

**LONDON REVIEW OF EDUCATION**

e-ISSN: 1474-8479

Journal homepage:

<https://www.uclpress.co.uk/pages/london-review-of-education>

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### How to cite this article

Owen, S. and Davies, S. (2020) 'Maintaining an empowered school community: Introducing digital technologies by building digital literacies at Beehive Montessori School'. *London Review of Education*, 18 (3), 356–72. <https://doi.org/10.14324/LRE.18.3.03>

Submission date: 13 March 2020

Acceptance date: 10 July 2020

Publication date: 13 November 2020

### Peer review

This article has been peer-reviewed through the journal's standard double-blind peer review, where both the reviewers and authors are anonymized during review.

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# Maintaining an empowered school community: Introducing digital technologies by building digital literacies at Beehive Montessori School

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## Abstract

In 2019, educators at Beehive Montessori School (Beehive) in Western Australia implemented their self-defined digital literacies framework. The framework guided their approach to, and use of, digital technologies in their classrooms. Doing so came out of a whole school action research project in which the school became a hub for inquiry and educators, and researchers worked together to identify issues and develop improvement processes. At the project conclusion, the educators and researchers had collaboratively defined a solution that met the mandated curriculum needs and fitted with the school autonomy. Most importantly the project and the solution empowered educators, as it aligned with the school-identified virtues and utilized the three-period lesson to teach it, all of which was consistent with Montessori pedagogy.

**Keywords:** action research, critical friend, Montessori, digital literacy, digital technology

## Introduction

In 2019 educators at Beehive Montessori School (Beehive), an independent pre-K-15 school in Perth, Western Australia, implemented their self-defined digital literacies framework and digital technologies guidelines. The framework and guidelines were the product of a commissioned research project run in a partnership between the school and Curtin University researchers. The project was initiated to respond to new and mandated state curriculum requirements, which, in 2017, had altered to comply with new standards in the Australian national curriculum and required schools to use digital technologies in all classrooms and learning spaces. At that time, the Beehive learning spaces for students under the age of 8 were screen-free and very few digital technologies were used. The leadership and the educators were unsure what the changes would mean for their learning spaces or if they wanted to introduce them. The Beehive leadership was also aware that they needed to respond to the new requirements and implement any necessary changes prior to re-registration in 2019. Hence, they decided to commission an action research project to determine whether the educational directive aligned with the school's Montessori philosophy and pedagogy. The research aimed to determine the place – if any – of digital technologies in the Beehive Montessori classroom. Beehive is affiliated with the Association Montessori Internationale (AMI) and follows their philosophy and pedagogy with fidelity, which, alongside their leadership in curriculum development, has helped to earn the school a reputation for delivering an authentic

Montessori education in the international, national and local community of Montessori schools. Maintaining this reputation is key to their recruitment and marketing strategy. Hence, making this determination was important pedagogically and reputationally not only to Beehive, but also in terms of Montessori philosophy: Montessori schools run according to their specific context, the leadership's understanding of Maria Montessori's teachings and their interpretation of education as an 'aid to life'. While Beehive could view and understand how digital literacies were being taught and digital technologies were being used elsewhere, they needed to do so within their particular context. Nevertheless, as educational leaders, the Beehive educators were interested to develop an approach that other schools could adapt to their own context and that might provide new insights for mainstream schools.

This article discusses how in our whole school action research project, Beehive became a hub for inquiry where the leadership team, educators and researchers worked together to identify issues and develop improvement processes. At the project conclusion, we had collaboratively defined a solution that met the mandated curriculum needs and fitted with the school autonomy. Most importantly, the project and the solution empowered educators, as they were consistent with Montessori pedagogy and used the language of Beehive's guiding virtues as well as the method by which they were introduced. In this manner, a digital literacies discourse was produced that was authentic and connected the community: educators, students and carers or parents. Throughout this article, we use the term 'educator' to refer to those teaching at Beehive, as the Montessori context includes early childhood learning spaces and students. The argument that we make is that for change to successfully take place in a school, the process and the *how*, the plan for doing, needs to be driven by the educators as specialist practitioners. The role of the researcher as critical friend is not to impose a methodology or a solution that has no reference within the school and is not generated by and through current school practice. Instead, the critical friend must listen, guide and provide expert advice as necessary to allow the educators to identify a way to approach the problem that is consistent with their pedagogy and practice. A further assertion in this article is that finding a consistent school language that is commonly used by all educators, students and school community members is imperative for the successful realization of the change, as the translation into the language of the community is the act of embedding. Doing so is empowering for the educators and vital for community building.

## **Beehive Montessori School: The educational context**

Beehive is a Montessori school positioned opposite the Mosman Park beach in an inner-city suburb of Perth, Western Australia. The school was established in 1977 for children aged 3–5 years, and in 2017 it celebrated 40 years of strong leadership and growth (Beehive Montessori, 2018). The Leadership team comprises the Principal and Deputy Principal, and they work closely with the School Board to govern and lead the school. There are 18 educators and educational assistants at the school, including specialist music, art and language educators. All educators have undertaken AMI training for the diploma as well as the initial teacher education degree, and many of the assistants have similar qualifications. The educators at Beehive are well regarded in the local community and frequently provide professional learning for other local Montessori schools through the Montessori Teachers Association of Western Australia (MTAWA) and, until it was dissolved in late 2019, they were active in the Montessori Australia Foundation (MAF). The school also houses an after-school care service, and

extra-curricular activities such as martial arts, art, drama and music are held on site after hours. These educators and services cater for approximately 200 learners from 18 months to 15 years of age, and just over 90 families. The school is independent and fee-paying and is a member of the Association of Independent Schools in Western Australia.

The school community is fairly cohesive, in that they are self-selecting and drawn from similar geographical areas and socio-economic groupings. The School Index of Community Socio-Educational Advantage (ICSEA) value for Beehive is 1,182 and the School ICSEA percentile is 99 (ACARA, 2020). The ICSEA formula is socio-educational advantage (SEA) + remoteness + percentage of Indigenous student enrolment. SEA is determined by education level and occupation type of the carers. An ICSEA value of 1,300 for a school indicates a very high level of privilege; schools classified as severely deprived have a value of 500 (ACARA, 2016). The ICSEA value of 1,182 for Beehive indicates a high level of privilege and translates to 81 per cent of students at the school as being classified in the top quarter for socio-educational advantage (ACARA, 2016). There are no Indigenous students at the school, and only 23 per cent of students have a language background other than English (ACARA, 2020). ICSEA was developed by the Australian Curriculum, Assessment and Reporting Authority (ACARA) as a way to compare schools and relative educational advantage. ACARA is an independent national authority with the mandate to collect and collate all the reporting data for schools in Australia, run the National Assessment Program (NAPLAN) and set the Australian Curriculum.

For registration purposes, Beehive must meet the state and national curriculum requirements as set by ACARA and the Western Australian School Curriculum and Standards Authority (SCSA). However, key to a Montessori education is a developmentally appropriate curriculum. Beehive provides this by implementing the AMI Guidelines and Curriculum. Accordingly, the learning environments in the school follow Maria Montessori's planes of development (Montessori, 2004). These four stages of growth are identified by Montessori (*ibid.*) in *The Four Planes of Education* as:

- Infancy, birth to 6 years old: the age of physical independence
- Childhood, 6 to 12 years old: intellectual independence
- Adolescence, 12 to 18 years old: social, emotional and economic independence
- Maturity, 18 to 24 years old: moral and spiritual independence.

At Beehive, Plane One is provided for by the playgroup (18 months to 3 years) and junior primary (3–6 years), Plane Two incorporates middle primary (6–9 years) and upper primary (9–12 years), and the students begin their Third Plane journey in the adolescent programme (12–15 years). Each of the classrooms are given a name that corresponds to their stage. Hence the adolescent programme is *La Casa della Terra* (the House of the Earth), reminding that the pedagogy directs the students to be connected with the land, and so the programme is set on the school farm, which the students manage.

Designed to meet the needs of the child at each stage of development, the prepared environment of each classroom provides a range of sequential activities and materials that entice the learner to engage and explore. The educational spaces are home-like and comfortable. Each contains an age-appropriate kitchen, a bathroom, cleaning implements, tables and chairs for eating, spaces for self-care, reading corners, work spaces, mat areas and the educational materials. The junior and middle primary environments are screen-free. As students progress through the planes, screen and digital technologies are introduced according to their neurological development, and they are fully integrated when they enter the adolescent programme. Students work

in the prepared environment independently or in small groups throughout a 'three-hour work cycle', which enable the student to engage in prolonged and uninterrupted work (Montessori, 1963). Montessori educators are trained to 'follow the child' as they are drawn towards certain activities in the prepared environment, and to guide the student's learning through purposeful activity (Montessori, 1912). The student's voice is centred in their classroom and teaching practice, and Montessori educators are distinguished by their focus on working with, and following the interests of, the child (Montessori, 1949).

To implement the AMI curriculum and meet the state and national curriculum requirements, Beehive follows an agreed alternative curriculum. The alternative curriculum document outlines how they will work within their own parameters to prepare their students. Accordingly, the Beehive alternative curriculum does not follow the Western Australian Curriculum Scope and Sequence order exactly, but it covers each area at the age and in the manner that the Montessori curriculum deems developmentally appropriate. The Beehive agreed alternative curriculum evolved from a collaboration of Montessori school leaders from across Australia who belonged to MAF. Together, they authored the National Montessori Curriculum, which was submitted to ACARA in 2011 and accepted (Montessori Australia, 2011). The curriculum was then taken up by other MAF and Montessori schools across Australia, as it provided a clear methodology to balance mandatory obligations with Montessori pedagogy. On behalf of all Montessori schools in Western Australia, all Beehive educators then worked collectively to map the National Montessori Curriculum to the Western Australian Curriculum and the Early Years Learning Framework, which they submitted to SCSA with their own alternative reporting structure in 2014. The National Montessori Curriculum as adapted for Western Australia has remained in place at the school and has established Beehive as a curriculum leader for local Montessori schools.

The alternative curriculum provides the educators at Beehive with some autonomy in terms of curriculum implementation, and it empowers them to remain true to the tenets of Montessori educational philosophy. However, the changes in the 2017 curriculum provided a significant challenge for Beehive educators, as they demanded that the educators assess their curriculum and their practice and make a judgement as to the place of digital technologies in the junior and middle primary learning spaces.

## The Montessori position on digital technologies

In November 2017, the then principal, Rhonda Sheehan, outlined the *Beehive Position Paper on the Use of Digital Technology*. She opened with the statement that technology is part of the everyday life of children, and 'in this sense they represent a 21st century expression of Montessori's belief that education should be preparation for life' (Sheehan, 2017: 1). The guidance for how that should be done is decreed in the equally important tenet that all Montessori education be developmentally appropriate. Sheehan (ibid.) referred to neurological research that supported 'Dr Montessori's observation that young children ... require real world hands on experiences' and raised the concern that using digital technologies might interfere with 'motor skills' and a child's 'ability to think logically and distinguish between reality and fantasy'. She also indicated her intention to apply for a curriculum exemption in the manner they had done previously by stating that the digital technology curriculum for the early years would be covered at Beehive in middle primary. Sheehan concluded her statement with a reference to the 'home environment'. She conceded that the school could not dictate their use, but she did draw parents' attention to 'a significant body of research

showing links between heavy media use and issues such as lack of sleep, academic challenges, obesity, aggression, addictive and other behavioural difficulties', and so recommended limited use (*ibid.*).

Sheehan's paper confirmed that in her view – and prior to the commencement of the research project – the use of digital technologies for children younger than 9 years old was regarded as inconsistent with Beehive Montessori philosophy and pedagogy. Her position was consistent with the 2013 American Montessori Society (AMS) *Position Statement on Information Technology*, which the school had looked to for guidance. The AMS recognized: 'Using technology is appropriate and desirable for educators and school administrators, and also for a variety of student uses.' However, with respect to student use, technology must be 'Intelligently integrated' and 'not replace any part of the Montessori approach or curriculum' (AMS, 2013: para 6). Some ambivalence was expressed about how much and when, but they recommended to practitioners that they make implementation decisions that were authentic to Montessori pedagogy and that respected children's neural development: 'Using Montessori's methods of observing will help us determine the place of technology in the Montessori world' (AMS, 2013: para 1). The AMS position was taken in response to a debate that started in the US in the late 1990s and asked how Maria Montessori would use – if at all – digital technologies in the classroom (Cichuki, 2006; Love and Sikorski, 2000; Montminy, 1999; Moore, 2006; Hubbell, 2003). The position taken in the literature was that meaningful use was key to good practice when using digital technologies. In 2015 Richard Ungerer, the Executive Director of the American Montessori Society, made explicit some tenets of the statement directives: children younger than 6 years old should have limited to no engagement with digital technologies, and for all others, the interaction should be meaningful and authentic use consistent with Montessori pedagogy (Ungerer, 2015). The AMI endorsed the approach and suggested questions that educators should ask when deciding to use digital technologies: "'Is there a practical purpose" and "Does it offer an alternative approach that exists in no other format?"' (MacDonald, 2015: 3).

While these position papers and the surrounding research addressed the use of digital technologies and screens in classrooms, what they did not consider was how and where digital literacies were taught in the Montessori curriculum. For Beehive, making this distinction and ascertaining whether the foundations for learning some of the principles of digital literacy could be in place if they were not using digital technologies in the classroom was essential for their response to the curriculum authority.

## The project methodology

It was for this reason that the school leadership chose to commission the action research project with Curtin University. While the school had a strong and stated position on digital technology use, they did not have a good understanding of how their curriculum and learning was assisting students to become digitally literate. Doing so was an essential educative component of choices made around digital technology use and when, for example, it can be determined that there is not an alternative approach that exists in any other format. Action research involves educators acting, observing and reflecting to guide future teaching practice (Mertler, 2019; Mills, 2014). It is a dynamic process that engages educators in the process of inquiry, ongoing testing and monitoring improvements of their own practice. Using a cyclic approach, evidence is collected, organized and analysed (Stringer, 2010). Action research differs

from other types of research as everyday experiences are critically examined using a fluid approach, creating knowledge that leads to change (McNiff *et al.*, 2003). The method aims to expand educator knowledge as they examine how students learn in order to formulate best teaching practice. It is a process where the voices of educators and students are heard (Holly *et al.*, 2005). During the action research cycle, the learning is shared with other educators, parents and caregivers, providing an avenue for a common understanding to develop that gives holistic support and creates a sense of belonging to the school community (DEEWR, 2009). When whole school action research is facilitated, the school becomes a centre of inquiry and educators are investigators working collaboratively to identify issues and develop improvement processes (Phelps and Graham, 2009).

Following consultation with the researchers, the school leadership commissioned a whole school project over a six-month time frame and in four phases:

1. Two professional development days during which we introduced the project and ran a number of sessions to identify where and how we could build capacity in the areas of digital literacies and digital technologies.
2. Three action research cycles.
3. Further professional development and trials to define a community language for digital literacy that would determine the holistic approach to digital technology use.
4. Whole school critical reflection workshop and delivery of the findings to the school community.

The research team comprised the lead researchers and project managers, Sharon Davies and Samantha Owen, from Curtin University. Davies specializes in early childhood and STEM (science, technology, engineering and mathematics) education. She has a particular interest in how action research and professional development can produce meaningful change and determine rich educational experiences for all students. Davies led the professional learning around action research and the critical friend. Owen is a humanities and social sciences education researcher who works on 'alternative' education, policy and impact assessment. She also has extensive experience in field research and reflective methodologies. Owen used these skills to co-lead the project with Davies, to work with the school leadership on the project outcomes and to build the professional learning interventions with the Beehive educators. The work of Davies and Owen was supported by Sarah Iles, who is a research associate at Curtin University. She is an experienced educational leader who understands how to lead whole school change and mentor those engaging in it. She is qualified to work in primary and early childhood mainstream and educational support settings. Iles has a particular interest in developing digital literacies and the use of digital technology with children with diverse abilities and needs, and she brought this specialist knowledge into Beehive as she worked with educators as their critical friend.

The research project was guided by two questions: Was the prepared Montessori environment providing the groundwork for students to become digitally literate? Can digital technologies be used in classrooms with students in the first two planes of development? The aim of the project was to find a method consistent with Beehive values to introduce digital technologies to these early learning spaces. The proposed project required whole school participation and had the potential to instigate whole school change – so long as it did not compromise Beehive's pedagogy. Hence, as researchers, we first needed to understand the Montessori position on digital technologies use outlined above. Second, we needed to identify an approach that would empower

educators and enhance their practice, so that we could collectively define a school strategy for holistic development of digital literacies. The approach, arising from consultation and identified needs in professional learning and development days and school and executive meetings, was to collectively identify how digital literacies for students were developed at the school. Once that process was recognized, and a corresponding language established and embedded, then it was possible to identify the role of digital technologies or how they might be introduced.

Using these questions, we approached the research project by seeking to understand how digital literacies developed at Beehive Montessori. Secure that the school pedagogy centred and responded to the voice of the child, our focus was on how the educators would do so in a way that they understood was authentic and consistent with practices across the school. This decision was driven by the results of a study of robotics in the early childhood education Montessori environment by Mollie Elkin, Amanda Sullivan and Marina Umaschi Bers (2014). They sought to identify 'an effective approach for foundational programming and engineering concepts into Montessori education' (Elkin *et al.*, 2014: 154). They found that the key to efficacy was training and integration into existing classroom routines (*ibid.*: 166). Following their findings, professional development and learning was central to our project.

In the case of Beehive, we also identified that we needed to go further than to 'teach' the educators. First, as implementation to change in practice was coming about as a result of an external directive, it was essential that the educators felt empowered in their choice to use or not to use digital technologies in their classrooms. It was necessary if they made the latter choice, as they needed to be able to articulate it on their own terms and in a manner consistent with their pedagogy. Second, and because the Beehive community relied on a consistency of practice across the home and school environments, the educators needed to be able to identify how digital literacies developed in their classroom, the common community of practice language used to express these literacies, and how they applied to the use of digital technologies at school and home. Finally, doing so had to be consistent with the Montessori method: to be shown, to absorb and associate, and then to do, and it was for this reason that action research fitted, because the methodology supports educators to trial their own ideas.

## Action research and the critical friend

To provide educators with professional development particular to their educational environment, educators were asked to critically examine their practice. Iles was appointed as the facilitator for this process in her role as the critical friend: a 'trusted person who asks provocative questions and provides data to be examined through another lens and offers critique of a person's work as a friend' (Costa and Kallick, 1993: 50). The role of the critical friend within an action research project is to maintain a democratic shared relationship between researchers and participants (Foulger, 2010). Equal power between the critical friend and the educators enables shared responsibility for driving the research and achieving the outcomes.

There are three components to the critical friend role: support, challenge and vision. The focus is on collecting evidence. The critical friend provides the educator with support through facilitated discussions or professional conversations (Timperley, 2015). Through these discussions, educators develop actionable knowledge in an environment where ideas and solutions can be explored and tested. The role of the critical friend is to be supportive and encouraging, and to provide an avenue for



educator-led development (Elliott, 1985; Stenhouse, 1975). This guidance is different to teaching or mentoring, where the focus is on making judgements and teaching specific skills with the view to development of teaching proficiency or expertise (Weston and Clay, 2018). Schuck and Russell (2005: 107) state that 'a critical friend acts as a sounding board, asks challenging questions, supports reframing of events, and joins in the professional learning experience'. Within this action research project, the critical friend challenged the educators, encouraging engagement in managing their own observations of practice, reflections and trialling new ways of doing things that can impact outcomes for students. Through these interactions, trusting relationships between the critical friend and educators were forged.

The critical friend works with educators to offer a new perspective or direction that may enable the educator to develop a vision through reflection on their positionality, how their thinking influences their teaching practice, and the transformative learning they experience. Notetaking by the critical friend during visits and discussions enables information to be fed back to educators to clarify understanding and help them to notice their practice, the approaches they take and to make connections. Key to success of this relationship is the rapport that is achieved between the critical friend and educators as they ask educators to reflect on the data collected as it emerges. The critical friend may challenge the educator to take a different direction or approach as a way to assist educators to risk take. This external view of the context by the critical friend can be especially supportive for new educator researchers (Foulger, 2010). By building agency, the critical friend gives the educator the confidence to trial new ideas and raise awareness of practice, and in turn increases metacognition in relation to their own assumptions (Prytula, 2012). During the process, improved practice can be developed through revised pedagogy or new or different processes and resources (Timperley, 2015). For the Beehive project, the critical friend was a project team member and a facilitator at the professional development and learning days. Integral to her role was establishing good relationships with the educators prior to the action research cycles commencing.

## Phase 1: Professional learning at Beehive Montessori

At the first professional development session with the Beehive educators, we focused on relationships and knowledge. To begin, we asked educators to fill in an initial survey to gauge understandings, fears and gaps in knowledge that may need further learning support. Educators expressed high levels of confidence around pedagogy, fear about the potential impacts of screen-based technologies and a lack of understanding of digital literacies and technologies (Owen *et al.*, forthcoming). We followed this with an interactive session on responsive learning relationships to hear more about expectations and understandings. For the rest of the day, we focused on familiarization and professional learning around what digital technologies looked like in classrooms, and how different schools and researchers were using devices. We also introduced action research as a project methodology and outlined the project team roles.

Following the first professional development day, we used the survey and data collected and worked closely with the leadership team to better define the project and the outputs. With the school leadership team, we confirmed that our way of working in the school would be to run an action research project driven by critical reflection, which empowered educators, enhanced their practice and gave them the toolkit to defend their practice or to transform it. The answers to the survey also highlighted that there was not a clear understanding of what digital literacies were and how they were

taught – if at all – at the school. To address both of these, at the second professional development day, a planning and reflection template for recording observations and interactions was introduced (see Table 1). The template asked educators to identify a Montessori lesson, to identify the links to the new digital technologies curriculum or to the Information and Communication Technology General Capability outline in the national curriculum (ACARA, 2015). The educators were then asked to identify how the lesson could be extended and digital technology use incorporated. We also asked educators to add a column (3) to record the digital literacies they expected the chosen lesson to develop. A further post-implementation column (6) asked the educators to reflect on how the digital literacies identified beforehand were actually targeted or developed in the lesson. The educators were also provided with a journal template, and they were specifically asked to journal these lessons.

However, the main focus of the second professional development day was to define digital literacies in the school context. We asked the educators to read key texts, and then to work together to define digital literacy and think about how it applied to their context. At the end of the workshop, we had worked with the educators to identify the ten elements that defined digital literacies in the Beehive context: critical thinking; navigation skills; communication skills; collaboration skills; problem solving; participation in and contribution to civil society; self-regulation and independence; global citizenship; multimodality and innovation; and creativity. The educators were then asked to collaboratively define each of these, and to provide examples of what they looked like or could look like in their classrooms (Owen *et al.*, forthcoming). These examples became the focus of the three action research cycles that ran throughout Phase 2 of the project.

## Phase 2: The critical friend visits

A particular focus of Iles's critical friend visits at Beehive was to support educators to notice, define and record observable behaviours: what students say (words), do (actions) and produce (products). According to Vygotsky (1978), sociocultural perspective connects a child's social interactions to their cognitive development and stresses the importance of quality interactions between children and adults. Recognizing that 'learning is situated in activity and social practice' (Carr, 2001: 19), educators were also encouraged to document details of interactions between students and educators,

**Table 1: Planning and reflection template, digital literacies and digital technology – partially completed**

Name: Aline		Class Name: Terra			
1. PRE - Example from planning [Experience/lesson/activity – exploring manipulation, repetition, frequency]	2. Links to Curriculum	3. Digital Literacy Elements	4. Ideas for extension [Progression]	5. Ideas for extension [links to other DL elements]	6. POST Implementation – reflection based on observation related to DL
Water Testing using thermometer, pH, digital salinity tester	ACTDIP026 ACTDIP025	TBD	Digital data graphs Research waterways on different continents	TBD	

peers and significant others. Information recorded included questions that were asked by students, educators, parents and anyone else in the community. They also took into account gestures, actions and manipulation of objects and materials during interactions.

Iles's critical friend visits took place after the delivery of the workshops and involved one-on-one discussions with the educators and observations in the classrooms. Over the three action research cycles, Iles visited each of the 15 participant educators three times for a reflective discussion. As the critical friend in this research project, Iles positioned herself as an experienced classroom educator with a background in supporting schools to develop their approach to embedding digital literacies and technology use. Her understanding of the action research process, professional experience and knowledge of curriculum enabled interactions with educators to be guided by her experience. Ultimately, the critical friend acts to build relationships and as an agent to facilitate educator development, and this was the role Iles took on.

The first critical friend meeting was a discussion of the template and how the educators were populating and using it. Iles went through with them how, using the amended template, educators were able to sort and theme the data collected related to observations and interactions with students, which gave classroom examples of how students were able to demonstrate their understandings of digital literacies. These included technical behaviours and imaginary play with digital technology (Fleer, 2016). In her fieldwork notes from the first meetings Iles recorded:

Educators are recognising where the DL [digital literacies] links are within learning experiences. Discussions were held with educators around engaging children with the recognition of these so that they are aware of what they are doing and how it fits into their lives and skill development. This will also hopefully make the connections stronger for the educators too.

Guidance was given around the detailed reflections of the 'say', 'do', 'produce' evidence of these DLs. (Iles, Critical Friend Visiting Record, 8 March 2018)

In a follow-up email she then sent to all educators, Iles explicitly asked them to use the template and journal to record the 'digital talk' or language used by students and educators during interactions while using digital tools. Emerging from this came a list of words that could be used as a glossary by educators when working together with the students.

Fleer (2010) discusses the importance of language and discussion to support students' development of concepts during play. The Australian Government's Early Years Learning Framework, *Belonging, Being and Becoming*, notes that effective learners are able to 'transfer and adapt what they have learned from one context to another and to locate and use resources for learning' (DEEWR, 2009: 33). Recognizing that each context is different, patterns may emerge related to what students say, do and produce for each of the key aspects. Further learning experiences are then able to be created based on the observed achievements (Cohrssen *et al.*, 2017). The Beehive educators' completed templates and journals provided worked examples showing ways that educators can provide learning experiences with technology that are balanced and purposeful to allow the transformation of traditional authentic learning experiences.

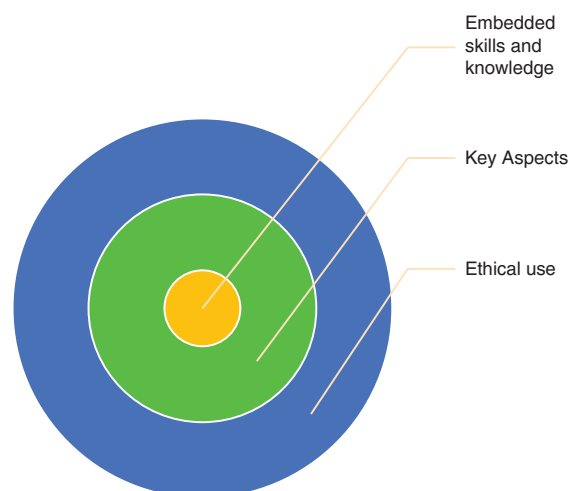
At the conclusion of the first visit, Iles left each educator with an individualized plan to continue with until her next visit. At the beginning of the second visit, Iles ran

an activity with each educator. She asked them to reflect on what learning looked like in their classroom and to represent it visually. She left them with the task of running this as an exercise with the students in their classroom to reflect as a community on how learning happened in their school. When the conversation turned to their individualized tasks, it centred on pedagogy and how the educators were choosing to adopt and adapt the mandated curriculum. In the course of these conversations, the educators made two significant realizations that would form the core of how the school would respond to the new curriculum.

First, they began to articulate where the use of digital technologies would fit into their Montessori curriculum. One group identified that an adaptation could be made to the three-period lesson. In the third period of a Montessori lesson, learners are asked to demonstrate their understanding and apply it – having first watched and then copied the educator in the first two lessons. The third period provided a space in the curriculum for the application and then extension of the authentic Montessori curriculum (Owen *et al.*, forthcoming).

The second significant realization related to the digital literacies key competencies, which the educators had identified and defined in the second professional development day. Using the planning and reflection template, the educators were working throughout the project to collaboratively define these within the school and to give meaning to them on their own terms. At the second professional development day, Davies and Owen had visually represented how the educators had articulated what held relative weight in terms of digital literacies (see Figure 1). For them, it was ensuring ethical use: that the school community was using the technology in a way that built and maintained community and was consistent with their expectations for community citizenship and belonging.

However, what had not come out of the day was an understanding of how ethical use was clearly communicated in the everyday life of the school: how the language they were using helped students to understand that the digital and the material worlds are fluid, that our identity, and our feelings, travel with us into the digital world (Sefton-Green and Livingstone, 2019). The latter was especially important to the educators as they were seeking to help students understand that the standards we apply to face-to-



**Figure 1: Relationship between ethical use of digital technology, key aspects and embedded skills and knowledge**

face communications should remain the same online. In the course of the conversations with Iles, educators discussed how they were building the students' understanding of the digital literacies key elements at Beehive – navigation skills, multimodality and so on – to get them to see where they are using the skills throughout the day and in particular activities. An educator working in early childhood connected the approach to the way they were teaching the school virtues by modelling behaviours and getting the students to see the actual links between the language and the actions. During the third action research cycle, empowerment of educators was encouraged through conversations with the critical friend. Interactions provided opportunities for the educators to be creative and autonomous, and to explore how their commitment to Montessori pedagogy influenced their teaching. The interrelationship between building students' citizenship skills, and the development of digital literacies and the use of digital technologies became central to these conversations.

### Phase 3: A community language for digital literacies?

The link that the early childhood educator made between digital literacies and the virtues taught at the school suggested a clear method by which a non-Montessori approach had been adopted by the school and aligned with Montessori philosophy and pedagogy. This served as a guide for embedding the development of digital literacies and the use of digital technologies in an authentic manner in the Montessori classroom. The virtues to which the educator referred were derived from *The Virtues Project Educator's Guide: Simple ways to create a culture of character* (Popov, 2000). Popov provides a method to teach character education to students and to facilitate what she refers to as 'moral readiness', the capacity to make choices grounded in consistent ethical principles (Popov, 2000: 4). The fundamental tenet of the *Guide* is that to build the foundations for safe and caring communities, we have to empower children to confront problems and to have the strength to solve them. Using the virtues means that when confronting a difficult situation, children and adults ask which virtues apply and which might help. The role of the carer in the Virtues Project is as a guide, authority, educator and counsellor, and when the carer assumes one of these roles, they also adopt the following empowering strategies:

1. Speak the Language of the Virtues
2. Recognize Teachable Moments
3. Set Clear Boundaries
4. Honor the Spirit
5. Offer the Art of Spiritual Companionship. (Popov, 2000: 11)

The Beehive executive selected the Virtues Project as a way of systematically and holistically addressing social and emotional development across the school, and because, in the words of the *Beehive Staff Handbook*, it 'aims to provide empowering strategies that inspire the practice of virtues in everyday life'. The *Beehive Staff Handbook* named the virtues that would be focused on – assertiveness, courage, helpfulness, honesty and so on – and which would be taught throughout a child's journey in the school, and it clarified the method in a Montessori framework.

The educators at Beehive concentrate on a new virtue each month, covering two or three each term. They communicate the selected virtue to parents and carers so that it can be practised and discussed at home – and the language of the virtue can be embedded into the discourse of carers and children. The educators also planned small demonstrations and activities in the classroom, which gave the students the opportunity

Table 2: Digital literacies template with 'Virtues' column added

Top 10 [no particular order]	Key Aspect	Virtues	Embedded skills/ knowledge	Pre-skills and knowledge Observable behaviours in daily life (cognitive, physical, social, emotional)	Using Digital Technologies (DT) Observable behaviours (cognitive, physical, social, emotional in a digital world)
1	Critical Thinking	Assertiveness Confidence Consideration Cooperation Courage Creativity Flexibility Modesty Reliability Respect Trust	<ul style="list-style-type: none"> <li>Evaluate</li> <li>Analyse</li> <li>Reflect</li> <li>...</li> </ul>	<ul style="list-style-type: none"> <li>Analytical skills</li> <li>Critical thinking</li> <li>Evaluating and reflecting on personal/academic achievements</li> <li>...</li> </ul>	<ul style="list-style-type: none"> <li>Applies critical thinking skills to DT use</li> <li>Reflecting on DT use to suit task requirements</li> <li>Analysing DT uses linked to intended outcomes</li> <li>Evaluating products creating using DT</li> <li>...</li> </ul>
2	Navigating Skills	Confidence Cooperation Courage Creativity Determination Excellence Moderation Orderliness Purposefulness Self-discipline Steadfastness	<ul style="list-style-type: none"> <li>Identify sources of information</li> <li>Identify resource locations</li> <li>Identify knowledge pathways</li> <li>Collects data</li> <li>...</li> </ul>	<ul style="list-style-type: none"> <li>Able to find appropriate objects/resources/negotiate pathways and links between object uses and purpose examples</li> <li>Recognise that information gathering requires multiple sources</li> <li>Skills to locate required resources/information</li> <li>Recognises the need to find/source information/resources</li> <li>Knows a range of sources for information/ resources</li> <li>...</li> </ul>	<ul style="list-style-type: none"> <li>Able to find/negotiate pathways and links between within a digital world such as websites</li> <li>Can find multiple online sources</li> <li>Collects digital data</li> <li>Confidence in the use of digital technologies</li> <li>...</li> </ul>

to see the virtue modelled and to make the connection between 'say' and 'do', so that they can 'produce'. The structure for teaching and embedding virtues followed the Montessori three-period lesson, and also the method proposed in our planning and reflection template. Aligning these methodological consistencies suggested a way to introduce digital technologies and build and embed digital literacies in the Montessori classroom in an authentic manner.

At the conclusion of the third action research cycle we ran the third professional development day as a reflect and review session. Our focus was on aligning the educators' values related to students' citizenship and those of the Montessori pedagogy, and to do so we returned to the digital literacies framework we had co-produced with the educators and added a 'Virtues' column (see Table 2). We then asked educators to consider how each 'Key element' or 'Aspect' was expressed in the everyday practice of the school, naming virtues associated with them.

The addition of the 'Virtues' column enabled us as researchers to complete our brief: to find an authentic way to introduce digital technologies into the Beehive Montessori classroom. Understanding that commitment to Montessori pedagogy drove the work of the educators, we concentrated on how digital literacies were developed in the everyday practice of the curriculum in the classroom lessons and activities. Having done so, we needed to identify a sustainable method by which they could be communicated to the community. Through the critical friend conversations, the educators realized the method in the link to the virtues, highlighting that 'ethical use' was their primary driver in the development of digital literacies and the guide for the use of digital technologies.

Hence, the educators had been empowered to self-identify an implementation plan to respond to the new digital technologies curriculum requirements and in readiness for reaccreditation in 2019. Consistent with the school philosophy and the tenets of Montessori pedagogy, the school focus would be on developing digital citizenship in the community through purposeful teaching of digital literacies in the manner prescribed by the Virtues Project, as outlined in the *Beehive Staff Handbook*. Key was standardizing a language or constructing a glossary of terms related to digital technologies and digital literacies expression for the whole school, so that there could be a uniform approach. We suggested that these be reinforced through the development of 'materials cards', which use the language prescribed in the digital technologies curriculum, for example, naming when doing activities related to coding, branching, algorithms and so on, to assist with the implementation in the classroom. When implemented, this essential step would stand as proof that mandated curriculum requirements were met and would increase educator confidence that their decisions surrounding digital technology use in the classroom were driven by, and not in conflict with, Montessori pedagogy.

## Conclusion

We have argued that successful whole school change must be driven by the school pedagogy as it can only be authentic and meaningful when it is consistent with the practices of the educators as specialist practitioners. Our project empowered Beehive educators to enact change process by asking them to critically reflect on their own practices. Through their conversations with the critical friend, they identified an authentic method that had previously been used in the school and utilized existing pedagogical practice. Hence, while the digital literacies framework was defined in the early professional development sessions, it was only in the course of the action research

and through the work with the critical friend that a link to the everyday practice of the school could be articulated and then implemented as a whole school approach. Examples of how to do so in practice were identified in the educator-produced planning and reflection templates, and in their journals, reflections and photo-diaries. The link between the school-taught virtues and digital literacy development is peculiar to the school, and to the community supporting the school, and so becomes a point of difference in the educational environment offered by Beehive. The virtues language is understood by the educators, students at the school and community members. It is congruent with the school language, and shared understanding provided a pathway to empowering the educators and to embedding a new approach to developing digital literacies and the use of digital technologies that was consistent with Montessori pedagogy and fitted the school context.

## Acknowledgements

We acknowledge the commitment, encouragement and help of Debbie McCarthy. We acknowledge the work of Sarah Iles as a research associate. We thank the Curtin School of Education Learning Technology Support team for guidance, and for loaning many iPads to the project. We thank all the Beehive Montessori educators, students, carers and parents for their assistance.

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