
Activating the Child's Own Natural Desire to Learn: Using Neuroscience as a Way to Understand Key Issues in Early Childhood Development and Education

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Abstract

Brains are built over time, and the foundations of brain architecture are constructed early in life (Center on the Developing Child at Harvard University, 2016, p. 7). Therefore, the experiences a human being encounters during the first years of their life affect how the brain will develop. Furthermore, this means that aspects of the brain may be reinforced whilst others may be pared down. This evidences the importance of focusing on the educational journey offered to our youngest learners in schools. The introduction of a different approach to a philosophy of education revolving around inquiry-based learning through an emergent curriculum in Malta (MEDE, 2015) has allowed educators to tap into a child-centred pedagogy which allows the development of skills, knowledge, and understanding through active learning. This necessitates, however, an understanding of how learning occurs. The Universal Design for Learning framework may assist in this paradigm, as it provides a neuroscientific and psychological background to the 'why', 'what' and 'how' of learning (Meyer et al., 2014). The narrative inquiry in this research paper will outline the salient links between the science of learning and the creation of a meaningful learning journey, by acquiring and sharing the experiences of a kindergarten educator as a research participant implementing the emergent curriculum, and interviews with two key professionals in the area, linking educational neuroscience to flexible learning environments.

Keywords

Emergent Curriculum, Universal Design for Learning, Primary Education, Neuroscience Education, Narrative Inquiry

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Narrative beginnings

Around forty years ago a primary school in a quaint suburb in Sydney, Australia, offered me the opportunity to learn in a fun, active, inquiry-based, and child-centred way. I have very vivid memories of lessons during which I was asked questions and formulated my own ideas and solutions to learning invitations which were presented to me and my peers. We learnt at our desks, whilst sitting down on cushions, in the yard, investigating in the garden, whilst getting messy or rather creating a mess in our surroundings. As a child I vividly remember feeling excited to go to school to learn, a school which not only became my place for learning but also a place in which I felt I was understood and appreciated as part of a community of learners. However, the day came when my parents decided that it was time for them to return to their country of origin, Malta. It was not easy to adjust to a different educational context which was still evolving from what it was at the time, one which was mostly based on exams, rote learning, and the segmented learning of different subjects. As a ten-year-old child, suddenly, I felt lost and found it extremely difficult to remember what was being taught to me. This deeply affected my educational journey at the time. I became disinterested in learning, which evolved into an internal struggle to prepare myself for exams. There were times when I gave up and just ploughed through the educational system trying as best I could to make it to the end of the scholastic year. It was only at the age of eighteen, after a few setbacks, that I managed to pick myself up, celebrate the achievement that I had managed to get that far, and decide on my future career. I do feel that the foundation I was given during my primary years in Australia sustained that spark within me to thrive and pull through. My mind was set that I would choose education as my profession. I wanted to make a change, at least with the students I would be responsible for. The skills of self-inquiry, self-reflection, and independent learning that I was given as a young child were reignited and hence, I learnt to apply them to my own endeavours as an educator. Many hours were spent researching what I had learnt during our psychology of education modules at university, to continue to understand how children develop and what basic needs should be met for them to be able to acquire skills which in turn would facilitate the acquisition of knowledge. In time, I was also able to apply this on a larger scale, upon being appointed Assistant Head of School, during which time I strived to give priority to the concept of assisting our educators, children, and their parents in acquiring skills which make learning meaningful both at school and at home. It was hard to digest how many children were just being led through the educational system.

As part of this narrative inquiry, I invited three colleagues in the educational sector to converse on the matter of educational neuroscience, brain development, pedagogy and learning. Dr Jacqueline Vanhear,¹ who has studied extensively in the area, gave insight into how we can put these scientific theories into practice; Dr Josephine Deguara² put this into perspective as to how new educators in the early years can apply a meaningful learning experience to their pedagogy; whilst a kindergarten educator, whose name will be Lisa for the purpose of this paper, described her journey as an educator in the early years, her experiences in the classroom, and her knowledge of these various concepts emerging from educational neuroscience. It was most interesting to see how past experiences that each one, directly or indirectly, had during their educational journey also affected the philosophy of teaching and learning they have today.

Brain Development and Learning

So why is educational neuroscience important for creating meaningful learning experiences? Leslie Hart (1983) argues that

Education is discovering the brain, and that's about the best news there could be. Anyone who does not have a thorough, holistic grasp of the brain's architecture, purposes, and main ways of operating is as far behind the times as an automobile designer without a full understanding of engines. (p. 21)

Dr Vanhear, in fact, compares the educator to a doctor who is able to diagnose symptoms in order to determine the underlying illness or injury. With a clear understanding of how the organs of the body work, the doctor will then choose the right medicine for the patients' needs. Similarly, an effective educator would be the one who is cognisant of how learning occurs, with an understanding of children's brain development, and would be able to use different strategies to activate the child's own natural desire to learn.

Rushton (2011) presents four basic principles, in simple terms, which refer to how one can tap into the mental, emotional, social, and physical life of these young beings, by understanding brain development and linking this to learning. Firstly, we must keep in mind that each child has a unique brain which thinks, feels, and learns in different ways. Therefore, one strategy, even if effective for one child, may not be applicable to all children. Secondly, brain development

continuously occurs as one adapts to the environment one is in, and this development is determined by the stimulation offered in this environment. This is most prominent during the first five years of a child's life, during which billions of neurons are being connected for development to occur (Miller & Cummings, 2007). Thirdly, the educator should take the role of the facilitator of a child's learning, during which children learn to learn and are given the opportunity to make choices and take decisions, whilst also allowing their emotions and feelings to be part of this equation. Fourthly, the educator should be using inquiry-based learning strategies linked to real-life, hands-on learning experiences which allow the student to ask questions, assisting the development of critical thinkers and activating the child's own natural desire to learn.

These overarching principles emerge from scientific studies of the brain, hence the terms which may seem overwhelming to some educators, such as "neuroscience and education" (Goswami, 2004), "neurolearning" (Bruer, 2003) and "educational neuroscience" (Petitto & Dunbar, 2004). Horvath et al. (2017) note that it is concerning that there seems to be a lack of transference from theoretical scientific research to effective strategies for teaching and learning in the classroom to positively impact educational development. In fact, Dr Deguara explains that this lack of transference is also evident when comparing assignments which are based on academic research and what is actually observed during teaching practice visits.

Throughout my own experience in education, I have witnessed educators who struggle to resort to research as part of their reflection on their pedagogy and find it daunting to relate research presented to them to practice. From my discussions with these educators over the years it always seemed that what scared them the most were the "big words" included in educational research. In this case it is most likely that terms such as "brain architecture" (Center on the Developing Child at Harvard University, 2021), "executive functioning" (Vanheer & Reid, 2019), and the umbrella term "neuroscience" may be overwhelming to them due to their scientific nature, hindering them from truly grasping brain development, and how understanding what goes on in the brain may assist them in being effective educators. One might realise that, in fact, they might have some of this knowledge ingrained within them, and, in some way, they are already applying some strategies in their pedagogy which are conducive to a meaningful education. However, it is highly important that educators continue to enrich themselves with research conducted and professional

development related to educational neuroscience, to be able to truly grasp the concepts of brain-based learning and applications which will provide them with the information one needs to understand “the engines” that educators are responsible for. Both Dr Vanhear and Dr Deguara stress the need for educators to continuously engage in education and research, as this is where the quality of a teacher comes from. Dr Deguara remarks on her observation of educators who need to reflect on their philosophy of education by seeking literature related to education, instead of merely relying on the action they think is best to be taken in their classrooms. She refers also to a lack of cultural capital and the need to read about anything which may be relevant, as we have children who are interested in so many different things besides creating one’s own training for professional development. Dr Vanhear emphasises the need to read in any way which one deems relevant to oneself. Her observation of educators today is that many might not have the patience to read. With regards to training, she also stresses the fact that those who are preparing educators need to create effective and meaningful methods of transferring knowledge complemented with on-the-ground experiences and nourished with reflective practice. Lisa explains that she does revert to research, mostly when she encounters a situation in which she feels she needs to seek alternative strategies for her pedagogy. In fact, upon the introduction of the emergent curriculum in the kindergarten years, she felt the need to read more about this philosophy of teaching and learning to understand how best to implement it. However, she also feels the need of more continuous applied training rather than simply the transferring of knowledge, which is mostly what she has experienced.

Lighting up the mind

“I hear and I forget. I see and I remember. I do and I understand.” Confucius (Philosopher, 551 BC – 479 BC)

Dr Vanhear explains that the Universal Design for Learning (UDL) presents us with a picture of the brain structure where “thinking” and the acquisition of knowledge networks are located at the back of the brain, “doing” is the strategic network that is manifested in actions and skills and is located at the front of the brain, while “feeling” is related to the affective networks which are underlying both recognition and strategic brain networks thereby affecting both thinking and doing. Research on neuroscience suggests that these three sectors are always interacting at the same time, and neither can be ignored

nor separated from the others. Hence, a child's educational journey should be facilitated through models of learning which focus on thinking, doing and feeling (Novak & Gowin, 1984; Johnston, 1996; Jarvis, 2006). Vanhear and Reid (2019) sustain that any education that does not address these three human forms of learning will produce unbalanced and, often, disengaged and disenchanting learning (p. 4). Lisa speaks of how, for such a long time, education in Malta focused mainly on cognition, as was her own experience as a student, leading her to be reluctant to want to learn. As an educator she understands that the development of thinking and doing are crucial in a child's development, as is also feeling. Dr Deguara also accounts her childhood experience of observing peers being failed by a system that did not recognise these human forms of learning, and frustrated educators not being able to meet their needs. In fact, with the introduction of the emergent curriculum in Malta, priority was given to the development of the senses in conjunction with the cognitive and behavioural development of a child. Rushton (2011) gives an example of two children playing with toy animals which is a common occurrence in a kindergarten class. Whilst playing, several parts of the children's brains are being used all at once through different "neuro-pathways" (p. 92–93), which shows the importance of having interaction, by use of various stimuli through their five senses, and with that which surrounds them. They may be categorising the toy animals according to their habitat, such as those pertaining to the farm, those which are predatory, and those which are domestic. Rushton (2011) explains that light rays enter the eyes' pupils, convert to an electrochemical impulse behind the retina, and follow neurons to the thalamus, which sends the signal to the occipital lobe's millions of cells, each one designed for a specific task (p. 93). This may relate to their shape, colour or shade of colour, or texture, as they also feel the toys with their hands, from which nerves send electrochemical messages to the brain.

This travels up the arm to the spinal column and again to the thalamus. The signal is then sent directly to the motor cortex located midline centre of the brain, which allows the child to place the animal in one pile or another. As the child decides in which pile to place the animal, the prefrontal lobe is also activated, as this is the decision-making centre of the brain. (Rushton, 2011, p. 93)

Feelings and the emotions of a child also affect their cognitive processes. Lisa's experience in the classroom has brought her to realise that if an educator does not attend to the child's emotional well-being, their performance in class will be affected. Dr Vanhear also recounts an experience during which a child in her class

was crying and she sought to find out what was troubling the child, referring to the fact that the educator needs to have an understanding of the learning brain in order to implement the right strategy according to the needs of the child. On the other hand, we still find educators today who disregard or condemn such an exhibition of feelings, without realising that if the child's well-being is not addressed and taken care of, it will affect the child's attention (Vuilleumier, 2005), learning and memory (Phelps, 2004; Um et al., 2012), reasoning (Jung et al., 2014), and problem-solving (Isen et al., 1987). These factors are critical in educational domains because when students face such difficulties, it defeats the purpose of schooling and can potentially render it meaningless (Tyng et al., 2017, p. 2).

A child-centred pedagogy

Dr Deguara stresses the crucial process of the educator building a relationship with the children in class, to understand their needs and create a community of learners. This is also of relevance within the emergent curriculum, as this teaching philosophy initiates from the interests of the child. Harris et al. (2013) describe how this should be promoted from the earliest years of education by focusing on the strengths of a child, whilst making sure that the educator's pedagogy is one which supports student learning, rather than one which is geared towards teaching to cover the curriculum. This also refers to the attainment of milestones within the Learning Outcomes Framework. The starting point should not be how one should teach for students to attain the learning outcomes, but how students need to be supported to reach these learning outcomes. Hence, here emerges the educator's capability and wisdom to identify each child's skills, capacities, dispositions, interests and motivations (Harris, 2013, p. 7).

Dr Vanhear explains that when she herself was an educator in class, she realised that in order to provide a child-centred learning experience, she would plan lessons to include a multitude of ways in which the content is presented in order to meet all the children's needs in one way or another. This would be done whilst keeping in mind the various struggles the children in class may be facing to make sure that these too are being addressed. In view of the Learning Outcomes Framework, which has undoubtedly given added value and clarity to the educational journey of our students, research shows criticism (Eisner, 2000; Wisdom, 2001; Hussey & Smith, 2002, 2003) towards a perspective of using these learning outcomes as an expectation and prescription for all students

(Vanhear & Reid, 2019). This entails that the educators' endeavour to create a "brain-compatible" classroom which also enables the connection of learning to positive emotions is crucial. The most naturalistic way for this to occur is by allowing students to make relevant decisions and choices about their own learning (Rushton, 2011, p. 92).

Lisa recounts her experience of being a young child who was restricted to abide by what the teacher expected. She describes a particular moment when one day she was asked to colour in a picture of a dog. As a young child she decided to colour this dog in different shades of brown rather than the singular shade of colour the teacher was expecting, leading to being criticised by the teacher and told that her picture was "dirty". A child-centred pedagogy also refers to placing at the centre children's wishes, feelings, and experiences. In fact, Lisa expresses the deep disappointment and disengagement this experience had left her with during her educational journey as a student, and yet it was also one of the driving factors which encouraged her to become an educator of the early years: to make a difference. As an educator, Lisa believes that teaching and learning revolves around each individual child in the class, their interests, their own development and how they learn. She sustains that she cannot decide herself what should be done in class. For example, she explains she cannot assume that all the children should and will learn the numbers from 1–10 at the same time, and that is how it should be. Rushton (2011) explains that our emotions are based on different levels of neurochemicals in the brain, namely dopamine and serotonin. Hence, a child's mood and motivation to want to learn and react positively to the learning experience offered to them depends on the impact from fluctuations of these levels of neurochemicals, created by the same learning experience presented to them.

Universal Design for Learning

In view of a child-centred pedagogy, the National Policy Framework for Malta and Gozo in Early Childhood Education and Care (MEDE, 2021) promotes an inclusive learning-friendly environment using a UDL (Meyer et al., 2014), which enhances accessibility and removes curricular, social, and physical barriers towards inclusion (p. 6). This national policy defines UDL as a framework to improve and optimise teaching and learning for everyone based on scientific insights into how humans learn. It equips the educator with an understanding of how learning occurs to ensure that all learners can access and experience

meaningful, challenging learning opportunities by providing multiple means of engagement, recognition, as well as action and expression. Vanhear and Reid (2019) explain UDL as a framework that is guided by the neuroscience and psychology behind how learning occurs and which guides educators to best support ALL learners' needs (p. 1).

In fact, it was interesting to observe that upon hearing the term UDL, Lisa felt unsure about talking about this framework; however, upon delving into a conversation of what it entails, she realised that as an educator she unknowingly applies the principles of this framework. She explained that she strives to provide students with multiple means of engagement, activity, opportunity for expression and recognition through flexible learning environments, which are all important within this framework. Once again, this realisation of how this educator already implements strategies based on this framework shows that our educators need to be given more of an opportunity to understand the transference from theory to practice. However, with a better understanding of this framework, educators would be able to relate this better to executive functioning by presenting learning opportunities to their students, using teaching skills and strategies that are scaffolded and conducive to a meaningful learning environment.

The Universal Design for Learning Guidelines (CAST, 2018; see Figure 1), also referred to by Vanhear and Reid (2019), suggests that any learning experience presented to a child should refer to the "why", "what" and "how" of learning, as they are linked to neural networks that work together to activate learning (p. 10). In our conversations, Dr Vanhear explains how she adopted UDL in her own pedagogy as a teacher, after realising that neither one of these networks could be ignored if there is to be effective teaching and learning. She states how this helped her to plan, think of ideas how to present the content she wanted to deliver, assess what the child has learnt or not learnt in different ways, address the child's feelings, create a safe haven for children in class, and enrich her relationship with them all in a universal way, which in turn means catering for everyone in class. Similarly, Dr Deguara explains that UDL is very relevant since she observes a parallelism with the emergent curriculum, as UDL also considers the different ways that children learn. During our conversations, Lisa and I also discussed this framework quite extensively. Lisa also feels that UDL relates well to a philosophy of education related to the emergent curriculum. In fact, she believes that if a child is struggling to learn, it is not the child's fault. On

the contrary, such a situation implies that the educator should strive to seek alternative opportunities for the child to learn. Hence, an understanding of the UDL framework may well provide such an opportunity, considering all the frameworks it incorporates.

Figure 1

UDL Guidelines



Source: CAST, 2018

The Emergent Curriculum and beyond

The emergent curriculum (Cassidy & Lancaster, 1993; Cassidy & Myers, 1987) is derived from a philosophy of teaching and learning which revolves around specific observations of young children, namely those in kindergarten and before, either individually or in small groups. In such a context the educator plans daily activities based on children's interests in response to observations carried out, with the intent to facilitate the learning and development of each child in the classroom. In Malta, the emergent curriculum was given prominence in the Learning Outcomes Framework (MEDE, 2015) as a philosophy of teaching and learning which involves interactive learning processes where investigations, discussions and active learning are at the core of pedagogy and where reflective practice is promoted.

It was through her doctorate studies that Dr Deguara found the true meaning of the emergent curriculum, as her endeavour was to give a voice to the children in the kindergarten class she was observing, and which communicated mostly through drawing. At that time the emergent curriculum had not yet been implemented in the Maltese educational early years system, but the principles of this teaching philosophy were sustained as she realised how important the image of the child is, and how important it is to get to know them as individuals, whilst focusing on their interests, in order to plan activities and projects for teaching and learning to take place at such a tender age. In fact, she describes this as an obvious way of doing this with children and for children. Most importantly, it is effectively learning about how the child learns (Slavkin, 2004; Pritchard, 2018).

This is supported by Lisa, who experienced the changes in the educational system in the early years from what it was before to the implementation of the emergent curriculum. During our conversations, she gave many beautiful examples of projects done and play experiences which may be offered through this teaching philosophy, which were also mentioned by Dr Deguara, such as messy, sensorial, constructive, kinaesthetic, visual, auditory play, besides role play and creative play. Lisa states that this involved changing her resources, strategies, and the environment in class. However, she explains how she observed the great improvement this is providing for the development of the children in her care, compared to results from previous years. This is something which is expected as, during their early years, children's brains are expanding at a fast rate. Therefore, such opportunities given to children encourage the

connections made within the cerebral cortex (the grey matter of the brain) between more than 100 billion neurons. All this is happening before the child turns five (Miller & Cummings, 2007). It is sad to think that if this was not the case, so many neurons would die if not used. Dr Vanhear agrees that such learning experiences are crucial, especially in the early stages of a child's life, and educators should take the opportunity of the developing networks of synapses and the fine-tuning of neurons in children's brains to better prepare them to navigate through life with skills which would have been already enhanced. Her concern is that our educational system might tend to stick to one teaching philosophy, without exploring others which may be similar or varied, as also mentioned within our Learning Outcomes Framework (MEDE, 2015), examples such as Te Whāriki, The Reggio Emilia approach, Aistear and Solta, which also favour an emergent curriculum or may be an extension of it. Dr Vanhear also refers to the Reggio Emilia approach, as does Dr Deguara, besides the Montessori approach and the Pikler approach. She explains that it is important that an educator understands that the principle of a "child-centred pedagogy" is first and foremost understanding how the child learns, and then using the appropriate approach according to their needs.

Observation

Here we come to the most important task an educator in the early years of a child's development has in the classroom: that of observation. Through my experience and from the conversations I had with Dr Deguara and Dr Vanhear, it emerged that it is still a feat for some educators to observe the children in an effective way. Upon discussing this with Lisa, one understands that it is not an easy task to carry out in a class of a number of three- to five-year-olds with different needs and interests and requiring a lot of attention. However, as Lisa states, if one believes in the importance and relevance of the information derived from observations to provide the educator with knowledge to improve the learning experience they offer to the children in class, then one would make sure to invest time and take any opportunity which arises to carry out observation. Unlike monitoring the class, as Dr Deguara insists, this means that through aptitude, knowledge, and time the educator listens in or participates in conversations with the children during play, asks questions to imbue them with a sense of intrigue and get to know what their interests and opinions are, or at times simply stay a foot away and observe them play. These techniques were also among those described by Lisa with regards to her own observations in

class. Such a task involves making sure one knows what one is observing, and looking for clues such as actions, behaviour, language, and themes discussed which give the educator information about the child. Dr Vanhear explains that the educator then needs to record and reflect upon these observations and use them to the benefit of the child's learning. She recounts a story about a child who was struggling in class, becoming easily agitated and resorting to tapping his pencils on his desk. He was shouted at for distracting the class and excluded from the classroom, making him increasingly defiant, until one day someone took the time to try to understand why he resorted to this behaviour, and he is nowadays one of the best drummers in the world.

This resonates with the need for educators to be able to ask themselves "What am I doing wrong?" or "What can I improve?". Dr Vanhear relates to her own experiences as an educator, stating that when she encounters a situation in which a child does not seem to be grasping a concept, she has learnt to refrain from working herself up or concluding that the child has a problem which is hindering his or her understanding, and rather takes a step back to evaluate what she might be doing wrong. Dr Deguara insightfully suggests that educators have to be mindful of, first and foremost, their knowledge, baggage, teaching philosophy, experiences, and why they have chosen a profession in education, making sure they all relate to the transference of these factors towards a pedagogy which activates the child's desire to learn.

Self-reflection

Self-reflection is a skill which takes time and evaluation to master. Dr Deguara observes that many educators still struggle with eliciting weaknesses during self-reflection. Lisa confirms that self-reflection is not an easy task, especially with time constraints and preparations needed for class projects and related requirements. However, she insists that during a quiet moment during the day she reflects, which might also be a characteristic of the type of person she is. She contemplates on the day in class, what might have gone wrong, what she could have done better, what went well and what could improve. Upon discussing why some educators may find this difficult, she answers that from her experience of school life some may get stuck in a routine of content and methods used, without feeling the need to evolve. Suggestions for reflection help teachers focus on aspects of their teaching that they might otherwise have failed to notice (National Research Council, 2000).

A simple question asked by Coffield et al. (2004) should be the pivot for educators immersing in critical reflection: "How can we teach students if we do not know how they learn?" (p. 1). It is imperative that we as educators understand that we too have a need to be learners throughout our professional journey. All three participants in this narrative inquiry commonly referred to the educator as a researcher. It is crucial that a fire within us continues to burn in pursuit of an understanding of educational neuroscience, of how learning occurs, and of how meaningful and expert learning experiences can be provided to children to empower them through an analysis of systems and networks of connections occurring within their brain, whilst moving away from the idea that the elements of cognition (thinking), affectation (feeling) and conation (doing) can be considered disparately (Meyer et al., 2014).

Conclusion

It is clear that all educators need to seek to identify themselves within the realm of educational neuroscience and make time to get into the heads of their students before plunging in to determining their direction for teaching and learning, whilst keeping in mind their great responsibility for the ability to shape a child's mind. Educators are aware of the changes that take place in children from day to day, month to month. Many of these changes are biologically driven and unique from child to child. Our job is to notice, accept, and modify the curriculum to each student (Rushton, 2011, p. 92).

Notes

1. Dr Jacqueline Vanhear joined the University of Malta in December 2021 as Senior Executive, Quality Support Unit. Prior to this role, she was Director – Quality Assurance Department (QAD) within the Directorate for Quality and Standards in Education (DQSE) in the Ministry for Education in Malta for 7 years, leading a dynamic team with the aim of evaluating and promoting the quality of learners' holistic education provision in Maltese pre-compulsory and compulsory educational institutions. Within its regulatory role, the DQSE is also responsible for issuing and renewing operational licences for educational institutions (0–16 years) and monitoring compliance to national legislation and standards. Furthermore, the DQSE accredits learning and assessment programmes up to MQF Level 3 of academic, applied, vocational and non-formal nature, thereby creating diverse opportunities for all learners and contributing to inclusive and equitable quality education. During her tenure, Jacqueline played an instrumental role in the launching of the National Policy

for Early Childhood Education and Care (0–7 yrs) for Malta and Gozo and the National Standards for Early Childhood Education and Care Services (0–3 yrs). Jacqueline has taught in the early years, secondary and tertiary sectors and coached educators, with a special focus on learning how to learn. She focused her research on how children learn and explored teaching and learning models which facilitate meaningful learning while addressing learner variability. Over the years Jacqueline has written papers and given presentations in these and related areas, as well as published locally and internationally about the learning process, focusing on Let Me Learn, Concept Mapping and Vee Heuristics and collaborating with other passionate colleagues in the field. She has in recent years expanded and integrated her previous knowledge and research with in-depth understanding of the Universal Design for Learning.

2. Dr Josephine Deguara is currently a Senior Lecturer in Early Childhood and Primary Education within the Department of Early Childhood and Primary Education, Faculty of Education, at the University of Malta. Dr Deguara graduated with a Bachelor's Degree in Primary Education from the University of Malta before serving as a primary teacher. Dr Deguara obtained her Master in Early Childhood and Primary Education from the University of Malta in joint collaboration with the Dublin Institute of Technology, Ireland, Oslo University College, Norway, and Martin Luther University of Halle Wittenberg, Germany. Subsequently, she embarked on an academic career where to present date, she teaches undergraduate and postgraduate students. In 2015, Dr Deguara obtained her Doctor of Philosophy from the University of Sheffield, England. Dr Deguara has occupied different roles in researching and working with young children and educators both in the Early Childhood sector as well as in Primary Education. She is a member of the European Early Childhood Education Research Association (EECERA), for which she was country coordinator between 2013–2020, a member on the Editorial Board of the International Journal of Early Years Education, and a reviewer for other international journals in the field of Early Childhood Education. Her research interests focus on curriculum philosophy and implementation, children's rights, play-based learning, the role of the environment as a pedagogical tool for learning, and multimodal meaning-making in early childhood education and care.

Notes on contributor

Janice Darmanin was born in 1978, in Sydney, Australia. Her primary education was based mostly in an Australian church school along with students from various nationalities and cultures. She continued her education in Malta and graduated from the University of Malta with a Bachelor's Degree in Maltese and Early & Middle Years. Her career in education includes being a primary school class teacher, 11 years of teaching Personal and Social Development in the Primary Sector in around 12 different schools, and in 2011 being appointed Assistant Head of School. During this time, she worked closely with kindergarten educators in the implementation of the emergent curriculum, and with educators and parents of the school to improve the learners' educational journey by understanding how they learn. She holds a Master's degree in Applied Educational Leadership with the Institute of Education and is currently holding the role of Manager Research Analyst within the Institute for Education.

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