Addressing Learner Variability Through Executive Function as a Preventive Measure for Early School Leaving

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Abstract - The Strategic Plan for the Prevention of Early School Leaving in Malta, (2014) identifies high-quality Early Childhood Education and Care (ECEC) as one of the preventive measures to improve learning outcomes. The Free Childcare Schemelaunched in (2014) led to an increase in the participation of children (0-3 years) in childcare. Furthermore, the responsibility of Childcare Centres (0-3 years) has shifted to the Ministry of Education and Employment to establish an integrated model approach towards ECEC (0-7 years) which includes the acknowledgment of educational attainment for all learners through a learning outcomes framework complemented by an authentic assessment approach revolving around a learner-centred environment. To address individual learner variability, educators also need support to proactively plan and address such needs across learning environments. Universal Design for Learning (UDL) is a framework that is guided by the neuroscience and psychology behind how learning occurs and guides educators to best support ALL learner needs. Rather than waiting for learners to struggle or fail, UDL establishes flexible learning environments that provide accessibility from the outset. By providing multiple means of engagement, recognition, as well as action and expression, educators can promote expert learning to help each individual actualise their potential and understand what serves them best across contexts. One point of focus is to support expert learning by scaffolding and explicitly teaching skills and strategies related to executive function. This awareness and understanding will assist educators to equip young learners with a robust platform for successful future learning impinging on their learning engagement and motivation.

Keywords: early childhood, executive function, universal design for learning, learning process, meaningful learning environments.

I INTRODUCTION

Reducing early school leaving is a top priority for Malta. Notwithstanding that in recent years there has been a declining trend, with a drop of 2.7 percentage point between 2015 and 2018, the proportion of early leavers (17.5%) is still markedly above the EU average (10.6%). According to Eurostat, early school leavers are those aged between 18 and 24 who at most, have only obtained a lower secondary level of education and who are not in further education or training.

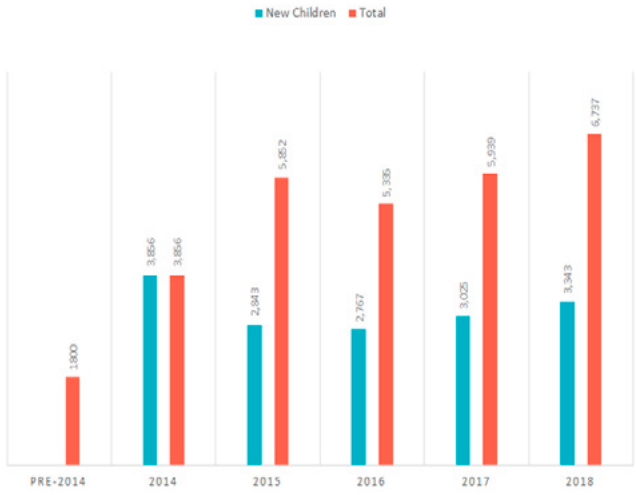
A Strategic Plan for the Prevention of Early School Leaving in Malta was launched in June 2014 (MEDE, 2014a). This strategic plan identifies prevention measures, in particular, to ensure that schooling responds to learner diversity and addresses learner needs from a very young age.

It is becoming increasingly accepted that early years' provision is the foundation of learning throughout life and "early childhood settings around the world serve as societal platforms" (Johansson & Einarsdottir, 2018: 4). There is a consensus that high-quality learning programmes in Early Childhood Education and Care (ECEC) are pivotal for future education and work and for social and relational competences (Ringsmose & Kragh-Müller, 2017; Johansson & Einarsdottir, 2018). Research is showing that children who experience high-quality childcare and early education meaningful learning programmes, perform better in their later years at school,

develop better social skills and display fewer behavioural problems. Inclusive and equitable quality educational programmes in ECEC will nurture a meaningful personal journey of holistic development and promote lifelong learning opportunities for all, in congruence with the National vision of My Journey: Achieving through different paths (MEDE, 2016).

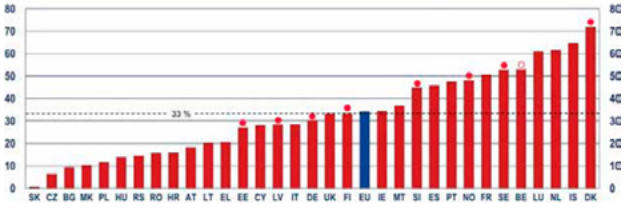
Enhancing the quality of education within ECEC is pivotal to respond adequately to the Framework for the Education Strategy for Malta 2014-2024 (MEDE, 2014b) and to keep up with Malta's commitment to reach the target of reducing Early School Leavers to 10% by 2020 (MEDE, 2014a). Consequently, in 2014, the Free Childcare Scheme was launched to increase female participation in the labour market and this led to a significant increase in participation of children from three months up to three years of age in childcare centres. This impacted a steady increase in the proportion of children below three years in formal childcare (see Figure 1) and it has contributed to Malta reaching the Barcelona target of 33% of children under 3 years old attending formal childcare and which nowadays is above the EU average (see Figure 2). Furthermore, participation in ECEC for children between three and five years is also above the EU average (see Figure 3).

Figure 1: Participation in Free Childcare Scheme



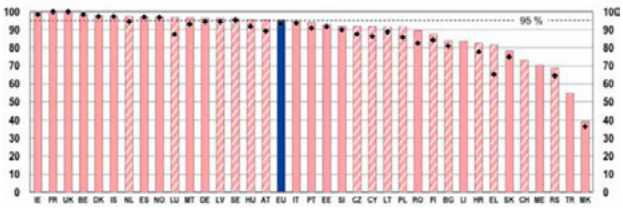
Source: Jobsplus data, 2019

Figure 2: Participation rates in centre-based ECEC of children under the age of 3 in EU, (provisional) 2017



Source: Eurydice (2019) calculations based on Eurostat EU-SILC Survey.

Figure 3: Participation rates in ECEC of children aged between 4 years old and the starting age of compulsory primary education, 2017



Source: Eurydice (2019) calculations based on Eurostat UOE statistics.

Additionally, to reinforce the vision of lifelong learning, from the cradle to the grave, as from 1st July 2016, the responsibility of Childcare Centres (0-3 years) shifted from the Department of Social Welfare Standards (DSWS) in the Ministry for Family and Social Solidarity (MFSS) to the Directorate for Quality and Standards in Education (DQSE) in the Ministry for Education (MEDE). This has formally established an integrated model approach towards ECEC including acknowledging the educational attainment of all learners through a learning outcomes framework complemented with an authentic assessment approach revolving around a learner-centred environment.

It is valid to state that Malta is on the right track in its efforts to effectively put an edge on ECEC as a prevention measure. This paper will shed more light on the concept of a learner-centred environment which views that it is more than just providing information or teaching skills but rather an approach of developing responsible and autonomous learners through positive learner/teacher relationships (McCombs & Miller, 2007). As educators, one must focus on the learner but not at the price of minimising the role of the teacher in the whole process. Both learners and teachers are equally important, and they should be seen as partners in achieving the desired learning outcome. There is a need to complement a learner-centred approach with teacher/learner meaningful interaction through intentional teaching with an understanding of how children learn.

II HOW DO CHILDREN LEARN?

Defining learning is not an easy task. 'Learning' is one of those terms that is frequently used, and seemingly understood ubiquitously, but would be hard pressed to define. We have all experienced it, we usually know it when we see it, and we tend to accept its crucial function in life.

Learning is a complex process and each individual's learning experience may present "as unique as our fingerprints" (Meyer, Rose & Gordon, 2014:49). Models of learning should focus on thinking, feeling and acting (Novak & Gowin, 1984; Johnston, 1996; Jarvis, 2006) and any education that does not address these three human forms of learning will produce unbalanced and, often, disengaged and disenchanted learning. This intricate process involves different mental processes and will develop and change over time. It is part of our being and if one wants to be a contributing citizen in society one

must understand how one learns (Slavkin, 2004; Pritchard, 2018). Coffield et al. (2004:1) ask a very simple question which triggers off critical reflection "How can we teach students if we do not know how they learn?"

Research in neuroscience and elsewhere shows that cognition (thinking), affectation (feeling) and conation (acting) cannot be studied as disparate elements, but one must analyse systems and networks of connections if one wants to understand how learning occurs and empower meaningful and expert learning experiences (Meyer, Rose & Gordon, 2014). Such theories of learning emerge as paradigm shifts to consider learning as a complex dynamic system of networks and mental processes that impact the process of thinking, acting and feeling. Consequently, teachers should be interested and focus on an understanding of the process of learning rather than content acquisition alone so as to increase the quality of their teaching. This will minimise the risk of superficial learning by giving due importance to engage in teaching and learning.

In this premise, to create a learner-centred environment, especially in the early years, one should provide different opportunities and choices for participation that are centred on the learners' interests. However, to be able to do so, one should listen to the voice of the learners by understanding why, what and how learners feel, think and act. This kind of understanding will empower educators to build meaningful relationships with their learners (Bateman, 2016). Educators are encouraged to work collaboratively with their learners to foster curiosity in finding answers to questions in inquiry-based learning environments.

The 'learner's voice' in this context refers to the move to consulting individuals to provide opportunities for learners to voice their opinions about things that matter to them and that affect their learning. The learner's voice helps both the learner and the teacher to better understand how to make learning more meaningful for the learner. Spendlove (2009:76) claims that "learners can provide rich and penetrating evidence and insight into what works well in lessons and what does not." He also suggests that listening to the learner's voice may make the teachers feel vulnerable since it goes against the grain in which most adults were brought up and it gives the learners a kind of elevated status, therefore, creating a students-vs-teachers scenario within the classroom. However, Spendlove (2009:76) explains that this is a misconception and "that just because a pupil says something does not make it correct; what it does is provide a rich insight into pupils' perceptions which can provide incredibly valuable information about their beliefs and misconceptions" and as a result teachers can then plan their learning programme accordingly and more effectively.

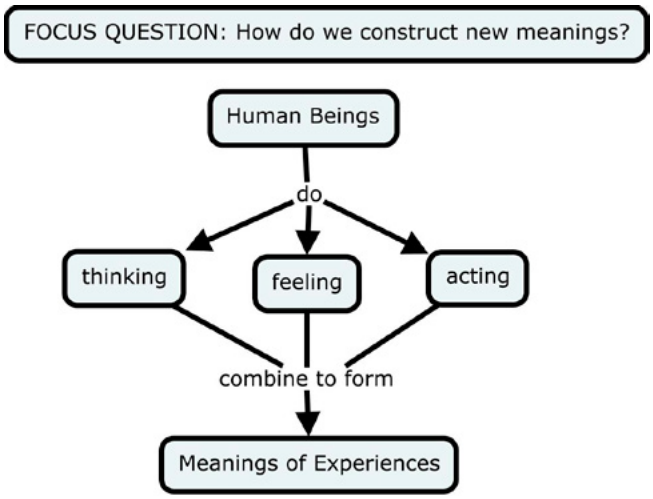
Individual differences or learner variability (Meyer, Rose & Gordon, 2014) in the context of this paper may present itself in the form of various factors such as differing thoughts, feelings and ways of performing (Matthews et al. 2000). For instance, Brain (2000) suggests that while some incoming information is selected for attention, other information may be neglected. Brain's work on how information is received shows that information enters the senses through a 'sensory buffer' where the information is selectively filtered. This selectivity view is also presented in Sousa's (2017) model. The way in which an individual perceives a situation can differ based on a number of variables that can shift or change the point of initiation for that experience. Similarly, affective responses to experiences can physiologically change a learner's performance (Immordino-Yang & Damasio, 2007) and these perceptions are considered as initial points of engagement or disengagement for learning (Meyer, Rose & Gordon, 2014) that can skew a learning experience even before it occurs.

Many theories of learning further distil the emotional and cognitive influences on learning. For instance, Forsten et al., (2006), Dweck and Masters (2008) and Brophy (2010) reveal how learners can interpret and respond differently to learning experiences in the face of challenge. The appraisal of a situation will determine how learners feel about a situation that may impact their performance. Marshall Shelton and Stern (2004) and Smith (2018) also suggest that having teachers who are attuned to understanding feelings, referred to as 'emotional information', would increase the effectiveness of teaching and student learning. Other authors such as Matthews et al., (2000:16) state that there are differences in "stylistic variables such as willingness to respond and preference for speed over accuracy." "Emotions play a major role in behaviour and in human learning since they are at the heart of our personhood" (Jarvis, 2006:177). Novak (2010:30) proposes that "feelings or what psychologists call affect, are always a concomitant of any learning experience and can enhance or impair learning."

It is evident that learning is quite a complex process involving cognition (thinking), conation (acting) and affectation (feeling). Many times, learning theories' literature present cognition, conation and affectation as disparate mental processes. Each of the different learning theories offers insights into the learning process. Nonetheless, some authors refer to an integration of these three mental processes (Novak & Gowin, 1984; Johnston, 1996, Novak, 2010) For example, Seel (2012:17) claims that "it is widely acknowledged that academic achievement is the result of a complex interplay between cognition, affect and conation." Jarvis (2006:23) suggests that as thinking, feeling and acting beings we transform our experiences "through all three dimensions, often simultaneously." According to Novak (2010:132) "meaningful learning must underlie the constructive integration of thinking, feeling and acting if learners are to be successful and achieve a sense of empowerment." Corno (2008:197) claims that "when the full range of conative processes is studied in conjunction with cognition, and when affect is seen as central and not peripheral to performance, human behaviour and performance can be better explained."

This scenario leads us to a realisation that learning can no longer be viewed as a process which involves solely cognition. While learners are going through a process of thinking during learning, they are also doing and feeling. Novak and Gowin (1984:xi) in the preface to their book claim: "Human experience involves not only thinking and acting but also feeling, and it is only when all three are considered together that individuals can be empowered to enrich the meaning of their experience".

Figure 4: Meaning of Experiences (Novak & Gowin, 1984).



Understanding how a child learns by taking into consideration the integration of thinking, feeling and doing, opens a door for the educator to plan meaningful interaction and learning experiences in early childhood education and care that truly capture a personalised learning journey that will serve to generate a robust platform for future successful learning to take place.

III LEARNING OUTCOMES

Malta has recently embarked on a learning outcomes approach as the keystone for learning and assessment. The Directorate for Quality and Standards in Education indicates that "The aim of the Learning Outcomes Framework is to free schools and learners from centrally-imposed knowledge-centric syllabi, and to give them the freedom to develop programmes that fulfil the framework of knowledge, attitudes and skills-based outcomes that are considered national education entitlement of all learners in Malta."

A common good working definition of a learning outcome would be that "a learning outcome is a statement of what a student should know, understand and/or be able to demonstrate after completion of a learning process" (Kennedy, 2009:126; Bernholt et al, 2012:111). One interesting definition is the one put forward by Watson (2002:208) where he defines a learning outcome as "being something that students can do now that they could not do previously….a change in people as a result of a learning experience."

One popular way of constructing learning outcomes is by using the structure as presented in Bloom's taxonomy (Kennedy, 2009; Bernholt et al., 2012). This has provided a scaffold for teachers to follow when writing learning outcomes. However, Hussey and Smith (2002) have criticised approaches to writing learning outcomes that rely on a generic level descriptor such as those based on Bloom's Taxonomy. Allan (1996) argues that learning outcomes limit the students' learning experience or focus on minimal learning. Ecclestone (1999:29) points out that "if unchecked, there is a real danger that uncritical acceptance of increasingly prescriptive, standardised outcomes will create cynical, instrumental attitudes to learning in teachers and students alike and remove critical dimensions of student centeredness."

In the literature, there seems to be one common critique proposed by various authors (Eisner, 2000; Wisdom, 2001; Hussey & Smith, 2002, 2003) that although learning outcomes may be added value to educational processes since they bring more clarity to the learning process, however they will be counterproductive if they serve as fixed prescriptions or recipes or as Eisner (2000:344) puts it "uniformed army of young adolescents all marching to the same drummer." Neuroscience is showing us that our brains are unique, therefore having fixed learning outcomes would not be responding effectively to the reality of today's diverse classroom (Meyer, Rose & Gordon, 2014). One should not regard the learning outcomes as a once and for all but as Wisdom (2001) points out, they should indicate an iterative process that involves both learners and teachers as active participants in their development. Therefore, the use of learning outcomes can add value to the educational process but only if they are used in a flexible way to guide rather than dictate student learning in the early years (Woods, 2013).

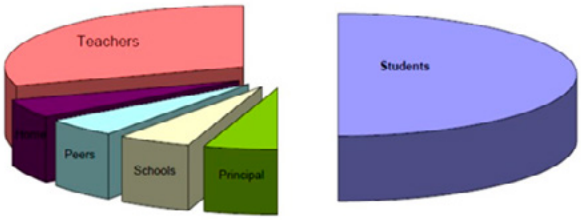
If learning outcomes are used too rigidly, they will limit the unplanned outcomes or what Hussey & Smith (2002) refers to as 'emergent outcomes' that tend to arise during learning moments. These 'emergent outcomes' are extremely important during the educational process, particularly in the early years and promote deep learning (Pianta, 2012; DQSE, 2015, OECD, 2017). This very much depends on the teacher and how adept he/she is in recognising and tolerating these unintended outcomes that emerge as the learners engage with the content and relate it to their own experience and pushes the students over threshold concepts to encourage creativity in thinking. This is in congruence with the recently established learning outcomes for the early years which clearly state "In the very early years, learning outcomes should be conceptualised as a compass not a map: they point in possible directions that children can learn and grow, but do not lay down templates that all children must follow" (DQSE, 2015:5).

Learning outcomes should move beyond the traditional view of focusing on knowledge and skills only to, for example, indicate also affective factors such as developing enthusiasm for learning or the ability to self-regulate (Meyer, Rose & Gordon, 2014). This notion is also mirrored in Hussey & Smith (2003:367) "accepting that student motivation is an essential element in learning, we propose that those who teach should begin to reclaim learning outcomes and begin to frame them more broadly and flexibly, to allow for demonstrations and expressions of appreciation, enjoyment and even pleasure."

Furthermore, Darling-Hammond's (2000) findings from her evidence-based research about the effects of quality teaching on student outcomes reveal that the quality of teaching and teacher education seems to be more strongly related to student achievement and outcomes sought than other variables such as class size, teachers' salaries or students' background. Likewise, Hattie (2003) provides some of the most compelling evidence for the importance of quality teaching through a recent meta-analytic synthesis of the relevant evidence-based research which was drawn from an extensive review of the literature and a synthesis of over half a million studies. This

valuable work identifies the greatest source of variance that can make a difference in the classroom as the teacher, and excellence in teaching is the single most powerful influence on students' achievement (Hattie, 2003:3-4). Hattie's (2003) percentages of achievement variance are represented in Figure 5. This was also asserted by Rowe et al. (1993) where on the basis of their findings it was argued that effective schools were only effective to the extent that they had effective teachers. Moreover, Hattie distinguishes between expert and experienced teachers and identifies one of the five major dimensions in an excellent teacher as being that "expert teachers can attend to affective attributes" (Hattie, 2003:5) by having high respect for their students and by being passionate about teaching and learning.

Figure 5: Percentage of Achievement Variance (Hattie, 2003).



Teaching is very personal and idiosyncratic (Vanhear, 2015) and therefore, teachers need to gain more understanding about the learning process. As a result, they would then be able to select the pedagogical tools and strategies which would work for them in such a way that they would become more engaged and use these with the intention to deliver meaningful learning. The teaching process becomes most effective when teachers plan intentional approaches in response to how students are learning (OECD, 2019). Effective tools and strategies are important but they very much depend on the teachers' commitment and willingness to use them intentionally. It is not a particular strategy or tool that matters most, but the teachers' belief that they are willing to use them with the intention to improve their practice to reach different learners. This is where a paradigm shift needs to occur where a learner centred approach is coupled with teacher/student meaningful interaction emanating from an understanding of how children learn.

IV UNIVERSAL DESIGN FOR LEARNING

The aim of education is to meet the needs of all learners to increase their participation in society and to better themselves for the future. Currently, educators observe a mismatch of learner and environmental fit as systematic variability in learning often adds to the complexity of each individual's learning needs. This has led to an uptick in early school leaving and attrition for learners. To address individual learner variability, educators also need support to proactively plan and address such needs across learning environments. Universal Design for Learning (UDL) is a framework that is founded upon and guided by neuroscience, educational sciences, and psychology relative to how learning occurs with the aim to support educators to proactively plan for ALL learner needs. Rather than waiting for learners to struggle or fail, UDL establishes flexible learning environments that provide accessibility for content, assessments, and engagement from the outset or instruction and learning. By providing multiple means of engagement, recognition, as well as action and expression, educators can promote expert learning to help each individual actualise their potential and understand what serves them best across contexts. One point of focus is to support expert learning by scaffolding and explicitly teaching skills and strategies related to executive function.

Universal Design for Learning (UDL) is a framework to provide scaffolds to design teaching and learning environments that best support a wide range of learners and is guided by the fundamentals of how the learning brain works (Meyer, Rose, & Gordon, 2014). As more individual students began applying for and receiving services in the 1990s to improve learning skills and output, the founders of CAST shifted their focus from individual learning differences to barriers that exist in learning environments. Traditional classrooms and curricula are typically built around text-based materials that are not always accessible to all learners. With the increasing ubiquity of technology available, CAST began to design digital curricula and materials that are flexible from the beginning, rather than needing to retrofit to meet a specific student's needs after a point of struggle. Upon further evaluation of learning environments, not only are students with specifically diagnosed disabilities in need of more flexible options, but all learners can benefit from alternate pathways to meeting learning goal (Meyer, Rose, & Gordon, 2014). Learning goals are pre-established outcomes that educators and learners may define to work toward in any given lesson, activity, or segment of time. Similar to "learning outcomes," learning goals through a UDL lens are also ways in which learners demonstrate their understanding of new concepts or skills.

During the 1990s technology was becoming more readily available and inexpensive which provided an opportunity to design digital environments for learning and ways to show what is learned. This allows for support to those who had not previously been able to participate in traditional learning experiences. Though digital technology is one way to design accessible learning opportunities, it is not the only way. Through years of research and the amalgamation of best practices and studies from the fields of education, psychology, and neuroscience, CAST has developed a set of guidelines that establish intentional and innovative pathways for educators to better meet the needs of all learners. Rather than providing options after a need arises, supports and scaffolds can be integrated directly into learning environments from the start. This is further solidified through the provision of **clear, rigorous goals, along with flexible means** which help to increase self-awareness and the development of skills for learners to increase mastery, confidence, and what is known as "expert learning". Understanding one's self as an expert learner in UDL terms is to be resourceful, knowledgeable, strategic, goal-directed, purposeful, and motivated. The UDL guidelines and framework set out to provide intentionally planned options to allow for the optimal navigation of different learning environments across context and time (Meyer, Rose, & Gordon, 2014). Ultimately, this helps to transform teaching and learning experiences for all.

Over the years, educational institutions have recognised the increasing diversity that is inherent in all classrooms and learning

environments around the world. From a global perspective, when traditionally established institutions make changes in response to diversity, they may fall short due to lack of training, resources, or follow-through. The UDL framework was established as a way to provide more flexible options to accommodate such learner variability and also supports educators in their committed work to serving all learners. Learner variability is simply defined as the uniqueness in how each individual learns (Meyer, Rose, & Gordon, 2014) and accounts for the systematic variability that is inherent in all learners. A number of variables from culture, disability, socio-economic, developmental or social emotional needs can influence how a learner learns. It is undeniable that each learner brings with them a unique set of experiences, strengths and needs that vary depending on the situation and context (Meyer, Rose, & Gordon, 2014). **Learning is variable.**

As a framework that started in the margins of the normal distribution or bell curve where learners may typically fall in one region or another, UDL shifts the focus from individual differences to predictable variability that exists among all learners. Rather than conceptualising learning through a normal distribution, it is imperative that we recognise how variability impacts learning and how learning experiences are context dependent. Learning is interactional and therefore a learner's traits will have an interaction with the environment. Learning environments may necessitate different demands where learners' internal as well as external states can influence learning and performance (Immordino-Yang & Damasio, 2007). Understanding how the environment, expectations, and interactions can shift and change how learners navigate through different learning experiences provide opportunities to increase expert learning (Meyer, Rose, & Gordon, 2014). **Context matters.**

Learning environments can often dictate how and why students will perform or engage in different activities, lessons, or experiences. One of the key tenets of UDL is that the environment can provide structure, support, and flexibility that is proactively planned to allow for learners to access resources, interactions, and different components of the environment that will best meet their needs. Traditionally, education has taken more of a clinical approach where there is a recognised need or deficit that is identified and then some corresponding reaction or response to manage the identified need. At its core, the UDL framework provides a lens to support the establishment of learning environments that have **flexible pathways to reaching rigorous goals**. Such environments proactively integrate supports that are necessary for leveraging learner variability through the activation of the networks of the brain to allow for holistic learning experiences.

V THE UDL GUIDELINES

The UDL Guidelines (see Figure 6) highlight three neural networks that work together to activate learning. Each of these guidelines provides a roadmap to consider how learning occurs. For each guideline, there are three levels of principles that establish opportunities to access, build or practice skills, and ultimately internalise skills and checkpoints within each principle to provide options for learning. The top level of principles, at the access level, provide options that educators can manipulate in learning environments. Further, they provide ways for learners to practice and build their skill sets and eventually to be able to internalise skills that lean toward embodying expert learning skills. Often, educators find that they are already incorporating many of the principles into their teaching. However, UDL challenges to integrate options to promote expert learning skills in more intentional ways. Ultimately, the UDL Guidelines are intended to serve as a tool to design goals, assessments, methods, and materials that provide access to rigorous and authentic learning experiences for all (Meyer, Rose, & Gordon, 2014).

At the internalise phase of the UDL Guidelines (CAST 2018), higher level skills to be developed revolve around providing options to increase self-regulation, comprehension and executive function. These three fit together as learners who increase mastery and comprehension while regulating their emotions can often access and effectively utilise executive function skills. Developmentally, this may look different across contexts and time. However, many of the ways in which executive function is established and strengthened is determined by how the learning environment is established. In early childhood, the learning environment and social interactions become opportunities to strengthen these important skills for learning and life.

Figure 6: UDL Guidelines (CAST 2018).

Udlguidelines.cast.org/CAST, Inc. 2018/Suggested Citation: CAST (2018), Universal design for learning guidelines version 2.2 [graphic organizer], Wakefield, MA: Author.

CAST 2018

A Provide Multiple Means of Engagement

Initially, establishing a safe, comfortable learning environment that minimises threats and promotes self-regulation through the clarity of goals and expectations can help to provide a welcoming space. These clear expectations can optimise motivation while fostering collaboration and community. When spaces are organised, predictable, and clear of clutter, distractions are minimised, and learners can best navigate through their spaces without anticipating irregularity while increasing connection to learning and the community. Learning is incredibly emotion driven and supporting the affective network promotes engagement and motivation for learning. Immordino-Yang and Damasio (2007) have elucidated the connection between cognition and emotion through a neurobiological perspective to show the interconnections of cognition, emotion, and social functioning. The more that environments and educators understand the important role of emotion in learning, the better generalizable skills will be outside and across classrooms. Integrating aspects of social emotional learning increases the likelihood of students using coping mechanisms to better regulate how they are feeling, their focus, attention, cognition, and biophysical responses to stimuli within themselves or in the environment (Reid et al, 2017). In consideration of variability among learners, providing mastery-oriented feedback in conjunction with varying demands and resources to optimise challenge allows for engagement that can be generalised across contexts. As learners interact with their environment, it is critical that they are provided with feedback that is authentic, timely, and accurate to their experiences (Hattie & Clarke, 2018).

Consistent feedback can guide the process of learning as the more mastery-oriented or growth mindset focused feedback will establish a narrative that functions as a protective factor against maladaptive learning or social behaviours. Elliott and Dweck's (1988) early research showed that regardless of the perceived skillset, mastery-oriented response to failure can help to increase motivation and the choice to take on greater challenges in the future while minimising the chances of learned helplessness. For young learners, perceiving their ability to attempt a novel task or lesson can be an access point or barrier to learning. For feedback to be effective, it must be in the context of learning and can have different intents from reframing understanding of something, to sharing information or providing an alternate approach or strategy (Hattie & Timperley, 2007). Feedback is information that guides the learning process and when it provides genuine as well as specific information, it can increase motivation and support future attempts at novel tasks (Elliott & Dweck, 1988). Ultimately, the goal is for learners to utilise feedback in a way that translates into self-assessment and reflection. In addition to providing explicit, master-oriented feedback modelling and explicitly teaching ways to recognise, identify, and regulate emotion is pivotal to establishing a safe and productive learning environment. As educators we have the power to shape environments to promote resilience by the way in which we present, face, and support the interaction with challenges. Teaching mindfulness by way of developing breathing skills to pause, take a breath, and assess what is happening to inhibit before responding to a challenge or stimuli can be helpful across situations. Noticing when a strong emotion or point of distraction occurs can allow a reset, recalibration, or shift in approach to optimise next steps. Susan Kaiser Greenland, Thich Nhat Hanh , and others have developed stories, tools, mindfulness cards, and games that can be practised with young children as soon as they enter the classroom. Developing and practising these skills along with young learners promotes a positive space and community that allows emotion to come up and not take over an experience or space. The development of emotional regulation skills establishes a basis for building executive function and expert learning skills.

B Provide Multiple Means of Recognition

Providing multiple means of recognition establishes access points that create opportunities where learners can utilise different materials to access the curriculum. In a text-based world, especially early childhood, learners need multiple means of representation for symbols, text, and other information are clarified. Integrating multiple means of representation not only shows learners that they are seen and noticed, but that they are respected and understood. At this crucial developmental time point, learners are still finding their voices and figuring out how to best access and learn information. In early childhood classrooms this may look like words and symbols paired with visuals, tactile manipulatives, role playing, modelling, playing, story-telling, problem solving, or information provided in other formats for young, often non-readers. Options for perception allow for learners with and without disabilities to interact with new content and information independently. These options to optimise perception activate the senses to offer ways to customise the display of information, alternatives for auditory information, and alternatives for visual information. Additionally, options for language and symbols promote the opportunity for a shared understanding. These different access points become ways for learners to approach and interact with content and learning experiences in different ways. These options bolster and activate the recognition network of the brain to allow for the generation of new understandings through the consolidation and comprehension of new knowledge. To allow for practice and internalisation of these skills it is imperative to supply background knowledge, highlight patterns, critical features, big ideas, and relationships among new information. A visual display using images and words to make connections using a tool like a concept map can connect one concept to its component parts (Vanhear & Reid, 2014). If a lesson centres around understanding the importance and use of numbers, a concept map can highlight how and where we see and use numbers in our world. From counting buttons in a collection, to using currency to pay for different items of interest, establishing a background knowledge becomes a starting point for new learning. By connecting the concept to real world experiences, for example, seeing, using, or hearing about numbers, helps to maximise the transfer and generalisation of learning across contexts.

C Provide Multiple Means of Action and Expression

The three core executive function skills are not explicitly highlighted in the UDL guidelines, yet, and at the same time components of the engagement guideline and the guideline to support action and expression directly influence the support and development of executive function skills. How learners express what they have learned requires a complex set of skills that allow for the generation and organization of ideas, the establishment of a plan, and execution of that plan while monitoring progress and navigating toward a goal. The UDL guidelines encourage the provision of options that promote physical action or how learners act on what they are learning. Using accessible and flexible tools and materials helps learners to vary the methods for response and navigation through access to tools and assistive technologies when needed or beneficial. These access points provide options for how learners choose to show what they know or have been learning. Further, as learners practice how they express or show what they have been learning options for expression and communication can be provided with multiple media for communication, tools for construction and composition, or ways to build fluencies with graduated levels of support for practice and performance. This level of support relates to how learners can choose from developmentally appropriate options to demonstrate their learning. Early childhood learners can choose to tell a story, construct an image, record their voices, a video, or sequence a series of images to show what they know. For example, if learners explored how a worm becomes a butterfly, they can show what they learned about the steps of that process in many different ways. Images, digital apps, games or image manipulation, using cards with images on them, acting out how the organism changes form, or using another media (finger puppets, stick puppets, etc.) can share the experience they learned and enjoyed together. When appropriate, rigorous, and clear goals are established it allows for planning and strategy development.

In order to best support developing learners, it is imperative that we understand how their brains are growing. The development of the prefrontal cortex, or front part of the brain coincides with the refinement of executive function skills. These are a collection of cognitive

processes that are not automatic and typically require additional forethought through the activation of the core executive functions: inhibition, working memory, and cognitive flexibility (Nigg, 2017 & Diamond, 2013). These skills are not necessarily developed by means of teaching academic skills that may be associated with learning outcomes (e.g. literacy or numeracy). Most of these skills are developed through social, creative, active, and play-based experiences in and outside of the classroom. The goal is both to challenge and support these developing skills without overly taxing them which can lead to emotional fatigue or challenge that may shut down or minimise efforts of learners. From an early childhood perspective, it may seem as though articulating a learning goal is not important due to students' level of understanding, however, by establishing goals that are clearly stated, models how to establish and work toward such goals in the future. Maintaining clear goals and flexible means honours each learner's individual journey and supports their quest to learn more about themselves as learners. Goal setting and planning can be explicitly taught by establishing a schedule or plan for a lesson or the day, thinking about steps it takes to complete a goal, or even component parts of a bigger task. Verbalising the steps and rationale or even an adult thinking about multiple-options increases willingness to try new approaches, especially after the student struggles to complete a task previously. Articulating what is needed (materials, resources, assistance, partnership, time, etc.) along with verbalising which stage of the process you may be in while working through a project, task, or lesson, establishes connections for learners to incorporate with and without support moving forward.

For young children, inhibitory skills help them to wait their turn, monitor physical and bodily control, emotional control, and not acting impulsively. The act of waiting, increasing focus and attention, as well as to have greater skills to monitor how they are doing while helping to increase self-discipline. With inhibitory control comes persistence in the face of challenge, resiliency, problem-solving, and often greater learning outcomes. To support these skills educators can set up their learning environments with minimal decorations on the walls to limit potential points of distraction. Establishing clear expectations for how to be safe and respectful in class, as well as having predictable schedules, places to find materials, and expectations also help to minimise threat and distractions. Playing go-no go games like Simon says, red light, green light, and others all help to promote inhibitory control (Diamond, 2012). Working memory allows for learners to hold ideas in mind and manipulate or use such information in some way. This is important for the development of language skills, monitoring progress, and remembering what needs to be done next or to hold in mind details about the information they are interacting with or hearing through their environment or direct storytelling. Working memory can be developed by following simple, multi-stepped (though not too many) directions, and taking turns. Story reading and telling also tax and supports working memory as details are often delivered auditorily where new information needs to be taken in and held to make sense of the bigger picture (Diamond, 2011). Cognitive flexibility has to do with recognising and understanding that there may be alternate options, strategies, or approaches to accomplishing a task. Often young learners may get "stuck" and shut down if they are not sure how to solve a problem or determine another option to get around a barrier, challenge, or distraction. Even knowing that there needs to be a change taxes executive function skill and allows for an opportunity to support the skill with scaffolds to get there. With exercise and practice, they can get stronger. However, if adults swoop in to support children who may be struggling or are challenged, they may not strengthen their executive function. Without the proper supports or scaffolds, learners may not be building or improving their executive function skills. It is imperative to be patient and show patience with learners who are navigating through learning opportunities, even if they are a bit clumsy upon the first try. Learning is emotional and when learners feel connected, encouraged, and capable (either perceived or accurately) they will take on greater challenges more consistently to improve their skills. When there are biophysical, emotional, or cognitive challenges it can be counterintuitive to learning and may impede executive function skills. If the learning environment is set up to support executive function skill development, it may also minimise stress, frustration, and emotional dysregulation (Diamond, 2013).

Often interventions that have been present in early childhood classrooms like storytelling, movement, art, music, play, using manipulatives, playing or creating music or art, as well as other forms of creativity, problem-solving, and social interactions can be more intentionally focused and supported to strengthen executive function skills (Diamond, 2011). Incorporating joy, mindfulness, collaboration, and helping one another establish emotional and cognitive connections that transform and strengthen executive function and expert learning skills. Ultimately, the goal is to increase confidence, self-regulation, resiliency, and autonomy. One of the common concerns in educational institutions is that learners are limited by their own expectations for themselves (either that great or no efforts are needed to achieve learning success) and that they do not trust in themselves. Nourishing and supporting expert learning skills allow for learners of all ages and stages to have agency around how they navigate through learning environments and utilise flexible means to meet rigorous goals.

Though each of the guidelines highlight options to support different networks in the brain, they are not working in isolation of one another. They are working together to establish cross-cranial connections that activate optimal pathways to learning (Meyer, Rose, & Gordon, 2014). Though each individual may have their own unique path to achieving and finding expert learning, the provision of options and flexibility within a learning environment provides developmentally appropriate challenge and support to promote expert learning. The UDL guidelines and framework ultimately supports educators to support all learners.

VI CONCLUSION

Equitable educational opportunities promote long-lasting, inclusive economic growth and social cohesion (OECD, 2017). Global research and evidence acknowledge the power of ECEC as an entry point to address issues of inequities and social justice. Early childhood is a short span of time in one's life which is critical for individual growth. Early childhood years' experiences have an intense impact due to the unparalleled speed at which the brain develops, affecting learning, health, behaviour and consequently, social

capital and income (World Bank, 2016). In a climate of Sustainable Development Goals (SDGs) investing in early years pays off. It is one of the most cost-effective interventions any country can make to yield the highest economic return in human capital when compared with investments made at later stages in life (Heckman, 2013; Miller et al., 2018).

Malta is putting an edge on ECEC as a prevention measure to address early school leaving. This paper may serve as a stepping stone for educators so that early years' learning outcomes complemented with an authentic assessment approach revolving around a learner-centred environment may be enhanced through a better understanding of how children learn. UDL is a practical framework which may be used in classrooms to create flexible learning environments that respect learners' voices while equipping educators to empower learners' expert learning. By providing multiple means of engagement, recognition, as well as action and expression, educators can promote expert learning to help each individual actualise their potential and understand what serves them best across contexts. This awareness and understanding will assist educators to equip young learners with a robust platform for successful future learning while increasing their engagement and motivation in learning.

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