

2017 The Premier’s Early Education Scholarship

The role of the digital mentor in early childhood education

Guiding teachers to embed technology creatively in an exploding digital technology market

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# Introduction

The debate about technology use in early childhood education (ECE) has shifted. The conversation has turned to how technology is used in ECE, rather than if it should be used. There is an acknowledgement that young children, in and outside of ECE settings, are now increasingly using digital devices. This acknowledgement has implications for parents and educators and the role of the digital mentor is becoming more important.

Technology use in education is at a crossroads. In choosing how to embed technology into an early childhood program, educators need to apply the same critical reflection and pedagogical decision-making as they would to any other aspect of the program. Educators must choose to understand and make wise choices based on sound practice, rather than being swept up by advertising and marketing claims from app and technology developers.

“Early childhood educators are not un-equipped to be digital decision-makers but often feel ill-equipped.” (Donohue, 2017)

Technology has the capacity to transform education and provide significant learning benefits or act as a digital substitute for traditional experiences. For educational transformation to occur, relationships must remain at the centre of all interactions and educators must engage in pedagogical debate to challenge technology use and look for and allow new possibilities for learning. There is a risk some will uncritically consume technology and allow technology to merely entertain or instruct. Informed educators can use technology as a tool to create and innovate.

What is becoming evident is how bewildering the choices in technology have become. As an example, the marketplace at one conference attended showed the vast array of choice available. Salesmen staffed 385 exhibits, all trying to convince attendees that their product would make school a better place to learn.

"With each marketing season, technology is only getting newer and more unknown…most of us are now relegated to be users and consumers in the rapidly evolving world of digital technology.” (Boyle, Butler, Li, 2017)

On this study tour, in early 2017, I explored the T in Science, Technology, Engineering and Mathematics (STEM). The specific focus is how digital mentors can use technology to strengthen relationships and embed technology use in an ECE setting. Developing digital mentors creates the potential to help educators navigate the intimidating array of digital choice and, in turn, promote practices that will help children explore and innovate.

In context of the report, a mentor is an experienced person in a company, college, or school who trains and counsels new employees or students (Google Dictionary, March 2017). The role of a digital mentor, while perhaps a new term, is similar: to provide expertise and guidance to educators and other adults in digital media usage.

# Focus of Study

Conferences:

* FETC – Co-presenting with Dr Kate Highfield, Quality teaching with technology: Is there an app for that?
* FETC – Future of Education Technology Conference held in Orlando, Florida in January 2017.
* ECSTEM – Early Childhood STEM Conference, hosted by The Children’s Centre at Caltech, in collaboration with THINK Together. This conference took place in Pasadena, California, in February 2017.
* Interviews with professionals engaged in offering teacher training and professional learning at post and undergraduate level.

Site visits:

* Centres visited include: Burly School, Chicago; Catherine Cook School, Chicago; Erikson Institute, Chicago; Ravenswood School, Chicago; Children's Centre at Caltech, Pasadena.
* The Huntington Botanical Gardens and Children's Garden, San Marino, California; Kidspace Children's Museum, Pasadena; Heinz History Centre, Pittsburgh; Children's Museum, Pittsburgh; Carnegie Science Centre, Pittsburgh.

# Significant Learning

The SAMR model for technology integration is a tool that represents how technology can be used to either enhance or transform learning in an education setting.

## SAMR model

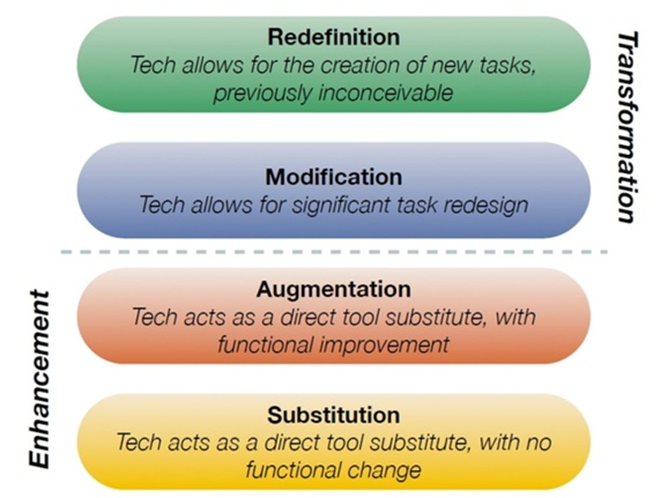


Figure : SAMR model of enhancement and transformation – Image the creation of Dr. Ruben Puentedura, Ph.D <http://www.hippasus.com/rrpweblog/>

### Enhancement

* **Substitution:** Tech acts as a direct tool substitute, with no functional change
* **Augmentation:** Tech acts as a direct tool substitute, with functional improvement

Technology in an education setting is usually introduced at the enhancing level, substituting or replacing old ways of doing something and augmenting methods with digital technologies.

Creating digital music libraries is an example of how music experiences can act as a direct substitute for traditional music experiences. Substituting one form of technology, CDs, for a more updated form of technology, iTunes library. The functional benefits, the augmentation level, include access to your entire music library and mobility, but the experience remains essentially unchanged.

The real benefits of using technology in an education setting begin when we start using technology to transform learning.

### Transformation

* **Modification:** Tech allows for significant task redesign
* **Redefinition:** Tech allows for the creation of new tasks, previously inconceivable

“If we want outcomes to change, we must change the task.” (Apple educator, name unknown)

Continuing to do the same tasks, but doing them with technology, means we are not really implementing change. For technology to really make an educational difference, it must allow learners to do something differently, in ways that traditional methods couldn’t allow.

Using technology for transformation as in the SAMR model involves looking at tasks differently. Technology integration at the redefinition level is the highest form of technology integration. At this level of technology integration, the task couldn’t have been done without using technology.

In an early childhood setting, this level of integration might involve creating puppets and then designing backdrops for the puppet show. The next stage might involve using the props to create a digital puppet shows. Adding scenes and voices to the story so that the show can be revisited, replayed and refined enables continuous learning and improvement to change the experience.

Digital mentors can help educators use the SAMR model as a tool and guide for technology integration, and challenge educators to use technology for more than simple substituting or augmenting experiences and instead look for opportunities to transform and redefine learning opportunities for children.

## The importance of questioning

Educators at Caltech Children’s Centre understand the importance of the question. Throughout the learning environment at Caltech are chalkboards with open-ended questions on them. These questions are for the adults in the space. The question conveys the intention behind the choice of materials and gives an insight into the thinking behind the ‘set up’ of the environment. The question acts as a prompt for staff and is a strategy that communicates the possibilities for learning. Books and other traditional materials are offered beside tech materials. They reinforce the idea that someone else is thinking the same thing and show how tech and traditional materials can be used together.

Karen Worth, a professor at Wheelock College in Boston, reinforces the idea of the importance of the question. Drawing on the work of Francis and David Hawkins (see below) which includes ‘messing about’ and ‘teacher as learner’. Worth encourages teachers to ‘think about the big ideas’, and to look for unified concepts that might, for example, take playing with spinning tops, to an investigation into concepts such as balance or rotational motion.

Worth challenged educators to consider the ‘question’, and how the ‘question’ educators ask can support further investigation, or to limit it. Taking the messing about stage to the next level of intellectual engagement is challenging. The concept of ‘messing’ is explained in further detail below. Typically, the tendency is to question for cognitive acquisition. With the question answered, the inquiry ends. For inquiry to continue, the questions we ask as educators must be rich in exploratory potential. If the aim is to move forward with conceptually challenging ideas, the questions asked of children need to be considered and necessary.

The power of collaboration, where all educators are committed to the pursuit of furthering learning and engagement through considered and open-ended questioning, will support and nurture children’s natural curiosity. Educators, in promoting technology, or any STEM concepts, need to know enough about the subject to question insightfully and allow children opportunities to wonder and test out ideas. Questions like, “What would happen if…?” promote discovery.

A successful digital mentor will understand the importance of the question and in doing so seek to prompt for intellectual, rather than academic, understanding.

## Teacher as learner (Hawkins philosophy)

Early childhood educators know and understand the importance of messing about. Messing about is central to a play-based program. Messing about with technology is an idea to be considered for teachers as well as children. Technology for educators is a new challenge, and more than ever before, teachers need to see themselves as learners. The reality is that many adults currently working in ECE do not see themselves as competent in engaging in STEM activities (*Early STEM Matters* 2017 p.2).

Recommendations released in the new publication, *Early STEM Matters* (January 2017), support the Hawkins idea of ‘teacher as learner’ and the need to provide opportunities for teachers in ECE to mess about with technology and gain even incremental steps towards developing a positive mindset towards using technology as a tool for learning.

Frances and David Hawkins understood that by ‘experiencing play, teachers could develop the routes not only to the answers, but also to the challenges that arise along the way’. The implication for teachers is that they, too, need time and opportunity to engage in hands-on ‘messing about’ activities.

“They understood that to truly teach, you must always be learning.” – Further information is available via [Teacher as Learner.](http://www.hawkinscenters.org/teacher-as-learner.html)

Educators need to be aware of what technology tools are available so that they can choose the most appropriate tool for the task and then take the time to experiment with the technology to develop competence and confidence.

The team at Erikson Institute’s Technology in Early Childhood (TEC) Centre, in Chicago, understands the importance of supporting educators to become more confident and familiar with embedding technology into ECE. To facilitate the idea of teacher as learner, the TEC Centre hosts ‘playdates’ and presentations for educators. As well as facilitating opportunities to further adult learning, the TEC Centre also offers a borrowing system through the TEC Centre Tools Collection. Educators can borrow digital resources and test them out in their own playspaces.

The Fred Rogers Centre in Pittsburgh has a similar program offering ‘tech lending kits’ and digital workshops for educators. This initiative was established to support educators to implement technology in ECE appropriately, regardless of their centre’s financial resources.

The lack of access to digital resources created a challenge for teachers in the Pittsburgh area. The Fred Rogers Centre recognised that “providing digital media and learning workshops to educators without access to these tools is much like trying to teach a cooking class without kitchen tools! This challenge is further complicated by the need for a public way to provide access to these tools.” (Baronti, 2017).

Offering digital lending libraries, coupled with teacher training, increased the accessibility of digital tools and was the first stage of enhancing education through the implementation of tech resources in Pittsburgh and Chicago.

## Professional learning

The digital lending kits offered in both Chicago and Pittsburgh help mentor educators in the selection and implementation of technology. Educators who have evaluated the pedagogical appropriateness of the digital tools selected have made informed choices about the kits’ content.

Preconditions for successful digital mentoring include learner access to the equipment and mentor expertise with the approved or preferred equipment. When a program meets these conditions, a community of practice can be established. A successful community of practice and its participants are a valuable reference, building confidence and awareness. Its community of learners has the potential to become a community of practitioners who, with support, can complete the circle and themselves become mentors.

Just having access to tech materials is not enough. The Pittsburgh Check-Out Tech Kit program found that, while the lending program was effective in increasing access to technology, access with support was required to ensure best practice. Review of the program after the first year confirmed that access also required ‘support, informal training and guidance for early educators on the best use and practices with technology tools and digital media.’

Haines (2016) stated that *‘*We learned that having access to the tools did not necessarily equate to best practices.’

The lessons learnt in Pittsburgh have implications for other ECE communities that offer digital devices. A program intending to enhance the curriculum by increasing the access to technology tools must also mentor the educators through both formal and informal training. Access to technology tools/toys and mentoring need to go hand in hand.

## Mobile Device Management (MDM) system

Rouse (2013) states, ‘the intent of MDM is to optimise the functionality and security of mobile devices within the enterprise, while simultaneously protecting the corporate network.’

Managing mobile devices is a bewildering and intimidating task. Managing the set up and configuration of devices and apps often results in a fear of messing up or ill-informed choices. Cassandra Stewart, Apple District Resource Teacher in Volusia County, Florida, USA, stresses the importance of having a system for managing mobile devices. Stewart (2017) stressed the need to find the right system for managing even small ‘fleets’ of devices. Typically, which system is chosen depends on the number of devices being managed.

Children play with a mobile device without fear of making a mistake, but adults are all too aware of doing something that will potentially have serious consequences. An MDM can help to manage concerns and allow opportunities for educators to take risks without the fear of leaving a feature on that should have been turned off or making a mistake.

At an organisation level, an MDM is one way of implementing a form of digital mentoring that supports educators and encourages them to take a risk. Children, and educators, can safely explore when they know settings can be easily recovered.

The rationale behind the implementation of an MDM is to ensure the quality of engagement, control and security of Apple iPads and similar tablet devices.

An MDM provides the opportunity for educators to suggest and discuss possible new apps. Educators can critically reflect on a suggested app and add it to available apps if it meets the agreed level of quality and organisational ITC Policy.

## Makerspace

In 2014, President Obama added to the momentum of the Maker Movement by saying, “I am calling on people across the country to join us in sparking creativity and encouraging invention in their communities.” (White House, 2014)

Makerspaces are being embraced around the world, not just in the ECE settings, but also in schools as the role of creating and making in an education setting continue to be explored. “Think it, make it” is the catch phrase (Poole, 2017).

“A makerspace approach values individuals moving in and out of a space freely.” (Halverson, et al, 2014)

The makerspace concept is about developing collaborative learning spaces that have an emphasis on doing. Digital materials and robotics coexist with loose parts, such as cardboard, timber offcuts and other recycled materials. Tinkering is the activity that is encouraged in a Makerspace.

The Maker Movement is the perfect way to integrate STEM concepts and specifically a way of making visible dispositions for learning. When engineering habits of mind are added, and the idea of making things, and making things better, the potential for learning is even greater.

Successful technology integration requires a high degree of creating as opposed to consuming. An attitude of tinkering, within a makerspace, allows opportunity for testing out ideas, working collaboratively and dealing with failure.

## Embedding technology in an ECE classroom/playspace

In a classroom/playspace where technology is embedded, it is possible to see iPads, screens and robotic toys dispersed through a room.

In a tech-embedded classroom/playspace, you may see:

* coding toys such as Bee-Bots sitting on shelves alongside other wheeled toys, and being used with loose parts and blocks in construction activities
* screens and cameras sitting beside a painting easel, and children referring to the images displayed to create their own works of art
* a green screen set up in the corner of a room, acting as a space to record and create movies that reflect the current theme of the dramatic play area or specific project-based interest
* another screen which allows for the co-construction of knowledge and sharing of information between groups of children.

Relationships matter in a classroom/playspace where technology has been embedded, and you almost have to search out the technology to even realise it is there. In a classroom/playspace with embedded technology, it is not about teaching how to code or how to use a green screen. It is more about knowing these tools are available and then understanding how and when to use them with children.

“When the focus of children’s technological engagement is limited to giving them access to the stuff of technology rather than to the thinking of technology, children’s capacity to learn and to wonder are neither respected nor served.” (Boyle, Butler, Li, 2017)

To successfully embed technology into a classroom/playspace, educators need both knowledge and resources. Educators need in-service and/or training in how to use technology resources to maximise the possibilities of technology integration. Educators need an understanding and awareness of what technology tools are available, so that they may choose the most appropriate technology tool for the task.

A quote from Erin Stanfill from Burley School Chicago sums it up with words for us to ponder… “Have the need, find the tool.”

## Mistakes happen

Astronaut John Herrington was the first enrolled member of a Native American tribe to fly in space. Herrington spent time on the International Space Station in 2002. In 2014, he gained his Doctorate in Education, with a specific interest in helping young children retain or gain an interest in STEM.

When Herrington talks about his time on the Space Station and the journey that led him to become an astronaut, he reinforces the need for hard work but also the importance of being able to tinker and solve problems. His story is one of mistakes, but he didn’t let his mistakes define him and instead had a solutions focus to the problems he faced.

Mistakes will happen when you use technology. There will be times that technology will frustrate you and you will want to give up.

Our role as teachers of young children is to inspire the next generation of astronauts to ‘think outside the box’ and be prepared to take a risk without the danger of being 220 miles above the earth.

## New reports

Two new reports were released in the USA in January 2017: *Early STEM Matters* and *STEM Starts Early: Grounding Science, Technology, Engineering and Math education in Early Childhood.*

These new reports are highly regarded in the sector and come with guiding principles and recommendations for teachers and administrators. Central to the recommendations is teacher education and the need for educators to be equipped to support, guide and nurture children’s natural curiosity in STEM. If adults are to be effective guides, there is a need for both interest and understanding in STEM subject matter.

# Conclusion

“If we teach today’s students as we taught yesterday’s, we rob them of tomorrow.”   
(Dewey, 1944)

Technology integration has the potential to transform education and offer opportunities for learning previously unimagined. The SAMR model for technology integration as a reference, affords educators the opportunity to integrate technology in ways far beyond simply substituting traditional activities onto a digital platform.

Educators must therefore pursue opportunities to dwell in spaces that value competence and courage; that recognise the potential of teacher as learner, guide and mentor. These professional pursuits support the exploration of new terrains of learning, a topography of digital landscapes with many wonders and challenges. The initiation and support of successful technology integration requires a high degree of creating as opposed to consuming. Educators must insist upon an attitude of tinkering and begin to consider the notion of a makerspace as integral to the early childhood environment. This concept endorses creativity and exploration and encourages both children and adults to recognise the value of intelligent materials. Educators as digital mentors must establish clear expectations toward learning outcomes and proactively participate in the teaching and learning process. Provocative questions need to be considered and necessary to prompt intellectual engagement as opposed to academic understandings.

Informed digital mentors and educators require resources, time and professional learning opportunities. Creating a thriving culture of exploration and collaboration, where mentors and educators develop leadership capacity through a relationship with their own mentor; and the insights, and professional lens of colleagues and collaborators. A professional learning community needs to be crafted to buoy, challenge and support the learning potentials of digital mentors through the layered complexities of technology integration in early childhood spaces

It remains an imperative that educators facilitating the seamless integration of technology in education must apply the same critical reflection and pedagogical decision-making as they would employ in all aspect of curriculum construction. It is encumbered on educators to remain true to the tenets of sound early childhood pedagogy while embracing the promise of a technology integrated learning environment.

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