*
- *Simulate physical harm minimisation techniques including volume control*
- *Practice using a computer appropriate ethical and legal measures related to digital rights management*
- *Practice assuming roles within a committee*
- *Practice using different publication tools in a classroom setting*

Responsibility and Autonomy

By the end of the module, the student shall have acquired the responsibility and autonomy to:

- *Choose the appropriate device to import data files including images in autonomy*
- *Demonstrate leadership skills*
- *Demonstrate the ability to organise and plan for a given task*
- *Compile a report on given task*
- *Complete a project related to the community*
- *Demonstrate the ability to reflect on the experience of programming the game and ways of improvement in a controlled environment*
- *Responsible to maintain an updated portfolio including appropriate self-reflection in autonomy.*
- *Able to work in a team and assuming leadership roles*
- *Able to adhere to time frame*
- *Give and receive appropriate feedback with limited prompting*
- *Able to demonstrate creativity and innovation under limited guidance*
- *Able to solve a problem in a real-life scenario with prompting*
- *Able to share ideas and listen to others' ideas*
- *Able to present their creative/innovative idea*

References

Carretero, S., Vuorikari, R., & Punie, Y. (2017). DigComp 2.1: *The Digital Competence Framework for Citizens with eight proficiency levels and examples of use*. (EUR 28558 EN). Publications Office of the European Union. https://doi.org/10.2760/38842

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Accredited programme: Applied Award in Digital Competence (MQF 3)
by the Accreditation Unit DQSE
Author of this programme: Ms Gianella Mifsud
2019

Appendix 3

Accredited Programmes

The following two applications, which were filled to accredit the two programmes designed for this study, were filled on an application template which was sent by email to the researcher by the Accreditation Unit of DQSE. The following is a proof that no reference could be inserted in the References list of this writeup.

6/30/2020 University of Malta Mail - Accreditation Unit DQSE

L-Università ta' Malta

Gianella Mifsud <gianella.busuttil.07@um.edu.mt>

Accreditation Unit DQSE
1 message

[redacted] 30 June 2020 at 13:55
To: "gianella.busuttil.07@um.edu.mt" <gianella.busuttil.07@um.edu.mt>
Cc: [redacted]

Dear Ms Mifsud

I am following up on your query pertinent to the accessibility of the template for programme accreditation. Please note that the template used by DQSE is not accessible online. [redacted] and I had sent word document of template via email.

Yours

[redacted]
Directorate For Quality and Standards in Education (DQSE)
Triq Joseph Abela Scolaro, Hamrun

[redacted]
MINISTRY FOR EDUCATION AND EMPLOYMENT
Kindly consider your environmental responsibility before printing this e-mail

image001.jpg
24K

DIRETTORAT GĦAL
KWALITÀ U STANDARDS FL-EDUKAZZJONI
J ABELA SCOLARO STREET, HAMRUN 1304
MALTA

DIRECTORATE FOR
QUALITY AND STANDARDS IN EDUCATION
J ABELA SCOLARO STREET, HAMRUN 1304
MALTA

30th October 2019

Dear [redacted],

The Accreditation Unit DQSE is hereby informing you that accreditation process of the programmes **Applied Award in Introduction to Digital Competence (MQF 1)** and **Applied Award in Digital Competence (MQF 3)** together with associated stand-alone awards submitted by **Ms. Gianella Mifsud**, on behalf of [redacted] representing [redacted]. The programmes are being accredited at level 1 and level 3 of the Malta Qualifications Framework, as indicated:

Name of Education and Training Provider	Title of Programme	Credits	MQF Level	Date Accredited	Expiry Date
[redacted]	**Applied Award in Introduction to Digital Competence MQF 1**	6	1	30/10/2019	30/10/2024
	Applied Award in Digital Competence MQF 3	10	3	30/10/2019	30/10/2024
	Applied Award in Concepts and Technical Aspects of IT (MQF 3)	2	3	30/10/2019	30/10/2019
	Applied Award in IT in Society (MQF 3)	2	3	30/10/2019	30/10/2019
	Applied Award in Electronic Services (MQF 3)	2	3	30/10/2019	30/10/2019

The Quality Assurance Department is a member of the Standing International Conference of Inspectorates (SICI).

	Applied Award in Media and Publications (MQF 3)	2	3	30/10/2019	30/10/2019

The recognition binds you with the following conditions:

- All requirements approved in the attached application cannot be amended or disregarded without seeking prior authorisation from the Accreditation Unit DQSE;
- The DQSE reserves the right to perform any announced or unannounced, remote or on-site visit verifications of any information/processes and/or outcomes related to the above accredited programme;
- The applicant has to include external validation of assessment ustilised in its Internal Quality
- Assurance Processes;
- The applicant has to forward the Accreditation Unit DQSE any MOUs or similar agreement with receiving institutions;
- The accreditation of this programme is valid for a period of five (5) years. Should the holder of this accredited programme wish to retain such accreditation, an application for renewal is to be submitted six (6) months before the lapse of the five (5) year period.

Regards,

[redacted] Education
Officer Accreditation
Unit, DQSE

Section A – Overall Application Form

1. Title of the programme:
Applied Award in Introduction to Digital Competence (MQF 1)
2. Proposed MQF level:
MQF Level 1
3. Duration of course and number of educators involved:
Duration 60 No of Weeks within a maximum of 2 Year/s **Ratio of Educator: Learner.** 1:10 ***N.B: Beyond the stipulated contact time, will be a minimum of 20 hours of additional activities in two years.***
4. Target group:
Students enrolled at Year 7
5. Special Requirements:
- *Agreement of practicum* - *Microsoft Office or equivalent software* - *Freeware programmes* - *Computers* - *Internet connection* - *Projector and/or interactive whiteboard* - *Portfolio* - *IT curriculum* - *Talk by speaker/s*

6. Overall programme objectives: (the course rationale, progression/transition prospects and competences acquired by the learner at the end of the course)

The aim of the programme is to introduce the candidate to everyday use of IT in a variety of context. The programme will be based on hands-on applied approach and include activities outside the classroom setting and shadowing.

By the end of the programme, candidates are expected to have the knowledge, skills and competences to replicate given tasks and help them advance to Level 3 'Applied Award in Digital Competence'. Candidates will be introduced to lifelong learning skills including team building, creativity, respect and responsibility, willing to learn and be well integrated in society.

7. Programme outline: (provide a numbered list of modules together with specific exit points, if applicable)

The programme consists of one Award based on 2 years

8. Assessment Principles:

As per assessment policy attached.

9. Hours of total learning:

Hours dedicated to new content:	60	Supervised Practice:	75
Self-Study hours:	10	Assessment hours:	5

10. Total Number of Credits:

6

Educational Institution shall include the number of Credits proposed as indicated in the Referencing Report 2106.

11. General minimum qualifications and experience of Lecturers/tutors:

As per MEDE call in the area.

Section B – Profile for each module/unit of the qualification

(fill Section B for each module/unit listed in Section 10)

1. Title of the module/unit:
Applied Award in Introduction to Digital Competence (MQF1)
2. Competencies of the module:
Unit 1: Applied Award in Introduction to Concepts and Technical Aspects of IT (MQF1) - *Apply the basics of IT including health and safety issues* - *Using a Graphical User Interface in a controlled environment and under guidance and using basic applications effectively* - *Choose appropriate computer, software and other peripheral devices for a given scenario in a controlled environment* - *Demonstrate how to stay safe on the Internet* - *Maintain an updated portfolio effectively* **Unit 2: Applied Award in Introduction to IT in Society (MQF1)** - *Follow given ethical principles in the production of their work* - *Apply safe and secure measures when viewing and/or adding online content* - *Complete projects/tasks on known topics* - *Recall basic principles of sustainable living with particular emphasis on disposal of technological components.* - *Maintain an updated portfolio effectively* **Unit 3: Applied Award in Introduction to Electronic Services (MQF1)** - *Able to use given electronic services under guidance* - *Complete projects/tasks on known topics* - *Demonstrate understanding of basic principles and usage of given search engine/s* - *Maintain an updated portfolio effectively* **Unit 4: Applied Award in Introduction to Media and Publications (MQF1)** - *Practice using animation techniques* - *Good practice of health minimisation risks* - *Maintain an updated portfolio effectively* - *Able to complete and present a given animation/publication for a chosen scenario*

3. Learning Outcomes:

3.1 Knowledge – at the end of the module/unit the learner will have acquired the practical and theoretical understanding to:

Unit 1: Applied Award in Introduction to Concepts and Technical Aspects of IT (MQF1)

- *Describe the term Digital Competence*
- *List the use of equipment, procedures and techniques while working with computers to ensure user's health and safety wellbeing.*
- *List the use of different computer components and software for a given scenario*
- *List and match different types of software including freeware, shareware, open source*
- *Recall the use of a GUI environment in a computer*
- *List the use of different safeguard measures in line with secured access to data*
- *List different network types including LAN, WLAN, WAN*
- *Recall the importance of keeping the portfolio and the main sections.*
- *List ways to prevent loss or corruption of data*
- *Recall the term malware*
- *Mention the potential danger of malware while connected to a network*
- *Match the use of hardware and software that protects user from potential danger*
- *Describe the importance of Internet Safety and Security including phishing and cyberbullying*
- *Describe the importance of setting up privacy settings on social networking sites*
- *Recall how to carry out a plan for solving a problem for a given scenario*
- *Recall key terminology associated with the subject*
- *List the main characteristics of different roles in a team*

Unit 2: Applied Award in Introduction to IT in Society (MQF1)

- *Recall given legal obligations associated with the ethical use of digital products including plagiarism, downloading of files under guidance*
- *List areas of computer applications in the industry and society*
- *Recall key terminology in the area*
- *List the importance of security and safety of user's own data and material including ethical considerations, protecting personal data of others, copyright data, protecting passwords.*
- *Recall ways of disposing of technological equipment*
- *Recall how one can keep oneself updated on technological advancements/trends*
- *Describe the main characteristics of a credible website*

Unit 3: Applied Award in Introduction to Electronic Services (MQF1)

- *Describe the term electronic commerce*
- *List the advantages and disadvantages of buying and selling online*
- *Recall tips for customers when buying online and be aware of the safety precautions*
- *List different types of payments when buying and selling online*
- *Recall the use of electronic mail (e-mail)*
- *Recall parts of an e-mail address including username, sub-domain and top-level domain*
- *Recall e-mail programmes that exist to manage e-mail accounts*
- *Describe the term electronic government services (e-government services)*
- *Recall different given e-government services including electronic identity (e-ID)*
- *Describe the advantages and disadvantages of using e-government services*
- *Recall how given search engine/s work/s*
- *Recall the meaning and use of cookies on electronic services*
- *Recall encryption measures on electronic sites*
- *Recall key terminology associated with the subject*

Unit 4: Applied Award in Introduction to Media and Publications (MQF1)

- *List different ways to import data files including images*
- *Recall basic characteristics of the different types of digital animations*
- *Recall different concept drawings including storyboard, freehand sketches*
- *Name given animation applications*
- *Recall the basic programming constructs which includes sequence, selection and iteration*
- *List potential physical harm related to media applications including volume control*
- *List the basic characteristics of given publications*
- *Recall key terminology associated with the subject*

3.2 Skills – at the end of the module/unit the learner will have gained the expertise to:

Unit 1: Applied Award in Introduction to Concepts and Technical Aspects of IT (MQF 1)

- *Practice using a computer in an appropriate way to ensure user's wellbeing for example ergonomics, good environment under guidance*
- *Simulate good health and safety practices with limited guidance*
- *Identify parts of a computer, software and their use under guidance*
- *Choose the appropriate type computer, parts of a computer, peripheral devices and software for a given scenario in a classroom setting*
- *Log on to a networked computer system and navigate within a GUI environment with limited guidance*
- *Choose a suitable safeguard measure in line with secured access to data under guidance.*
- *Practice using Windows, Microsoft Office, or equivalent for set tasks under guidance.*
- *Match network components and their use under guidance*
- *Build a portfolio to keep a record and for self-analysis under guidance.*
- *Identify malware types and their potential harm on a device*
- *Practice good computer's security measures against malware in a controlled environment*
- *Identify potential cybercrime that may be encountered while using ICT including cyberbullying, identity theft, phishing attempts under guidance in a simulated environment*
- *Identify how to respond to inappropriate sites and offensive online behaviour in a simulated environment*

- *Practice using a computer prevention of loss of data under guidance*
- *Choose suitable privacy settings for social networking sites for a given scenario under guidance*
- *Practice implementation of a plan for solving a problem for a given scenario under guidance*

Unit 2: Applied Award in Introduction to IT in Society (MQF1)

- *Practice good practices to abide by legal obligations and guarantee the ethical use of digital products including plagiarism, downloading of files*
- *Practice abiding to given policies using a given platform related to security and safety of user's own data and material including ethical considerations, protecting personal data of others, copyright data, protecting passwords.*
- *Practice ways of disposing of technological equipment*
- *Identify ways of recognising the credibility of a website*

Unit 3: Applied Award in Introduction to Electronic Services (MQF1)

- *Practice identifying and purchasing an online given product or service used by the community in a classroom setting*
- *Practice use of a given type of payment when buying and/or selling online*
- *Identify potential danger of sending and receiving e-mails including fraudulent and unsolicited e-mails, phishing in a classroom setting*
- *Identify encrypted sites in a classroom setting*
- *Practice using a computer sending and receiving e-mails*
- *Logon to an e-mail service account*
- *Recognise potentially dangerous e-mails in a classroom setting*
- *Practice use of appropriate site/application to complete a given task under guidance*

Unit 4: Applied Award in Introduction to Media and Publications (MQF 1)

- *Practice ways to import data files including images under guidance*
- *Identify different digital animations.*
- *Draw a concept drawing to be later used for a digital animation under guidance*
- *Practice programming an interactive game using a given programming application under guidance*
- *Practice implementation of a given project under guidance*
- *Practice a digital animation using a given animation application under guidance*
- *Simulate physical harm minimisation techniques including volume control*
- *Practice using a computer appropriate ethical and legal measures related to digital rights under guidance*
- *Practice using different given publication tools in a classroom setting under guidance*

3.3 Responsibility and autonomy – at the end of the module/unit the learner will have acquired the responsibility and autonomy to:

Unit 1: Applied Award in Introduction to Concepts and Technical Aspects of IT (MQF1)

- *Able to conduct a basic research on a given topic and under guidance*
- *Practice what to do in case of emergency while using a computer in a controlled environment*
- *Make appropriate use of equipment, procedures and techniques while working with computers to ensure user's health and safety wellbeing in a classroom setting under guidance.*
- *Implement preventive measures against loss or corruption of data under guidance*
- *Maintain an updated portfolio with guidance.*
- *Able to work in a team*
- *Able to adhere to timeframe*
- *Able to follow instructions*
- *Able to share ideas and listen to others' ideas*
- *Demonstrate good practices in accessing sites*
- *Discuss alternative problem-solving solutions to consider ways to improve this process in the future in a controlled environment*

Unit 2: Applied Award in Introduction to IT in Society (MQF1)

- *Work on a given practical idea for a given scenario that has a positive impact on society*
- *Practice sustainable living through proper disposal of technological components*
- *Able to adhere to given timeframe on given tasks*
- *Demonstrate continuous learning*
- *Use appropriate referencing on a given research project under guidance*
- *Practice self-confidence*
- *Maintain an updated portfolio with guidance*
- *Able to listen and share ideas in a classroom setting*

Unit 3: Applied Award in Introduction to Electronic Services (MQF1)

- *Manage one's own electronic accounts with limited guidance*
- *Act with respect towards others*
- *Communicate findings in a group in a classroom setting*
- *Practice self-confidence when managing one's own electronic accounts*
- *Demonstrate awareness of given ethical issues in relation to one's own and others' accounts*
- *Maintain an updated portfolio with guidance*

Unit 4: Applied Award in Introduction to Media and Publications (MQF 1)

- *Practice the ability to organise work for a given task under guidance*
- *Complete a given project related to the community under guidance*
- *Discuss challenges encountered while programming the interactive game under guidance in a controlled environment*
- *Maintain an updated portfolio with guidance*
- *Able to adhere to given timeframes*
- *Able to share ideas and listen to others' ideas*
- *Able to present a given idea which includes a creative element*

4. Hours of total learning for the module/unit

Hours dedicated to new content:	60	Supervised Practice:	75
Self-Study hours:	10	Assessment hours:	5

Educational Institutions shall include the estimated learning time learners will dedicate to successful complete the proposed accredited programme. The DQSE will adopt the guidelines indicated in the Referencing Report 2016 to verify the suitability of the proposed distribution. Due consideration will also be given to ensure the suitability of the distribution in light of the type of programme, MQF Level and methodology.

5. Total Number of Credits of the module/unit

6

Educational Institution shall include the number of Credits proposed as indicated in the Referencing Report 2106.

6. The module will be delivered through:

- ☐ discussions
- ☐ fieldwork
- ☒ hands-on
- ☐ lectures
- ☒ lessons
- ☐ placement
- ☐ presentations
- ☒ project
- ☐ role-play
- ☐ seminar
- ☐ tutorials
- ☐ practicum

Other (please specify)

Educational Institution shall indicate the delivery method proposed.

Provide indication on how methodology adapts itself to the type of programme and provides for learner centre learning

The students will be actively involved in class and/or field hands-on activities to help them understand and gain hands-on and soft skills. They will be required to complete projects/tasks and maintain an updated portfolio. Thus adhering to an applied programme principles.

Provide indication on monitoring procedure

As per school policy

7. The module will be assessed through:	
☐ assignment _____ words ☐ examination ☐ fieldwork ☐ logbook ☐ mentoring ☐ ongoing assessment ☐ oral examination ☐ oral exercises ☐ placement ☐ portfolio Other (please specify): *Educational Institution shall list the assessment modes proposed.*	☐ practical ☐ presentation ☒ project ☐ reflective diary ☐ report ☐ transcription ☐ workbook ☐ workshop ☐ written exercises ☐ written test
Provide indication on how assessment adapts to the type of programme and provide for child center learning. *As per school assessment policy*	
Provide indication on assessment structure including, rubric (descriptors), relative distribution of assessment modes. *As per school assessment policy*	
8. Learning Resources:	
- Student pack – [redacted] student pack - Portfolio - Computer with an installed Operating System for each student - Internet connection - Queensland Information and Communication Technology 2019 v1.0 Applied Senior Syllabus https://www.qcaa.qld.edu.au/senior/senior-subjects/technologies/information-communication-technology-skills - DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/digcomp-21-digital-competence-framework-citizens-eight-proficiency-levels-and-examples-use - Journal paper The Computer Clubhouse:Preparing for Life in a Digital World https://web.media.mit.edu/~mres/papers/Comp_club/Clubhouse.html	
9. Additional minimum formal qualifications and experience required to deliver this module/unit (if any):	
Three or more-year experience in the IT field and/ or further qualification in teaching IT	

Evaluation
☒ I recommend accreditation of the course.[13] ☐ The accreditation of the course should be considered once the comments and recommendations on the content of the programme are reflected in a revised course description which is submitted for further evaluation.[14] ☐ I do not recommend accreditation of the programme.[15]
Date: 30th October 2019

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Applicant Feedback
I consider the Evaluation Report to be fair and reasonable. ☐ YES ☐ NO
If NO, state why:

[13] *The application form fully satisfies the standards and requirements of the Malta Qualifications Framework and of the subject matter at hand.*

[14] *The application form is substantially correct but requires further substantive amendments related to the content, delivery and assessment of the course to better reflect the standards and requirements of the Malta Qualifications Framework and of the subject matter at hand e.g. recalculation and redistribution of the learning hours, inclusion of other learning outcomes etc.*

[15] *The application form is substantially incorrect/insufficiently developed and needs to be revised and resubmitted to MEDE.*

Section A – Overall Application Form

12. Title of the programme:
Applied Award in Digital Competence (MQF 3)
13. Proposed MQF level:
MQF Level 3
14. Duration of course and number of educators involved:
Duration 80 No of Weeks within a maximum of 3 Year/s **Ratio of Educator: Learner.** 1:10 ***N.B: Beyond the stipulated contact time, will be a minimum of 80 hours field placement in three years.***
15. Target group:
Targeted cohort*: students interested in following the applied IT programme and have completed level 1 or a comparable assessment.*
16. Special Requirements:
- *Agreement of practicum* - *Microsoft Office or equivalent software* - *Freeware programmes* - *Computers* - *Internet connection* - *Projector and/or interactive whiteboard* - *Portfolio* - *IT curriculum* - *Talk by speaker/s*

17. Overall programme objectives: (the course rationale, progression/transition prospects and competences acquired by the learner at the end of the course)

The aim of the programme is to expose the candidate to everyday use of IT in a variety of context. The programme will be based on hands-on applied approach and include job shadowing and practicum in related areas.

By the end of the programme, candidates are expected to have the knowledge, skills and competences to perform effectively in entry level jobs related to IT and/or pursuing their studies in a post-secondary institution in IT. Candidates will also acquire lifelong learning skills including entrepreneurship, team building, creativity, self-reflection, willing to learn and be well integrated in society.
A memorandum of understanding is required to guarantee the progression of the candidate in education.

- *Apply the basics of IT including health and safety issues*
- *Use portfolio effectively for self-reflection and development*
- *Apply ethical principles in the production of their work*
- *Able to use technological advancements for their needs*
- *Able to produce and present a business plan and Market a given idea*
- *Able to assume leadership within the committee role assigned*

18. Programme outline: (provide a numbered list of modules together with specific exit points, if applicable)

The programme consists of the below mentioned four stand-alone awards:

Applied Award in Concepts and Technical Aspects of IT– Credit Points: 2 ECVET
Applied Award in IT in Society– Credit Points: 2 ECVET
Applied Award in Electronic Services– Credit Points: 2 ECVET
Applied Award in Media and Publications– Credit Points: 2 ECVET

To obtain the full certification 'Applied Award IT in Digital Competence' equivalent to 10 ECVET, candidates should have completed successfully the stand-alone modules within the three year period. Candidates are also expected to participate in a compulsory practicum equivalent to 2 ECVET.

Each stand-alone module constitutes a separate exit point. Candidates will be assigned the overall MQF level for each module based on the performance in the assessment of the respective module, as per assessment policy.

Candidates that successfully completed all four stand-alone modules will be assigned an overall MQF level for the certification 'Applied Award in Digital Competence' based on the performance in the assessment, as per assessment policy.

19. Assessment Principles:
As per assessment policy attached.

20. Hours of total learning:			
Hours dedicated to new content:	65	Supervised Practice:	160
Self-Study hours:	15	Assessment hours:	10

21. Total Number of Credits:	
10	*Educational Institution shall include the number of Credits proposed as indicated in the Referencing Report 2106.*

22. General minimum qualifications and experience of Lecturers/tutors:
As per MEDE call in the subject.

Section B – Profile for each module/unit of the qualification

(fill Section B for each module/unit listed in Section 10)

1. Title of the module/unit:
Applied Award in Concepts and Technical Aspects of IT (MQF 3)
2. Competencies of the module:
- *Apply the basics of IT including health and safety issues* - *Using a Graphical User Interface in autonomy and using basic applications effectively* - *Choose appropriate computer, software and other peripheral devices for a given scenario* - *Present how to stay safe on the Internet* - *Use portfolio effectively for self-reflection and development* - *Market a given idea*
3. Learning Outcomes:
3.1 Knowledge – at the end of the module/unit the learner will have acquired the practical and theoretical understanding to:
- *Describe the term Digital Competence* - *Explain the use of different computer components and software for a given scenario* - *Explain different types of software including freeware, shareware, open source* - *Link possible troubleshoot problems associated with hardware and software technical issues* - *Explain the use of a GUI environment in a computer* - *Explain the use of different safeguard measures in line with secured access to data* - *Explain different network types including LAN, WLAN, WAN* - *Recall the importance of keeping the portfolio and the main sections.* - *Identify ways to prevent loss or corruption of data* - *Describe the term malware* - *Identify the potential danger of malware while connected to a network* - *Explain the use of hardware and software that protects user from potential danger* - *Explain the importance of Internet Safety and Security including phishing and cyberbullying* - *Explain the importance of setting up privacy settings on social networking sites* - *Explain key terminology associated with the subject* - *Explain the main characteristics of different roles in a team* - *Explain the main characteristics of marketing* - *Explain how to carry out a plan for solving a problem for a chosen/given scenario*

3.2 Skills – at the end of the module/unit the learner will have gained the expertise to:
- *Practice using a computer in an appropriate way to ensure user's wellbeing for example ergonomics, good environment* - *Simulate good health and safety practices with limited guidance* - *Distinguish parts of a computer, software and their use* - *Choose the appropriate type of software for a given scenario* - *Identify ways to troubleshoot problems associated with hardware and software technical issues* - *Log on to a networked computer system and navigate within a GUI environment.* - *Choosing a suitable safeguard measure in line with secured access to data.* - *Practice using Windows, Microsoft Office, or equivalent for set tasks under guidance.* - *Distinguish network components and their use* - *Build a portfolio to keep a record and for self-analysis under guidance.* - *Distinguish malware types and their potential harm on a device* - *Practice good computer's security measures against malware* - *Distinguish potential cybercrime that may be encountered while using ICT including cyberbullying, identity theft, phishing attempts* - *Identify how to respond to inappropriate sites and offensive online behaviour* - *Practice using a computer prevention of loss of data* - *Choose suitable privacy settings for social networking sites for a given scenario* - *Identify possible target audience to a given idea* - *Practice market ideas* - *Practice implementation of a plan for solving a problem for a chosen scenario*
3.3 Responsibility and autonomy – at the end of the module/unit the learner will have acquired the responsibility and autonomy to:
- *Responsible to implement preventive measures against loss or corruption of data* - *Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario in autonomy* - *Choose the appropriate network type, basic components needed to connect to the Internet and services for a given scenario in autonomy* - *Practice what to do in case of emergency while using a computer* - *Make appropriate use of equipment, procedures and techniques while working with computers to ensure user's health and safety wellbeing in a classroom setting.* - *Evaluate the problem-solving solutions to consider ways to improve this process in the future in a controlled environment* - *Responsible to maintain an updated portfolio including appropriate self-reflection in autonomy.* - *Able to work in a team* - *Able to adhere to timeframe* - *Give and receive appropriate feedback with limited prompting* - *Able to demonstrate creativity and innovation under limited guidance* - *Able to solve a problem in a real-life scenario with prompting* - *Able to share ideas and listen to others' ideas* - *Able to market their creative/innovative idea*

4. Hours of total learning for the module/unit

Hours dedicated to new content:	15	Supervised Practice:	30
Self-Study hours:	2	Assessment hours:	3

Educational Institutions shall include the estimated learning time learners will dedicate to successful complete the proposed accredited programme. The DQSE will adopt the guidelines indicated in the Referencing Report 2016 to verify the suitability of the proposed distribution. Due consideration will also be given to ensure the suitability of the distribution in light of the type of programme, MQF Level and methodology.

5. Total Number of Credits of the module/unit

2

Educational Institution shall include the number of Credits proposed as indicated in the Referencing Report 2106.

6. The module will be delivered through:

- ☐ discussions
- ☐ fieldwork
- ☒ hands-on
- ☐ lectures
- ☒ lessons
- ☐ placement
- ☐ presentations
- ☒ project
- ☐ role-play
- ☐ seminar
- ☐ tutorials
- ☐ practicum

Other (please specify)

Educational Institution shall indicate the delivery method proposed.

Provide indication on how methodology adapts itself to the type of programme and provides for learner-centred learning

The students will be actively involved in class and/or field hands-on activities to help them understand and gain hands-on and soft skills. They will be required to complete projects/tasks and maintain an updated portfolio. Thus adhering to an applied programme principles.

Provide indication on monitoring procedure

As per school assessment policy

7. The module will be assessed through:	
☐ assignment _____ words ☐ examination ☐ fieldwork ☐ logbook ☐ mentoring ☒ ongoing assessment ☐ oral examination ☐ oral exercises ☐ placement ☐ portfolio Other (please specify): *Educational Institution shall list the assessment modes proposed.*	☐ practical ☐ presentation ☒ project ☐ reflective diary ☐ report ☐ transcription ☐ workbook ☐ workshop ☐ written exercises ☐ written test
Provide indication on how assessment adapts to the type of programme and provide for child center learning. *As per school assessment policy*	
Provide indication on assessment structure including, rubric (descriptors), relative distribution of assessment modes. *As per school assessment policy*	
8. Learning Resources:	
- Student pack – [redacted] student pack - Portfolio - Computer with an installed Operating System for each student - Internet connection - Queensland Information and Communication Technology 2019 v1.0 Applied Senior Syllabus https://www.qcaa.qld.edu.au/senior/senior-subjects/technologies/information-communication-technology-skills - DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/digcomp-21-digital-competence-framework-citizens-eight-proficiency-levels-and-examples-use - Journal paper The Computer Clubhouse:Preparing for Life in a Digital World https://web.media.mit.edu/~mres/papers/Comp_club/Clubhouse.html	
9. Additional minimum formal qualifications and experience required to deliver this module/unit (if any):	
Three or more-year experience in the IT field and/ or further qualification in teaching IT	

Section B – Profile for each module/unit of the qualification

(fill Section B for each module/unit listed in Section 10)

1. Title of the module/unit:
Applied Award in IT in Society (MQF 3)
2. Competencies of the module:
- *Apply ethical principles in the production of their work* - *Able to use technological advancements for their needs* - *Apply safe and secure measures when viewing and/or adding online content* - *Complete projects/tasks on known topics* - *Use portfolio effectively for self-reflection and development*
3. Learning Outcomes:
3.1 Knowledge – at the end of the module/unit the learner will have acquired the practical and theoretical understanding to:
- *Describe by legal obligations associated with the ethical use of digital products including plagiarism, downloading of files* - *Describe the term copyright and its application* - *Explain the term digital citizenship* - *Identify areas of computer applications in the industry and society* - *Explain key terminology associated with the subject* - *Explain the importance of security and safety of user's own data and material including ethical considerations, protecting personal data of others, copyright data, protecting passwords.* - *Describe the impact of technological equipment and associated material on the environment* - *Explain how one can keep oneself updated on technological advancements/trends* - *Explain the main characteristics of a credible source of data, information and digital content*
3.2 Skills – at the end of the module/unit the learner will have gained the expertise to:
- *Identify good practices to abide by legal obligations and guarantee the ethical use of digital products including plagiarism, downloading of files* - *Identify ways of abiding to policies related to security and safety of user's own data and material including ethical considerations, protecting personal data of others, copyright data, protecting passwords.* - *Practice using a computer appropriate measures to abide to policies related to security and safety of user's own data and material* - *Identify sustainable ways to reduce impact of technological equipment and associated material on the environment* - *Practice using constructivist tools to come up with an innovative idea* - *Practice providing peer-to-peer feedback with limited guidance* - *Identify ways of recognising the credibility of the source of data, information and digital content*

3.3 Responsibility and autonomy – at the end of the module/unit the learner will have acquired the responsibility and autonomy to:

- *Present an innovative and practical idea for a chosen scenario that has a positive impact on society*
- *Able to positively critique theirs' and others' work*
- *Practice sustainable living*
- *Use appropriate referencing on a given research project*
- *Able to adhere to timeframe on given tasks*
- *Able to plan and implement a project*
- *Demonstrate continuous learning*
- *Demonstrate awareness of ethical issues*
- *Take initiative to search for other relevant sources*
- *Demonstrate the ability of self-confidence in relation to digital citizenship*
- *Able to demonstrate creativity and innovation when planning and implementing a project*
- *Demonstrate the ability of how one's own digital competence may be improved or updated*
- *Responsible to maintain an updated portfolio including appropriate self-reflection in autonomy.*

4. Hours of total learning for the module/unit

Hours dedicated to new content:	15	Supervised Practice:	30
Self-Study hours:	2	Assessment hours:	3

Educational Institutions shall include the estimated learning time learners will dedicate to successful complete the proposed accredited programme. The DQSE will adopt the guidelines indicated in the Referencing Report 2016 to verify the suitability of the proposed distribution. Due consideration will also be given to ensure the suitability of the distribution in light of the type of programme, MQF Level and methodology.

5. Total Number of Credits of the module/unit

2

Educational Institution shall include the number of Credits proposed as indicated in the Referencing Report 2106.

6. The module will be delivered through:

- ☐ discussions
- ☐ fieldwork
- ☒ hands-on
- ☐ lectures
- ☒ lessons
- ☐ placement
- ☐ presentations
- ☒ project
- ☐ role-play
- ☐ seminar
- ☐ tutorials
- ☐ practicum

Other (please specify)

Educational Institution shall indicate the delivery method proposed.

Provide indication on how methodology adapts itself to the type of programme and provides for learner center learning

The students will be actively involved in class and/or field hands-on activities to help them understand and gain hands-on and soft skills. They will be required to complete projects/tasks and maintain an updated portfolio. Thus, adhering to an applied programme principle.

Provide indication on monitoring procedure

As per school policy

7. The module will be assessed through:

☐ assignment _____ words ☐ examination ☐ fieldwork ☐ logbook ☐ mentoring ☒ ongoing assessment ☐ oral examination ☐ oral exercises ☐ placement ☐ portfolio	☐ practical ☐ presentation ☒ project ☐ reflective diary ☐ report ☐ transcription ☐ workbook ☐ workshop ☐ written exercises ☐ written test

Other (please specify):

Educational Institution shall list the assessment modes proposed.

Provide indication on how assessment adapts to the type of programme and provide for child center learning.

As per school assessment policy

Provide indication on assessment structure including, rubric (descriptors), relative distribution of assessment modes.

As per school assessment policy

8. Learning Resources:
- Student pack – [redacted] student pack - Portfolio - Computer with an installed Operating System for each student - Internet connection - Queensland Information and Communication Technology 2019 v1.0 Applied Senior Syllabus https://www.qcaa.qld.edu.au/senior/senior-subjects/technologies/information-communication-technology-skills - DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/digcomp-21-digital-competence-framework-citizens-eight-proficiency-levels-and-examples-use - Journal paper The Computer Clubhouse:Preparing for Life in a Digital World https://web.media.mit.edu/~mres/papers/Comp_club/Clubhouse.html
9. Additional minimum formal qualifications and experience required to deliver this module/unit (if any):
Three or more-year experience in the IT field and/ or further qualification in teaching IT

Section B – Profile for each module/unit of the qualification

(fill Section B for each module/unit listed in Section 10)

1. Title of the module/unit:
Applied Award in Electronic Services (MQF 3)
2. Competencies of the module:
- *Able to use electronic services in total autonomy* - *Able to work in teams* - *Market a given idea* - *Complete projects/tasks on known topics* - *Use portfolio effectively for self-reflection and development*
3. Learning Outcomes:
The applicant has to list down the Learning Outcomes related to Knowledge, Skills and Autonomy/Responsibility in the respective sections below as indicated in Referencing Report 2016.
3.1 Knowledge – at the end of the module/unit the learner will have acquired the practical and theoretical understanding to:
- *Describe the term electronic commerce* - *Explain the advantages and disadvantages of buying and selling online* - *Recall tips for customers when buying online and be aware of the safety precautions* - *Explain the use of electronic mail (e-mail)* - *Describe how e-mails work* - *Recall parts of an e-mail address including username, sub-domain and top-level domain* - *Recall e-mail programmes that exist to manage e-mail accounts* - *Describe the term electronic government services (e-government services)* - *Recall different e-government services including electronic identity (e-ID)* - *Describe the advantages and disadvantages of using e-government services* - *Explain how a search engine algorithms work* - *Explain how cookies affect content on electronic services* - *Explain encryption measures on electronic sites* - *Explain the importance of identifying target group and appropriate strategies to reach such group* - *Explain strategies one could use to make teams more productive* - *Explain key terminology associated with the subject*

3.2 Skills – at the end of the module/unit the learner will have gained the expertise to:

- *Practice identifying an online product or service used by the community with limited guidance*
- *Identify different types of payments when doing online payments and their characteristics*
- *Identify potential danger of sending and receiving e-mails including fraudulent and unsolicited e-mails, phishing*
- *Practice using a computer sending and receiving e-mails*
- *Logon to an e-mail service account while identifying parts of an e-mail address*
- *Recognise potentially dangerous e-mails*
- *Log on using an e-ID to access a governmental online service*
- *Identify and practice use of appropriate site/application to complete a given task*
- *Identify target group and appropriate strategies to reach such group*
- *Practice assuming different roles within a team*

3.3 Responsibility and autonomy – at the end of the module/unit the learner will have acquired the responsibility and autonomy to:

- *Manage one's own electronic accounts in autonomy*
- *Demonstrate ability to choose the appropriate electronic means to conduct research*
- *Demonstrate ability to use electronic tools ethically including netiquette*
- *Act with respect towards others*
- *Able to analyse outcomes*
- *Able to rank and prioritise findings*
- *Communicate findings in a group*
- *Demonstrate awareness of marketing strategies*
- *Give and receive appropriate feedback with limited prompting*
- *Demonstrate self-confidence when managing one's own electronic accounts*
- *Demonstrate awareness of ethical issues in relation to one's own and others' accounts*
- *Responsible to maintain an updated portfolio including appropriate self-reflection in autonomy.*

4. Hours of total learning for the module/unit

Hours dedicated to new content:	15	Supervised Practice:	30
Self-Study hours:	2	Assessment hours:	3

Educational Institutions shall include the estimated learning time learners will dedicate to successful complete the proposed accredited programme. The DQSE will adopt the guidelines indicated in the Referencing Report 2016 to verify the suitability of the proposed distribution. Due consideration will also be given to ensure the suitability of the distribution in light of the type of programme, MQF Level and methodology.

5. Total Number of Credits of the module/unit

2 *Educational Institution shall include the number of Credits proposed as indicated in the Referencing Report 2106.*

6. The module will be delivered through:

- ☐ discussions
- ☐ fieldwork
- ☒ hands-on
- ☐ lectures
- ☒ lessons
- ☐ placement
- ☐ presentations
- ☒ project
- ☐ role-play
- ☐ seminar
- ☐ tutorials
- ☐ practicum

Other (please specify)
Educational Institution shall indicate the delivery method proposed.

Provide indication on how methodology adapts itself to the type of programme and provides for learner center learning

The students will be actively involved in class and/or field hands-on activities to help them understand and gain hands-on and soft skills. They will be required to complete projects/tasks and maintain an updated portfolio. Thus adhering to an applied programme principles.

Provide indication on monitoring procedure

As per school assessment policy.

7. The module will be assessed through:

- ☐ assignment _____ words
- ☐ examination
- ☐ fieldwork
- ☐ logbook
- ☐ mentoring
- ☒ ongoing assessment
- ☐ oral examination
- ☐ oral exercises
- ☐ placement
- ☐ portfolio
- ☐ practical
- ☐ presentation
- ☒ project
- ☐ reflective diary
- ☐ report
- ☐ transcription
- ☐ workbook
- ☐ workshop
- ☐ written exercises
- ☐ written test

Other (please specify):
Educational Institution shall list the assessment modes proposed.

Provide indication on how assessment adapts to the type of programme and provide for child center learning. *As per school assessment policy*
Provide indication on assessment structure including, rubric (descriptors), relative distribution of assessment modes. *As per school assessment policy*
8. Learning Resources:
- Student pack – [redacted] student pack - Portfolio - Computer with an installed Operating System for each student - Internet connection - Queensland Information and Communication Technology 2019 v1.0 Applied Senior Syllabus https://www.qcaa.qld.edu.au/senior/senior-subjects/technologies/information-communication-technology-skills - DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/digcomp-21-digital-competence-framework-citizens-eight-proficiency-levels-and-examples-use - Journal paper The Computer Clubhouse:Preparing for Life in a Digital World https://web.media.mit.edu/~mres/papers/Comp_club/Clubhouse.html
9. Additional minimum formal qualifications and experience required to deliver this module/unit (if any):
Three or more-year experience in the IT field and/ or further qualification in teaching IT

Section B – Profile for each module/unit of the qualification

(fill Section B for each module/unit listed in Section 10)

1. Title of the module/unit:
Applied Award in Media and Publications (MQF 3)
2. Competencies of the module:
- *Programme an interactive game using a given programming application under guidance* - *Able to produce and present a business plan* - *Able to assume leadership within the committee role assigned* - *Use portfolio effectively for self-reflection and development* - *Able to complete and present a publication for a chosen event*
3. Learning Outcomes:
3.1 Knowledge – at the end of the module/unit the learner will have acquired the practical and theoretical understanding to:
- *Recall ways to import data files including images* - *Explain the features of different types of digital animations* - *Explain different concept drawings including storyboard, freehand sketches* - *Recall animation design software applications* - *Explain the basic programming constructs which includes sequence, selection and iteration* - *Explain the main characteristics of a business plan* - *Explain main characteristics of leadership* - *Explain potential physical harm related to media applications including volume control* - *Explain the role of digital rights management in relation to controlled access to animations* - *Explain ethical and legal issued related to digital rights management* - *Explain the basic characteristics of given publications* - *Define the duties of editorial board* - *Explain key terminology associated with the subject*

3.2 Skills – at the end of the module/unit the learner will have gained the expertise to:
- *Identify and practice ways to import data files including images* - *Distinguish between different digital animations.* - *Draw a concept drawing to be later used for a digital animation* - *Practice planning and implementation of a given project* - *Practice leadership skills* - *Create a digital animation using an animation application* - *Practice programming an interactive game using a given programming application under limited guidance* - *Simulate physical harm minimisation techniques including volume control* - *Practice using a computer appropriate ethical and legal measures related to digital rights management* - *Practice assuming roles within a committee* - *Practice using different publication tools in a classroom setting*
3.3 Responsibility and autonomy – at the end of the module/unit the learner will have acquired the responsibility and autonomy to:
- *Choose the appropriate device to import data files including images in autonomy* - *Demonstrate leadership skills* - *Demonstrate the ability to organise and plan for a given task* - *Compile a report on given task* - *Complete a project related to the community* - *Demonstrate the ability to reflect on the experience of programming the game and ways of improvement in a controlled environment* - *Responsible to maintain an updated portfolio including appropriate self-reflection in autonomy.* - *Able to work in a team and assuming leadership roles* - *Able to adhere to time frame* - *Give and receive appropriate feedback with limited prompting* - *Able to demonstrate creativity and innovation under limited guidance* - *Able to solve a problem in a real-life scenario with prompting* - *Able to share ideas and listen to others' ideas* - *Able to present their creative/innovative idea*

4. Hours of total learning for the module/unit

Hours dedicated to new content:	15	Supervised Practice:	30
Self-Study hours:	2	Assessment hours:	3

Educational Institutions shall include the estimated learning time learners will dedicate to successful complete the proposed accredited programme. The DQSE will adopt the guidelines indicated in the Referencing Report 2016 to verify the suitability of the proposed distribution. Due consideration will also be given to ensure the suitability of the distribution in light of the type of programme, MQF Level and methodology.

5. Total Number of Credits of the module/unit

2

Educational Institution shall include the number of Credits proposed as indicated in the Referencing Report 2106.

6. The module will be delivered through:

- ☐ discussions
- ☐ fieldwork
- ☒ hands-on
- ☐ lectures
- ☒ lessons
- ☐ placement
- ☐ presentation
- ☒ project
- ☐ role-play
- ☐ seminar
- ☐ tutorials
- ☐ practicum

Other (please specify)

Educational Institution shall indicate the delivery method proposed.

Provide indication on how methodology adapts itself to the type of programme and provides for learner center learning

The students will be actively involved in class and/or field hands-on activities to help them understand and gain hands-on and soft skills. They will be required to complete projects/tasks and maintain an updated portfolio. Thus adhering to an applied programme principles.

Provide indication on monitoring procedure

As per school assessment policy

7. The module will be assessed through:	
☐ assignment _____ words ☐ examination ☐ fieldwork ☐ logbook ☐ mentoring ☒ ongoing assessment ☐ oral examination ☐ oral exercises ☐ placement ☐ portfolio Other (please specify): *Educational Institution shall list the assessment modes proposed.*	☐ practical ☐ presentation ☒ project ☐ reflective diary ☐ report ☐ transcription ☐ workbook ☐ workshop ☐ written exercises ☐ written test
Provide indication on how assessment adapts to the type of programme and provide for child center learning. *As per school assessment policy*	
Provide indication on assessment structure including, rubric (descriptors), relative distribution of assessment modes. *As per school assessment policy*	
8. Learning Resources:	
- Student pack – [redacted] student pack - Portfolio - Computer with an installed Operating System for each student - Internet connection - Queensland Information and Communication Technology 2019 v1.0 Applied Senior Syllabus https://www.qcaa.qld.edu.au/senior/senior-subjects/technologies/information-communication-technology-skills - DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/digcomp-21-digital-competence-framework-citizens-eight-proficiency-levels-and-examples-use - Journal paper The Computer Clubhouse:Preparing for Life in a Digital World https://web.media.mit.edu/~mres/papers/Comp_club/Clubhouse.html	
9. Additional minimum formal qualifications and experience required to deliver this module/unit (if any):	
Three or more-year experience in the IT field and/ or further qualification in teaching IT	

Evaluation
☒ I recommend accreditation of the course.[16] ☐ The accreditation of the course should be considered once the comments and recommendations on the content of the programme are reflected in a revised course description which is submitted for further evaluation.[17] ☐ I do not recommend accreditation of the programme.[18]
Date: 30th October 2019

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Applicant Feedback
I consider the Evaluation Report to be fair and reasonable. ☐ YES ☐ NO
If NO, state why:

[16] *The application form fully satisfies the standards and requirements of the Malta Qualifications Framework and of the subject matter at hand.*

[17] *The application form is substantially correct but requires further substantive amendments related to the content, delivery and assessment of the course to better reflect the standards and requirements of the Malta Qualifications Framework and of the subject matter at hand e.g. recalculation and redistribution of the learning hours, inclusion of other learning outcomes etc.*

[18] *The application form is substantially incorrect/insufficiently developed and needs to be revised and resubmitted to MEDE.*

Appendix 4

Observation Protocol Sheets and Questions Asked during Focus-Group Interview And Semi-structured interviews

The Observation Protocol Sheet filled by the critical friend during the lessons

OBSERVATION PROTOCOL

Date _____ **Observer** _____

Teacher _____ **Year** _____

Topic _____

(Tick a box ✓as applicable)

Length of lesson: _____ **minutes** ☐ **New Lesson** ☐ **Continued**

This instrument is to be completed by the critical friend following observation of Year 9 ICT lesson. Prior to instruction, the critical friend will review planning for the lesson with the teacher. During the lesson, the critical friend may write an anecdotal narrative describing the lesson and then complete this observation protocol.

(Tick ✓as applicable)

1. TEACHERS DELIVERY OF LESSON AND STUDENTS' EXPERIENCE OF THE LESSON	**N/A**	**Observed**	**Not Observed**
a) Teacher asked closed-ended and open-ended questions to students			
b) Teacher provided questioning opportunities for all students			
c) Teacher encouraged all students to share ideas about the topic			
d) Students identified anything unclear to them and the teacher provided alternative explanations			
e) Teacher was non-judgmental of students' opinions			
f) Teacher used various methods and materials to foster student understanding (interactive whiteboard, online videos, notes, sharing personal experience etc.)			
g) The material used during the lesson seem to help students engage with the lesson content			

2. ACTIVITY	**N/A**	**Observed**	**Not Observed**
a) Teacher provided clear outcomes for activity			
b) Teacher helped students to accomplish work during the activity			
c) Teacher provided adequate feedback to students			
d) Teacher presented information that was accurate and appropriate to student cognitive level			
e) Teacher helped all students when needed			

3. LIFE SKILLS	**N/A**	**Observed**	**Not Observed**
a) Teacher applied content to real-world situations			
b) Students made connections between content and personal life			

4. FUTURE PROSPECTS	**N/A**	**Observed**	**Not Observed**
a) Teacher encouraged discussion of how this topic may help them if they further their studies after completing secondary school			
b) Teacher encouraged discussion of how this topic may help in the work-field			
c) Teacher encouraged discussion of how this topic may help them if they further their studies after completing secondary school			
d) Teacher encouraged discussion of how this topic may help in the work-field			

Other notes *(optional)* :

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I confirm that (if you agree , please tick each box with a ✓)

☐ There was no undue pressure on children to participate in the video recording session

☐ Ms Gianella ensured that if any participant choose not to participate in the study, he should not be excluded from any benefit which the action may provide. All children in a class should benefit.

The Observation Protocol Sheet filled by the critical friend during the focus group

OBSERVATION PROTOCOL

Date _____	**Observer** _____
Moderator _____	**Year** _____
Length of focus group interview: _____ **minutes**	

This instrument is to be completed by the critical friend following observation of Year 9 ICT focus group interview. Prior to instruction, the critical friend will review the focus group questions. During the focus group interview notes will be taken by the critical friend. This will be done to ensure that there is no interference between recording the spontaneous comments of the focus group interview and the flow of the focus group.

(Tick ✓as applicable)

	N/A	**Observed**	**Not Observed**
a) Teacher asked closed-ended and open-ended questions to students			
b) Teacher provided questioning opportunities for all students			
c) Teacher encouraged all students to share ideas about the topic			
d) Students identified anything unclear to them and the teacher provided alternative explanations			
e) Teacher was non-judgmental of students' opinions			
f) Teacher provided clear outcomes for activity			
g) Teacher presented information that was accurate and appropriate to student cognitive level			
h) Students made connections between content and personal life			

Notes:

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I confirm that (if you agree , please tick each box with a ✓)

☐ There was no undue pressure on children to participate in the audio recording session

☐ Gianella ensured that if any participant choose not to participate in the study, he should not be excluded from any benefit which the action may provide. All children in a class should benefit.

Questions asked during Focus Group Interview with students of Year 9 class

INTRODUCTORY QUESTION & QUESTIONS ABOUT EXPERIENCE:

1. Think back over the past few weeks. Tell us about your experience in the ICT lessons we have covered in class.

   Probe: was it fun, boring, useful, affected your views on the subject

2. Tell us about something that we did/used in class that may help a student to understand a concept better

   Probe: the fact that it was project-based on real-life scenarios, the idea of solving a real-life problem, the hands-on activities, the opportunity to search for content (active learning)

3. Suppose that you were in charge and could make one change that would make the program better. What would you change?

QUESTIONS ABOUT ACTIVITIES:

4. Is there any particular activity that was done in class that you still remember? Can you please share your experience about it?

   Probe: games like the dominoes and cooking a spicy recipe example, classroom discussion helped me to understand something that I was shy to ask about in class, working in groups helped me, preferred working alone

5. If we do a similar activity in the future, should I consider any modifications?
6. What are your views about integrating English and Design and Technology lessons with the ICT lessns?
7. What disadvantage any particular activity that was done during the lesson may have?

   Probe: I do not always understand or be able to read in English; if the LSE is not present, the teacher may not have enough time to help us when we are working alone or in groups

8. During these lessons you were assessed through various modes of assessment including the webquest, research on exisiting technology, we looked inside the computer and changed some parts. Can you please share your experience about it?
9. Is there anything that you would change on the way you were assessed?

   Probe: the teacher observe and assess me on the work done in class; oral assessment; written assessment

QUESTIONS ABOUT LIFE SKILLS:

10. During these lessons, we also practiced other skills like working in a group, adhering to timeframes, sharing ideas and listening to others' ideas and others. How do you think these might help you in the future?
11. How do you think the topics covered in class can help you in your everyday life?
12. Can you think of other topics related to ICT which might help you in your everyday life?

    Probe: how to use online services like buying and selling online, how to plan and book a vacation using technology

QUESTIONS ABOUT FUTURE PROSPECTS:

13. How do you think that ICT might help you to further your studies after completing secondary school or to become employable?
14. What do you think needs to be changed in the curriculum of ICT to encourage you further your studies after completing secondary school?

CLOSING QUESTIONS:

15. If a new student is joining us for the ICT lessons, what would you say to him about ICT lessons?
16. Would you recommend this course to another student? Why or why not?
17. Is there anything else you would like to tell us?

Mistoqsijiet lill-istudenti tal-Year 9 waqt il-Focus Group Interview

MISTOQSIJA TAL-BIDU U MISTOQSIJIET DWAR ESPERJENZA:

1. Aħseb ftit dwar l-aħħar ftit ġimgħat li għaddew. Għidilna dwar l-esperjenza tiegħek fil-lezzjonijiet tal-ICT li kellna fil-klassi.

   Stħarreġ: kienet esperjenza ta' gost, tedjanti, utli, affettwatek kif tħares lejn is-suġġett

2. Għidilna dwar xi ħaġa li għamilna/użajna fil-klassi li tista' tgħin student jifhem xi kunċett b'mod aħjar

   Stħarreġ: il-fatt li l-lezzjonijiet kienu bbażati fuq proġett ta' sitwazzjonijiet reali, l-idea li trid issolvi problema reali, l-attivitajiet *hands-on*, l-opportunita' li nfittxu l-infomrazzjoni aħna (active learning)

3. Immaġina li inti kont inkarigat u stajt tbiddel ħaġa waħda sabiex il-programm ikun aħjar. X'kont tbiddel?

MISTOQSIJIET DWAR L-ATTIVITAJIET:

4. Kien hemm xi attività partikolari li għamilna fil-klassi li bqajt tiftakar? Tista' taqsam magħna l-esperjenza tiegħek dwarha?

   Stħarreġ: il-logħob bħal tad-dominoes u l-eżempju li ssajjar riċetta pikkanti; x'inhuma l-vantaġġi jew l-iżvantaġġi: tad-diskussjoni fil-klassi; li ħdimna fi grupp, li tkun ħdimt waħdek

5. Jekk nagħmlu xi attività simili fil-futur, għandi nikkunsidra xi tibdil?
6. X'taħseb dwar il-fatt li integrajna l-lezzjoni tal-Ingliż u tad-Design and Technology mal-lezzjonijiet tal-ICT?
7. Xi żvantaġġ taf toħloq kwalunkwe attività partikolari li għamilna fil-klassi?

   Stħarreġ: Li tkun trid tifhem jew taqra bl-Ingliż; taffettwak jekk l-LSE ma tkunx preżenti u l-għalliema jista' ma jkollhiex ħin biżżejjed biex tgħin meta tkunu qegħdin taħdmu weħidkom jew fi grupp?

8. F'dawn il-lezzjonijiet inti ġejt assessjat b'modi differenti fosthom il-webquest, riċerka fuq teknoloġiji li jeżistu, ftaħna kompjuter u bdilna apparat ġewwa l-kompjuter. Tista' taqsam magħna l-esperjenza tiegħek dwarha?
9. Hemm xi ħaġa dwar kif ġejt assessjat fuq xogħlok li kieku inti tibdel?

   Stħarreġ: l-għalliem josserva u jagħtini marka fuq dak li jarani nagħmel fil-klassi; niġi assessjat b'mod orali; xogħol ta' kitba

MISTOQSIJIET DWAR ĦILIET:

10. F'dawn il-lezzjonijiet prattikajna wkoll ħiliet ta' kif taħdem fi grupp, li żżomm malħin meta tiġi biex tipreżenta xogħlok, li titkellem dwar l-ideat tiegħek u tisma' lil ħaddieħor u oħrajn. Kif taħseb li dawn jistgħu jgħinuk fil-futur?
11. Kif taħseb li s-suġġetti koperti fil-klassi jistgħu jgħinuk fil-ħajja tiegħek ta' kuljum?
12. Tista' taħseb f'suġġetti oħrajn relatati mal-ICT li jistgħu jgħinuk fil-ħajja tiegħek ta' kuljum?

    Stħarreġ: kif tuża' servizzi onlajn bħal xiri u tbiegħ onlajn, kif wieħed għandu jagħmel biex jippjana u jibbukja vaganza permezz tat-teknoloġija

MISTOQSIJIET DWAR PROSPETTI GĦALL-FUTUR:

13. Kif taħseb li jista' jgħinek l-ICT sabiex tkompli l-istudji tiegħek wara li tispiċċa l-iskola sekondarja jew biex issib xogħol?
14. X'taħseb li għandu jinbidel fil-kurrikulu tal-ICT sabiex jinkoraġġik tkompli tistudja wara li tispiċċa l-iskola sekondarja?

MISTOQSIJIET TA' GĦELUQ:

15. Li kieku kellu jingħaqad magħna student ġdid għal-lezzjonijiet tal-ICT, x'tgħidlu dwar il-lezzjonijiet tal-ICT?
16. Tirrikomanda dan il-programm lil xi student ieħor? Għaliex iva jew għaliex le?
17. Hemm xi ħaġa oħra li tixtieq tgħidilna?

Questions asked during a semi-structured interview with the Director General of Curriculum, Lifelong Learning and Employability

1. Tell me something about your position in the education system
2. What are the main factors that define the nature of Applied curricula?
    a. *If he mentions hands-on I'll ask this question:*

       What can be included in an Applied (ICT) programme to provide a hands-on learning approach for students with different learning styles and aspirations?
3. What is the difference between the Applied trend and the non-Applied?
4. What are your views about other subjects be applied too?
5. Do you think that Computing should be applied?
6. Do you envisage community engagement with schools through the applied routes?
    a. *If he asks for interpreting/clarifying the question*

       What I mean is community connections that build students' awareness of life beyond school through real-world experiences. For example, organising an event for the school or community; gaining work experiences in the industry
7. I looked at applied curricula of Queensland and Australia. These curricula link assessment with Applied. What assessment methodology is being envisaged for the applied subjects?
    a. *If he asks for interpreting/clarifying the question*

       For example Queensland outlined in their curriculum that assessment technique should be used to determine students' achievement in objectives from Knowledge and understanding, analysis and applying, and Producing and evaluating. Is there a relationship between this assessment technique and the assessment technique of the Applied route in My Journey?
8. Are there any modes of assessments which are a must to include?
9. Are there any other factors for the Applied Strand which can empower the students to focus on their strengths?
10. My Journey also outlines the aims vis-à-vis early school leavers. How can Applied subject help in reducing early school leavers?
11. Should the applied subjects be targeted at students who will not make it in the traditional subjects?
12. So will applied subjects be of a lesser quality?
13. What about parity of esteem?
14. Any skills which will be mastered by students to become employable while giving them

the option to further their studies in post-compulsory institutions?

15. Is there anything else you would like to tell me or ask?

I would like to thank you for giving up the time to participate in this interview.

Questions asked during a semi-structured interview with EO of ICT

1. Tell me something about your position in the education system
2. What are the main factors that define the nature of Applied curricula?
    a. *If she mentions hands-on I'll ask this question:*

       What can be included in an Applied (ICT) programme to provide a hands-on learning approach for students with different learning styles and aspirations?
3. What is the difference between the Applied trend and the non-Applied?
4. What are your views about other subjects be applied too?
5. In line with that, do you think that other Computing subjects should be applied too?
6. Do you envisage community engagement with schools through the applied routes?
    a. *If she asks for interpreting/clarifying the question*

       What I mean is community connections that build students' awareness of life beyond school through real-world experiences. For example, organising an event for the school or community; gaining work experiences in the industry
7. I looked at applied curricula of Queensland, Australia, Northern Ireland and others. These curricula link assessment with Applied.* What assessment methodology is being envisaged for the applied subjects?
    a. *If she asks for interpreting/clarifying the question*

       For example Queensland outlined in their curriculum that assessment technique should be used to determine students' achievement in objectives from Knowledge and understanding, analysis and applying, and Producing and evaluating. Is there a relationship between this assessment technique and the assessment technique of the Applied route in My Journey?

       *These curricula that I looked into were based on hands-on learning, problem-solving and real-life scenarios. Is this also envisaged for the Applied route in My Journey?
8. Which modes of assessments, if any, are a must to include?
9. Are there any other factors for the Applied Strand which can empower the students to focus on their strengths?
    a. *If she answers yes*

       Can you please tell me a bit more about these factors?
10. My Journey also outlines the aims vis-à-vis early school leavers. How can Applied subject help in reducing early school leavers?

11. Should the applied subjects be targeted at students who will not make it in the traditional subjects?
12. So will applied subjects be of a lesser quality?
13. What about parity of esteem?
14. Which skills which will be mastered by students to help them become employable?
15. How do you think these skills will help students to further their studies in post-compulsory institutions?
16. Is there anything else you would like to tell me or ask?

I would like to thank you for giving up the time to participate in this interview.

Appendix 5

Lesson Plans and Resources

PROJECT-BASED ASSESSMENT

For Applied Digital Competences

as part of the research conducted for Masters in Education in Computing

Teacher/researcher: Ms Gianella Mifsud

Project - Choose the appropriate computer, software and other peripheral devices for a given scenario

Assessment dimensions

This project-based assessment is used to determine the student's achievement in the following dimensions:

Knowledge – Skills – Responsibility & Autonomy

Name of the student: _____

Class: Year 9

Assessment technique: Project-based assessment
The scope of a project-based assessment is to give you the opportunity to demonstrate your learning on the subject by providing a solution to a problem-solving situation in a real-life scenario. The assessment will be done through different modes of assessment which will be presented later on in this project-based assessment.
Conditions of Assessment
Since this project is undertaken in a group, each student is asked to keep this assessment file updated so that the teacher can validly assess the work of each student. It is important that when different roles are assigned in a group, each student writes down his/her role in this report in the designated area of such activity.
Student's work authentication
Each student must submit his/her own work.

Subject	Applied Digital Competences Curriculum
Assessment technique	*Project-based assessment - Choose appropriate computer, software and other peripheral devices for a given scenario*
Module	Concepts and Technical Aspects of IT

Final assessment component	Each student will be continuously assessed for the proposed solution of the respective tasks, for all the activities that will be carried out. The final assessment component will be the proposed solution. Example you can design a leaflet using any freeware software of your choice or Microsoft Publisher which is already installed on the computer lab workstations. It is up to you to decide how to present your solution. This can be presented either in soft or hard copy.
Duration of module that will be partly implemented	Around 10 lessons **This project is going to occur over 4 weeks, however students may work in their own time to as well to complete the assessment task.*
Individual / group	Group work

Year 9 Applied Digital Competences

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 1)

Title	Different types of computers
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

- **Choose the appropriate type of computer for a given scenario**

Learning outcomes

Skills

- How to choose the most suitable type of computer?

Responsibility and Autonomy

- Able to solve a problem in a real-life scenario with prompting
- Able to work in a team
- Able to adhere to timeframe
- Give and receive appropriate feedback with limited prompting

Knowledge

- What are the different types of computers?
- What is problem-solving?
- What is project-based learning and assessment?
- The main characteristics of different roles in a team

Resources required

Software

- IWB software
- MS PowerPoint

Hardware

- Interactive whiteboard
- Computers

Worksheet:

- Activity Sheet 1 – Different types of computers

For Activities:

- Presentation for Introduction
- Assignment file
- Internet access for Web-based search activities (Web Quest)
- Webquest on https://sites.google.com/site/msgbusuttil/applied-ict

Introduction *(about 10min)*	▪ Settling down time
	▪ Lesson objectives:
	  ○ Understand what is a problem-solving process
	  ○ Project-based learning as an on-going learning process and as part of assessment
	  ○ Distinguish between different types of computers

Development *(about 5 minutes)*	▪ Explain to students what is a problem-solving process
	  ○ A problem-solving process in ICT is when we have an ICT problem and **we try to find solutions for such problem**.
	  ○ An ICT problem could be:
	  ▪ An issue to be solved
	  ▪ A task where at the beginning, we would not know which is the best solution to solve such problem.

Activity *(about 3 min)*	▪ Tell me what an ICT problem could be then? ○ **Answers may be:** scenarios, an issue to examine

Development *(about 10 minutes)*	▪ **In order to provide a solution we must have a set of criteria**
	  ○ Therefore, a problem solving process have three phases which are:
	  ▪ **Identifying the problem** – problem aspects' are identified and investigated
	  ▪ **Plan and apply** – apply knowledge, skills and have the responsibility to plan, develop and present solution
	  ▪ **Produce and evaluate** – actually produce and evaluate it.
	
	▪ As part of the learning process and assessment, we are going to work on a **project**
	  ○ You are going to work in 3 groups (3-4 students each group)
	  ○ The **aim** of this project is to provide a **solution** for a real-world scenario.
	  ○ **Each group** is going to have a **different scenario** through a problem-solving process. You have four scenarios from which you can choose one.
	
	▪ This process involves **active learning** where the teacher will present the conditions to learn and find a solution to the problem rather than provide-ready made knowledge
	▪ The assessment will be based on various on-going tasks. Though this project is going to occur over the following 6 weeks, you may work on the assessment tasks during class time and also during your own time.
	  ○ As a final product component, you must give back to the teacher:
	  ▪ The assignment file which I am about to give you
	  ▪ The tasks which you are going to be asked to do in different modes (the teacher will be collecting these tasks during the coming weeks as per instructions); and
	  ▪ The proposed solution for the problem in the real-world scenario which you are going to choose in a short while.
	▪ The first task which you are going to do to learn about different types of computers is a webquest.
	▪ Explain what a web quest is:
	  ○ An on-line learning activity
	  ○ During this activity, students work in groups
	  ○ Their job is to read, analyse & synthesize web info

	▪ 3 groups (3-4 students in each) – they take different roles
Activity *(about 7 min)*	▪ Activity Sheet 1 – Different types of computers ▪ Introduce Activity Sheet 1 (to be continued next lesson) ▪ First they access the web quest from https://sites.google.com/site/msgbusuttil/applied-ict ▪ The scenarios can be found in this webquest. Indicate to the teacher which scenario you would like to work on. ▪ I can read out the scenarios. ▪ Answer the questions on the activity sheet given.
Conclusion *(about 3 min.)*	▪ Review main points of lesson: ○ Learnt about the scenarios ○ The scope of a webquest – different types of computers
Follow up *(about 2 min)*	▪ Remote preparation: ○ Webquest to be continued ○ Bring earphones for next lesson in case you will need to access some videos in class while doing the webquest.

Choose the appropriate computer, parts of a computer and software for a given scenario

Applied ICT

Module: Applied Award in Concepts and Technical Aspects of IT

Ms.Gianella Mifsud

1

Lesson objectives

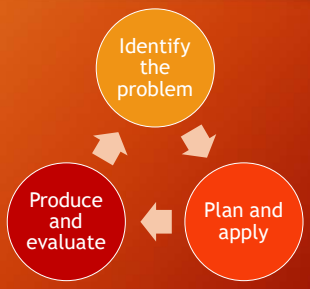
- What is a problem-solving process?
- Project-based learning
  - An on-going learning process
  - Project-based Assessment
- Webquest
  - What is a webquest?
  - Different types of computers

2

What is Problem-solving?

3

What is a problem-solving process?



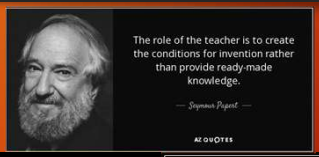
4

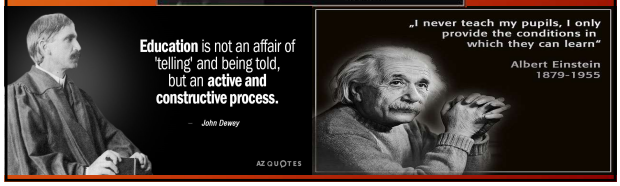
Project-based learning

SCENARIOS

5

#activelearning





6

Project-based assessment

- **Assignment file** (hard copy)
- **Various on-going tasks**
- **Proposed** solution for the problem in the real-world scenario which you are going to choose in a minute.

7

Why it's interesting…

Enthusiastic

Search for information yourselves!

Collaborate with your friends

You discover information!

8


ACTIVITY SHEET 1 -
Different types of computers
https://sites.google.com/site/msgbusuttil/applied-ict

9

I am John. I am now retired and spend most of the day reading and doing some light exercise like walking in the public garden.

Tommy and I have been close friends since we were 15 years old and we have been writing letters to each other ever since.

A few months ago, Tommy bought a new computer and he encouraged me to buy one for myself. I have a budget of €700

1

I need a small portable computer to read online news, browse the Internet, read electronic books and maybe do some online shopping.

I would like a computer that fits in my shoulder bag (but not with a very small screen) so that when I go for a walk in the public garden, I can take it with me to listen to some music privately.

If I buy this computer, Tommy told me that we can communicate and send pictures to each other in real-time.

I also wish that I store them digitally and keep a backup of these somewhere.

2

Me and my friend Tommy have another thing in common. We are both Juventus FC fans! He is building up a portfolio on this big team. He bought a hardware item to have the news as hard copy and I want to buy one as well so that I can do the same...it's exciting to have all memories in a book!

3

I am Charlene and I have my own business. I sell nutrition products. Before I started a family I used to work from the office and also used to travel a lot by car to sell products. However, after I started a family and since most of the clients are nowadays ordering their products by phone/online, I want to start working from home (teleworking).

Basically I need a computer with a large screen to place it in the study room.
My budget is €1,400

4

I am going to use it mainly to: keep record of products, work out quotations of products, send and receive emails, ordering and selling products online.

I was thinking of having video chats with my clients if need be since now I will not be travelling by car anymore to deliver products but I still want to communicate with clients to explain the use of certain products via video at least.

5

Though I try to print as least as possible, certain documents must be printed to keep a record of things. When I used to work at the office, I used to print a lot of statements, quotations and other files to record these in files. I am planning to keep the same system so I need a high quality low cost monochrome printer.
Just to give you an idea, I print around 300 pages monthly.
Sometimes I will need to scan or photocopy some important documents.

6

I am Mireille and I work as a personal nutritionist/fitness trainer. Early mornings I start sessions at clients' houses where I give them guidance on how to keep fit. After each session, I weigh clients and write their progression on their personal journal diary. I have been doing this job for 5 years in a row and now I have a pool of clients. I wish to get more organised when it comes to health progression record keeping.

I would like to buy a very small computer to help me doing my job.
My budget is €400

7

I am going to buy this very small computer mainly to keep a digital record of the clients' weight and preferably find a suitable programme to be used by me and my clients to keep record of home workouts, their weight and keep an online diary of what they eat so that they can manage better their portions of food. Ideally this data could be shared online.

If possible, this computer I buy will be compatible with the weighing scale which I also plan to buy that will have more functions like BMI.

Since I travel a lot, it would make sense to make telephone calls while on the go, keeping hands-free.

8

For accounts keeping and to keep a record of monthly progress data of clients, I think it would be better to keep a hard copy at least once a month while keeping a digital backup copy of this data.

9

I am Andrew and I work as a mechanic. I have been doing this job for the past fifteen years.

Due to the technological advancements in the last couple of years, I was thinking of investing in a not so small portable computer that will ultimately help me doing my job. My budget is €600

10

I want to use this computer mainly to search online for car parts and order them online. My friend who is also a mechanic told me that he is using the computer to help him fix cars – he uses a camera which he connects to the portable computer and this saves him a lot of time.

Cars are my passion and I intend to expand the business and maybe I will start dealing cars as well so this computer will surely help me to advertise the cars and other car accessories as well. Clients are nowadays using social media to run their errands so maybe I will take advantage of this. I also buy a lot of products and I think it is time to use technology not just to keep an inventory of items but also keep a copy somewhere else.

Since I will be selling products I would ultimately benefit of a device that will ease inputting and identifying products in the computer system.

11

I usually give quotations by phone and maybe in the future I will send them by email, thus a printer for A4 paper is not that needed. However I would prefer to buy a printer to issue bills to the clients in a small format.

12

Activity Sheet 1: Different types of computers

Group members' names: (your name) _____ _____

_____ _____

Webquest

First access the web quest from https://sites.google.com/site/msgbusuttil/applied-ict

As you may notice, you are going to do this webquest in a group with a task split into different roles. The webquest has 5 parts. Start from the introduction part to read about the different scenarios. You may also read the scenarios on this activity sheet for future reference.

The files needed for the task are found in the webquest. After you have finished these tasks, the teacher will print your work so may keep this in this assignment report file. **Make sure to save your work to avoid losing the work you will be doing.**

Write below the group number and scenario number that your group have chosen:
Group ___ : Scenario: ____

Scenario 1

I am John. I am now retired and spend most of the day reading and doing some light exercise like walking in the public garden. Tommy and I have been close friends since we were 15 years old and we have been writing letters to each other ever since. A few months ago, Tommy bought a new computer and he encouraged me to buy one for myself. I have a budget of €700.

I need a small portable computer to read online news, browse the Internet, read electronic books and maybe do some online shopping.

I would like a computer that fits in my shoulder bag (but not with a very small screen) so that when I go for a walk in the public garden, I can take it with me to listen to some music privately.

If I buy this computer, Tommy told me that we can communicate and send pictures to each other in real-time.

I also wish that I store them digitally and keep a backup of these somewhere.

Me and my friend Tommy have another thing in common. We are both Juventus FC fans! He is building up a portfolio on this big team. He bought a printer to have the news as hard copy and I want to buy one as well so that I can do the same…it's exciting to have all memories in a book!

Scenario 2

I am Charlene and I have my own business. I sell nutrition products. Before I started a family I used to work from the office and also used to travel a lot by car to sell products. However, after I started a family and since most of the clients are nowadays ordering their products by phone/online, I want to start working from home (teleworking).

Basically I need a computer with a large screen to place it in the study room. My budget is €1,400

I am going to use it mainly to: keep a record of products, work out quotations of products, send and receive emails, ordering and selling products online.

I was thinking of having video chats with my clients if need be since now I will not be travelling by car anymore to deliver products but I still want to communicate with clients to explain the use of certain products via video at least.

Though I try to print as least as possible, certain documents must be printed to keep a record of things. When I used to work at the office, I used to print a lot of statements, quotations and other files to record these in files. I am planning to keep the same system so I need a high quality low cost monochrome printer. Just to give you an idea, I print around 300 pages monthly. Sometimes I will need to scan or photocopy some important documents.

Scenario 3

I am Mireille and I work as a personal nutritionist/fitness trainer. Early mornings I start sessions at clients' houses where I give them guidance on how to keep fit. After each session, I weigh clients and write their progression on their personal journal diary. I have been doing this job for 5 years in a row and now I have a pool of clients. I wish to get more organised when it comes to health progression record keeping.

I would like to buy a very small computer to help me doing my job. My budget is €400.

I am going to buy this very small computer mainly to keep a digital record of the clients' weight and preferably find a suitable programme to be used by me and my clients to keep record of home workouts, their weight and keep an online diary of what they eat so that they can manage better their portions of food. Ideally this data could be shared online.

If possible, this computer I buy will be compatible with the weighing scale which I also plan to buy that will have more functions like BMI.

Since I travel a lot, it would make sense to make telephone calls while on the go, keeping hands-free.

For accounts keeping and to keep a record of monthly progress data of clients, I think it would be better to keep a hard copy at least once a month while keeping a digital backup copy of this data.

Scenario 4

I am Andrew and I work as a mechanic. I have been doing this job for the past fifteen years.

Due to the technological advancements in the last couple of years, I was thinking of investing in a not so small portable computer that will ultimately help me doing my job. My budget is €600.

I want to use this computer mainly to search online for car parts and order them online. My friend who is also a mechanic told me that he is using the computer to help him fix cars – he uses a camera which he connects to the portable computer and this saves him a lot of time.

Cars are my passion and I intend to expand the business and maybe I will start dealing cars as well so this computer will surely help me to advertise the cars and other car accessories as well. Clients are nowadays using social media to run their errands so maybe I will take advantage of this. I also buy a lot of products and I think it is time to use technology not just to keep an inventory of items but also keep a copy somewhere else.

Since I will be selling products I would ultimately benefit of a device that will ease inputting and identifying products in the computer system.

I usually give quotations by phone and maybe in the future I will send them by email, thus a printer for A4 paper is not that needed. However I would prefer to buy a printer to issue bills to the clients in a small format.

Year 9 Applied Digital Competences

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 2)

Title	(continued) Different types of computers
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

- **Choose the appropriate type of computer for a given scenario**

Learning outcomes

Skills

- How to choose the most suitable type of computer
- Distinguish types of computers and their use

Responsibility and Autonomy

- Choose the appropriate computer for a given scenario in autonomy
- Able to work in a team
- Able to adhere to timeframe
- Give and receive appropriate feedback with limited prompting
- Able to solve a problem in a real-life scenario with prompting
- Able to share ideas and listen to others' ideas

Knowledge

- What are the different types of computers?
- Explain any key terminology associated with the subject

Resources required

Software

- IWB software
- MS PowerPoint

Hardware

- Interactive whiteboard
- Computers

Worksheet:

- Assignment file
- Activity Sheet 1 – Different types of computers

For Activities:

- Internet access for Web-based search activities (Web Quest)
- Webquest on https://sites.google.com/site/msgbusuttil/applied-ict

Introduction *(about 10min)*	▪ Settling down time
	▪ Revision of last lesson:
	  ○ Different scenarios
	  ○ We learnt what a webquest is and why it is useful
	  ○ Started the webquest on different types of computers
	▪ Review main points of the lesson:
	  ○ Use the webquest to learn about the different types of computers and choose the most suitable type of computer

Development *(about 5 minutes)*	▪ continue Activity Sheet 1 - Different types of computers
	  ○ First they access the web quest from https://sites.google.com/site/msgbusuttil/applied-ict
	  ○ The chosen scenario is found on the webquest and also on Activity Sheet 1
	  ○ The webquest is about the different types of computers
	  ○ The task explains different roles for each member. Discuss with your group the role of each one of you and download the necessary file/s for your assigned role. **Remember to save the file after you have finished the task**. This file will be viewed by your teacher, assessed and then printed so that later you can put it in your assignment report file.

Activity Sheet (*about 20 min*)	▪ Activity Sheet 1 – Different types of computers. ▪ Work out task according to your role assigned

Conclusion *(about 3 min.)*	▪ Review main points of lesson:
	  ○ Used the webquest to learn about the different types of computers
	  ○ Chose the most suitable type of computer

Follow up *(about 2 min)*	▪ Remote preparation: ○ We will be preparing for a dialogue – justifications for choosing a type of computer.

Year 9 Applied Digital Competences Curriculum

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 3)

Title	(continued) Different types of computers
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

- **Choose the appropriate type of computer for a given scenario**

Learning outcomes

Skills

- How to choose the most suitable type of computer
- Choose the appropriate computer for a given scenario in autonomy
- Practice using a word processing application for set task under guidance

Responsibility and Autonomy

- Able to work in a team
- Able to adhere to timeframe
- Give and receive appropriate feedback with limited prompting
- Able to solve a problem in a real-life scenario with prompting
- Able to share ideas and listen to others' ideas

Knowledge

- What are the different types of computers?
- Explain any key terminology associated with the subject

Resources required

Software

- IWB software
- MS Word Processing

Hardware

- Interactive whiteboard
- Computers

Worksheet:

- Assignment file
- Activity Sheet 1 continued– Different types of computers for scenarios – Dialogue Preparation

For Activities:

- Internet access for Web-based search activities (Web Quest)
- Webquest on https://sites.google.com/site/msgbusuttil/applied-ict
- Role 2 files – properties of different types of computers

Introduction *(about 5 min)*	▪ Settling down time
	▪ Revision of last lesson:
	  ○ Each one of you finished his 'role' part and saved your findings
	▪ Review main points of the lesson:
	  ○ We are going to use these findings, especially the part of 'different types of computers' i.e. role 2 and in groups you are going to discuss which type of computer is most suitable for the scenario you have chosen and give 4 justifications for your decision.

Development *(about 10 minutes)* Activity (*about 20 min*)	▪ Now that you have all finished the process part till part 3, now we have to discuss our findings. ▪ Today we are going to use findings of Role 2 mostly (the others will be given more attention in the coming weeks). ▪ Role 2 students task was to find the different properties such as portability, weight etc of different computers. ▪ Each group has chosen the most suitable type of computer for the chosen scenarios, giving justifications ▪ During the coming English lesson you are asked to write a dialogue. It will contain the justifications mentioned earlier. Two of the team members will be role-playing (one person will act the part of the person needing a computer as per scenario and the other one will be the one giving suggestions). This role-play will be done during the following ICT lesson. The other team member/s that will not be role-playing will be responsible to write/present the written dialogue as per discussed in the group during the English lesson.

	▪ So today you are going to work in groups again to:
	  ▪ 1) Decide which type of computer is most suitable for the chosen scenario; and
	  ▪ 2) Give 4 justifications for your answer
	○ In order to do this you are going to open a new blank document:
	  ▪ At the top write the most suitable type of computer
	  ▪ Below write the four justifications.
	  ▪ **Remember to save the file after you have finished the task**. This file will be viewed by your teacher, assessed and then printed so that later you can put it in your assignment report file.

Conclusion *(about 3 min.)*	▪ Review main points of lesson: ○ Chose the most suitable type of computer and gave justifications.
Follow up *(about 2 min)*	▪ Remote preparation: ○ You are going to continue this activity during the English lesson and then you are going to do the role-play in class during ICT.

Activity Sheet 1 Part 2: Different types of computers – Dialogue preparation

Group members' names: (your name) _____ _____

_____ _____

Dialogue

Work together to:

a) Write in point form at least 4 justifications of choosing such type of computer for the given scenario.

b) During your English lesson you are asked to write a dialogue. It will contain the justifications mentioned earlier. Two of the team members will be role-playing (one person will act the part of the person needing a computer as per scenario and the other one will be the one giving suggestions).

This role-play will be done during the following ICT lesson. The other team member/s that will not be role-playing will write the dialogue as per discussed in the group during the English lesson.

Justifications:

1. _____
2. _____
3. _____
4. _____

Space to write dialogue

Year 9 Applied Digital Competences Curriculum

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 4)

Title	(continued) Different types of computers
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

- **Role-playing the dialogues**

Learning outcomes

Skills

- How to choose the most suitable type of computer

Responsibility and Autonomy

- Give and receive appropriate feedback with limited prompting
- Able to share ideas and listen to others' ideas
- Able to adhere to timeframe
- Able to work in a team

Knowledge

- What are the different types of computers?
- Choose the appropriate computer for a given scenario in autonomy

Resources required

Software

- IWB software

Hardware

- Interactive whiteboard
- Computers

Worksheet:

- Assignment file
- Activity Sheet 1 – Dialogue - Different types of computers for scenarios

For Activities:

- Internet access for Web-based search activities (Web Quest)
- Webquest on https://sites.google.com/site/msgbusuttil/applied-ict
- Justifications document
- Dialogues typed by a group member

Introduction *(about 5 min)*	▪ Settling down time
	▪ Revision of last lesson:
	  ○ In groups you discussed which type of computer is most suitable for the scenario you have chosen and gave 4 justifications for your decision.
	  ○ Then during the English lesson, you worked in groups and write a draft dialogue to justify your decision. The other team member/s that will not be role-playing should have written the dialogue as per discussed in the group during the English lesson.
	▪ Review main points of the lesson:
	  ○ We are going to role-play the dialogues.

Development *(about 5 minutes)*	▪ During this lesson, two of the team members from each group will be role-playing (one person will act the part of the person needing a computer as per scenario and the other one will be the one giving suggestions).
Activity (*about 25 min*)	▪ Role-plays ▪ A chance for classroom discussion
Conclusion *(about 3 min.)*	▪ Review main points of lesson: ○ Chose the most suitable type of computer and gave justifications.
Follow up *(about 2 min)*	▪ Remote preparation: ○ learn about the units of storage

Year 9 Applied Digital Competences

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 5)

Title	Units of storage
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

- **Identify the internal memory and storage size of a computer system**

Learning outcomes

Skills

- How is the binary system used in computers?
- How are bits grouped to form bytes?
- Distinguish parts of a computer and their use

Responsibility and Autonomy

- Give and receive appropriate feedback with limited prompting

Knowledge

- What is the binary system?
- What is the smallest to the largest units of storage?
- The use of different computer components and software
- Explain any key terminology

Resources required

Software

- IWB software
- MS PowerPoint
- Web browser

Hardware

- Interactive whiteboard
- Computers

For Activities:

- Online game about units of storage
- Dominoes (3 sets)
- Units of storage flashcards

Introduction *(about 5 min)*	▪ Settling down time
	▪ Revision of last lesson:
	  ○ Justifications for choosing a type of computer & role-play
	▪ Review main points of the lesson:
	  ○ Units of storage
	  ○ We are going to identify the processor type, speed and storage of the main components of an embedded device

Development *(about 5 min)*	▪ Units of storage
	  ○ Computers work using the binary system
	  ○ The word binary comes from "Bi-" meaning two. We see "bi-" in words such as "bicycle" (two wheels) or "binocular" (two eyes)
	  ○ Binary numbers are made up of 0s and 1s

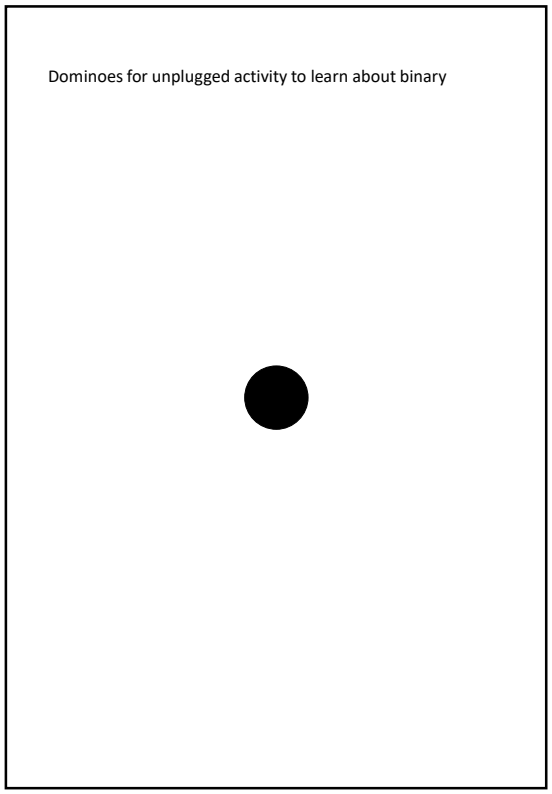
Unplugged activity - Game (*about 10 min)*	▪ **So anything that you see or hear on a computer—words, images, sound data is stored using just 0s and 1s!**
	  ○ But how come that using just these two numbers we represent anything?
	  ○ Dominoes Game: let's see what is the binary number to represent any decimal number - The numbering system that we use every day, based on 10 digits (0,1,2,3,4,5,6,7,8,9)
	  ○ First we will do this game as a class then you'll play it in groups of 3 or 4 students, turn taking.
	  ○ Instructions for game – refer to unplugged activity to teach binary number system

Game *(about 10 min)*	▪ Binary digit" is often shortened to "bit" – the smallest unit of storage (a game will follow to learn from the smallest to the largest units of storage)
	▪ In order to represent numbers, letters and other special characters, bits are bundled together into groups of **8-bits called bytes**
	▪ When we're talking about a lot of bytes, you get into prefixes
	▪ As a class we play a game about the units of storage to learn/practice http://planeta42.com/it/informationunits/
	▪ So to revise:
	  ○ 1KB (Kilobyte) = 2^{10} = 1024 bytes
	  ○ 1MB (Megabyte) = 2^{20} = 1024x1024 bytes = 1024 KB
	  ○ 1GB (Gigabyte) = 2^{30} = 1024x1024x1024 bytes = 1024MB
	  ○ 1 TB (Terabyte) = 2^{40} = 1024x1024x1024x1024 bytes = 1024GB

Revision *(about 5 min)*	▪ To revise units of storage:
	  ○ Two students are going to be selected randomly. Tell them: 'Imagine that each one of you is a computer machine and that your internal storage currently can store up to 2TB. Your job is to store as much data as possible.
	  ○ The remaining students will give their backs to these two students and they will each hold a flashcard showing an amount of storage. Randomly selected, two students will face the 'two computer machines'. Each computer machine must select the biggest file to store. The 'computer machine' storing the largest amount of data wins.

Conclusion *(about 3 min.)*	▪ Review main points of lesson: o We learnt about the units of storage
Follow up *(about 2 min)*	▪ Remote preparation: o We are going to learn how to identify the processor type, speed and storage of the main components of an embedded device

Dominoes for unplugged activity to learn about binary



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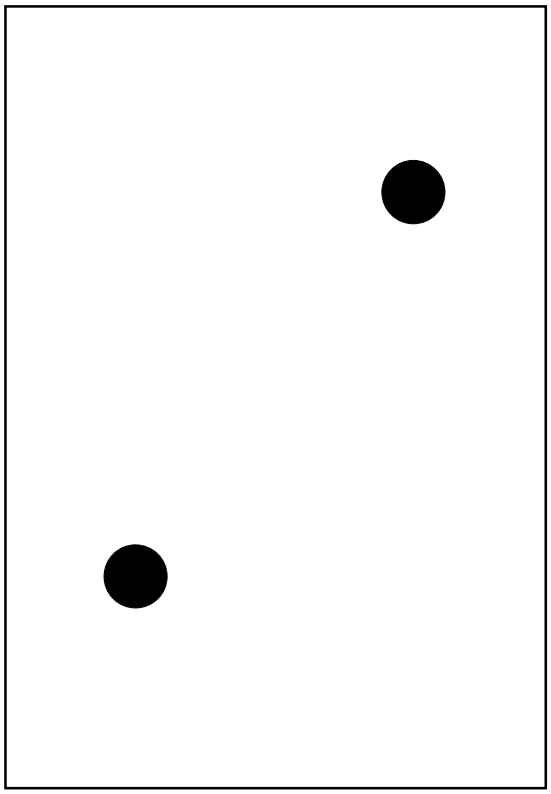

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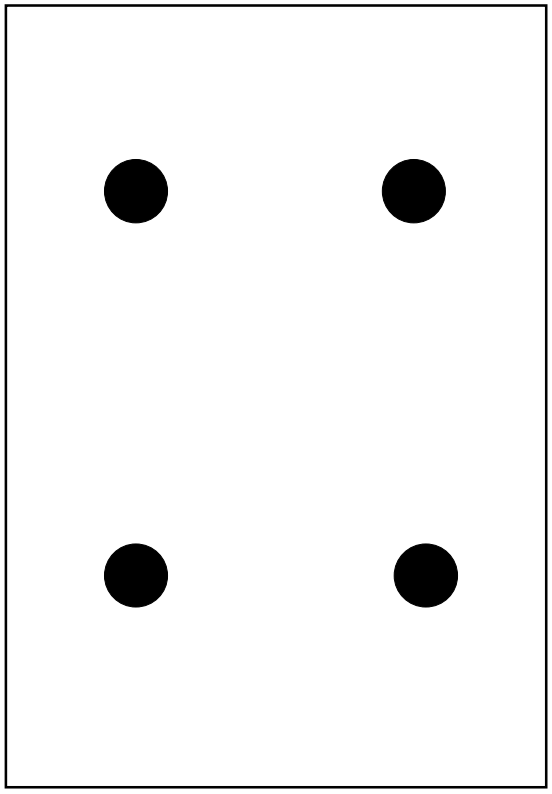
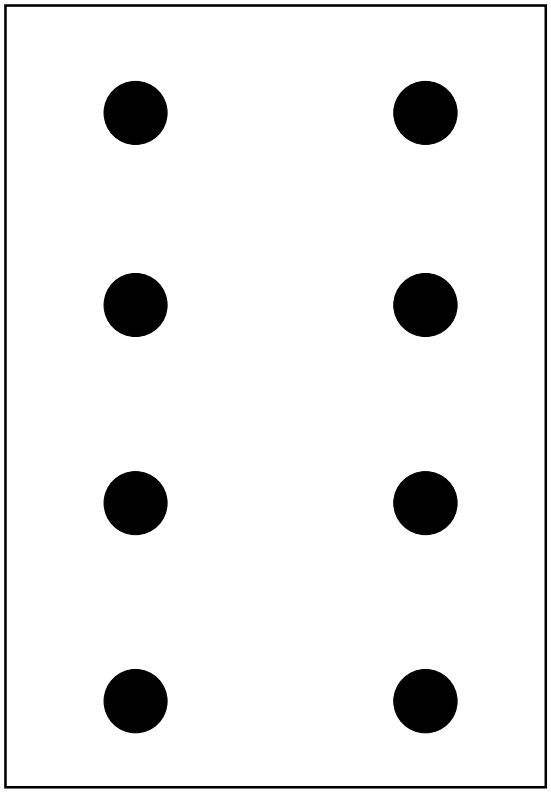
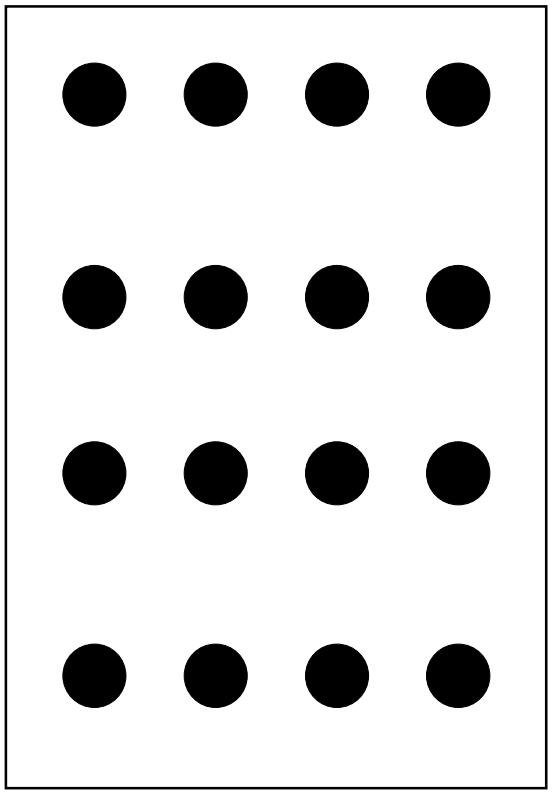


3



4



5

Units of storage flashcards

One letter

1 byte

ON/OFF state

1 bit

1

A 4-minute MP3

5MB

A presentation file with videos

80 MB

2

A mobile app

20MB

A word document

15 KB

3

A 2 hour video file

1.5GB

A backup folder

1 TB

4

Year 9 Applied Digital Competences

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 6)

Title	Internal memory and storage size of a device
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

- **Identify the internal memory and storage size of an embedded computer system**

Learning outcomes

Skills

- Distinguish parts of a computer and their use

Responsibility and Autonomy

- Able to work in a team

Knowledge

- What is the use of different computer components?

Resources required

Software

- IWB software
- MS PowerPoint
- Web browser

Hardware

- Interactive whiteboard
- Computers

For Activities:

- Activity Sheet – 2
- Dominoes (3 sets) – *if needed to recap*

Introduction *(about 5 min)*	▪ Settling down time
	▪ Revision of last lesson:
	  ○ Units of storage
	▪ Review main points of the lesson:
	  ○ We are going to identify the processor type, speed and storage of the main components of an embedded device

Revision *(about 5 min)*	▪ Units of storage
	  ○ Computers work using the binary system
	  ○ The word binary comes from "Bi-" meaning two. We see "bi-" in words such as "bicycle" (two wheels) or "binocular" (two eyes)
	  ○ Binary numbers are made up of 0s and 1s
	  ○ **So anything that you see or hear on a computer—words, images, sound data is stored using just 0s and 1s!**
	  ○ Dominoes game (unplugged activity): using binary to represent any decimal number
	  ○ We referred to ASCII

Activity *(about 25 min)*	▪ Each group is going to be assigned with a device for which they must research and find out the size of the memory (RAM) and internal storage.
	▪ Links just in case some students need further help
	  ○ Device 1: PlayStation 4
	  ▪ https://www.playstation.com/en-gb/explore/ps4/tech-specs/
	  ○ Device 2: Samsung Galaxy S10
	  ▪ https://www.samsung.com/uk/smartphones/galaxy-s10/specs/
	  ○ Device 3: Skystream Three Android TV Box
	  ▪ https://www.skystreamx.com/products/skystream-three-android-tv-box

An extra activity in case they finish early	▪ The speed of a CPU is nowadays measured in Gigahertz (GHz) which means billions of instructions per second! The faster the speed of a CPU, the faster it can execute instructions. But remember that the CPU is not the only component that affects the speed of the computer. ○ Find out the CPU type and speed of the chosen device
Conclusion *(about 3 min.)*	▪ Review main points of lesson: ○ We learnt about the units of storage
Follow up *(about 2 min)*	▪ Remote preparation: ○ We are going to identify the CPU, internal storage and RAM on a motherboard

Activity Sheet 2: Computer Speed and Storage

Part 1: The internal memory and storage of an embedded device

Chosen device: _____

As a group find out the internal memory and storage of the chosen device**.** Write down these specifications in the below box

Tip: Open a web browser. Type the device name followed by 'specs'. Then find out the information you are searching for and write it here. Each student must write it on his own activity sheet.

Internal memory (RAM):

_____

Internal storage:

_____

Part 2: The processor of a computer

Find the CPU specifications (specs) of the chosen device**.**
Write down these specifications in the below box

The teacher is going to give you a printed copy of the specifications that you found out as a group during the last lesson.

Write the CPU specifications in the below box including the type and speed:

CPU: Type - _____ **Speed -** _____

Year 9 Applied Digital Competences

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 7)

Title	Inside the computer – processor, RAM and internal storage
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

- **Identify the CPU, internal storage and RAM on a motherboard.**
- **Practice using the appropriate tools and following safe working conditions and safe lab procedures to open the side panel of the desktop computer.**

Learning outcomes

Skills

- Distinguish parts of a computer and their use – CPU, RAM and Hard Disk

Responsibility and Autonomy

- Make appropriate use of equipment, procedures and techniques while working with computers to ensure user's health and safety wellbeing in a classroom setting
- Able to work in a team

Knowledge

- What are the safe working conditions and safe lab procedures?
- What are the necessary tools and procedures to remove a RAM chip from a desktop computer?
- What is the use of CPU, RAM, and internal storage of a computer?

Resources required	**Software** ▪ IWB software ▪ Web browser for videos (if needed) **Hardware** ▪ Interactive whiteboard ▪ Computers **For Activities:** ▪ Units of storage flashcards for revision ▪ Components and tools: CPU, RAM, Hard disk, HDD, Motherboard ▪ Motherboard for demonstration ▪ 3 motherboards to remove/attach a RAM chip ▪ The motherboards specifications ▪ Extra RAM chips compatible with the motherboard

Introduction *(about 5 min)*	▪ Settling down time
	▪ Revision of last lesson:
	  ○ Units of storage - the size of the memory (RAM) and internal storage.
	▪ Review main points of the lesson:
	  ○ We are going to practice using the appropriate tools to open the side panel of the desktop computer.
	  ○ We are also going to look closely where a CPU and Hard disk are found on a motherboard and the speed and storage of such components.

Development *(about 5 min)*	▪ To revise units of storage - the size of the memory (RAM) and internal storage.: ○ Review the specs of PS4, Skystream Three Android TV Box & Samsung Galaxy S10

Development & Activity *(about 10 min)*	▪ Each group will have a desktop computer on the table
	▪ The inside of a desktop computer (slides)
	  ○ Step 1: Gather the tools needed to open a computer
	  ○ Step 2: Shutdown your computer
	  ○ Step 3: Unplug the power cable
	  ○ Step 4: Unplug all other cables and all other attached devices
	  ○ Step 5: Using the right tool, remove the side panel of the computer case
	  ○ Step 6: Touch a grounded metal object before touching the inside of a computer (for example the metal part of the computer case) so that any static build-up is discharged. ***The reason behind this, is because transmittance of static electricity can go through the computer circuits, which can seriously damage your machine.***
	▪ Identify the motherboard
	  ○ Discuss about it
	▪ **Where** is the CPU is located on the motherboard?
	  ○ Discuss about it
	  ○ Show them a CPU which was already removed from a motherboard
	  ○ Video to help: https://www.youtube.com/watch?v=Cz4vpkfYoII
	▪ **Where** is the Hard disk is located on the motherboard?
	  ○ Explain about it – information on flashcard including storage
	  ○ Show them a Hard disk which was already removed from a motherboard and from the Hard disk drive
	▪ **Where** is the RAM on the motherboard
	  ○ How to remove a RAM from a motherboard so that they can see closely how it looks – ***explain the purpose of safe working conditions and safe lab procedures.***
	  ○ Discuss about it

Conclusion *(about 3 min.)*	▪ Review main points of lesson – to recap: ○ What is the purpose of each component mentioned today i.e. CPU, RAM and HDD/SSD? The speed/storage measurement unit of each?
Follow up *(about 2 min)*	▪ Remote preparation: ○ We are going to learn how to upgrade the RAM of the computers

The inside of a desktop computer

1

Step 1: Gather the tools needed to open a computer

2

Step 2: Shutdown your computer

3

Step 3: Unplug the power cable

4

Step 4: Unplug all other cables and all other attached devices

5

Step 5: Using the right tool, remove the side panel of the computer case

6

Step 6: Touch a grounded metal object before touching the inside of a computer (for example the metal part of the computer case) so that any static build-up is discharged.

7

Year 9 Applied Digital Competences

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 8)

Title	(contd.)Inside the computer – processor, RAM and internal storage
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

Learning outcomes

- **Identify the amount of RAM installed on a computer.**
- **Practice using the appropriate tools and following safe working conditions and safe lab procedures to remove/install a RAM chip from/to a motherboard.**

Skills

- Remove and install a RAM from/to a motherboard while simulating good health and safety practices
- Distinguish parts of a computer and their use
- Check the amount of installed RAM that the computer and how much RAM can be installed on the computer

Responsibility and Autonomy

- Make appropriate use of equipment, procedures and techniques while working with computers to ensure user's health and safety wellbeing in a classroom setting
- Able to work in a team

Knowledge

- What are the safe working conditions and safe lab procedures?
- What are the necessary tools and procedures to remove a RAM chip from a desktop computer?
- What is the use of CPU, RAM, and internal storage of a computer?

Resources required	**Software** ▪ IWB software ▪ Web browser for videos (if needed) **Hardware** ▪ Interactive whiteboard ▪ Computers **For Activities:** ▪ Units of storage flashcards for revision ▪ Components and tools: CPU, RAM, Hard disk, HDD, Motherboard ▪ Motherboard for demonstration ▪ 3 motherboards to remove/attach a RAM chip ▪ The motherboards specifications ▪ Extra RAM chips compatible with the motherboard

Introduction *(about 5 min)*	▪ Settling down time
	▪ Revision of last lesson:
	  ○ Used the appropriate tools and following safe working conditions to open the side panel of the computer and discussed about CPU, RAM and internal storage.
	▪ Review main points of the lesson:
	  ○ We are going to learn how to upgrade the RAM of the computers

Development *(about 10 min)*	▪ Get a desktop computer on the table
	▪ The inside of a desktop computer (slides)
	  ○ Step 1: Gather the tools needed to open a computer
	  ○ Step 2: Shutdown your computer
	  ○ Step 3: Unplug the power cable
	  ○ Step 4: Unplug all other cables and all other attached devices
	  ○ Step 5: Using the right tool, remove the side panel of the computer case
	  ○ Step 6: Touch a grounded metal object before touching the inside of a computer (for example the metal part of the computer case) so that any static build-up is discharged. ***The reason behind this, is because transmittance of static electricity can go through the computer circuits, which can seriously damage your machine.***

Activity *(about 20 min)*	▪ Work in groups of 3-4 students
	▪ We may want to upgrade the RAM. To revise: ask them why?
	  ○ Scaffold their learning into this: so that the computer can run more smoothly since the more RAM you have installed on your computer, the more programmes can be run at once.
	▪ To check the amount of RAM that can be installed on your computer:
	  ○ **Step 1: Check your operating system**
	  ▪ Start → Control Panel → System→ check the system type.
	  ▪ If it is a **32-bit OS**, then it can handle up to 4GB of RAM, the extra RAM will be a waste.
	  ▪ If it is a **64-bit OS**, then it an even handle up to 2TB of RAM
	  ▪ Other OS like Linux or Lion OS have similar issues.
	  ▪ How much RAM is installed on your computer?
	  ○ **Step 2: Check your motherboard**
	  ▪ Identify the motherboard
	  • Some options to do so: open the computer case and take note of the motherboard's model number OR find the computer model that you are using and google it (This link is to show them how to check for the maximum ram for my laptop as an example https://support.hp.com/sg-en/document/c04355112) OR take a look at the motherboard's documentation
	  • Take note of the motherboard model number of their computer that they are using.
	  • Check the type and the maximum amount of RAM that their motherboard can handle

	○ **Step 3: Check the number of available slots of RAM on your motherboard** ▪ Example if your motherboard can handle up to 16GB of RAM and it has 4 slots, either install 4 4GB RAM or 2 8GB RAM for the maximum RAM allowed. ○ **Step 4: Upgrade the RAM (to be done during the next lesson)** This link can help: https://www.wikihow.tech/Find-Out-the-Maximum-RAM-Capacity-for-Your-Computer
Conclusion *(about 3 min.)*	▪ Review main points of lesson – to recap: ○ What is the purpose of each component mentioned today i.e. CPU, RAM and HDD/SSD? The speed/storage measurement unit of each?
Follow up *(about 2 min)*	▪ Remote preparation: ○ Research about peripheral devices that exist on the market that suits the user in the given scenario

Year 9 Digital Competences

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 9)

Title	Computer peripheral devices
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

- **Choose the computer, peripheral devices and software for the given scenario**

Learning outcomes

Skills

- Choose the appropriate computer, peripheral devices and type of software for a given scenario
- Practice using a spreadsheet programme to help the students keep within the budget

Responsibility and Autonomy

- Choose the appropriate computer, peripheral devices and type of software for the given scenario in autonomy
- Able to work in a team
- Able to adhere to timeframe
- Give and receive appropriate feedback
- Able to solve a problem in a real-life scenario with prompting
- Able to share ideas and listen to others' ideas

Knowledge

- What peripheral devices suits the user's needs of the given scenario?
- The use of different peripheral devices for the given scenario

Resources required

Software

- IWB software
- Web browser
- Publisher

Hardware

- Interactive whiteboard
- Computers

For Activities:

- The dialogue and printed scenarios.
- The findings of the 'shopaholic' in the webquest part regarding what to look for when doing online shopping.

Introduction *(about 5 min)*

- Settling down time
- Revision of last lesson:
  - We upgraded the computer's RAM according to the motherboard's specifications
- Review main points of the lesson:
  - We are going to propose a computerised system including peripheral devices and software to the user according to the scenario

Development *(about 5 min)*

- Now we are familiar with different ports found on your computer, components that make up the computer system and some software
- These ports exist for different peripheral devices which are found on the market.
- Your job is to find a suitable computer which you proposed at the beginning of this project, peripheral devices and software for the given scenario

Activity *(about 25 min)*

- **Step 1:** Students are grouped as before according the chosen scenario. Write your details at the top of activity sheet 5
- **Step 2:** Open the file called **budget planning.xls** – in this file you are going to write a short description of the item, copy and paste the link found online, and the cost. The spreadsheet programme is going to help you keep within the budget. An example is given
- **Step 3:** At the top of the file budget planning (in cell C1), write down the budgeted money.
- **Step 4:**
  - **2 students from each group:** Each group must research for a suitable computer which you proposed at the beginning of this project, peripheral devices and software for the given scenario.
    Be careful not to miss any details. If you proposed additional peripheral devices or any other software other than those asked by the user, make sure to include them in your research
  - **1 to 2 students from each group:** start laying out how you are going to present your solution. Example design a leaflet using any freeware software of your choice or Microsoft Publisher which is already installed on the computer lab's computer. It's up to you to decide how to present your solution. This can be presented either as a soft copy or hard copy. Make sure to:
    - **Save the file using the group number and the names of all students in the group. The teacher will be use this file to print it for assessment purposes.**
    - **Design the leaflet in a way that the information is not too clustered and will be easy to read from. Remember to use appropriate design techniques as learnt during the ICT lessons giving special attention to font formatting and design colours techniques.**
    - **Front page: write the Scenario number and the name of the user of the chosen scenario**
      Example: A computerized system for Scenario 3 – user Mireille (nutritionist)
    - **Space for each item you are going to propose that includes the item name (including brand and model number if applicable), cost, link from where to buy and a picture (if applicable)**
- **Save your findings on your computers so that later we can share these with the class**

Conclusion *(about 3 min.)*

- Review main points of lesson:
  - We learnt about other peripheral devices and started working on the leaflet

Follow up *(about 2 min)*

- Remote preparation:
  - We are going to go continue today's lesson to finish off this activity
  - You will then be asked to present your work in front of the class

Activity Sheet 3: Choose the computer, peripheral devices and software for the given scenario

Group number: _____Scenario number: _____ Your name: _____

Instructions for this activity:

- **Step 1:** Students are grouped as before according the chosen scenario. Write your details at the top of this activity sheet.
- **Step 2:** Open the file called **budget planning.xlsx** – in this file you are going to write a short description of the item to be included in the leaflet, copy and paste the link found online, and the cost. The spreadsheet programme is going to help you keep within the budget. An example is given in the file budget planning.xlsx
- **Step 3**: At the top of the file budget planning (in cell C1), write down the budget.
- **Step 4:**
  - **2 students from each group**: names: _____
    Each group must research for a suitable computer which you proposed at the beginning of this project, peripheral devices and software for the given scenario. Write these down in the excel sheet provided below the heading 'Description of product'.
    Be careful not to miss any details. If you proposed additional peripheral devices or any other software other than those asked by the user, make sure to include them in your proposal
  - **1 to 2 students from each group**: name/s: _____
    Start designing the leaflet using Publisher. This will be the leaflet that you are going to present as hard copy to the user of the chosen scenario. Make sure to:
    1. Save the file using the group number and the names of all students in the group. The teacher will be use this file to print it for assessment purposes.
    2. Design the leaflet in a way that the information is not too clustered and will be easy to read from. Remember to use appropriate design techniques as learnt during the ICT lessons giving special attention to font formatting and design colours techniques.
    3. Include a front page: write the Scenario number and the name of the user of the chosen scenario
       Example: A computerized system for Scenario 3 – user Mireille (nutritionist)
    4. Include space for each item you are going to propose that includes the item name (including brand and model number if applicable), cost, link from where to buy and a picture (if applicable)

Example: Xiaomi Redmi 6A 16GB Dual-Sim Android Smartphone Gold
Cost: €99

It is important to save the files on your computers as requested so that the files are easily identified.

Year 9 Applied Digital Competences

Choose the appropriate computer, parts of a computer, peripheral devices and software for a given scenario

Lesson Plan (Lesson 10)

Title	3D designing & printing – embedded lesson with Design & Technology
Duration	40 min
Forms	Year 9
Dates	

Class	To be delivered on	Delivered on
Year 9		

Objective/s

- **Able to understand the potential of 3D printing while being able to use a 3D CAD software to design a 3D object to print.**

Learning outcomes

Skills

- How to 3D Print objects while giving attention to safe working conditions?
- How can I use a 3D CAD programme to design a 3D object?
- How can 3D printing can be used for the given scenario?
- Practice using a 3D CAD software to design a 3D object

Responsibility and Autonomy

- Able to work in a team
- Able to adhere to timeframe
- Give and receive appropriate feedback with limited prompting
- Able to demonstrate creativity and innovation under guidance
- Able to design a 3D object for a given scenario with prompting
- Able to share ideas and listen to others' ideas

Knowledge

- What is 3D printing?
- What are its potentials?

Resources required

Software

- IWB software
- Web browser for tinkercad.com

Hardware

- Interactive whiteboard
- Computers

For Activities:

- Plain paper to draw and write idea of the 3D object

Introduction *(about 5 min)*	▪ Settling down time ▪ Revision of last lesson: ○ We proposed a computerised system including peripheral devices and software to the user according to the scenario ▪ Review main points of the lesson: ○ We are now going to learn more about 3D printing
Development *(about 15 min)*	▪ An embedded lesson with Design & Technology: ○ What is 3D printing? ○ Where is 3D printing used? ▪ To use a CAD programme to design a 3D object ○ Design and Technology teacher - a brief demonstration
Activity *(about 15 min)*	▪ Now that you know more about 3D printing, each group is going to think and discuss what you can create in 3D that will be useful for the user in the given scenario. You are going to actually not just see the examples but you are also going to design it using an online tool www.tinkercad.com and then we are going to actually print it in 3D. ▪ Use the plain paper and write or draw anything that you want to illustrate your idea. ▪ You are going to discuss your idea with your group and the teacher and design the object using the online tool tinkercad.com
Conclusion *(about 3 min.)*	▪ Review main points of lesson: ○ We learnt more about 3D printing. ○ Started the design of the 3D object
Follow up *(about 2 min)*	▪ Remote preparation: ○ Continue designing the object using the online tool tinkercad.com ○ 3D print the object