2.2

DLTV JOURNAL

The Journal of Digital Learning and Teaching Victoria

Volume 2 | Number 2 | 2015 | ISSN 2205-3611 (Online)

Digital Learning and Teaching Victoria

Contents

DLTV Journal
The Journal of Digital Learning and Teaching Victoria

Publisher

Digital Learning and Teaching Victoria
Statewide Resources Centre
Level 2, 150 Palmerston Street
Carlton VIC 3053 Australia
Phone: +61 3 9349 3733
Email: office@dltv.vic.edu.au

Invitation to send contributions to

publications@dltv.vic.edu.au

Digital Learning and Teaching Journal is published as a resource for all educators engaged in the effective use of information and communication technologies for teaching and learning.

The editors welcome contributions to the bi-annual issues from classroom teachers and other educators in the form of articles, reports of school-based projects and other reviews. Text and graphic files may be submitted to publicatons@dltv.vic.edu.au

Submission date for next issue: 19 September 2014

The journal is published by Digital Learning and Teaching Victoria, the new association formed from the merger of the Victorian Information Technology Teachers Association (VITTA) and ICT in Education Victoria (ICTEV).

Editorial

Dr Michael Phillips and Dr Michael Henderson
Faculty of Education, Monash University

Welcome to the second edition of the DLTV journal for 2015. We are pleased to bring you another bumper edition of the journal that provides you with insights into the ways in which teachers are using digital technologies as part of their classroom practice in a range of contexts. Effective integration of educational technology to enhance teaching and learning is a complex and challenging task and many people have developed theoretical frameworks that attempt to explain how teachers do this in different contexts. One very popular theoretical framework is technological, pedagogical and content knowledge or TPACK.

TPACK is a well-known theoretical framework that has reshaped contemporary understanding of the forms of knowledge required by expert teachers. Following Mishra and Koehler's (2006) reconsideration of Shulman's (1986) delineation of teachers' professional knowledge, hundreds of studies have examined the interplay between these aspects of knowledge (for example, see: Kereluik, Casperson, & Akcaoglu, 2010; Meagher, Ozgun-Koca, & Edwards, 2011; Schmidt, Baran Sahin, Thompson, & Seymour, 2008), attempted to describe and define the overlapping components of the framework (Cox, 2008; Graham, 2011), measure the knowledge levels of pre-service (Albion, Jamieson-Proctor, & Finger, 2010) and in-service teachers (Doukakis et al., 2010), considered the order in which teachers should develop different aspects of their TPACK (Hofer & Grandgenett, 2012) and recently to consider the ways in which TPACK may be distributed between teachers (Di Blas, Paolini, Sawaya, & Mishra, 2014). While all of these studies have contributed valuable insights into the knowledge required by expert teachers using technology, the vast majority of work has examined TPACK from the outside looking in - considering what goes on inside the three overlapping circles that are commonly used to represent TPACK and shown in Figure 1.

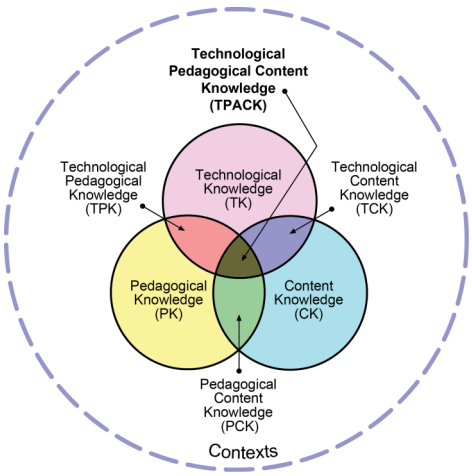


Figure 1: The TPACK framework from http://tpack.org/

This paper aims to not only draw together some more recent thinking that suggests a shift in focus to more closely examine what occurs outside the circles by paying closer attention to the contexts in which TPACK is developed and enacted but to also highlight some significant challenges which remain when considering teachers TPACK development and enactment.

Context: exploring a contested term

Drawing on a long history of contextual references, Burke (2002) highlighted that context is a term that has become more common in research 'in the last thirty or forty years' (p.152). The increasing frequency of 'contextualised studies' can be found in a range of disciplines including, but certainly not limited to, research of 'legal context[s] that helps to determine which rules should be applied in a particular situation' (Banakar, 2015, p. 78), changes in social dynamics in a global context (Martin, Warren-Smith, Henry, & Scott, 2014), architecture in context (Bogoni & Lucchini, 2011), and educational research which is increasingly focussed on 'studying individuals and groups in context' (Tabak, 2004, p. 225).

Described by some as a 'contextual turn' (Lawson, 2008, p. 584), a focus on the conditions and circumstances of events has resulted in refined understandings of many phemomena; however, the increased contextual focus has also led to a number of problems. For example, Burke (2002) suggested 'there is a price to be paid … the inflation or dilution of the central concept, which is sometimes used - ironically enough, out of context - as an intellectual slogan or shibboleth' (p.152). More particularly, Turner and Meyer (2000) indicate that educational researchers 'have developed a folk definition of context that we think we all understand but truly do not use coherently or cohesively' (p.83). In response to this issue, they suggest:

> we do not need a larger research base that presents as a basic principle that 'everything depends on context.' Instead we need to explore what it means to create a learning context and how or whether processes become context specific. (Turner & Meyer, 2000, p. 83)

While the challenges associated with the development of a general understanding and application of the term 'context' have been outlined for a number of years, the 'messiness' of the term, in particular understandings of how or whether processes become context specific, continues to plague more recent theoretical developments including TPACK. Burke (2002) discouraged researchers trying to find a new term (or set of terms) to replace context as this, he argues, would likely create new problems in turn. Alternatively, he suggests 'it is more realistic to employ the word in the plural, to place it mentally in inverted commas, and then to do our best to contextualize it, in all the many senses of that term' (p. 117).

TPACK and 'contexts'

One reason why TPACK acquisition and development (and PCK before it) have proven so difficult to measure is that knowledge must be acquired and exhibited in specific contexts. Mishra and Koehler (2006) acknowledged the influence of context on teachers' TPACK enactment stating:

> the core of our argument is that there is no single technological solution that applies for every teacher, every course, or every view of teaching. Quality teaching requires developing a nuanced understanding of the complex relationships between technology, content, and pedagogy, and using this understanding to develop appropriate, context-specific strategies and representations. (Mishra & Koehler, 2006, p. 1029)

The importance of context was also discussed by Cox (2008) who concluded that 'the effect of context is that TP[A]CK is unique, temporary, situated, idiosyncratic, adaptive, and specific and will be different for each teacher in each situation' (p.47) therefore suggesting that 'any true example of TP[A]CK must necessarily include the context of that example' (p.48). Despite Cox's (2008) recognition of the importance of context, her extensive literature review revealed that much of the published research examining TPACK focused on measuring or defining forms of knowledge that are part of the TPACK framework and paid less attention to the context in which the TPACK is developed or enacted.

Cox's findings (2008) were substantiated by Kelly's (2010) content analysis of TPACK research which reported erratic inclusions of context in TPACK research conducted between 2006 and 2009. Subsequently Rosenberg and Koehler (2014) conducted a comprehensive content analysis of peer-reviewed journal articles between 2005 and 2013 and found that only 36% of published TPACK papers considered context, and that when context was included, classroom and school aspects and those related to teachers were more common than those related to students and society. One may argue, therefore, that the 'contextual turn' described by Burke (2002) which is evident in other areas of academic research is not consistently apparent in investigations of teachers' TPACK.

In addition to this inconsistent consideration of context in TPACK research, Porras-Hernández and Salinas-Amescua (2013) argued that 'the original TPACK framework is limited in that it defines the contexts in which teachers work too narrowly. In fact, the majority of published work refers to the context element in a rather general manner' (p.224). In contrast, drawing from the conceptual framework from Porras-Hernández and Salinas-Amescua, Rosenberg and Koehler (2014) provided a revised, particular definition of context in relation to TPACK and indicate that context can be considered as 'the conditions around the knowledge and activities of teachers' (p.2619).

While this clarification of the notion of context provides some sense of direction for researchers, we believe the broad notion of the 'conditions around the knowledge and activities' may be enhanced by further consideration and refinement. Previous research has considered the notion of 'conditions' from a variety of perspectives including factors inside the four walls of a classroom including 'the school environment, the physical features of the classroom, the availability of technology, the demographic characteristics of students and teachers including prior experience with technology' (Kelly, 2008 as cited in Cox, 2008, p.47), the broader socio-political conditions that exist within school workplaces (author 2013, 2014) as well as systemic conditions associated with pre-service teacher preparation (Albion et al., 2010). The variety in these different contexts is reflected in Rosenberg and Koehler's (2014) coding frame that categorises micro, meso or macro contextual levels; however, this characterisation of context amplifies additional challenges for TPACK researchers.

One of these significant challenges centres on the ways in which researchers might consider how knowledge *and* activities of teachers are dialogically linked to the contextual conditions that surround them. While context arguably shapes teachers TPACK development, there is also a strong argument to suggest that context shapes the enactment of this knowledge (for example, see the discussion regarding pedagogical reasoning and action in Shulman, 1987). Prior research has also shown that the relationship between knowledge and practice is not unidirectional, but additionally researchers need to consider the ways in which teachers also shape their context (An & Shin, 2010; Banister & Reinhart, 2011). Thus, context may be better defined as both influencing and being influenced by teachers and their activities. For this reason, scholars have argued that context cannot be fully separated from individuals (Tabak, 2004).

The distinction between teachers' TPACK and their practice is unclear: By practice, we refer not only to the things that teachers do to facilitate learning, but also a broader definition that encompasses the teacher, their identity, and their community, aligning with sociocultural views of participation in practice (Grossman et al., 2009; Wenger, 1998). Knowledge development and the enactment of that knowledge in contexts remains an under-theorised aspect of TPACK research. For example, few researchers have published empirical studies which examine the intricacies involved in teachers' TPACK enactment in situated workplaces such as schools. In such contexts, teachers' knowledge may not arguably change from one hour to another on any given day yet the way they enact that knowledge in different classes over the course of that day

may look entirely different. While some of this may be explained by micro-contextual factors such as the age of the students in any given class, there are a significant number of other mes- and macro-level factors which also shape teachers' TPACK development *and* enactment. Taken together, the challenge is to consider teachers' knowledge, practice, and context as entities individually important for understanding and supporting teachers' efforts to integrate technology into their teaching, and to consider how these entities are woven together to explain what teachers think and do.

Some initial steps have been taken to address this challenge and empirical research (Phillips, 2014) has been conducted using Wenger's (1998) Communities of Practice (CoP) as a theoretical frame. Findings from this investigation have resulted in an elaborated representation of TPACK enactment in a CoP that suggest context may be better thought of as processes of identity development and practice as illustrated in Figure 2.

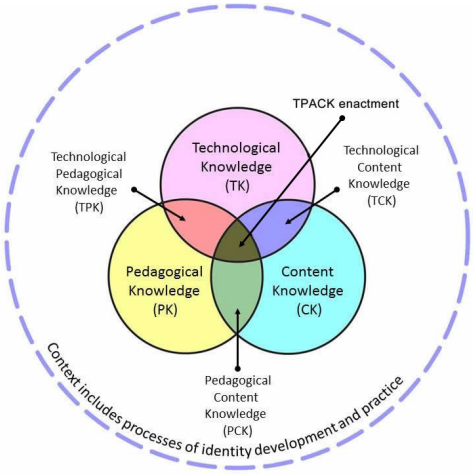


Figure 2: An elaborated representation of TPACK enactment in a CoP (Phillips, 2014, 2015).

We hope you enjoy this edition of the DLTV Journal and trust that the knowledge you develop from the many and varied articles provides you with the opportunity to enhance teaching and learning in your context.

References

Albion, P., Jamieson-Proctor, R., & Finger, G. (2010). *Auditing the TPACK Confidence of Australian Pre-Service Teachers: The TPACK Confidence Survey (TCS)*. Paper presented at the Society for Information Technology & Teacher Education International Conference 2010, San Diego, CA, USA. http://www.editlib.org/p/33969

Banakar, R. (2015). On the Paradox of Contextualisation *Normativity in Legal Sociology* (pp. 77-97): Springer.

Bogoni, B., & Lucchini, M. (2011). *Architecture, context, culture:* Alinea Editrice.

Burke, P. (2002). Context in context. *Common knowledge, 8*(1), 152-177.

Cox, S. (2008). *A conceptual analysis of technological pedagogical content knowledge.* (PhD), Brigham Young University, Provo, UT.

Di Blas, N., Paolini, P., Sawaya, S., & Mishra, P. (2014). *Distributed TPACK: going beyond knowledge in the head.* Paper presented at the Society for Information Technology & Teacher Education International Conference.

Doukakis, S., Psaltidou, A., Stavraki, A., Adamopoulos, N., Tsiotakis, P., & Stergou, S. (2010). Measuring the technological pedagogical content knowledge (TPACK) of in-service teachers of computer science who teach algorithms and programming in upper secondary education. *Readings in technology and education: Proceedings of ICICTE*, 442-452.

Graham, C. R. (2011). Theoretical considerations for understanding technological pedagogical knowledge (TPACK). *Computers and Education, 57*, 1953-1960.

Hofer, M., & Grandgenett, N. (2012). TPACK development in teacher education: A longitudinal study of preservice teachers in a secondary MA Ed. program. *Journal of Research on Technology in Education, 45*(1), 83-106.

Kelly, M. A. (2008). Bridging digital and cultural divides: TPCK for equity of access to technology. In AACTE Committee on Inovation and Technology (Ed.), *The Handbook of Technological Pedagogical and Content Knowledge (TPCK) for Educators*. New York: Routledge.

Kelly, M. A. (2010). *Technological pedagogical content knowledge (TPACK): A content analysis of 2006-2009 print journal articles.* Paper presented at the Society for Information Technology & Teacher Education International Conference.

Kereluik, K., Casperson, G., & Akcaoglu, M. (2010). *Coding pre-service teacher lesson plans for TPACK.* Paper presented at the Society for Information Technology & Teacher Education International Conference.

Lawson, S. (2008). Political studies and the contextual turn: A methodological/normative critique. *Political studies, 56*(3), 584-603.

Martin, L., Warren-Smith, I., Henry, C., & Scott, L. (2014). Power shifts: women as entrepreneurs in the global context. *Gender in Management: An International Journal, 29*(8), null. doi:doi:10.1108/GM-09-2014-0078

Meagher, M., Ozgun-Koca, A., & Edwards, M. T. (2011). Pre-service teachers' experiences with advanced digital technologies: The interplay between technology in a pre-service classroom and in field placements. *Contemporary Issues in Technology and Teacher Education, 11*(3), 243-270.

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record, 108*(6), 1017-1054.

Phillips, M. (2014). *Teachers' TPACK enactment in a Community of Practice.* (PhD), Monash University, Monash University, Melbourne.

Phillips, M. (2015). Models of technology integration. In M. J. Henderson & G. Romeo (Eds.), *Teaching and Digital Technologies* (pp. 318-331). Melbourne, Australia: Cambridge University Press.

Porras-Hernández, L. H., & Salinas-Amescua, B. (2013). Strengthening TPACK: A Broader Notion of Context and the Use of Teacher's Narratives to Reveal Knowledge Construction. *Journal of Educational Computing Research, 48*(2), 223-244.

Rosenberg, J., & Koehler, M. (2014). *Context and Technological Pedagogical Content Knowledge: A Content Analysis.* Paper presented at the Society for Information Technology & Teacher Education International Conference.

Schmidt, D., Baran Sahin, E., Thompson, A., & Seymour, J. (2008). *Developing effective technological pedagogical and content knowledge (TPACK) in PreK-6 teachers*. Paper presented at the Society for Information Technology & Teacher Education International Conference.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14.

Shulman, L. S. (1987). Knowledge and teaching: foundations of the new reform. *Harvard Educational Review, 57*(1), 1-22.

Tabak, I. (2004). Reconstructing context: Negotiating the tension between exogenous and endogenous educational design. *Educational Psychologist, 39*(4), 225-233.

Turner, J., & Meyer, D. (2000). Studying and understanding the instructional contexts of classrooms: Using our past to forge our future. *Educational Psychologist, 35*(2), 69-85.

Wenger, E. (1998). *Communities of Practice. Learning, meaning and identity.* Cambridge: Cambridge University Press.

From the President

Melinda Cashen

Welcome to our final journal for 2015, and my first as president of DLTV. It is always a busy time in education as we begin reflecting on the year that has passed and start planning for 2016, and this is no different at DLTV. We are already excited about what DLTV can offer their members in 2016 and there is no better time to join as you will have access to more professional learning, resources and networks than ever before.

This year has continued to be a busy one for the DLTV office and Committee. In January at our planning day we started to develop our strategic drivers. These drivers not only share with our members the direction for DLTV but also ensures our projects and partnerships are aligned with our thinking and objectives.

- Support and develop creative ideas and connections which recognise successful digital learning and teaching practices throughout Victoria.
- Build a future of digital learning and teaching through innovation and promotion of the value of digital technology education.
- Shape students' futures through digital learning and teaching, and prepare them with skills, capabilities and knowledge to succeed in a range of settings.
- Develop educators focussed on building and sharing pedagogies, skills and capabilities in digital learning and teaching.

Committee of Management

At the AGM in May we elected a new Committee of Management and it was great to see some new faces who are dedicated to highlighting Digital Learning across Victoria. We have a diverse committee who have a huge amount of expertise in education from early childhood to tertiary along with our co-opted members who come from our three educational sectors. Once again we have a strong executive and the Vice Presidents have determined their focus for members and are already leading projects for 2016 in these areas.

Jo Bird - Secretary and Membership
Phil Brown - Treasurer
Laura Barker - Leading & Learning
Ben Gallagher - Students & Community
Bec Spink - Advocacy & Networks

Conference

The annual conference, DigiCon was a great success and a wonderful two days of inspiration and provocation with over 400 delegates. Once again we show that DLTV is leading the way in representing and showcasing Victorian educators, with the four keynotes coming from Victoria. The fringe festival offered presenters an opportunity to try out new ways of presenting and were more flexible for the delegates and highly popular. So much so that in 2016 we will see more emphasis on the fringe concept. Organisation for DigiCon16 is already underway with Bec Spink announced as the new Conference Chair so keep an eye out for details.

Student Showcase

900 students descended on Swinburne University in ICT week to take part in activities from National Gallery of Victoria, ACMI, The Channel-Arts Centre Melbourne, Museum Victoria, Deloitte, The Brainary and JMC Academy, just to name a few. The students enjoyed hearing about careers in computing, watching the Nao robots dancing and talking to other students and organisations. Supported by Google, the event was free to all students.

Digital Technologies Curriculum

At DLTV we have been anxiously waiting on the release of the Victorian Curriculum Digital Technologies Curriculum. The curriculum is an important step towards recognising the importance of digital learning in our future and in education. As the new curriculum is implemented, DLTV will be supporting teachers in becoming familiar with the curriculum, sharing resources and examples and various professional learning opportunities. We have already started with webinars and workshops and will continue with more resources in the coming months.

As 2015 comes to an end I would like to thank the members for continuing to support DLTV and for the work they do in the area of digital learning and teaching and I encourage you to take some time in the busy lead up to the end of the year to reflect on the difference you have made this year, to students, other teachers and education as a whole. As teachers, we often forget to take the time and appreciate all that we do but DLTV certainly appreciates all of our members for their dedication.

Using research and strategic planning to improve DLTV Professional Learning for 2016 and beyond.

Mark Richardson

Professional Learning Manager - DLTV

Mark Richardson is the Professional Learning Manager at Digital Learning & Teaching Victoria. He was a former ICT Coordinator in a primary school. He has extensive experience as a professional learning planner, presenter and consultant. His current interests are iPads in the classroom, online learning, digital citizenship, pedagogies for the 21st century, learning space design and Challenge Based Learning. @ictedservices

Amazingly, DLTV is planning its third year of professional learning events. It is a complex process to design professional learning that will meet the specific needs of all members and the wider education community. Many factors have to be taken into account such as the content to be covered in the events, the cohort of teachers who will be involved, the appropriate mode of delivery [F2F workshop, conference, webinar, study tour etc.], the level of participant interaction required by the event, the venue, the best time of day and the most appropriate month the year.

Now, while that planning process may seem complex, but it really still doesn't address questions such as,
what are the specific PL needs of participants?
what pre-knowledge do they bring to the events?,
what opportunities are there for participants using and sharing the knowledge that they have learnt and reflected upon?
how does the PL impact on student learning?
and what ongoing support is there for participants?

Professional learning needs to be about sharing, networking and collaborating, so how should DLTV professional learning do this?

Clearly, there needs to be some rethinking about the professional learning that DLTV offers. This rethink is currently being completed by the DLTV Office and DLTV Committee of Management.
Two key elements are informing that process. DLTV now has four Strategic Objectives / Drivers that underpin all its activities, [including professional learning]. These can be found at https://dltv.vic.edu.au/strategic-drivers. The other element underpinning this rethinking is the current research into professional learning and seeing how that research can inform DLTV PL. The Australian Institute of Teaching and School Leadership [AITSL], has recently published two research documents. *They are Global trends in professional learning and performance and development. Some implications and ideas for the Australian education system*. [AITSL, 2014] http://bit.ly/1LuHN6k and *Designing Professional Learning*. [AITSL, 2014] http://bit.ly/1KaqEcV

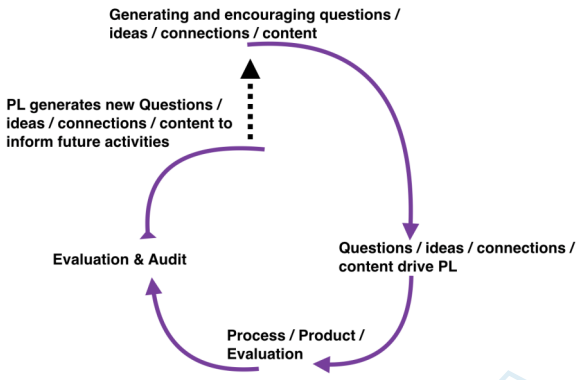
So how are we going to use the DLTV Strategic Drivers and current research to improve the quality of our professional learning and make it better suits the needs on participants?

Initially, we are looking at the four DLTV Objectives / Strategic Drivers and seeing how those directions will impact on professional learning.

This can be illustrated in these four diagrams below. Each diagram indicates that all DLTV PL will be part of a cyclical process, in which events will inform and enrich future events. Professional learning will be moving away in many instances from being sessions based around content delivery [allow this will still have a place], to sessions that encourage questions, ideas, reflections, connections. These interactions by presenters and participants will then inform future PL events.

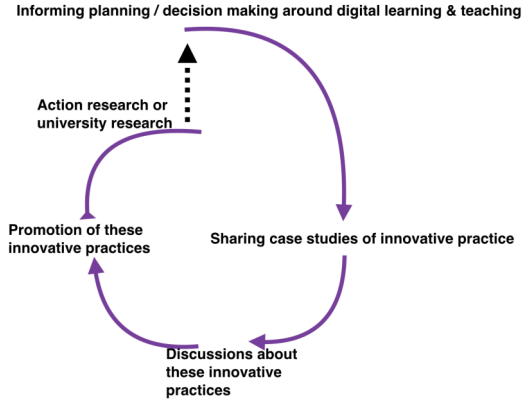
DLTV Strategic Objective / Driver 1

Generating and encouraging questions / ideas / connections / and new content in DLTV professional learning.



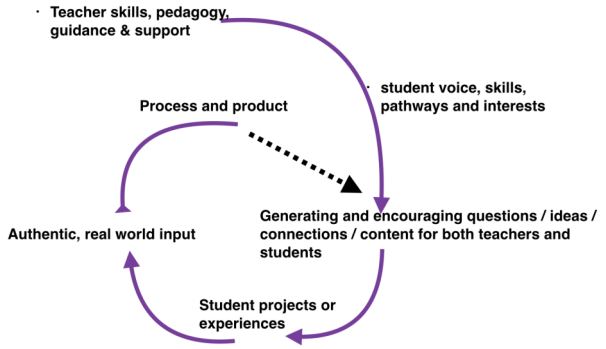
DLTV Strategic Objective / Driver 2

Informing planning / decision making around digital learning & teaching *[including the Digital Technologies curriculum & VCE Computing]* in DLTV professional learning.



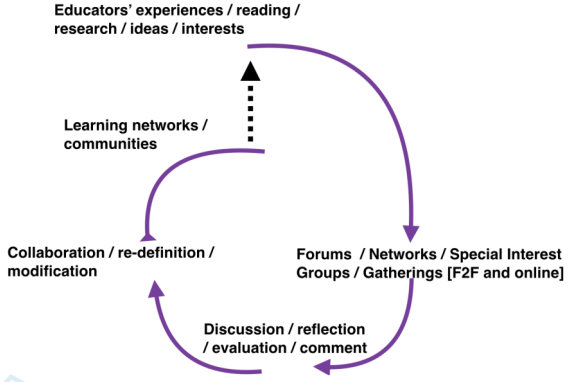
DLTV Strategic Objective / Driver 3

Enhancing teacher skills, pedagogy, guidance and support and empowering student voice, skills, pathways and interests in DLTV professional learning.



DLTV Strategic Objective / Driver 4

Developing and supporting educators focussed on building and sharing pedagogies, skills and capabilities in DLTV professional learning.



So what will I see when I attend DLTV professional learning events next year?

Initially you may not notice much difference as the effects of this rethinking around what we offer as professional learning will be a process over time. It will be an organic process where all can contribute in its development. Certainly the changes that you might have noticed over the past two years at DLTV professional learning will continue, e.g. the increasing diversity of events and presentation modes at our Annual Conference, DigiCon. Also, there will be an increasing amount of online events, such as webinars and the development of an online learning portal for asynchronous professional learning. Networking opportunities, both online and face to face, will increase as well.

In planning PL events there also needs to be a fit between the content, the audience and the type of professional learning session planned. Events will be placed of a continuum to meet those diverse needs. This PL continuum will allow foe events from the traditional or mainstream through the developmental to the disruptive. These are the features of each part of that PL continuum.

Mainstream events are

- often face to face / lecture style activities
- content delivery is pre-eminent
- appropriate for some audiences and content e.g. VCE Computing.

Developmental events are

- building and extending experiences from previous activities
- strategic & research based
- relationship / partnership / sponsorship based
- process driven / networked / ongoing.

Incubator events are

- strategic & research based
- disruptive / new approaches
- process / pedagogy / networked / learning community driven
- often organic
- are allowed to "fail", if this builds on knowledge and encourages future activities
- need ongoing support / evaluation / modification

Participants and presenters all have different preferences as to where they would like to be on this continuum and also where they would like to go to. Professional learning should be something that challenges us all, both as participants and presenters, and DLTV is building a model with allows for these ranges of professional growth. Everyone can start where they wish, but they have the opportunity to move to greater challenges. The rate of professional growth is up to the participant. There will be no surprises though, as when we introduce this continuum into our PL planning, all events will be clearly coded / described so that everyone is aware of the type of event that they will be participating in.

DLTV professional learning will always be a work in progress as it endeavours to meet the needs of all, in a landscape of ever changing curriculum, teaching and learning. I do recommend that you all read the AISTL research papers mentioned at the start of this article. Professional learning needs to be the product of many discussions. If you would like to share your thoughts or ideas, please contact me at the DLTV Office (03) 9349 377 or by email mark.richardson@dltv.vic.edu.au.

From the VCAA Corner

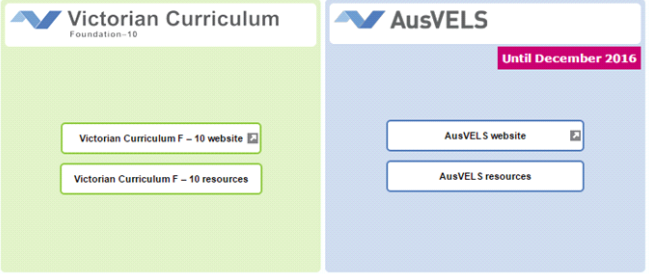
Paula Christopherson

Curriculum Manager | Digital Technologies
Victorian Curriculum and Assessment Authority

Paula is a Curriculum Manager at the VCAA, responsible for managing the digital technologies curriculum from Foundation to year 12. She was actively involved in co-developing both the Australian Curriculum: Digital Technologies and the ICT as a general capability resource for ACARA. Paula has presented professional learning sessions at state, national and international levels and was recently awarded a life membership to Digital Learning and Teaching Victoria in recognition of her outstanding contribution to digital technologies education.

After a very long gestation period I'm delighted to announce the release of the Victorian Curriculum: Digital Technologies. It was back in mid 2012 when I was first involved in the writing process of the curriculum. The ACARA-endorsed version of the curriculum was scheduled to be approved by the Education Council in December 2013; however, it was announced that there would be a review of all of the Australian Curriculum. It was only at the end of September 2015 that the Education Council endorsed all of the learning areas in the Australian Curriculum.

But in mid-September, as part of Victoria's Education State policy announcement, the Victorian Curriculum was published on the VCAA website http://victoriancurriculum.vcaa.vic.edu.au/ . This curriculum is how the Australian Curriculum will operate in Victoria.



From the beginning of 2017 all government and Catholic schools are required to teach, assess and report against the Victorian Curriculum. Between now and then there will be two curriculum offerings and depending where schools are at in the transition process they can dip into both the Victorian Curriculum and AusVELS when constructing learning programs.

In 2016 some schools may be ready to offer programs exclusively from the Victorian Curriculum, particularly as English, Mathematics, Science and History (Stage 1 studies) have already been implemented in many schools. Others may choose to offer programs that include the Stage 1 studies together with one or two new curriculum such as Digital Technologies (Digi Tech) and Economics and Business.

Now is the time for schools to be seriously planning its transition to the full implementation of the Victorian Curriculum by 2017. For Digi Tech, it may be appropriate to only offer one band level to three or four year levels because many students may not have the prior knowledge to be able to begin study at a higher level. There is nothing wrong with this practice in the infancy of implementation. For example, you may offer basically the same Digi Tech program focusing on band level 7 to 8 to all students at years 7 through to 10. And the same practice can apply in the earlier years of schooling.

While the content of the Digital Technologies in the Victorian Curriculum is basically the same as the Australian Curriculum version, what is different is how the content is organised into strands.

The following table shows some of the structural differences between the two curricula; but as mentioned, what is taught and the achievement standards are almost identical.

	Victorian Curriculum	Australian Curriculum
Strands	Digital Systems Data and Information Creating Digital Solutions	Knowledge and understandings Processes and Production Skills
Organising elements (problem-solving approach)	Analysing Designing Developing Evaluating	Defining Designing Implementing Evaluating
Glossary	Includes terms only in the content descriptions. Includes some additional terms not covered in the Australian Curriculum.	Includes terms used in the band descriptions, content descriptions and the elaborations.
Achievement standards	Standards are written in three paragraphs to match the strands. Standards are the same for the Australian Curriculum.	Standards are written in two paragraphs to match the strands. Standards are the same for the Victorian Curriculum.
Band level description	Minor editorial changes	
Elaborations	Minor changes	
Introduction	Small changes	

The VCAA together with the Department of Education and Training (DET) are developing resources to support the implementation of this curriculum. DLTV is also actively involved in providing professional leadership in this area, and VCAA and DET are working with DLTV to support teachers implement this challenging and exciting curriculum.

VCE

It's almost examination time for our VCE studies: Algorithmics (HESS), IT applications and Software development. It's a first-time for Algorithmics (HESS) and the last for IT applications and Software development as we know them. In 2016 the reaccredited study Computing is introduced and we will have examinations for Informatics and Software development. Sample examination papers for both of these studies will be available on the VCAA website in early Term 1, 2016.

The front covers of the examination papers and sample formats for the multiple-choice questions are now available on the VCAA website at: http://www.vcaa.vic.edu.au/Pages/vce/exams/examcovers/2015examindex.aspx

In the inaugural year of a reaccredited study design it is important to carefully check the requirements for each area of study. Always read the introduction to the area of study as this not only sets the scene for learning but it also provides important information about the area of study. The following are just some of the changes that have been made to this study design.

There is new terminology, such as application architecture, design principles, user experience and user flow diagrams.

There is a new form of assessment, namely School-assessed Tasks (SATs) in both Informatics and Software development.

There is a mandated list of programming requirements, but no longer a list of approved programming languages. This gives greater flexibility in the choice of languages.

There are four concepts that underpin all units: Approaches to problem solving; Data and information; Digital systems, and Interactions and impact.

The term ICT is no longer in the study design. The only two terms used as digital systems and information systems.

Next year will be an important year for our field of study – let's collaboratively approach the implementation of our new Foundation to Year 12 curricula and provide meaningful experiences for all learners.

World Education and Universal Expositions

A "vision" by HOC-LAB, Politecnico di Milano (Italy) and an opportunity for you to be part of a world-wide event.

The world exposition is currently running in Milan, Italy. As part of this major international event, the organizers have created a digital story telling project for school students. Until now, this has been available to students in Europe but for the first time it is now available to Australian students. DLTV are proud to present this opportunity initially to Victorian teachers.

If, after reading the following background information, you are interested in finding out more about this unique opportunity, please email: michael.phillips@monash.edu

Developing world-citizenship for the third Millennium

School systems around the world play a crucial role into shaping the "citizens of tomorrow": not only do they teach subjects that are directly related to the notion of "identity" (literature, history, philosophy, religion especially), but they also transmit values, convey what issues are relevant and how they should be tackled, embody a "way of living" and make an – implicit or explicit – reference to a "social contract".

School systems around the world share this goal: and they are all, without exception, trying to fulfill it taking a national perspective. Curricular subjects, values, issues, ways of living, etc. are all nation-centric.

School systems worldwide, are conceived and organized around what in essence is a national perspective

More and more, however, the need for creating "**world citizens**" is emerging: people (of almost any age) get in touch with other people (in presence or through the Internet). They exchange ideas, opinions and experiences, they take inspiration from different life styles; but there are also tensions, conflicts, misunderstanding, lack of tolerance and mutual respect, …

A contradictory situation is there: from many sides, it is claimed that the **third-millennium world citizenship** is crucial for our future. At the same time, we educate our youth (as it made sense centuries ago) with national-oriented school systems, each of them possibly providing a different version of what citizenship means. Several recent conflicts tell us that just physical intermixing of people is not enough, in the sense that it does not prevent intolerance, misunderstanding, conflicts and… worse. The need to modify the formative experience at school (crucial for the development of people's identity) is therefore emerging now more than ever.

World-education can help towards World-citizenship going beyond the boundaries of national education systems

National education systems need to maintain their national specificity. We advocate, however, that a new element should be added to their mission: developing world citizenship, not only in a socio-cultural sense but also in a practical sense (e.g. in view of international cooperation).

International organizations should put world-education in their long-term agenda and should encourage national education systems to balance national education with (as much as possible) world education.

An intermediate step toward this goal can be the organization of specific world educational experiences, where students (and teachers) from the world can work at a common subject and with a common purpose.

Organizing a world educational experience presents several practical difficulties, and also a major conceptual challenge: what (subject, content…) should the experience be about? Without a common theme, school works would be scattered and unrelated. Selecting a common theme, however, is "politically" difficult. Different countries and different areas of the world have different priorities in their agenda, for school activities.

Universal Expositions are organized every 5 years. All countries (for once) focus on a common subject: the theme of the Universal Exposition. **Glocalization** is the key word: each country interprets the **Exposition's theme** according to its own agenda and at the same time (being part of a Universal event) taking into account a global point of view.

Universal Expositions are the perfect occasion to focus the interest of all schools, worldwide, around a common theme, and therefore they van help creating world educational experiences

Universal expositions can therefore favor a first (small but important) step toward world citizenship: involving kids and young people from (almost) all countries, worldwide.

For the organizers of a Universal Exposition, promoting a world education activity would bring a number of advantages: early dissemination of the themes of the Universal Exposition, involvement of education experts and teachers from all over the world, early involvement of young people, kids and their families, and, in the end, a kind of viral marketing based on real educational values.

POLICULTURAEXPO

Digital Story Storytelling at school, worldwide, around the themes of the Universal Exposition

Digital Story Telling is acknowledged as a modern educational activity that schools carry on for a number of educational values: involvement of pupils, acquisition of skills and competence, use of ICT in education, in-depth understanding of content and media literacy.

PoliCultura has been deployed by Politecnico di Milano for a number of years: a competition based on digital storytelling, involving whole classes (groups) of students. **PoliculturaExpoMilano** has been deployed under mandate of the organizers of the Universal Exposition. So far more than 30,000 students (from 10 different countries) have been involved. Scientifically-grounded impact studies have shown that digital storytelling at school can be highly effective in a number of ways.

Involving schools around the themes of a Universal Exposition has to be a multiyear effort, since schools need time to react: the involvement must start at least 3 years before the exposition, in order to let the interest develop and grow; the year of the exposition is the peak of the attention; the year after the exposition can be used to leverage on the media attention generated by the exposition (so that preparatory work for the next exposition can be carried on).

Universal expositions for a world educational experience

In order to actually create a world education experience several ingredients are needed:

- A common subject of interest: the themes of the Universal Exposition
- MOOCs for training teachers (about the themes of the exposition and digital storytelling)
- A shared set of ICT tools (at various level of complexity) to develop digital stories
- Resources (created by the staff and later by the teachers) in order to create a common, shared, common ground
- Tips and ideas about what to do at school as “authentic-learning” activity
- Optional direct cooperation among schools: to foster international relationships
- Communities (for teachers and pupils) : for sharing resources, ideas, activities
- A common competition, with finalists, winners, prizes, a ceremony, adding thrill and motivation
- A shared communication channel: all the stories, from all over the world, sampled in a portal and disseminated via social media, web-tv, …
- Worldwide visibility of the narratives, connected to the Universal Exposition

PoliCulturaExpoMilano2015+1

The Universal Exposition in Milan will attract visitors until the end of October 2015.

MILANO 2015

Visitors of the exposition and people around the world have started to realize the relevance of the exposition's theme:

"Feeding the Planet, Energy for Life"

A number of issues, global for the planet, relevant for each country and each region, crucial for educating world citizens of the third millennium

The legacy of the exposition in Milan is to encourage schools to keep focusing on these issues: digging into data, understanding opinions and points of view, relating global issues to local situations, identifying challenges, facing contradictions, etc.

"I would like to engage the same group of students again next year, for carrying on our digital storytelling about Expo Milano 2015; we just started understanding the complexities of the issues, and my students want to understand more."

- Senior High School teacher of Humanities, Como (IT), May 2015

PCEM2015+1

Schools from all countries can develop their multimedia stories related to Expo Milano 2015

Northern hemisphere: school year 2015-2016
Southern hemisphere: second semester 2015, first semester 2016

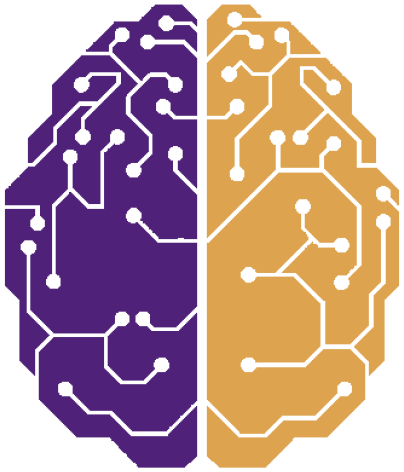
Schools from every country and every region of the world can take part into this extraordinary opportunity: developing a multimedia narrative (or a number of short narratives) that they offer to the world as a contribution to global knowledge and understanding.

PCEM is an extraordinary opportunity to build a long-lasting legacy, for future generations, from the Universal Exposition of Milan. All completed narratives will be made visible online.

Teachers are highly supported: 1,300 pages of resources, MOOCs, a seasoned staff for support, forums and data banks to exchange resources, ideas and help.

To know more, visit: www.policulturaexpo.it/world

To register your interest in participating in PCEM2015+1 please email Michael Phillips: michael.phillips@monash.edu



Computational thinking broadens students' analytical thinking skills

When Jeannette Wing shared her vision in 2006 that computational thinking (CT) would be "a fundamental skill used by everyone in the world by the middle of the 21st century," little did she suspect her words in a scholarly research journal would ignite debate in higher learning, stimulate conversation in the K-12 education community and forge a global pathway to problem solving that would transcend disciplines and grade levels during her lifetime.

Internationally recognized for her expertise in computer science, Wing is corporate vice president of Microsoft Research, having also served on the faculty at Carnegie Mellon University for more than 27 years, including two stints as head of the computer science department. In between those chair positions, she was assistant director for computer and information science and engineering at the National Science Foundation from 2007-2010.

Collaborative movement

The term "computational thinking" was first coined by Seymour Papert years before Wing's three-page article published by the Association for Computing Machinery (ACM), but it was Wing's expanded explanation and examples of what CT is and is not that captured the imagination of educators. Her vision eventually led to a joint project of ISTE and the Computer Science Teachers Association (CSTA), funded by a grant from the National Science Foundation to develop CT materials for K-12 education.

That project began in late 2009 with the intention of first defining a common language surrounding CT and identifying challenges and opportunities to integrate CT throughout all grade levels and into the mainstream. The project followed three strategies:

Linda A. Estep

Linda A. Estep is a former reporter for McClatchy Newspapers and the former public information officer for a large school district in California. Today, she works as a freelance writer covering education policy.

- Develop a better understanding of computational thinking by creating a shared working definition of CT as it applies across K-12 disciplines.
- Strengthen instruction of CT skills in K-12 by supporting the development and dissemination of classroom resources and model curriculum and assessments.
- Create broad-scale dissemination of examples of CT across the curriculum by working collaboratively with subject-area specialists.

The operational definition of computational thinking for K-12 education that came out of the project is:

Computational thinking (CT) is a problem-solving process that includes but is not limited to:

- *Formulating problems in a way that enables us to use a computer and other tools to solve them.*
- *Logically organizing and analyzing data.*
- *Automating solutions through algorithmic thinking (a series of ordered steps).*
- *Identifying, analyzing and implementing possible solutions with the goal of achieving the most efficient and effective combination of steps and resources.*
- *Generalizing and transferring this problem-solving process to a wide variety of problems.*

These skills are supported and enhanced by a number of dispositions (attitudes) that are essential dimensions of CT. They are:

- *Confidence in dealing with complexity.*
- *Persistence in working with difficult problems.*
- *Tolerance for ambiguity.*
- *The ability to deal with open-ended problems.*
- *The ability to communicate and work with others to achieve a common goal or solution.*

Exceeding expectations

Wing's seminal article turned out to be a catalyst to examine how students today and in the future can apply computational thinking skills to all fields of study and even to everyday life. Today, she says the growth and recognition of CT has exceeded her expectations. "It's happening in my lifetime," she admits.

"When I put out that three-pager, I was just hoping the university would offer classes that included computational thinking so students wouldn't need to be a computer science major to apply it," she says. "Then at the National Science Foundation, we explored the idea of introducing it to K-12. The vision was that all high school students would be proficient in CT."

Wing points out that some fields have been transformed by the use of CT, notably biology and statistics but also the humanities. "I'm seeing non-science disciplines being transformed. It's kind of happening on its own," she says.

"Computational thinking does not replace skills; it adds to one's repertoire of skills," she explains. "I think of CT as adding to the sophistication of problem-solving skills. I actually believe people already think computationally but don't know it."

Wing likes to use the simple example of cooking in the kitchen for a dinner party, applying CT components to determine the ingredients and measurements for the number of guests, assess cooking time and coordinate prepared dishes in order to present all items on the table at a prescribed time. "My mother read that article and called to tell me that she is a computational thinker," she laughs.

Still, the road to the universal application of CT across disciplines in K-12 education is hardly without potholes, something even Wing acknowledges despite the movement's advances. In the United Kingdom, the Ministry of Education now mandates that K-12 schools incorporate CT, but she notes that teacher training in CT in the UK is insufficient, just as it is in the United States. She also believes "computer science must be taught in a more positive way that kids will ask the question, 'How does this work?'"

Carolyn Sykora, senior director of the ISTE Standards program, explains that a primary charge of the collaborative project that ISTE and CSTA undertook was to make CT accessible to K-12 teachers, to build interest in thinking skills and integrate them into the curriculum. She says the emphasis is on thinking skills but not always with the use of a computer. The goal is to become more aware of what steps are needed to solve a problem and to apply that skill across disciplines. Another expectation is that students will become not just tool users, but tool creators, a skill useful in their personal lives as well.

Sykora believes students are the quickest to accept the concept of computational thinking but that for some teachers it can be interpreted as just another new skill to learn themselves and teach, adding to a load of responsibilities they already view as burdensome. "Teachers are still in the early stages of embracing CT, but once they break down the components, they get it," she says.

Determined to help

Karen North, a Texas-based computer science education consultant and ISTE member, is a strong proponent of CT and says she taught its principles in varying degrees throughout most of her career as a teacher at the high school, middle school and elementary levels. She agrees that teachers are often saddled with so many responsibilities that they feel just one more requirement will break their backs, if not their spirit.

However, North, feels equally emphatic that CT can be embedded creatively in all disciplines and that resources offered on various websites, including the ISTE website, can open up a world of new opportunities and discovery. ISTE members can find a plethora of information for teachers in all grade levels at iste.org/computational-thinking.

A particularly informative document, "CT Vocabulary and Progressive Chart," outlines examples of activities associated with the nine components of computational thinking for every grade level:

- ***Data collection*** – *the process of gathering appropriate information.*
- ***Data analysis*** – *making sense of data, finding patterns and drawing conclusions.*
- ***Data representation*** – *depicting and organizing data in graphs, charts, words or images.*
- ***Problem decomposition*** – *breaking down tasks into smaller, manageable parts.*
- ***Abstraction*** – *reducing complexity to define the main idea.*
- ***Algorithms and procedures*** – *series of ordered steps to take to solve a problem.*
- ***Automation*** – *having computers do repetitive or tedious tasks.*
- ***Simulation*** – *representation or modeling a process. Also running experiments using models.*
- ***Parallelization*** – *organizing resources to simultaneously carry out tasks to reach a common goal.*

"It makes no difference what career you go into, you will need computer science skills to succeed," North predicts. Computational thinking is at the core of computer science. North suggests a good place for teachers to start might be at csunplugged.org, where free learning activities related to computer science are available for all ages.

North would like to see state legislators get behind the CT movement, mandating more teacher training time for understanding how the CT framework can enhance learning in all areas of study. She is actively engaged in that effort.

Another ISTE member whose 34-year teaching career was almost exclusively in computer science before he retired 10 years ago is Joe Kmoch. Today, he spends much of his time reaching out to middle school students and young professionals, introducing them to the world of algorithms.

He believes in the importance of critical thinking skills found in CT and says, "We can do a better job of getting more examples of CT in different subjects. We need to get teachers to think about the lessons they have taught and think about the nine components in computational thinking. Many of them will realize they are doing it already and discover that it is just the vocabulary that is different. People begin to understand those nine components and see how it can be applied to or enhance the lesson."

Kmoch believes CT will be more readily accepted with better lessons aimed at teachers of topics other than computer science and notes that the National Science Foundation is now infusing the need to apply CT in its grants. "We need to get people out of the silos," he adds.

One of the most recognizable names in computer science education is Chris Stephenson, the 2004 founder of the Computer Science Teachers Association where she served as executive director for 10 years before joining Google to become the computer science education program manager. She says that since 2011, she has seen CT expand throughout the world in countries such as Great Britain, Australia and New Zealand, to name a few.

"Jeannette [Wing] lit a fire as to STEM education, and you can see the power of her idea as it moves across the globe," Stephenson says. "We hear more about it in the sciences, but it is just as much in the humanities. One example of that is the use of computational thinking in the practice of capturing and saving old languages."

Are there barriers to universal acceptance of CT? Stephenson puts it this way: "I don't think there are barriers, just unfamiliarity. Lots of teachers think that it is just another new thing to try. It falls to the [education] community to help make the connection between what they are teaching and how a problem-solving movement can apply to their subjects. This is about how methodology can be applied to world problems."

In other words, successful implementation of CT is all in the way it is presented to teachers. "The responsibility lies with the people who are helping teachers see how it applies to what they are teaching."

Stephenson tells of a recent workshop where teachers were offered an opportunity to ask questions or challenge CT validity after the presentation. Instead, the teachers wanted to share how they were planning to use it in their classrooms, now that they understood it.

While Google was involved in CT education before she was hired, Stephenson says a project called Exploring Computational Thinking on Google is being revamped and will be a repository of resources when it is completed before the end of the year.

One area Stephenson would like to see the CT discussion expanded to is in teacher preparation programs. "There are not many programs that incorporate CT for students working toward their teaching certification or credentials," she says. "ISTE membership has always brought richness to the importance of technology tools, and I encourage them to help colleagues see the power of an idea and how CT can be applied across disciplines."

Prophecy for the future

In February 2014, eight years after her article created a stir that continues to gather steam, Jeannette Wing addressed the Columbia Journalism School, where she repeated her contention that computational thinking will eventually be a fundamental skill of everyone in the world.

"To reading, writing and arithmetic, let's add computational thinking to every child's analytical ability," she urged. "Computational thinking is an approach to solving problems, building systems and understanding human behavior that draws on the power and limits of computing. While computational thinking has already begun to influence many disciplines from the sciences to the humanities, the best is yet to come. Looking to the future, we can anticipate an even more profound impact of computational thinking on science, technology and society—on the ways new discoveries will be made, innovation will occur and cultures will evolve."

And on the Carnegie Mellon University Computer Science Department home page there remains her vision with an analogy in her own words that reads, "Ubiquitous computing is to today as computational thinking is to tomorrow. Ubiquitous computing was yesterday's dream now becoming today's reality. Computational thinking is tomorrow's reality."

STUDENTS GAIN REAL-LIFE INSIGHTS WITH GLOBAL PBL

Tim Douglas

Tim Douglas is a former television news producer who also served as a senior media consultant to several speakers of the California state Assembly. Today, Douglas is a freelance writer who covers a wide range of topics.

In American schools, the vast majority of work is measured A to F (apologies to the letter "E," which unofficially stands for "excluded from the grading system").

Analyze the Lincoln-Douglas debates. Get a grade. Explain the impact and enduring relevance of "The Great Gatsby." Receive valuation through alphabetization. Use Avogadro's number to calculate the amount of pure substance. A student gets a letter.

Grades are the traditional form of measurement designed to appraise a learner's work. They are the main way for teachers to tell students how they're doing and whether or not they are mastering content.

We've long used grades to keep score, but maybe the true value of the education needs to come from the result, rather than the process. What if students learned incredible lessons about empathy and humanity while solving, examining or illuminating extraordinary problems? What if school-age children were working on projects that were possibly saving—or simply changing—lives? What if physical and mental borders were blurred by a learning approach without boundaries?

It's happening. With stunning outcomes.

Sparking deep learning

Last year, fourth-grade students at Wallenpaupack South Elementary School in Newfoundland, Pennsylvania, started to wonder why most clothes weren't made in the United States.

This basic question sparked the curiosity that turned into research, and what they discovered shocked them.

They learned that clothes are made by kids around the world, and usually these young people work in terrible conditions for very little money and do not attend school. They learned that, worldwide, roughly 250 million children are forced to work as child laborers. They learned that these children, just like them, are the most vulnerable in our world's society. But perhaps most important, they learned about connecting. They discovered that children in India were working on this problem because it was happening in their own country, and the Pennsylvania students decided to help, embarking on an empowering journey with their peers thousands of miles away to create an effective and elaborate awareness campaign to stop child labor.

For elementary school students in the Highland Falls-Fort Montgomery Central School District in Highland Falls, New York, their virtual field trips have led them to China, where they learned Mandarin and taught English via videoconferencing, and participated in show and tell with the Chinese students through a secure, online portal. They also "travel" to the far reaches of the galaxy, as they continue to learn about spiders in space with other students from around the world via wikis.

These students—and thousands more like them—are reaping the many benefits of global project-based learning, which is heavily supported by technology.

Real-life lessons

"What we need to do in schools is prepare children for real life," says Andrea Tejedor, director of innovation and instructional technology for the Highland Falls-Fort Montgomery district. "Global project-based learning helps students appreciate that we all—everyone in the world—bring something different to the table, and being different is good."

According to the Buck Institute for Education, project-based learning is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to a complex question, problem or challenge. The institute also explains that PBL needs to include a variety of essential elements: significant content (students acquire knowledge and skills), 21st century competencies (problem-solving in today's world and critical thinking), in-depth inquiry (asking the right questions and getting answers), driving questions (which focuses the learning), need to know (the need to gain knowledge), voice and choice (students get to decide, within reason, what they will create), critique and revision (extensive feedback), and public audience (the work is presented beyond the classroom).

Most experts would probably agree that this is a thorough, straightforward definition of PBL and global PBL, but the real power lies in the practice, and it's a game changer in education—especially when applied across continents—that leads to much deeper understanding.

"Students are identifying problems in the world and working toward solving them, which is very important, of course," says Michael Soskil, the head teacher and curriculum coach at Wallenpaupack South Elementary School. "But they are also seeing the good they are doing and want to do more. Kids understand they are learning for a reason, and they connect with this idea for life."

Rooted in neuroscience

Soskil adds that it's science—neuroscience, in fact—where learning is stored in long-term memory when a child emotionally connects with the lesson being taught. This is why his primary aim is to facilitate these connections through global PBL by allowing students to feel the joy that comes through helping others.

Livingstone Kegode is a teacher in Nairobi, Kenya,who believes deeply in PBL's value. He says it's a joy for his students on a powerful level, and as technology shrinks our planet, we will benefit more than we can imagine.

"My kids feel they have friends in different countries, not just fellow students working on a problem," he writes in an email. "This makes them feel loved, thus making the world feel like a village. Global collaboration promotes peace around the world and makes us work as a team."

Support for learning while doing

There are many coaches to help these teams. Julie Lindsay, a global collaboration consultant based in Australia, serves as the director of Flat Connections, which "provides resources, skills, strategies and access to 'learning while doing' in a global context through innovative pedagogy and online digital technologies," and is dedicated to taking education from local to global.

Lindsay, an ISTE member and former ISTE board member who is also writing a book about global education, leads workshops and webinars that range from helping audiences get started with global collaboration to curriculum design for global learners who are already engaged.

Flat Encounters is another service that provides an opportunity for challenge-based learning in a conference, challenge or workshop format. These are dynamic events that feature students, teachers and administrators working together to brainstorm, pitch and then create solutions to global problems. These solutions are then shared using multimedia and other avenues.

All the "flat" references are by design because, as the Flat Connections website states, the goal is to challenge teachers to "flatten your classroom walls to bring the world in and take you and your students out to the world for meaningful collaborations."

"Students do realize that learning can be flat and connected, and technology is ubiquitously available for this," Lindsay says. "When this is taken away from them, they feel disconnected and isolated. This is what students have told us after taking part in the Flat Connections Global Project work for one semester … the next semester they returned to non-flat classes and did not like it!"

TakingITGlobal empowers youth to understand and act on the world's greatest challenges. From projects like Commit2Act, which encourages people to perform small actions to have big impacts (commit2act.tigweb.org), to DeforestACTION, which is a global collaborative project to stop deforestation around the world (dfa.tigweb.org), TakingITGlobal works with students to organize an array of activities online and through technology to tackle complex problems.

Michael Furdyk, co-founder and director of technology at TakingITGlobal, says that creating empathy and actions that benefit our planet, driven by worldwide collaboration, will also lead to a better global economy.

"My 3-year-old son is now using the worst technology he will ever use," says Furdyk, who has appeared on "Oprah" and presented at TED. "We need to continually connect our kids to the world via technology to help them care about learning and people, and to be competitive in the job market. Jobs of the future will require deeper engagement and attachment."

More work to do

As proof, Furdyk cites a report titled the "Global Skills Gap," which was conducted on behalf of Think Global and the British Council. The study, based on interviews with 500 executives in the United Kingdom, was commissioned to determine how business leaders feel about global thinking and how important it is for job seekers to have this skill in the future. The study finds that "the vast majority of businesses think it is important for schools to be helping young people to think more globally and lead more sustainable lives…and that schools should be doing more: 93 percent of businesses think it is important for schools to help young people develop the ability to think globally; 80 percent think schools should be doing more; and only 2 percent think they should be doing less."

To Soskil, there are many instruments we can use to tear down walls, open children's hearts and minds, and create better world citizens.

"We have great tools that are already in place," he says. "Skype in the Classroom, for instance, is a great resource, but here is the best part: This is just the tip of the iceberg. We've only had these free and easy videoconferencing services for less than a decade. I can't wait to see what's next."

In fact, one of Soskil's favorite exercises is Mystery Skype, where two classrooms "Skype" each other and try to guess the location of the other by asking a series of yes/no questions.

Tejedor agrees, adding that connection has never been easier.

"Everyone has a phone. We carry incredible technology in our pocket," she says. "The future is here. There should be nothing stopping us from doing this."

Backed by the ISTE Standards

It's no accident that the ISTE Standards for Students which assist students in navigating the tech-powered world in which they live support the global PBL approach.

These standards call for students to engage in creativity and innovation; communication and collaboration; research and information fluency; and critical thinking, problem-solving and decision-making, all hallmarks of PBL.

When engaging in a global PBL project, educators can turn the ISTE Standards to determine student skill levels and to ensure students are able to use technology to analyze, explore and contribute.

Prepare for pitfalls

There are some real pitfalls to implementing global PBL, which ISTE experienced while researching this report. Kegode replied to questions and comments via email out of necessity. When we attempted a Google Hangout, Kegode couldn't participate because of a power outage, which he says is common in Kenya and also leads to other issues.

"When we miss Skypes or Hangouts with other schools, it makes them frustrated," he wrote. "Then this makes us unreliable and we sometimes lose collaboration."

Kegode also explains that the time difference can be problematic, as well as a lack of understanding of technology among teachers and directors. But the most serious hurdle is hunger and making sure kids have their basic needs met first.

"Many schools in Kenya cannot afford to pay for and sustain the internet," he says. "Schools often need to invest in other things like basic learning material and food for our learners."

Lindsay adds that it's important to be mindful of timelines and expectations to minimize hiccups.

"Completing a global interaction and project that includes student collaboration does not happen in two to three weeks," she says. "By the time you have holidays across different countries and other typical school-based interruptions, it's more like eight to 12 weeks or even longer."

Still, as Kegode states, it's worth persisting because "global PBL is a great benefit to a student. It's necessary because it makes them work hard, think wide and share what they know."

Creating giant leaps

Yet for generations, the learning experience has remained largely unchanged. Students attend school, sit in class and listen to the teacher, who stands before the pupils and explains the lesson with the help of a whiteboard, blackboard, overhead projector or other 20th century tools.

There is nothing wrong with this approach, per se, but as the world progresses, industries should evolve, too. Old habits die hard, however, and education is like any other system: Change is slow.

Leaders need to emerge and spread ideas before the beginning steps transform into giant leaps.

"I encourage educators to find one way to try [global PBL]," says Tejedor. "Nothing radical, not a major overhaul—just a simple connection, like between Maine and Florida. Engage students differently. Try something new."

"Most people get into education for all the right reasons, and while some may feel like they've lost their spark, those reasons are always there," adds Soskil. "We can use [global PBL] to remind them why they got into this profession and to inspire."

Educators need not go it alone. There is room for multiple partners. Global PBL shouldn't just focus on the relationship between student, teacher and school. Everyone—business leaders, elected officials, etc.—has a part to play.

"Really, what better lesson is there?"Soskil asks. "Find people who are doing good in the world and connect them with kids who want to do good. We need to get beyond the education world."

Get intentional, then act

And while technology is an integral component of collaboration, there needs to be comprehensive and intentional thinking in advance. In other words, learners and teachers need to do their homework before they hit the computer and the device.

"I don't want students to simply 'Google' something," Tejedor says. "I want them to dig deeper…find some experts, find the communities, find the best people to talk to and share with. These are the types of connections that lead to real outcomes."

Meanwhile, the work continues and the efforts grow. TakingITGlobal has launched Future Friendly Schools (futurefriendlyschools.org), which is a network that, according to Furdyk, will help educators measure and deepen their engagement in using technology and global PBL to develop global citizenship, environmental stewardship and student voice in their schools.

In addition to following the plight of the spiders in space, Tejedor's students will soon connect with their counterparts in Brazil and Turkey to compare their school days—the differences and similarities—through videos.

Flat Connections is facilitating several global projects, including youth debates where students engage in authentic discussion to foster global competence.

Soskil has been a speaker at the United Nations Social Innovation Summit and will continue to spread the word at a variety of conferences. His students—the ones who are part of the child labor awareness campaign—will also continue to share because they learned lessons they will never forget.

And isn't this the whole point?

"The goal is to not just adopt global collaboration or PBL for some aspects of the school day," Lindsay says. "We need to encourage interdisciplinary projects that connect students for a wide variety of reasons to each other and to others. These learning outcomes are far superior to reading a textbook, and last longer. In fact, students become the textbook for each other."

Give that idea an "A."

Substitution is not a Dirty Word

You are probably aware of the work from Dr Ruben Puentedura and in particular his SAMR Model. The model that he has created is an amazing tool for implementing Digital Technologies in teaching practices to enhance the learning outcomes of students.

Briefly, his model is a 4 stage process – Substitution – Augmentation – Modification – Redefinition, and it addresses how teachers are using technology in the modern day classroom and how this translates to the quality of learning from the students' point of view. His model suggests that teaching tasks can be mapped across these 4 stages and that each stage changes the way teachers teach and thus affect the learning outcomes for students. If you want some more in depth information about this model, please visit Dr Ruben Puentedura's website www.hippasus.com.

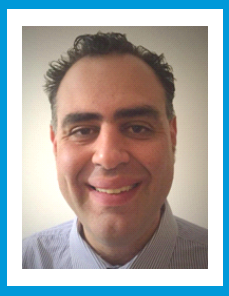
This model is far too large to unpack in a single article, and honestly, trying to cover and unpack it all in one post doesn't give the model the respect and attention it deserves, so this article is going to focus on pulling apart the first stage – SUBSTITUTION. It will explore some underlying concepts and, in my view, dismiss and redirect some myths.

Substitution, as defined by www.oxforddictionaries.com is "the action of replacing someone or something with another person or thing". With regard to digital education, the term 'substitution' has come to be a somewhat "dirty word" and that educational tools that are substituted into the digital domain are not real or valuable digital learning. To some extent this can be seen as true, however I think this is only a surface analysis of the meaning and that it can be seen as a valuable digital educational tool if it is unpacked and explored further.

On the surface, substitution can be seen as just replacing traditional means with digital ones; for instance, if a student uses a laptop to take notes in a class instead of writing in a notebook, or if a student reads an ebook instead of reading the text. These are true substitutional means and, I agree, they are not necessarily effectively using technology in the child's education. However let's look at it from two different points of view, first from the teacher and then from the student.

The Teacher

Prensky spends a lot of time exploring and discussing the concept of Digital Natives and Digital Immigrants. In a nutshell,



Benjamin Pisani

Apple Distinguished Educator

Sandringham College Classroom Music, VCE, VET teacher, Director of Music, Leading Teacher - Digital Technologies
pisani.benjamin.p@edumail.vic.gov.au @lastlegionaust

Benjamin is a teacher and leader in a Melbourne secondary school. He has a keen interest in the use of digital technology in education which has lead him to develop digital teaching tools to assist with the development and growth of students in music, creating iTunes U courses and iBooks, some of which will come onto the public market in the very near future. He works as a digital technologies coach in addition to his roles as a music teacher and leader, and has actively worked with colleagues at his school to implement and develop a 1:1 iPad program and a BYOD program. Benjamin has presented at statewide music teachers conferences, worked with Education Departments at Universities and the Victorian Curriculum Assessment Authority, and recently became an Apple Distinguished Educator.

Digital Natives (DN) are a generation who have grown up with technology as a key part of their life. They include it in most facets of their daily activities and, for the most part, are quite proficient in its use. Of course this is not always true, as some students are not as technologically savvy as others, but as a stereotype or generalisation, I think this holds true. DNs are therefore the generation of students we are currently teaching; students who carry smartphones, have mobile devices, interact on social media actively, use web resources like YouTube as a "go to" when learning or developing their knowledge - a generation of kids who have a world of information at their fingertips and are actively seeking out the information they require at the time they require it. Digital Immigrants (DI) are the older generations that did not necessarily grow up with this technology and, as such, have needed to "immigrate" its use into their lives and their professional practices. DIs therefore are those who have had to learn to adopt the skills, such as instant referencing or processes like social media, and have had to consciously make decisions about how they integrate technology into their daily lives. This also doesn't always hold true, with some DIs transitioning easily into the digital world and regularly applying digital tools into their daily activity, but once again, as a stereotype and a generalisation, I think it holds true. With this in mind, now stop and think about the modern day classroom and who is driving the learning. There is a strong majority of teaching professionals who are DIs and, as such, this leaves us with a large gap between what some teachers can offer and what students seemingly require. The modern day student will generally automatically adopt contemporary approaches to learning tasks that can be foreign concepts and processes to some of our teachers. And it is at this point where I would like to interject with the concept of substitution and how it can be a useful tool for changing the face of digital learning in the modern day classroom. While direct substitution in educational activities may not provide an advanced authentic learning experience for the student, it can work as a bridging task to upskill a generation of teachers who are DIs. The gap between teachers and students isn't always necessarily being closed because the use of digital technologies can be seen as a threat to a DI. Some may feel it questions a teacher's skills (as they are seemingly no longer the "expert in the room") and therefore reduce confidence levels – this also isn't a bad thing, but exploring that concept is for another article. With this as a threat and to appease their anxiety, many teachers could opt for a more traditional approach to a learning task, and thus closing the door of opportunity that digital technologies can provide to the learning. However, if teachers in this position were encouraged to substitute some of their learning activities towards a digital medium, over time, they could come to feel more comfortable with their use of digital technology, which could then lead onto the development of activities in the future that work up the SAMR model.

Think of it like a first date. First dates are generally packed with anxiety. You don't know what you're going to say, you don't know how the other person is going to react, you're not sure how it's going to turn out … but you've dressed to impress, you packed your best manners and you hope that this first date leads onto a second, a third and hopefully a relationship, especially as you obviously liked this person enough to ask them out on the date (or at least to say yes) in the first place. Substitution could be seen as that first date for the teacher. It can cause great anxiety presenting information that teachers are so familiar in a new way, but if the substitution is done with the intention of obtaining a "second date" it could lead to the development of digital learning tasks that focus on higher level thinking processes further down the track… the relationship. So in this manner substitution is not a "dirty word" but in fact it could be then seen as the building block for getting some DIs, who may be uncomfortable with digital educational tools, to push their pedagogy into new and exciting realms that will open up new and exciting doors of opportunity for the students of today and in the future. Though this may take some time, the teacher is at least on the path to growth and development instead of keeping their classrooms stuck in the past with somewhat outdated pedagogies and practices.

The Student

As I previously mentioned, many of today's students naturally gravitate to digital means when completing and presenting work at school. Students will write essays in a word processing

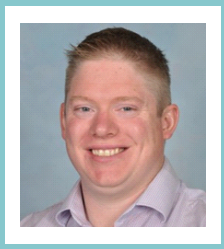
program like Pages or Word, will create slide decks in Keynote or PowerPoint, and will search for information on the web without a second thought, many opting for this option as opposed to going to a library to seek out a book. With this in mind, moving into the digital domain is vital to ensure that we keep up with the progression of society and the needs and requirements of the students of today. This move, however, triggers discussions about the need for "higher level thinking" activities to push the students to grow and develop, and that substitution just isn't "cutting the mustard"… we need more. While I do agree with this statement to a certain extent, I think it is important that we don't dismiss the power that can come from substitution. While it can be seen as a somewhat simple and meaningless transition, we need to keep in mind the CONTEXT that the learning is occurring. Not all learning activities need to be at a higher level of thinking.

Some substitutions can be used for pure convenience and that is not a bad thing. For example, a music class could use YouTube to access a live performance of a band or artist to analyse the performance techniques presented instead of attending a live concert, or a math class could use a digital version of a text instead of having a student carry around a big thick physical book. This substitution is convenient and effective and as such is a key element to the student's learning experience because it makes the student and teacher's lives a lot easier to manage.

From a learning point of view, substitution can also be a very effective way to differentiate the learning experience for students, especially those with high needs or with learning disabilities. Where some educationalists may write off digital substitution as a "sub-standard use of digital technologies in education", they can be really effective ways of allowing lower performing students to "taste success" and engage with learning. Granted a substitutional activity, like a student creating a marketing brochure on "water saving" instead of a poster may not push the learning of advanced students, it may be an avenue for students who have difficulty with the physicality or creativity of illustration or design, the opportunity to experience success. Digital tools may give that student an ability to share their voice, to engage in the learning activity and to develop a sense of pride in their development in an instance which could have traditionally left them feeling anxious and inadequate. In this case, the substitution activity is an effective and productive learning tool and one that has a valid place in the modern classroom. Granted it would be beneficial if the activity had an "option" that could cater for the stronger students too, but that is also a discussion for another article…

Overall, teachers substituting digital technologies into their practices is not a bad thing… actually I believe it should be encouraged because it can open up possibilities for students and teachers alike, to grow in this new and exciting digital world that we find ourselves in. Granted if a teacher utilises digital substitution in their practice and then goes no further with their development, then similar issues can arise, but I honestly believe if we can remove the negative stigma around substitution in digital education and have teachers embracing how these technologies can support and enhance the fantastic work that they are doing in their classrooms, it will pave the way for an educational revolution that will see pedagogies that foster the abilities for **all** students and teachers to "taste success" within the digital classroom, regardless of their skills, abilities or their initial digital status, and it will bridge the existing gap between teachers and students.

INFUSING SAMR INTO TEACHING AND LEARNING



Aaron Davis

By now, everyone has heard the acronym, sat through the session, listened to the call to redefine the use of technology in education. Often we are told that we just need to do x, y and z, then everything will be alright. However, what is often overlooked in such dialogue, is that it is just as important to critique the models we come to depend upon as it is to embrace them. For example, what are the pedagogical beliefs and learning outcomes? The question that remains then is how might we redefine the use of SAMR in order to increase student learning outcomes using technology?

By now, everyone has heard the acronym, sat through the session, listened to the call to redefine the use of technology in education. Often we are told that we just need to do x, y and z, then everything will be alright. However, what is often overlooked in such dialogue, is that it is just as important to critique the models we come to depend upon as it is to embrace them. For example, what are the pedagogical beliefs and learning outcomes? The question that remains then is how might we redefine the use of SAMR in order to increase student learning outcomes using technology?

The acronym SAMR stands for substitution, augmentation, modification and redefinition. It is a model for looking at the integration of technology into education, used to support staff with how to make better use of technology within the classroom. Devised by Dr. Ruben Puentedura (2014), the premise behind it is that each layer provides a deeper level of engagement and involvement with technology. Starting with the use of technology to progressively enhance student learning, it then progresses to transformative opportunities that are afforded only through the use of technology.

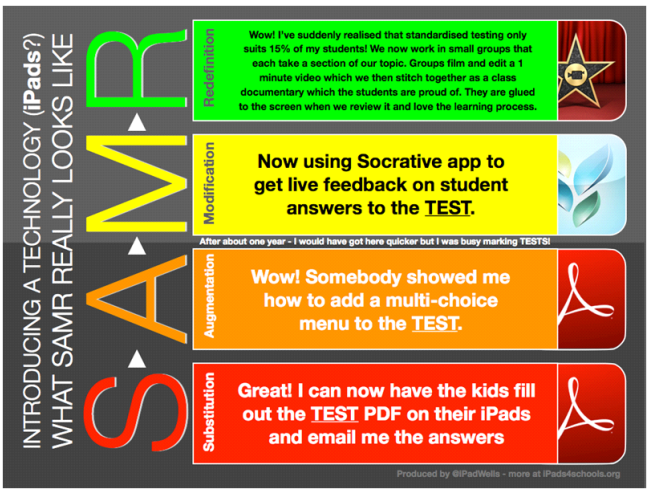
There are many different takes and interpretations out there of the SAMR model. Susan Oxnevad (2013) has created a wonderful interaction visual guide using Thinglink. Not only does it provide further clarification, but also a range of examples focusing on the skills of research, writing and digital citizenship.

Attempting to make sense of the model in his own way, Jonathon Brubaker (2013) uses the analogy of ordering a coffee from a cafe to explain the different layers. Starting out with the use of technology to make a simple coffee, he progresses to the ability to make a flavour - pumpkin spice - that was previously inconceivable.

Providing his twist on it, Richard Wells (2014) redefined the steps focusing on the place of the learner. He begins with students being supported with instruction about technology and moving to a point where control of learning and technology is actually returned to students. What is significant about Wells' revision is the focus on teacher/learner mindset, as much as the actual task at hand. He also provides a range of questions to guide reflection on technology, such as, “Can you

tell me your course content is more important than other courses?" and "What's your strategy to ensure your students can cope and learn without a teacher?"

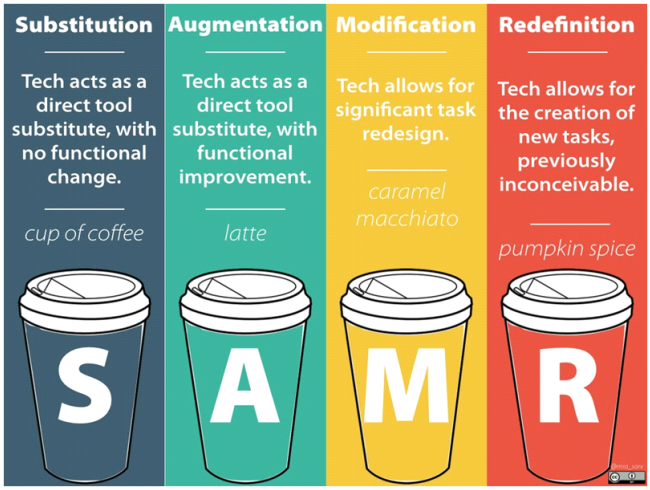
Continuing on a similar vein, Jackie Gerstein (2014) reframes SAMR in regards to the move from pedagogy to heutagogy, that is, the move from 'leading the child' to the 'leading of the finding and learning'. She marries the different layers with her case for Education 1.0, Education 2.0 and Education 3.0. From this perception, learners move from being learners as receptacles of knowledge to becoming connectors, creators and constructivists.



Providing a more creative perspective on SAMR, Amy Burvall renames the different terms. Using rhythmical rhyme, she replaces the usual substitution, augmentation, modification and redefinition, to same same, not so lame, reframe and changing the game. Burvall creates what Oliver Sacks (2007) calls an 'earworm', a catchy tune that continually repeats after it is no longer playing.

In regards to practical examples, Anthony Speranza (2015) provides an analysis of the different uses of Google Apps for Education. He uses the SAMR model to unpack some of the possibilities of applications like Google Sites and Blogger. He explains how applications can be used as a means for everything from recording personal writing to transforming the classroom by connecting and collaborating with other students from around the world.

While considering examples from the perspective of iPads in a secondary environment, Richard Wells (2013) provides some examples of ways in which technology use changes at the different levels. From simply using apps and devices to generate digital tests to working collaboratively to make a series of videos on a topic.



I could go on. If you search online you will find more and more samples of how SAMR is being used and interpreted to account for technological change. See for example Kathy Schrock's (2015) extensive list of resources. However, one of the challenges that often goes undiscussed are the queries that we might have. Such ideas are sometimes brushed off as somehow being against change and innovation, however this is not always the case.

One concern raised is that the focus on tasks overlooks the holistic nature of technology integration and learning. Catlin Tucker (2013) proposes her own model focusing on teacher development. Starting with getting connected, then incorporating technology within instruction, after that using it to engage students in learning. The final challenge is to skilfully use technology inside and outside of the classroom to enable deeper learning. Mark Samberg (2015) continues in much the same vein pointing out that there is little detail of instruction, instead technology is described as the transformational solution.

Another issue with SAMR is the question of hierarchy. Mark Anderson (2015) explains that SAMR is not a ladder. Being so makes it an exclusive club that is measured by those best apt at utilising different programs and applications. Instead, technology integration needs to be seen as a part of a wider context. Talking about the same concerns in regards to context, Steve Wheeler (2014) argues that the opportunities afforded by technology are often missed when we do not situate learning in real situations. While Alan November (2015) contends that even though the learning may be deemed as redefined, it really needs to be transformational where the actions taken are purposeful and have some sort of wider implications.

One of the supposed benefits of SAMR is the simplicity of it as a model for the integration of technology, however Darren

Draper (2014) questions whether it is ever so obvious. In addition to this, he wonders what the benefits to be gained actually are? More fun? Improved engagement? Better test scores? According to Draper, teaching at a 'higher' level does not guarantee better, merely different. A point also reiterated by James O'Hagan (2015).

Associated with simplicity is the question of ambiguity. Chris Hesselbein (2014) discusses the confusion associated with augmentation and modification. His solution to this problem, a mash-up of Robert Marzano's four point rubric with Joan Hughes' RAT Framework. Focusing on only three steps - replacement, amplification and transformation - Hesselbein adds leadership into the mix to achieve Marzano's four points. The suggestion is that surpassing the transformation phase involves working collaboratively to share and support other teachers on their journey.

Questioning the credentials of SAMR, Jonas Linderoth (2013) suggests that the ideas put forward through the SAMR model are not only obvious, but nothing new. This is something echoed by Gary Stager (Malcher and Campbell, 2015) when he states that there has been nothing new in regards to the implementation of technology for the last 30 years. Stager makes the comment that we would do well to go and reread Seymour Papert's (1971) 20 Things to Do With a Computer. In addition to this, Puentedura's work is based on unsubstantiated research and a doctorate in a completely different field of study, that being chemistry.

Continuing with the critique of form over function, LeiLani Cauthen (2013) argues that the model actually stifles any discussion about new models of school and changing the traditional paradigm. According the Cauthen, we need to redefine function, not form. "Form follows function, and the current educational forms are not aligned to new function." Coming at the problem from a different perspective of learning spaces, Matt Esterman (2015) suggests that instead of designing for the unknown, teachers more often simply want a shiny version of what they already have.

What ever you do with technology, what stands out to me is the importance of starting with why (Davis, 2015). Although models, such as SAMR and RAT, TPACK, can be useful as a reflective tool or to guide discussions, they do not necessarily guide pedagogical practice. As Kentora Toyama (2015) has suggested, technology "amplifies whatever pedagogical capacity is already there." This to me is why ideas like the IOI Process (Olsen, 2015) may be a better place to start. Although tools like the Modern Learning Canvas may not involve the quick fix simplicity that SAMR and other such models provide, it allows for a more fluid and holistic perspective on learning. Maybe the question is how we better innovate focusing around the developmental needs of our students. (Brophy, 2015) For me, Miguel Guhlin (2015) summed it all up best when he says:

Go ahead, tear down your SAMR god...whatever you put in its place will serve for a time then be smashed to the ground. Not because the gods are unworthy, but because you invested them with so much of your understanding that when you grew, you failed to see how the model serves as a springboard for thinking, not a locked room that keeps fresh ideas out.

REFERENCES

Anderson, M. (2015). SAMR is not a ladder, a word of warning. [Blog] ICTEvangelist. Available at: http://ictevangelist.com/samr-is-not-a-ladder-purposeful-use-of-tech/ [Accessed 7 Aug. 2015].

Brophy, S. (2015). What is pedagogical innovation?. [online] transformative LEARNING. Available at: http://stevebrophy.com.au/2015/06/18/what-is-pedagogical-innovation/ [Accessed 7 Aug. 2015].

Brubaker, J. (2013). Tech Tips for Education: SAMR: Model, Metaphor, Mistakes. [online] Techtipsedu.blogspot.com.au. Available at: http://techtipsedu.blogspot.com.au/2013/11/samr-model-metaphor-mistakes.html [Accessed 6 Aug. 2015].

Cauthen, L. (2013). What's Wrong with SAMR in Education?. [online] Thelearningcounsel.com. Available at: http://thelearningcounsel.com/archives/Wrong-With-SAMR-Education [Accessed 7 Aug. 2015].

Davis, A. (2015). Leadership Starts with Why - A Review of Simon Sinek's #StartWithWhy. [online] Read Write Respond. Available at: http://readwriterespond.com/?p=689 [Accessed 7 Aug. 2015].

Drape, D. (2014). That Time When SAMR Gets Us Into Trouble - Drape's Takes. [online] Drape's Takes. Available at: http://drapestak.es/that-time-where-samr-gets-us-in-trouble-2/ [Accessed 7 Aug. 2015].

Esterman, M. (2015). Beanbags in space. [online] My Mind's Museum. Available at: https://mesterman.wordpress.com/2015/02/28/beanbags-in-space/ [Accessed 7 Aug. 2015].

Gerstein, J. (2014). SAMR as a Framework for Moving Towards Education 3.0. [online] User Generated Education. Available at: https://usergeneratededucation.wordpress.com/2014/02/23/samr-as-a-framework-for-moving-towards-education-3-0/ [Accessed 6 Aug. 2015].

Guhlin, M. (2015). Around the Corner-MGuhlin.org: Tearing Down False gods: SAMR Pushback Begins (Updated). [online] Mguhlin.org. Available at: http://www.mguhlin.org/2015/05/tearing-down-false-gods-samr-pushback.html [Accessed 7 Aug. 2015].

Hesselbein, C. (2014). Goodbye SAMR, Hello RATL!. [online] IGNITEducation. Available at: http://igniteducation.com/2014/01/24/goodbye-samr-hello-ratl/ [Accessed 7 Aug. 2015].

Linderoth, J. (2013). Spelvetenskapliga betraktelser: Open letter to Dr. Ruben Puentedura. [online] Spelvetenskap.blogspot.ca. Available at: http://spelvetenskap.blogspot.ca/2013/10/open-letter-to-dr-ruben-puentedura.html [Accessed 7 Aug. 2015].

Malcher, C. and Campbell, C. (2015). TER #049 – Innovating with technology in the classroom with Gary Stager. [podcast] Teachers' Education Review. Available at: http://terpodcast.com/2015/06/13/ter-049-innovating-with-technology-in-the-classroom-with-gary-stager-14-june-2015/ [Accessed 7 Aug. 2015].

November, A. (2015). Clearing the Confusion between Technology Rich and Innovative Poor: Six Questions. [online] November Learning. Available at: http://novemberlearning.com/educational-resources-for-educators/teaching-and-learning-articles/clearing-confusion-technology-rich-innovative-poor-six-questions/ [Accessed 7 Aug. 2015].

O'Hagan, J. (2015). Please, Stop Calling SAMR a Model for Technology Integration. [online] e-O'Hagan. Available at: http://www.e-ohagan.com/please-stop-calling-samr-a-model-for-technology-integration/ [Accessed 7 Aug. 2015].

Olsen, R. (2015). IOI Weekend Melbourne. [online] IOI Weekend Melbourne. Available at: http://melbourne.ioiweekend.com/ [Accessed 7 Aug. 2015].

Oxnevad, S. (2013). The SAMR Ladder Through the Lens of 21st Century Skills - Getting Smart by Susan Oxnevad - EdTech, SAMR, Teaching. [online] Getting Smart. Available at: http://gettingsmart.com/2013/07/the-samr-ladder-through-the-lens-of-21st-century-skills/ [Accessed 6 Aug. 2015].

Papert, S. (1971). Twenty Things To Do With A Computer. [online] Dspace.mit.edu. Available at: http://dspace.mit.edu/handle/1721.1/5836 [Accessed 7 Aug. 2015].

Puentedura, R. (2014). Ruben R. Puentedura's Weblog. [online] Hippasus.com. Available at: http://www.hippasus.com/rrpweblog/ [Accessed 6 Aug. 2015].

Sacks, O. (2007). Musicophilia. New York: Alfred A. Knopf, pp.41–48.

Samberg, M. (2015). Why I'm Done With SAMR | Mark Samberg. [online] Marksamberg.com. Available at: http://marksamberg.com/2015/05/why-im-done-with-samr/ [Accessed 7 Aug. 2015].

Schrock, K. (2015). SAMR. [online] Kathy Schrock's Guide to Everything. Available at: http://www.schrockguide.net/samr.html [Accessed 6 Aug. 2015].

Speranza, A. (2015). Transformed learning with Google Apps for Education | ReconfigurEd.. [online] Anthsperanza.global2.vic.edu.au. Available at: http://anthsperanza.global2.vic.edu.au/2015/03/26/transformed-learning-with-google-apps-for-education/ [Accessed 6 Aug. 2015].

Toyama, K. (2015). Why Technology Alone Won't Fix Schools. [online] The Atlantic. Available at: http://www.theatlantic.com/education/archive/2015/06/why-technology-alone-wont-fix-schools/394727/ [Accessed 7 Aug. 2015].

Tucker, C. (2013). Beyond SAMR: The Teacher's Journey To Technology Integration. [online] Catlintucker.com. Available at: http://catlintucker.com/2013/10/beyond-samr-the-teachers-journey-to-technology-integration/ [Accessed 7 Aug. 2015].

Wells, R. (2013). SAMR - The common truth. [online] LEARNING & IPADS. Available at: http://ipad4schools.org/2013/07/25/samr-the-common-truth/ [Accessed 6 Aug. 2015].

Wells, R. (2014). SAMR success is NOT about Tech. [online] LEARNING & IPADS. Available at: http://ipad4schools.org/2014/02/04/samr-success-is-not-about-tech/ [Accessed 6 Aug. 2015].

Wheeler, S. (2014). Learning with 'e's: The height of SAMR. [online] Steve-wheeler.blogspot.com.au. Available at: http://steve-wheeler.blogspot.com.au/2014/11/the-height-of-samr.html [Accessed 7 Aug. 2015].

The search for meaning in the term 'blended learning'

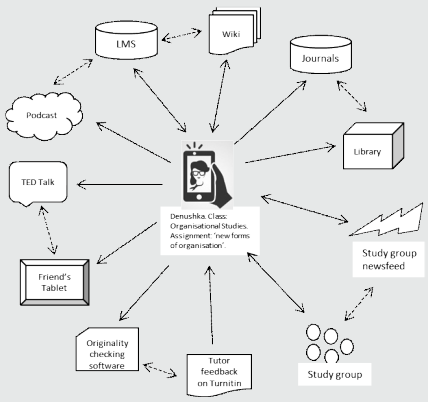
Tony Stevens

Tony Stevens is manager of graduate and degree programmes in business at Holmesglen TAFE in Victoria. He employs ICT to help deliver undergraduate business degree programmes in a blended learning environment, specialising in the business communication and management disciplines. He has a B.Bus and M.Ed., and is currently undertaking studies in the D.Ed. at the University of Melbourne.

There is an attraction to using new and advancing technologies that offer the promise of more useful, perhaps powerful, ways to teach in a more constructivist or stimulating way (Holmes, 2009; Lonn & Teasley, 2009; Ruth & Houghton, 2009). Our classrooms seem to be filled with learning applications, connectivity options, computers and students wielding smartphones (Taneja, Fiore, & Fischer, 2015). The integration of instructor-led teaching and learning approaches and technology-mediated activities – blended learning – now seems a fixture in day-to-day education practice. The blend of information and communications technology (ICT) into education suggests a need to examine how practices across 'multiple sites are or might be mashed up as learning in an educationally worthwhile way [and] is a major pedagogic question' (Fenwick & Edwards, 2010, p.84). How 'the blend' of technology is employed in teaching and learning in recent years reveals concerns with: (1) definitions (Graham, Henrie, & Gibbons, 2014; Graham, 2006); (2) design (Rossett, Douglis & Frazee, 2003; Stein & Graham, 2014); (3) interaction (Stevens, 2013; Wagner, 2006); (4) learning styles (Knowlton, 2005; Wise, Perera, Hsiao, Speer, & Marbouti, 2012); and (5) user 'acceptance' (Ertmer, 2005; Friedrich & Hron, 2010; Ocak, 2011). Many of the sources cited here are from papers or book chapters that explore, explain or theorise blended learning, but the meaning of the term blended learning itself is a vexed one, of interest for well over a decade. In this paper, I explore definitional concerns in blended learning.

It is possible to define and discuss blended learning without mentioning ICTs, given that 'schooling itself is an educational technology involving the continuous application of knowledge to make the mass shaping of ideas possible' (Cunningham & Allen, 2010, p.4). Further, much learning takes place outside school, and technologies from outside the school environment operate inside that environment in unforeseen or contrary ways. For example, one mash-up could see a student inside a classroom appropriating their own mobile technology to access a network through Wi-Fi (originating from 'outside') in order to engage with learning material offered unsolicited via a third party and so on. Despite these evolving challenges, the discourse of teaching and learning does suggest that 'blended learning systems combine face-to-face instruction with computer-mediated instruction' (Graham, 2006). An extension of this concept is a continuum of e-Learning, suggesting a scale from lower level, simpler technologies (like PowerPoint) to full-scale and intensive ICT use Jones (2006).

Sample from a personalised learning environment and the appropriation of learning tools (adapted from Drexler, 2010)



Scenario: Denushka is doing organisational studies. She has an assignment on 'new forms of organisation'. While she travels to college, she listens to a podcast about organisational structure she downloaded at home from the LMS. Later, she accesses a wiki constructed by students from previous courses about this topic from her PC. Before a tutorial, she meets with some of her classmates and decides to form a study group outside the LMS on Facebook. She subscribes to a discussion newsfeed from the group on her smart 'phone. While in the library, a friend shows her a TED Talk about post-modern forms of organising from a link on the LMS. Researching her assignment from home, Denushka later downloads some journal articles from the library database. She submits her assignment to Turnitin, the college originality checking software. Later, she receives her assignment feedback via Turnitin from her tutorial leader comprising text and audio.

Some authors suggest that blended learning is 'an evolving, responsive, and dynamic process that, in many respects, is organic, defying all attempts at universal definition' (Moskal, Dziuban, & Hartman, 2013, p.16). Meeting the challenge of defining blended learning is also about 'staking out a territory'. This means creating and delineating aspects of relevance to the particular writer or researcher, and is a feature of an evolving 'discipline'. We see this in the professions as they strive to trace a frontier 'between what is analysed and what is not, between what is considered, and what is supressed' (Callon, 1980, p.206). Definitions do this work. They are a form of *promise* for what is to follow. Another view of blended learning is offered by Rossett et al. (2003) when they explore strategies for building blended learning, suggesting that 'a blend is an integrated strategy for delivering on promises about learning and performance' (p.1). This incorporates early ideas about *hybrid* learning that account for multi-modalities, including the idea of combining classroom and fieldwork – not necessarily e-learning.

Even as we struggle to define blended learning and build theory in this area, newer and potentially more relevant conceptions might emerge accounting for how blending technology, learning and teaching are practiced. For example: will 'personalised learning environments' (PLE) (Drexler, 2010; Fiedler & Väljataga, 2013) become a dominant discourse? Will the blended learning discourse move from or converge with the PLE or some other 'mash-up', like mobile and ubiquitous technologies (Keengwe, 2015)?

Mary's use of mobile and ubiquitous technologies

Mary is a coordinator on the Hospitality Diploma programme in a large metropolitan TAFE college. She teaches a course that has both a theoretical and work placement-based component. To teach the theoretical component of the course, she uses a range of classroom-based digital technologies, with content stored on the college LMS, Moodle. Students are later placed in hospitality organisations (restaurants, hotels and special event venues) spread across Melbourne for their practical assessment. Mary sets a task for the students to establish and maintain a weekly Blog in the format of a reflective journal that will later be used to contribute to a major assessment item. The Blogs describe the students' placement experience and include photographs taken of events or products they have been involved in creating during their practicum. Members of class are encouraged to log in to the LMS regularly and review each other's blogs, compare 'notes' about their placement and read each other's photographic record of their work and placement activities. Towards the end of their course and after their practical placement, students are brought together in the classroom to discuss each other's experiences and their Blog entries in further detail. Blogs are later exported by the students into a report format that forms part of their final assessment.

Other disciplines struggle with the challenge of the 'universal' definition. Arguing that it is difficult to apply abstract or general models when teaching in management, some time ago Whitley argued that: 'managerial tasks and problems are highly interdependent and systemic, relatively unstandardised [and] combine both social reproduction and innovation' (1989, p.209). We face a similar challenge in our teaching and learning environments. When considering technology and learning, like the problems facing managers, we are reminded to look 'closely at particular ICTs as used by particular teachers in particular teaching situations to achieve particular curriculum or learning objectives with particular students' (Ham, Gilmore, Kaschelhoffer, Morrow, Moeau & Wenmouth, 2002, p.132). In their study of blended learning theory development, Graham et al. (2014) concluded that many models of the concept are presented or used only once 'because the limited specificity of the models does not allow meaningful replication across contexts' (p.29). It seems the *dynamic* and *organic* challenge in executing the 'blend' is reprised in the research and the articulating necessary to theorise the concept.

Prescriptive definitions of blended learning include the percentage of online and instructor-led learning as a defining characteristic. For example, Glazer (2012 citing Allen, Seaman, & Garrett, 2007) suggests that blended courses have between 30-79 percent of their activities online, while online courses might have up to 20 percent of their activities in face-to-face mode, and that face-to-face courses can include up to 29 percent of online activities. At the other end of this spectrum, Garrison & Vaughan (2008, p.5) offer the idea that blended learning could be considered as an approach that contains a 'thoughtful fusion of face-to-face and online learning experiences'. We now arrive at these parameters for defining blended learning: (1) a continuum from 'less' to 'more' technology; (2) three 'categories' marked off by level of technology employment; or (3) a 'thoughtful fusion'.

Rick"s 'thoughtful fusion' of face-to-face and online learning experiences

Rick teaches educational technology to post-graduate students at a large university. He offers the course online; however as a standard practice, he brings the class together as a group in the first session and encourages them to discuss their educational needs. At this session, a number of students express their preference for a face-to-face class. Some others don't have a strong preference and would be happy to take the class online. Rick decides to offer a hybrid arrangement of weekly drop-in tutorials with an online class via 'Ning'. He uses a Ning as his online platform as this offers a more informal learning environment, outside the university's LMS. Each week, a student is asked to coordinate the online discussion which works in tandem with the tutorial component. The Ning's functionality allows students to create interest areas that allow them to 'socialise' their learning environment and most students 'blend' their learning experience using a combination of formats. One week, students are asked to join a guest lecturer at another university using alternate identities in 'Second Life'. They visit the guest lecturer's 'venue' in Second Life and learn about how this technology is employed teaching undergraduate students. Later in the semester, students in Rick's class facilitate sessions where students who are studying online are 'Skyped' into the classroom for their discussion contributions. Rick's approach to 'blending' suggests that he has developed a thoughtful fusion which has allowed the mix to 'emerge' based on the needs of the learners.

The issue of broad and narrow definitions was examined by (Picciano, 2009), where he deemed the combination of on-line and face-to-face instruction as core elements critical to blended learning but added that they should be integrated in a 'planned, pedagogically valuable manner' (p.8). This contrasts

with Graham et al. (2014, p.21) who point to three different conceptions of blended learning: '(1) combining online and face-to-face instruction; (2) combining instructional modalities (or delivery media); or (3) combining instructional methods'. So is the online component core – or not? Alammary, Sheard, & Carbone (2014) argue that a definition needs to include two key ideas of blended learning: the pedagogical process and the course (product) with a mixture of components. Thus, they suggest that blended learning courses: '(1) thoughtfully integrate different instructional methods such as: lecture, discussion group, self-paced activity; and (2) contain both face-to-face and online components' (p.443). Including the design of the learning process supports (McGee's 2014, p33) contention that 'defining blended courses solely based on delivery mode suggests there is nothing more to a blended course than where students meet and how they use technology'.

The definitional work above often leads to theorising about blended learning with the supporting arguments of the researcher-author(s). Rossett et al. (2003) extend their discussion of blended learning by exploring practical issues such as the stability of content; time to implement; level of human interaction; and cost. Graham's (2006) review suggests (inter alia) that blended learning models assist with the practical question of: 'how to blend?' He provides three categories, depending on the focal concern of the designer: (1) enabling blends; (2) enhancing blends; and (3) transformative blends. Alammary et al. (2014) suggest that three distinct design approaches emerge from an examination of the 'constituents' of blended learning: (1) low-impact; (2) medium impact; and (3) high-impact. Graham et al.'s (2014) paper was focussed primarily on a critique of theory development, though they raised concerns that development in the field was being 'impeded' by a focus on 'physical or surface-level characteristics rather than pedagogical or psychological characteristics' (p.29).

Khoa's medium-impact business communication course

Khoa teaches business communication to undergraduate commerce students. The course started with a face-to-face design, supported by the LMS Moodle, and has recently been re-designed. Khoa posts all his lectures on Moodle as podcasts and encourages students to question and discuss concepts in the lectures in a 'flipped classroom' format. On Moodle, students are expected to contribute to several online discussions. Khoa also conducts an immersive activity to support a particular learning outcome of the course related to communication in 'virtual teams'. Students are required to form assignment groups comprising only of members from outside their face-to-face tutorial groups (there are eight tutorial groups on the course). They are required to do this via the discussion and chat functions within Moodle. In their 'virtual team', they are required to develop a report on Google Docs, a major assessment item, worth 25% of their final marks. Students have access to a variety of communication tools demonstrated by the lecturer to develop their assignment. These tools are discussed and tried out by students in the face-to-face tutorials which take place in PC labs. The class is a first-year, first semester one and as there is a relatively large cohort of students moving through, the 'virtual team' assignment gives them an opportunity to interact with their peers in an environment that is similar to a geographically dispersed workplace.

In defining blended learning, the search for a universal rendering causes a drift from the clarity we expect of a precise definition – this problem is not restricted to the task of defining blended learning. Developing definitions in a dynamic environment means interpretive flexibility will be exercised by the diverse communities of interest engaged in blended learning. Laumakis, Graham, & Dziuban (2009) describe blended learning as a boundary object, 'a construct that brings together constituencies from a variety of backgrounds with each of these cohorts defining the object somewhat differently'. I propose that engaging with additional perspectives on blended learning might be helpful in moving us towards definitional clarity: a sufficiently broad-reaching description that encapsulates the various modes and mash-ups without being tied to any particular technology or transaction distance (temporal or physical); and an appreciation that blended learning is not so much an *entity* but rather a *practice*. Describing blended learning as an 'entity' suggests that we are viewing human experience from the 'outside', trying to mirror it conceptually (Shotter & Tsoukas, 2014). I offer that blended learning is a practice or *performance* that emerges out of the experience of teaching and learning practices. This 'performative' view suggests that we could see 'blending learning' as something that unfolds from particular sequences of actions, and does so intra-actively (Barad, 2003, 2007). This suggests that *blended learning is something practiced by employing mixed modalities distributed across learning environments, tools, teachers and learners*. More attention may need to be given to what blended learning does rather than what it *is*. That is, the focus might fall on *how* blended learning works and for whom it works.

Bibliography

Alammary, A., Sheard, J., & Carbone, A. (2014). ascilite Blended learning in higher education: Three different d esign approach es. *Australiasian Journal of Educational Technology*, 30(4), 440-454.

Allen, I., Seaman, J., & Garrett, R. (2007). Blending in: *The extent and promise of blended education in the United States*. Needham, USA. Retrieved from http://onlinelearningconsortium.org/

Barad, K. (2003). Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter. Signs: *Journal of Women in Culture and Society*, 28(3), 801-831. doi:10.1086/345321

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Durham, NC: Duke University Press.

Callon, M. (1980). Struggles and negotiations to define what is problematic and what is not. In K. Knorr, R. Krohn, & R. Whitley (Eds.), *The Social Process of Scientific Investigation* (Volume IV.). London: D. Reidel Publishing Company.

Cunningham, C., & Allen, B. (2010). Philosophical Questions about Learning Technologies. In R. Bailey, R. Barrow, D. Carr, & C. McCarthy (Eds.), *The SAGE Handbook of Philosophy of Education* (pp. 481-502). London: Sage Publications.

Drexler, W. (2010). The networked student model for construction of personal learning environments?: Balancing teacher control and student autonomy. *Australiasian Journal of Educational Technology*, 26(3), 369-385.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development*, 53(4), 25-39. doi:10.1007/BF02504683

Fenwick, T., & Edwards, R. (2010). *Actor-Network Theory in Education.* New York: Routledge.

Fiedler, S., & Väljataga, T. (2013). *In-depth Personal learning environments: a conceptual.*

Friedrich, H. F., & Hron, A. (2010). Factors Influencing Pupils' Acceptance of an E-Learning System for Secondary Schools. *Journal of Educational Computing Research*, 42(1), 63-78. doi:10.2190/EC.42.1.c

Garrison, R., & Vaughan, N. (2008). *Blended Learning in Higher Education: Framework, Principles, and Guidelines.* San Francisco: John Wiley & Sons.

Glazer, F. (2012). Introduction. In F. Glazer (Ed.), *Blended learning: Across the Disciplines, Across the Academy.* Stirling, Virginia: Stylus Publishing.

Graham, C. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *Handbook of blended learning Global perspectives local designs* (pp. 3-21). Pfeiffer Publishing.

Graham, C., Henrie, C., & Gibbons, A. (2014). Developing models and theory for blended learning research. In A. G. Picciano, C. Dziuban, & C. R. Graham (Eds.), *Blended Learning: Research Perspectives* (2nd ed., pp. 13-33). New York: Routledge.

Ham, V., Gilmore, A., Kachelhoffer, A., Morrow, D., Moeau, P., & Wenmoth, D. (2002). *What makes for effective teacher professional development in ICT: An evaluation of the 23 ICTPD school clusters programme 1999-2001.* Wellington.

Holmes, K. (2009). Planning to teach with digital tools: Introducing the interactive whiteboard to pre-service secondary mathematics teachers. *Australasian Journal of Educational Technology*, 25(3), 351-365.

Jones, N. (2006). E-College Wales, A Case Study of Blended Learning. In C. J. Bonk & C. R. Graham (Eds.), *The handbook of blended learning. Global perspectives, local designs* (pp. 182-194). San Francisco: Pfeiffer.

Keengwe, J. (Ed.). (2015). *Promoting Active Learning through the Integration of Mobile and Ubiquitous Technologies.* Hershey, PA: Information Science Reference.

Knowlton, D. (2005). A Taxonomy of Learning Through Asynchronous Discussion. *Journal of Interactive Learning Research*, 16(2), 155-177.

Laumakis, M., Graham, C., & Dziuban, C. (2009). The Sloan-C pillars and boundary objects as a framework for evaluating blended learning. *Journal of Asynchronous Learning Networks, 13*(1), 75-87.

Lonn, S., & Teasley, S. D. (2009). Saving time or innovating practice: Investigating perceptions and uses of Learning Management Systems. *Computers & Education, 53*(3), 686-694. doi:10.1016/j.compedu.2009.04.008

McGee, P. (2014). Blended Course Design: *International Journal of Mobile and Blended Learning*, 6(1), 33-55. doi:10.4018/ijmbl.2014010103

Moskal, P., Dziuban, C., & Hartman, J. (2013). Blended learning: A dangerous idea? *The Internet and Higher Education*, 18, 15-23. doi:10.1016/j.iheduc.2012.12.001

Ocak, M. A. (2011). Why are faculty members not teaching blended courses? Insights from faculty members. *Computers & Education*, 56(3), 689-699. doi:10.1016/j.compedu.2010.10.011

Picciano, A. G. (2009). Blending with purpose: The mutimodal model. *Journal of the Centre for Educational Technology*, 5(1), 4-14. Retrieved from http://www.rcetj.org/index.php/rcetj/article/view/11/14

Rossett, B. A., Rossett, B. A., Douglis, F., Douglis, F., Frazee, R. V, & Frazee, R. V. (2003). Strategies for Building Blended Learning. *Learning Circuits*, 4-9. Retrieved from http://www.learningcircuits.org/2003/jul2003/rossett.htm

Ruth, A., & Houghton, L. (2009). The wiki way of learning. *Australasian Journal of Educational Technology*, 25(2), 135-152.

Shotter, J., & Tsoukas, H. (2014). Performing phronesis: On the way to engaged judgment. *Management Learning*, 45(4), 377-396. doi:10.1177/1350507614541196

Stein, J., & Graham, C. (2014). *Essentials for Blended Learning: A Standards-Based Guide*. New York: Routledge.

Stevens, T. (2013). Who you know and what you know: Student Interaction in Online Discussions. *Australian Educational Computing*, 28(1), 47-60.

Taneja, A., Fiore, V., & Fischer, B. (2015). Computers & Education Cyber-slacking in the classroom?: Potential for digital distraction in the new age. *Computers & Education, 82*, 141-151. doi:10.1016/j.compedu.2014.11.009

Wagner, E. (2006). On designing interaction experiences for the next generation of blended learning. In *The handbook of blended learning. Global perspectives, local designs.* San Francisco: Pfeiffer Publishing.

Wise, A. F., Perera, N., Hsiao, Y.-T., Speer, J., & Marbouti, F. (2012). Microanalytic case studies of individual participation patterns in an asynchronous online discussion in an undergraduate blended course. *The Internet and Higher Education, 15*(2), 108-117. doi:10.1016/j.iheduc.2011.11.007

Student Centred Learning in a Tech Rich Environment

The recent DLTV Digicon Conference featured many presentations that spoke about student voice and choice in one way or another, including our own. This notion of student centred learning isn't anything new, the value and impact of student centred learning methods has been well researched and documented for decades. However, what is changing our instructional methods is the increasing availability and access to 1-1 technology. Our school is currently in its first year of a school-wide BYO iPad program, which is driving a strong change in the roles of the teacher and student in the classroom. This increase in availability has allowed for a shift in the way learning is designed with students playing a large role in deciding how to meet learning outcomes using the digital tools that they now have at their fingertips. No learning experience is a one way fits all anymore if you leverage the available technology effectively. This article will illustrate what this looks like in our school setting. Our own experience is primarily in the early years, however, these concepts are applicable to any level of learning.

Less us, more them

Student-centred learning can be defined in many ways, however it all comes back to one key component, the student. In the context of this article, student-centred learning is about giving students the opportunity to make their own decisions and choices when using technology. Previously, the teacher would design a lesson which would include a learning intention, a teaching focus and an activity for students to complete. Now, through the use of technology, students break down learning outcomes themselves and decide how they want to meet the outcome and which iPad app they will use to do so. For example, if the learning focus is to summarize a narrative, students would analyse the learning outcomes and then decide how they would be able to best meet these intentions whilst taking into account their personal interests, learning needs and abilities. This means that some students may decide to create a news report through iMovie, a 'gami' animation through Tellagami, a flowchart in Popplet or a poster in PicCollage.

Emily Fintelman
@mrsfint
is a fifth-year teacher currently teaching Grade 2s at Aitken Creek PS.

Erin McNamara
@ErinMcNamara20
is a third-year teacher currently teaching Preps at Aitken Creek PS.

Student Choice - What's the purpose?

"When students make choices about their learning, achievement increases…"

(Gearhart, M & Wolf, S. 1995)

When students are given choices throughout the learning process, they move from passive receivers of information to active participants. The decision-making process allows students to become problem solvers, creators and innovative risk takers, and takes the focus from the teacher as the holder of knowledge and moves it onto the student, creating accountability and purpose.

Anthony Speranza said at Digicon 15 that changing trends in education mean that we need to move from teaching content to teaching dispositions (Speranza, A. 2015). Twenty-first century learning means that students have all the information they need at their fingertips. What they now need to learn is the transferrable skills and mindsets required for students' futures in a fast-changing world.

What Student Choice looks like in the Classroom

The following is an example of a student centred learning task in a Grade 2 setting.

AusVELS Numeracy Level 2 Standard: *Group, partition and rearrange collections up to 1000 in hundreds, tens and ones to enable more efficient counting.*

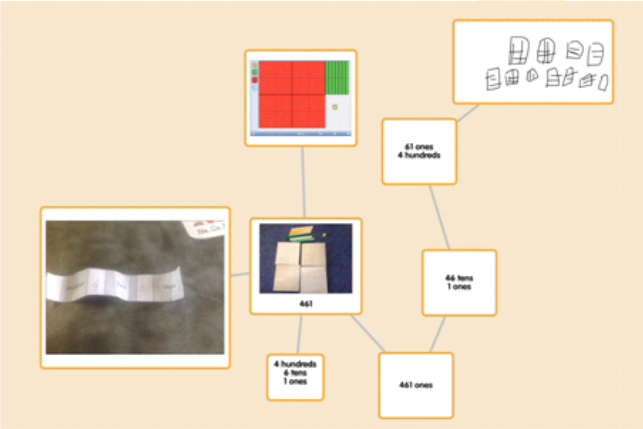
Learning Intention: We are learning to… rename a 3-digit number.

Success Criteria: I will be able to… show how many hundreds, tens and ones are in the number, and show the number different ways using an app of your choice.

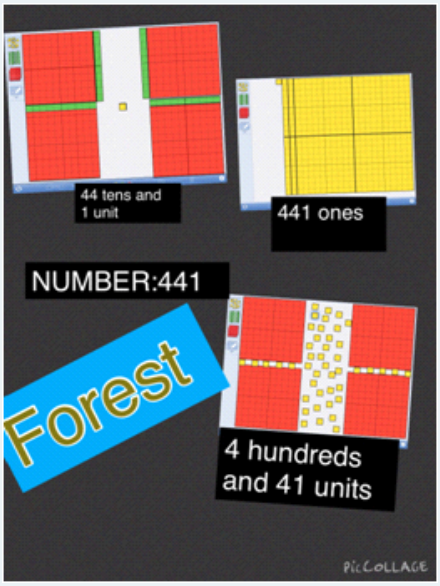
Possible app choices are visually displayed in the classroom.

Students negotiated three iPad apps they thought were best suited to this task, and each chose the one they thought would work best for them. They chose these based on the features they thought would enable them to achieve the outcome they wanted. For some, this looked like recording their voice to explain their thinking, for others this was inserting a photo to show how they used materials.

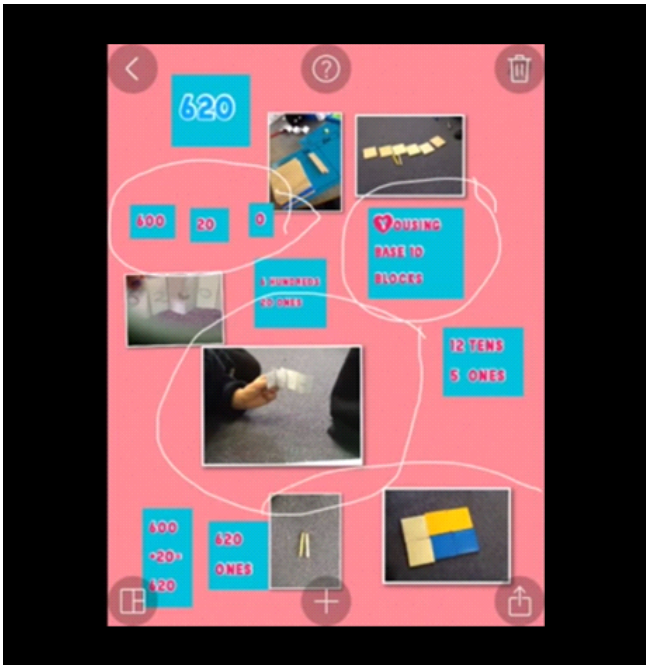
This student chose to use Popplet, a mindmapping tool, utilising text, drawings and photos to demonstrate how they could partition a number. This tool allowed the student to arrange and organise their information and show how they used materials to support their working out.



This student chose to use Pic Collage, a presentation tool, to group pictures and text showing the various ways he could describe the number. This student 'appsmashed' by also using another app to build his number with Base 10 Blocks and then inserted them into his collage. This technique of 'appsmashing' requires using the products from one or more apps and combining them with the tools in another app to create a more effective end product.



This student captured her learning by creating a Pic Collage with text and pictures, and then chose to insert the collage into Explain Everything, a highly versatile slideshow app, that allowed her to record her voice explaining her thinking and to annotate the screen with a pen while she was talking. The end product was a video.



Each student tackled the task in a different way in order to suit their learning needs, but all three reached the learning outcomes and were able to demonstrate their thinking effectively.

How to choose quality apps and tools

Choosing which digital tools to use can be daunting when there are so many to choose from. These are some of the guidelines we use to select apps and tools that enhance learning and can be used broadly.

- Creation-based, not consumption: Choose tools that encourage higher-order thinking skills and allow students to create, analyse, apply, evaluate. These tools often start with a 'blank slate' and require students to make decisions about what actions they need to take to achieve the outcome they are working towards. This might look like creating a video, annotating a picture or text, creating a mindmap and organising ideas, or recording a speech or song.

Creation-Based App

iMovie

Learning is driven by the student who needs to make all decisions in order to get the technology to produce what they need. Allows for a range of tasks.

Consumption-Based App

Whack-a-bone

The learning is driven by the app, not the student. Only allows for content-based learning and does not allow for a wide range of skills to be demonstrated.

Our top 5 creation-based apps:

- Explain Everything ($4.99)
- Book Creator ($6.49)
- Pic Collage (Free)
- iMovie ($6.49)
- Tellegami Edu ($4.99)

- **Versatility:** Often the best tools can be used in a variety of situations and contexts. We try to choose tools and apps that will work across the curriculum. Students will need to choose the tools they need based on the features they provide, such as functions for camera, video, annotation with a pen, voice recording, visually aesthetic output.
- **Aim High:** It is easy to assume that because the technology you are using might look difficult or complicated to use, it is too hard for your students to use. In our experience, if the teacher scaffolds the introduction of new apps and tools effectively, the students are comfortable with taking risks and problem solving to see what the tool can do and to leverage it to their needs.

Digital technologies give us the tools we need to design innovate and engaging learning experiences. However, the technology is just the vehicle. By giving students choice when using technology, they become active participants in the thinking and learning process, and you will be amazed by what you learn about your students when you allow them the opportunity to become the drivers of their own learning!

References

Speranza, A. (2015). *Digicon 15 - Disruptive Thinking in Education* http://anthsperanza.global2.vic.edu.au/2015/07/24/digicon15-disruptive-thinking-in-education/ Accessed 14/9/15.

Gearhardt, M. & Wolfe, S.A. (1995). *Engaging Teachers in Assessment of Their Students' Narrative Writing: The Role of Subject Matter Knowledge. Assessing Writing 1.1* (1994): 67-90.

Using technology to make assessment engaging, efficient and effective

Karen McMullen

Karen McMullen is the Mathematics Learning Leader at Killester College, Springvale. She has a strong passion for continually looking for and using new ideas to improve student learning.

We often attribute the concept of "coach" to sport, which is quite fair because nearly every sporting team has a coach. The role of the coach is to ensure players achieve success- either at grasping a specific skill or being able to use their skills to win. The coach is usually on the sidelines watching the players' progress and looking for ways the players can improve. And, although they often sit out of sight, there is no doubt that the coach plays an active and vital role in the development of a team.

There are many synonyms for teacher, with coach being one of them. If we think of the role of a coach (as described earlier) it is possible to see that both teachers and coaches have the same aim: to ensure players/students achieve success. Success will differ between students- just as it does for players- and therefore it is important to understand how (as a teacher) we can work with the student to ensure they develop the skills and knowledge required to achieve their own learning goals.

The idea of the teacher acting as a coach may sound good in theory but you're probably wondering how you can find the time to coach 29 students, or more if you are a secondary school teacher. This is where you have to get smart about the types of formative assessment you use and how you (and the students) can use the feedback from this assessment to improve student learning.

There are many ways to assess student learning and I encourage you to look at the work of Dylan William (www.dylanwiliam.org) who has written extensively on formative assessment. However, this article will focus on how you can use technology to assist with formative assessment to, hopefully, save you time and improve student learning.

Flubaroo

Flubaroo will basically do the marking for you and it can also email grades to students as soon as they have submitted their answers. It gives results to the teacher in a spreadsheet and will highlight students who had difficulty as well as questions that were particularly hard. All of this is done within a matter of seconds and it is so simple to set-up.

How I use Flubaroo

I've been using Google Forms for a while now to create short exam-prep tests to prepare students for their VCE exams. Before I came across Flubaroo I was writing "IF" statements in spreadsheets to quickly add up my students marks. However, this process was extremely time consuming and tedious and, if I made a small error in the formula, it meant that it was probably taking longer to figure out where I went wrong than what it would have taken me to actually correct the tests by hand.

This is how an exam-prep session will run:

Student's role	Tips for teachers
Students open the google form via email	Questions can be either on the google form or put on a sheet of paper. I have found that students prefer to work with the questions on paper. Answers can still be submitted via google forms.
Students are given 30 minutes to complete the 10 multiple choice questions or 5 mulitple choice questions and 1 short answer question.	If using short answer questions the answer must be exactly the same. This can be problematic if you have an answer that is "6 metres" but students may write "6" or "6m" and be marked incorrect. With multiple choice questions I always offer the option "I don't know how to answer the question" so I know that a student hasn't just guessed correctly.
Once the students have completed the form they can submit their answers and Flubaroo will automatically assess their work and email their responses.	You can see straight away when a student has completed the test. During this time I can see which questions a student got wrong or could not answer. This allows me to go straight to that student and give them assistance.
Once students have finished they are allowed 5-10 minutes talking about the questions with other students.	This is a great opportunity for peer-teaching. Students really like showing each other how to get an answer and, as a teacher, I can see who has really mastered a concept as they are able to confidently teach it to another student.
I then teach any difficult questions to the class.	From the spreadsheet it is easy to see which questions were difficult. Usually students tell me anyway but having this data as proof is helpful especially in a classroom where students may be reserved.
Follow-up with any students who had a lot of difficulty.	The spreadsheet allows me to see which students had a lot of difficulty. I can then go through these questions individually with the student and offer similar questions to take home to practise.

The process outlined above is all done in about an hour and within that hour I have been able to give the students immediate feedback and have been able to assist them with their areas of difficulty and offer them advice on what to do to improve. If the same process was done with a paper test I would have to correct it after class and give written feedback to students who may or may not read what I have written. And this latter process could take anywhere up to a week depending on the timetable and my ability to find time to correct the tests.

Flubaroo is extremely user friendly and requires very little technological skill. The time you spend learning how to use it can't even come close to how much time you will save when you actually use it. The process I use for my maths classes is just one of many possibilities and I encourage you to explore how you could use it in your classroom.

Kahoot

Kahoot is one of the most engaging programs I have seen in my decade of teaching. It is fun and entertaining for the students and it provides feedback for the teacher to work with. It uses multiple-choice questions but the way it operates makes you feel like you are in a game show instead of a classroom.

Basically students join a Kahoot (quiz) and then compete against each other live. The teacher can create his/her own Kahoots or can choose from a huge library of Kahoots that have already been created. Students use their own device to answer questions and can see the results live on the teacher's screen that can be projected on a whiteboard. Students receive points based on how quickly they answer the question and also whether they get the question correct.

You only have to witness a lesson using Kahoot to jump straight onto the Kahoot bandwagon. The great thing about Kahoot is it is extremely engaging and students love the competition it creates.

How I use Kahoot

Kahoot is great to use on a Friday afternoon when you know students may be a little reluctant to get much work done. As it creates a lot of excitement it's advised not to do it before students are required to settle into a quiet environment, so before lunch or at the end of the day is probably best but don't let this limit the possibilities of this great program.

I tend to use Kahoot to revise what has been taught so far. I never wait for the end of the topic to assess student learning (remember that a coach's feedback after a game is never as useful as what it is during the game) and constant revision is useful feedback to the student as well.

It is easy to get caught up in the fun of using Kahoot but it also offers a lot of insight into what the student knows. If students are working in groups you can monitor their interpersonal learning and also see which students work well together to inform possible groupings in the future. If students are working individually then you will be able to see which students are having difficulty and also those who perhaps need to be extended. The Ghost option in Kahoot is a great tool for students who may be having difficulty, as they are able to do the same quiz again and again and are basically competing against themselves instead of the rest of the class.

I have also asked students to create their own Kahoots. This is a great way for them to think about how multiple choice answers are created. This is a great exam revision tool as students need to be aware that multiple-choice answers (especially in maths) can be written differently to what you may have calculated but it doesn't necessarily mean it is incorrect.

Kahoot also allows you to compete against other classes- whether it is within your own school or at another school. The possibilities of Kahoot are endless and because there is a library of quizzes available you can start by using one of these before you start creating your own.

Also try...

Socrative is a combination of both Flubaroo and Kahoot. Socrative allows you to quiz students and gives feedback similar to Flubaroo so in that sense it can be used in a similar way to Flubaroo. Another option on Socrative is that it allows you to race against other students hence creating a competition like environment similar to Kahoot.

I have only recently been exposed to Socrative and have not used it yet with my students. However, despite not having used it I can see that it will have similar benefits to both Flubaroo and Kahoot and offer similar feedback that teachers can use to improve student learning.

Also consider playing game shows in your classrooms. These include Family Feud, Jeopardy, Wheel of Fortune, The Price is Right, Who Wants to be a Millionaire, The Spelling Bee, Numbers and Letters, Deal or No Deal… the list goes on. There are websites that provide you with templates so you can create a game show based on a particular topic and there are website that have games already created for you.

Remember that assessment offers you more information about a student other than whether they can just recall basic facts. You will gain insight into how a student learns best and this can inform your teaching. Assessment is vital for understanding how students are growing as learners and the relationship between teacher and student shouldn't be dissimilar to that of a coach and a player; we all want our students to achieve their personal best.

My 2015 DigiCon Experience

Kayla Kellett

Pre-service Teacher
RMIT University
Bachelor of Primary Education
Fourth Year

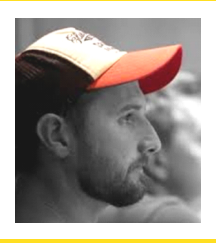
As a pre-service teacher, I am passionate about developing my knowledge and skills to ensure that I can implement engaging educational experiences for my future students. For students to be engaged they require a variety of learning experiences, including exposure to ICT. Therefore, I am always investigating creative and innovative ways that students can develop their ICT skills and abilities. After attending the 2015DigiCon conference I have developed many new ways of engaging students that I cannot wait to implement in my own classroom. The biggest impact on my professional development was the introduction of the new curriculum *Digital technologies*. I attended the session *Digi Tech Vs. ICT*, that identified key differences between the two areas of the curriculum and explicitly labeled what *Digital Technologies* refers to. As educators of the 21st Century, it is imperative to teach students how to use technology to create, collaborate and discover, which is what the new curriculum integrates. I also attended the *Piloting Digital Technologies Panel* session, which assisted me in developing strategies to implement this innovate curriculum and gave insight as to how educators are already instigating *Digital Technologies* at their schools.

If given the opportunity as a graduate teacher in 2016 I would be prepared to implement this new curriculum in my classroom to aid my students in becoming 21st century global citizens. The aim of the new curriculum strand refers to students developing coding skills, which lead me to attend the *Catch a Code* session. This enabled me to gain a vast amount of resources that can be used from Foundation to year 6, according to the needs of the students. As a pre-service teacher I have delved into these innovative resources and am confident of my capabilities to implement the digital technologies curriculum regardless of the year level I may be teaching. DigiCon2015 challenged me to think in new ways of providing engaging educational experiences for students and I feel prepared and confident to share and implement my newly found knowledge as a future graduate teacher.

DIGICON 2015
FESTIVAL of LEARNING

Engaging the Disengaged.

A 21st Century Approach.



Corrie Barclay

Northern Bay College

Corrie has been a teacher and educational leader for 13 years within a range of educational settings throughout the Victoria department of education system. During his time he has initiated, developed, and implemented College wide cultural changes around effective digital learning practices and integration.

His current role as the Educational Leader for Digital Learning at Northern Bay College in Geelong sees him responsible for engaging teachers and students with a curriculum that promotes highly effective pedagogies to develop learners who are confident, capable, enthusiastic and prepared for what lies beyond the classroom environment.

Corrie has had the pleasure of presenting and keynoting at various State, National and International Conferences with focuses being geared towards digital learning competencies, effective technology integration, BYOD, 1:1 implementation, and the challenges involved in changing school wide culture effectively driving that change. In 2013 he became a Google Certified Teacher and in 2013 part of the Apple Distinguished Educator community.

You would be hard pressed to find a school or college anywhere that did not have 'student' engagement' as a key focus for improvement. The need to continually engage our students within their learning appears to be more prevalent now than ever. We know from the research that students in today's classrooms are more connected, have greater access to online resourcing and are more digitally accessible than ever before. Why then do a vast amount of schools and educational settings denounce the need to engage students via this means?

> **"Today's digital kids think of ICT as something akin to oxygen; they expect it, it's what they breathe and it's how they live."**
>
> — Learning in a Digital Age, John Seely Brown

I have often seen that when schools and teachers undertake specific ways to engage their learners, a 'blanket approach' is often used. And, as we know, a blanket approach, or a one size fits all model, does not usually work out all that well.

Just like when differentiating learning activities for students, the need to also differentiate they way in which we aim to increase engagement must also be thought hard about. As an example, think about this. If we had a class of year 6 students who were for the most part not enjoying school, would throwing an iPad in to each of their hands change the way they felt for the better? And, more importantly, would we expect to see student outcomes increase exponentially? Personally, I do not think so, especially across the board.

Schools and teachers need to redefine what it is student engagement actually means within their own context because what engages one students may not, as is often the case, engage another.

The ways in which teachers design their curriculum is perhaps at the forefront of this paper. A need to change and mix things up. A shift in paradigm towards the way lessons are planned for, content delivered, and ways students can articulate the meeting of outcomes are all needed to be put under the microscope.

Earlier this year I heard the great Gary Stager of 'Invent2Learn' fame speak in Melbourne at one of his workshops and one comment that he made that day has sat with me since I first heard it;

What Gary meant by this, as he later stated, was that the notion of creativity and students having the ability to drive their own learning and to explore, tinker and invent is lost within our education systems. The curiosity that our students have outside

> **"Watching kids in schools is like watching balloons deflate."**
> – Gary Stager.

of the school setting is usually asked to be left at the door upon arriving at school. Now if this is the case, what do we do about it? How can teachers and schools embrace students' passions and the natural curiosity that young minds have within the spaces where they are expected to do the most learning? If schools are to encourage and promote these things, we will undoubtedly see an increase in students feeling more engaged towards the learning experiences that they have.

So how do we go about exciting our students about their learning? What can we do to ensure that the technology that is bound to our students' lives build on prior knowledge and more so enable that learnt knowledge to act as a driver of change? What can teachers integrate and embed to foster a classroom, or school, culture of highly engaged students? I have been very lucky over the years to work alongside teachers who have been ridiculously innovative, brave, and also disruptive, in a good way, to change up their classrooms and instigate that aforementioned culture.

The ways that I have seen, and also been actively engaged in myself, other educators increase student engagement within their settings are wide and varied. The amount of methods, tools, frameworks, trends, initiatives, etc. that teachers and students can engage in are endless, again however, you need to think about what works best for you and your context.

Recently I had the amazing experience of running what ended up being a very cramped (I always over plan and therefore run out of time…#poortimemanagement) workshop/session at the Digital Learning and Teaching Victoria annual conference, Digicon15. This session was titled 'Don't be A Textbook: Redesigning Curriculum for the 21st Century' and covered a lot of what I have spoken about here. (The link to that presentation can be found here: http://bit.ly/dbat-dltv15)

The importance to plan and cater for our students not only from a student learning perspective, but also an engagement point of view, should be higher on the agenda than what perhaps it potentially is.

The millennials that we are teaching are the first cohort of the human race to have access to personal technologies. These are young people who do not, usually, marvel at technology but accept it and revel in it. These are our students; students who are experienced campaigners when it comes to using technology to communicate, collaborate, be creative and problem solve through critical thinking. As teachers of these students we need to accept this because it is not going away.

The introduction in to educational settings of things such as flipped learning, gamification, genius hour, video and web conferencing, collaborative online spaces, social media, mobile technology, etc. serve to potentially enhance curriculum design and teacher practice.

Now when all is said and done, I am a staunch believer of one thing that exists purely to improve learning outcomes and drive student engagement, and that being student voice. Students like choice. They for the most part launch themselves in the opportunities that are given to express their creativity and passion when needing to apply learnt knowledge and skills. For students to be able to use an iPad to make a multimedia based video, or for others to use Minecraft to show what they have learnt, or for others to take this a step further and collaborate in the same world to build something together, or perhaps for students to create their own website, all to demonstrate the same learning outcome is extremely beneficial to them as learners, and you as their teacher. For as much as we want to increase student engagement, we can also be the ones who can stifle it.

Jayne Boon's

APP SMASH

Resources for teaching the Australian Curriculum: Technologies

CODING IS COOL!

Jayne Boon is Director of eLearning at Aitken College, a P-12 school with 1200 students, 150 teachers, over 1,000 iPads and a vast array of technology in the classroom. She has been teaching Modern Languages, Media and ICT for many years with a wealth of experience in ICT and eLearning in Australia and the UK. She was a curriculum ICT Consultant for BECTA working on the Academies Program and Building Schools of the Future programs in the UK, providing advice and guidance on infrastructure, integrating ICT into learning and teaching, identifying staff training needs and producing programs to upskill staff in the use of new technologies. Jayne has spoken at conferences and delivered many ICT training events in the UK and Australia.

I am frequently asked which app I would recommend for various tasks and I have quite often downloaded apps, tried them and then deleted them because they really weren't very good. What's useful personally isn't always as useful with your students? Do you need to spend money on app or are the free versions just as good? The app world is a minefield to be navigated and explored!

In this edition I have looked at the apps I use frequently on my own iPad and why I use them. One thing that is worth noting is the cost of apps. Apps can vary quite drastically in price and at times an app can appear quite cheaply then the next time you see it there appears to have been a huge price increase? Apple's Volume Purchasing Program (VPP) allows schools to purchase apps usually up to 50% below the advertised price if buying 20+ apps at any one time. Apps can then be distributed as codes or added to the school app MDS.

BookCreator – $5.49 or Free (only allows the creation of one eBook)

https://itunes.apple.com/au/app/book-creator-for-ipad-create/id442378070?mt=8

Perhaps the easiest of all eBook creation apps with endless possibilities. Students are able to create their own eBooks with audio, video and interesting backgrounds. When the document is published as an eBook it works well and looks good. The lite version only allows the creation of one book and as this is an app that can be used in a variety of subjects and year groups, investing in the full version is highly recommended.

Trello – Free

https://itunes.apple.com/au/app/trello/id461504587?mt=8

Trello allows you to keep track of all of the tasks on your 'To-do' list. Its easy to use and you are able to create 'boards' for any topic you are working on. You quickly get to know what needs be done, who's going to do it, and what's coming up next. Everything you do is synced and saved instantly to the cloud so that all your devices are always up to date. Trello boards can be used for individuals or group work so that everyone in the team knows what needs to be done, by whom and by when.

Miniatures – Free or $5.94

https://itunes.ap ple.com/au/app/ miniatures-pro-tilt-shift/id42757708 4?mt=8

Tilt shift time-lapse photography and movie making made easy. The free version limits the length of movie you or your students are able to create. This produces amazing results previously only possible with an expensive SLR digital camera. I have used this app to create 'A day in the life of..'. Students and teachers alike are able to easily create fun high speed 'miniatures' which almost look like Toytown. The addition of a soundtrack to the final product makes this a highly desirable app.

Popplet – $4.99 or free

https://itunes.apple.com/au/app/popplet/id374151636?mt=8

Popplet is a simple thoughts organisation tool allowing students to think and learn visually. By capturing facts, thoughts, and images, students learn to create relationships between them and generate new ideas. Planning any project or piece of work always enhances the final result and Popplet like other mind mapping tools allows this to happen. This is a really simple, easy to use app.

Explain Everything – $4.99

https://itunes.apple.com/au/app/explain-everything-interactive/id431493086?mt=8

Explain Everything is an easy to use design, screencasting, and interactive whiteboard tool that allows students and teachers to annotate, animate, narrate, import, and export almost anything to and from almost anywhere. It is particularly useful with flipped learning in mind and creating resources for students with both audio and video of explanations in class. There are endless possibilities with this app.

Educreations – Free

https://itunes.apple.com/au/app/educreations-interactive-whiteboard/id478617061?mt=8

An alternative to Explain Everything, Educreations is a simple, fun interactive whiteboard and screencasting tool. Teachers are able to create short instructional videos and share them with their students, or ask students to show what they know and help friends learn something new. Teachers can upload their videos to the Educreations website and share them with their classes via a link or email or embedding into a website.

iBookshelf – $2.49

https://itunes.apple.com/au/app/ibookshelf/id314982342?mt=8

iBookshelf is designed to help students keep track of their reading records and personal library and books can be digital or paper books. There is a free lite version of the app but the paid version is particularly useful as students are able to scan the bar codes on books to find out more information about the plot, author and also where the book is available for loan.

Notability – $7.49

https://itunes.apple.com/au/app/notability/id360593530?mt=8

Notability allows students to annotate PDF in a variety of ways from highlighting text to adding typed or handwritten notes. Teachers can also use the app to annotate and mark student work using digital ink and then returning the marked work to students as a PDF.

Videoscribe Anywhere – Free but costs $6.49 to unlock the content and $.99 for unlimited video exports

https://itunes.apple.com/au/app/videoscribe-anywhere/id995247153?mt=8

In app terms, this is not a cheap app but it does have many uses and its one of my favourite and very useful for teachers creating interesting content for their classes. Videoscribe allows teachers and students to create whiteboard animations that are captivating, imaginative and fun. Soundtracks and audio can be added to the animation and then exported to the camera roll.

Zenhat – $6.49

https://itunes.apple.com/au/app/zenhat/id624160032?mt=8

Zenhat is an app for research, which has thousands of specially selected websites organised into topics. Students are able to search or browse by keyword, learning area and subject heading. This app is particularly useful with younger students who need a little more guidance with their research.

Quiver – $9.99

https://itunes.apple.com/au/app/quiver-education-3d-coloring/id993479851?mt=8

There are two versions of this app – one aimed at the education market costing $9.99 and a free version offering in app purchases from $3.79 per unit. This app offers a 3D augmented reality colouring experience which never fails to amaze students and adults when images they have coloured in magically leap off the page and walk around in front of them. Prepare for the wow factor – this app could ber used for a variety of literacy and storytelling activities aimed primarily at younger students. The education version is designed around many diverse topics such as biology, geometry and the planets. The app is linked to the Quiver website where free colouring pages are available to download http://www.QuiverVision.com/Education

RefMe – Free

https://itunes.apple.com/au/app/refme-citations-made-easy/id553222694?mt=8

RefMe is a very useful tool for creating bibliographies using the iPad camera to scan barcodes or scan using book titles, ISBN or URL. It supports all of the major referencing styles and the final result can be exported to the final document.

Who is billy possum?

Michelle Somerton

Faculty of Education, University of Tasmania

Michelle Somerton B. Ed (Hons) has worked for three years as a tutor in inclusive education in the Faculty of Education, University of Tasmania and has recently submitted her PhD for examination. Michelle is the author of the iTunes App: Billy Possum's Interactive Comprehension and the recipient of a state postgraduate tertiary student iAward for research and innovation in Information Technology. She has a strong interest in children's language and communication development and academic development of students with Autism Spectrum Disorder (ASD).

Abstract

New mobile technologies such as tablet computers are not uncommon across many educational settings. A growing body of research is beginning to critically examine the educational effectiveness of these new technologies in applied settings in order to understand what works, for whom, and why. The present article describes the design and development of an evidence-based literacy application (app) for iPad and explains the process of addressing deficits in critical literacy skills through the use of new mobile technologies.

Introduction

I began my PhD with a desire to investigate ways to assist students with autism spectrum disorder (ASD) improve common difficulties with reading comprehension. Of course anything that involves a higher degree in research is not going to be straight forward but I did not expect that I would end up creating my own application (app) for iPad. In essence my research involved four main elements; reading comprehension, autism, technology, and a possum. Two of these elements concern the problem and the remaining two involve the solution.

Reading Comprehension

It is important to be able to read, however more important to understand what you are reading. For many children this can be problematic. The difficulties that some children face with reading concern not only elements of decoding or phonological awareness related to fluency, but also the ability to integrate and make sense of information such as understanding syntax and semantics (Nation et al., 2006). Problems associated with reading comprehension or making sense of what you are reading have lifelong impacts across all areas of an individual's life.

Autism

The behaviour and cognitive profiles of individuals with autism are characterised by core deficits associated with the disorder. These include language, social and emotional communication and repetitive behaviours (Lord et al., 2003). There are a number of theories that explain these deficits such as “theory of mind” or problems in understanding the mental and emotional states of others (Baron-Cohen, Leslie & Frith, 1985) and “weak central coherence theory” which describes cognitive difficulties with the organisation of information (Happe & Frith, 2006). These deficits can impact on the educational attainment of students with autism in varying ways. One of the common problems seen in the classroom with many of these students is the development of critical literacy skills such as reading comprehension (Nation et al., 2006). I was interested in investigating ways that could address these problems with comprehension and this is where technology became relevant.

Technology

In education, what we do know at this time is that new mobile technology such as Apple's iPad and accompanying 'apps' can assist students in many areas such as; communication, access to information, and engagement with a broader global world. There are innumerable accounts of increased motivation and engagement however, much of the research in this field is observational and anecdotal and often not empirically based (Armstrong & Hughes, 2012; Arthanat, Curtin & Kontak, 2013; Hutchison, Beschorner & Schmidt-Crawford, 2012).

So, what the literature couldn't really say was if any of these new products could deliver 'real' academic gains in the acquisition of critical literacy skills and developmental disorders (Kagohara et al., 2013; King et al., 2014; Knight, McKissick & Saunders, 2013). Based on the cognitive profiles of students with autism, I decided to frame a study that would remove the face-to-face teaching methods that can be barriers to learning for students with autism and replace them with widely used app technology. However, I came across a major problem and this is where I introduce my final element 'the Possum'.

The Possum

After evaluating many educational websites and products available on the market I could not justify a suitable 'app' for the

intervention in my study that aligned with the research. There were products that provided the strategies I needed as 'content' but did not consider 'process' or the way the software would appropriately support learning. Many of these products did not address important considerations raised by research such as how feedback is delivered, nor did they report on student performance (Su & Draper Rodriguez, 2012). Others lacked genuine curriculum links or were not authentic in task design (Walker, 2014).

After examining emerging research and relevant frameworks concerning software design for mobile technologies, I decided to work on the creative design process for an app based on a children's story 'The Adventures of Unc' Billy Possum' (Burgess, 1914).

The original story was first published in 1914 so it was not really useful in its original format. I re-wrote the story so it was 'localised' and appropriate for Australian students participating in my study (Nikolopoulou, 2007) and embedded the appropriate comprehension strategies drawn from evidence-based research. These were incorporated with research addressing principles and frameworks concerned with educational software design (Su & Draper Rodriguez, 2012; Walker, 2014). This process ensured that the app delivered not just the content that was required but delivered it in the same way that a teacher would by providing the necessary scaffolding and feedback (Su & Draper Rodriguez, 2012) to support the development of these particular critical literacy skills. The process was very involved considering it was very important to justify what should be included within the features and functions of the software, and of course just as important to justify what should not be included. For example, to frame this as a gaming app would have changed the authenticity of the reading task and removed the focus from the explicit learning content onto the game element (Falloon, 2013; Tsai, Yu & Hsiao, 2012).

For six months I oversaw the design and development of the app by a local software company. After it was completed I began a pilot study with two participants. The results of this pilot helped to improve the rigour of my main study and allowed me to make some modifications within the app software.

My research was completed in December 2014 and the results show that the app measured gains with those participants in my study that had the greatest deficits in oral vocabulary and reading comprehension. There were little or no measurable changes to those students with high levels of vocabulary and comprehensions. Therefore, the App did do what it was required to do for those students with the highest degree of deficits.

Summary

The app Billy Possum's Interactive Comprehension (Somerton, 2014) has now been sold in 22 countries around the world and is being used in schools in the United States. The app is not only used to support comprehension for students with autism but is being used to support typically developing students with their comprehension.

The implications of this research do not just end with the creation of an app, as there are broader considerations within my thesis for practitioners such as how to evaluate the quality of app software labelled as 'educational', and for developers of educational software in how they can best align the design of educational software with evidence-based practice.

So, who is Billy Possum? For me, he is not only the main character in my reading app but represents so much more. Billy Possum is perhaps a more concrete representation of the creative processes of research. He is the synthesis of research and literature, the application of new ideas, and the result of the talents of many individuals. But perhaps most importantly Billy Possum is a way to inform future research in technology to deliver better educational outcomes for *all* students.

Tables and Figures

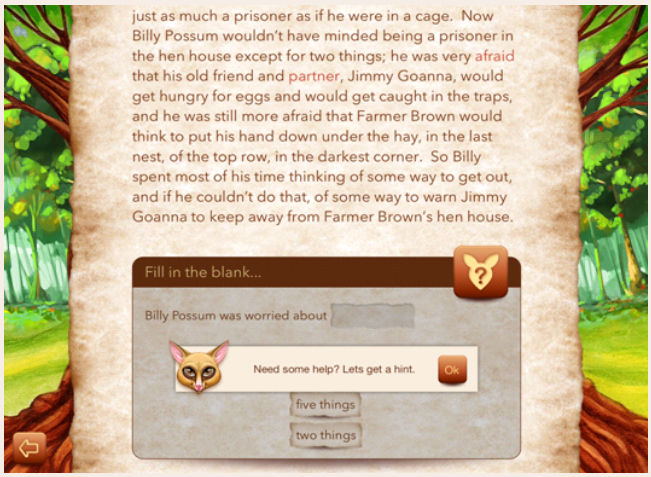


Figure 1. Example of a 'cloze' strategy with hint function after initial incorrect response.

Figure 2. Picture Builder for visualisation.

Figure 3. In app chapter view showing instruction walkthrough and locked chapters.

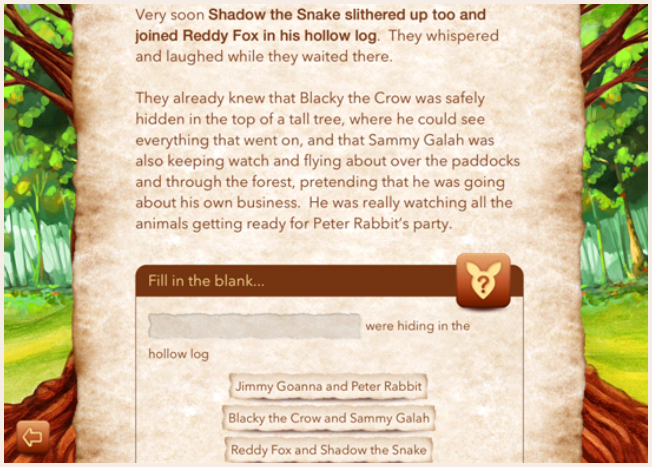


Figure 4. Bold text scaffolds a student's response to support comprehension.

References

Armstrong, T., & Hughes, M. (2012). Exploring computer and storybook interventions for children with high functioning autism. *International Journal of Special Education, 27*(3), 88-99.

Arthanat, S., Curtin, C., & Kontak, D. (2013). Comparative observations of learning engagement by students with developmental disabilities using the iPad and computer: A pilot study. *Assistive Technology*, 25(4), 204-213. doi: 10.1080/10400435.2012.761293

Baron-Cohen, S., Leslie, A., & Frith, U. (1985). Does the autistic child have a 'theory of mind'? *Cognition, 21*, 37-46.

Burgess, T. W. (1914). *The Adventures of Unc' Billy Possum:* Hachette Book Group.

Draper Rodriguez, C., & Cumming, T. (2012). Kyle Tomson, iPad Builder Applications: Language Builder, Question Builder, Sentence Builder and Story Builder, $7.99 to $9.99, (iPod and iPad Applications). *J Autism Dev Disord, 42*(12), 2767-2769. doi: 10.1007/s10803-012-1539-3

Falloon, G. (2013). Young students using iPads: App design and content influences on their learning pathways. *Computers & Education, 68*(0), 505-521. doi: http://dx.doi.org/10.1016/j.compedu.2013.06.006

Happe, F., & Frith, U. (2006). The weak coherence account: detail-focused cognitive style in autism spectrum disorders. *Journal of Autism and Developmental Disorders, 36*(1), 5-25. doi: 10.1007/s10803-005-0039-0

Hutchison, A., Beschorner, B., & Schmidt-Crawford, D. (2012). Exploring the use of the iPad for literacy learning. *The Reading Teacher, 66*(1), 15-23.

Kagohara, D. M., van der Meer, L., Ramdoss, S., O'Reilly, M. F., Lancioni, G. E., Davis, T. N., Rispoli, M., Lang, R., Marschik, P. B., Sutherland, D., Green, V. A., & Sigafoos, J. (2013). Using iPods (R) and iPads (R) in teaching programs for individuals with developmental disabilities: a systematic review. *Research in Developmental Disabilities, 34*(1), 147-156. doi: 10.1016/j.ridd.2012.07.027

King, A. M., Thomeczek, M., Voreis, G., & Scott, V. (2014). iPad® use in children and young adults with Autism Spectrum Disorder: An observational study. *Child Language Teaching and Therapy, 30*(2), 159-173.

Knight, V., McKissick, B., & Saunders, A. (2013). A review of technology-based interventions to teach academic skills to students with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 43*(11), 2628-2648. doi: 10.1007/s10803-013-1814-y

Lord, C., Rutter, M., DiLavore, P. C., & Risi, S. (2003). *Autism diagnostic observation schedule: Manual* Los Angeles, CA: Western Psychological Services.

Nation, K., Clarke, P., Wright, B., & Williams, C. (2006). Patterns of reading ability in children with autism spectrum disorder. [Research Support, Non-U.S. Gov't]. *Journal of Autism and Developmental Disorders, 36*(7), 911-919. doi: 10.1007/s10803-006-0130-1

Nikolopoulou, K. (2007). Early Childhood Educational Software: Specific Features and Issues of Localization. *Early Childhood Education Journal, 35*(2), 173-179. doi: http://dx.doi.org/10.1007/s10643-007-0168-5

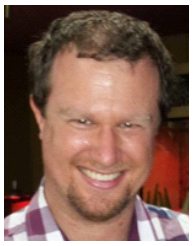
Somerton, M. (Producer). (2014, 2 August 2015). Billy possum's interactive comprehension (v1.1.2). [mobile application software] Retrieved from https://itunes.apple.com/us/app/billy-possums-interactive/id875598691?mt=8%E2%80%8B

Su, B., & Draper Rodriguez, C. (2012). *Identifying the key features in computer learning games*. Paper presented at the Global TIME: Global conference on technology, innovation, media & education, Chesapeake, VA.

Tsai, F.-H., Yu, K.-C., & Hsiao, H.-S. (2012). Exploring the factors influencing learning effectiveness in digital game-based learning. *Educational Technology & Society, 15*(3), 240-250.

Walker, H. (2014). *Establishing content validity of an evaluation rubric for mobile technology applications*. (PhD), John Hopkins University, Baltimore, U.S.

TECHNOLOGY IN THE EARLY YEARS



Daniel Cohen

Teacher Learning Network

Daniel Cohen trained in Early Childhood and Primary teaching. He worked in primary schools and a secondary setting for students with behaviour challenges. He has been an IT co-ordinator in different schools leading the introduction and use of new resources in a range of settings. He now works for the Teacher Learning Network as the Online Learning Project Officer. In this role he manages the online learning system, manages the PD courses in the TLN calendar, works with presenters to design the presentations and also presents PD sessions on the use of IT to support learning.

Abstract

The use of technology in early years classrooms can be contentious. I believe that the reason there is so much concern is because technology is rarely incorporated well. By keeping focus on educational outcomes instead of making the technology the main focus we can ensure that the core business of learning and teaching is addressed. Technology should be used as a tool to help achieve our goals. This may include making teaching better by creating more engagement and helping us as teachers put together lessons, or it may be by giving students more ways to explore and demonstrate their understanding of topics. Either way when used effectively it can make it easier to achieve educational outcomes and provide a better education for our students.

Introduction

Technology use in schools has always had advocates and critics. Unfortunately I believe that the reality of technology use in classrooms has rarely matched the description schools (and some teachers) give of technology use in classrooms. Too many times I have been told of the wonderful ways technology is being used in a school only to find that there is really just a substitution in the way work is completed that doesn't actually demonstrate the benefits of technology. In this article I will discuss effective ways to incorporate technology into the early years classroom in meaningful ways and also the often forgotten evaluation of whether it is working.

Developmental appropriateness

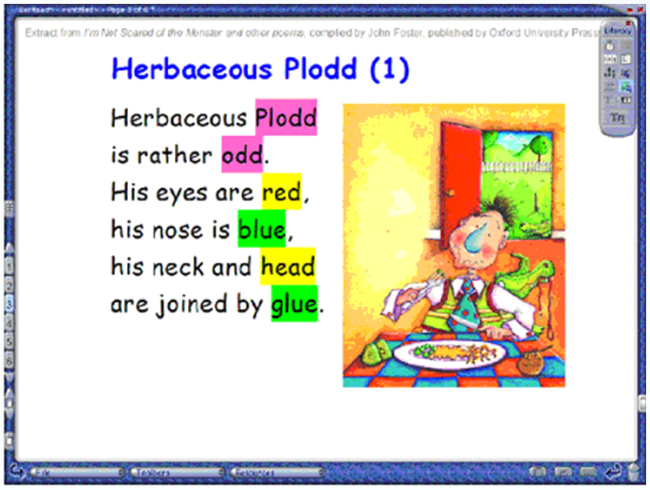
One of the criticisms of technology use is that it stifles some of the developmental aspects of a child. I will go into this in more detail throughout the article but as with everything in life there is more than one thing that affects development. When used properly technology is a tool that will aide development rather than be something that detracts from it. When I introduced a 1:1 laptop program into my class (where each student had their own laptop to use) there was concern that the use of laptops would remove the development of other skills like handwriting. At no point was the use of laptops going to remove any learning opportunity. Rather it would be a way to achieve the work and there would be times where laptops were not used. Once they understood that the laptop would be a tool, like a dictionary is, then we received 100% of the parents support in this program. In this way using technology in an early years classroom can encourage healthy development of children.

The technology we used

When I worked at Preston West Primary School I saw the introduction of 11 interactive televisions to the school. This worked out to be roughly one between two classrooms. We had a lot of discussion about choosing these over interactive whiteboards. We chose the TVs because: they used the same software as the interactive whiteboard (http://www.teamboard.com/) so included all the same features, they were mounted on a portable frame, they're smaller than portable whiteboards and easier to move, you didn't require a stylus and could use your finger to control the screen, it could be used as a TV to watch things like the Tour de France or the Olympics, but most importantly it was lower to the ground which meant it could be reached and used by the children. We wanted technology that was centered on children's use rather than stuck up high or on the wall where it

would just be a teacher's resource. Having them lower for students to reach meant that when setting up activities in the classroom room the interactive TV became one of the activities.

The interactive TV also came with the software 'Easiteach'(http://www.easiteach.com/eng/). We found this software provided lots of useful activities and served our purposes well. It could be setup in a similar way to Microsoft Powerpoint's structure. You could have one single page with activities on it or setup multiple pages so there were a series of activities to work through.



We also purchased five voice recorders, shaped like small microphones that connected to a computer with a USB. These had a single button to start and stop recording. We already owned a number of digital cameras as well as having three desktop computers in each classroom loaded with the standard software provided through Edustar by the Department of Education.

While people often leap straight to computers and interactive whiteboards when thinking of technology, there is a range of other simple everyday technology such as clocks and calculators that should also be included. There are probably still a few listening posts floating around in schools too that still have value.

Planning the use of technology

The most important part of using the technology in a classroom is in the planning for it. Too many times people have scheduled technology time instead of focusing on the curriculum and incorporating the technology into the subject being focused on. This is where it becomes easy for technology to be a gimmick and for time to be wasted. As teachers we are the experts in understanding the educational outcomes that need to be achieved. The technology is not the end goal, just the means to reach the outcome.

Having said that, it is important for students in the early years to have some guided and structured play time. They need to get over the excitement of something new before it can be incorporated as a learning tool. Giving the students time to explore the capabilities of the technology being used means that they then start using their own thinking skills, they share with each other when they make discoveries and they get to know the mechanics of using the particular device.

I wanted my students to take photos of work that demonstrated the learning they had achieved that week. For this to happen they needed to know how to take the photos. I introduced the cameras to the class the week before and let them experiment. I gave the cameras to them each afternoon when we had unstructured 'play time' but also at the end of each session before recess and lunch. Naturally some students had already had experience with this and they were able to be 'experts' that helped other students use the cameras. By the end of the week every student was able to take a photo, view the photo and delete photos from the camera. This meant the following week I was able to ask them to choose their best piece of work that showed they had learned the topic. Their discussions became reflections on their learning rather than opportunities to just take photos of everything around them.

When the interactive TV was first being used, I put a photo (from their school records which are saved on the network) of each student on a screen. The TV was then placed next to where the students sat on the floor. This then became part of the routine for entering the room. Students had to put their bag on the hook, put their reader in their tub, draw a tick or cross on their picture on the TV with their finger, and sit on the floor. This then meant I could quickly do the roll and they were learning how to draw on the screen.

When Microsoft released Windows they included the games 'Solitaire' and 'Minesweeper' because these games taught consumers how to use a mouse. To play the game you had to understand the difference between single and double clicks and well as the left and right mouse buttons (http://mentalfloss.com/uk/technology/32106/the-true-purpose-of-solitaire-minesweeper-hearts-and-freecell).

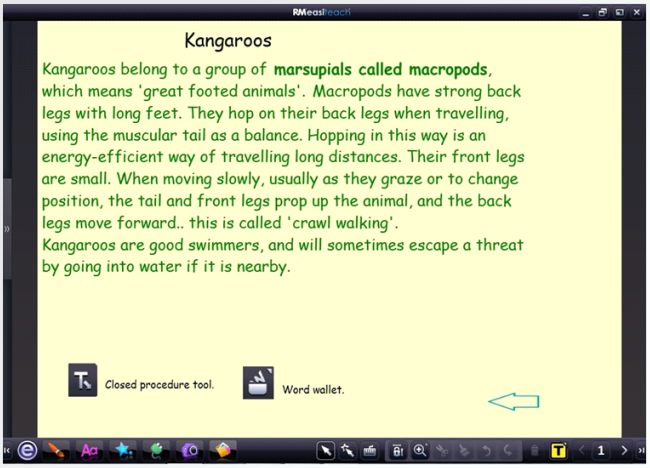
It is necessary to learn how to use the technology. Students in early years classrooms have little fear of having a go as they have no concern about 'breaking the computer'. This means that they can pick up a device and learn to use it fairly quickly allowing us to incorporate it into our planning for activities.

Technology supporting the curriculum

The most important thing when planning is to keep focus on the educational outcomes for the students. The outcomes are what determine how technology should be used.

During English classes I would set up workstations of different activities. Some were teacher directed where I could monitor students closely and some were more independent. The Easiteach software had an activity that would allow student to match puzzle pieces together. The first lesson in the week we looked at the different endings for 'BR'. We talked about them and read books and I showed them how the puzzle matching activity worked. The following lesson the interactive TV became a workstation for students to use. Students could then take the 'BR' piece and put other letters and match them up to

make words. This became a way for them to practice what I had been explicitly teaching at other times. (eg. BR + AND = BRAND, BR + END = not a word, BR + ING = BRING).



I wanted students to record themselves reading so that they could listen to themselves and judge whether they were reading the words well. There are many different ways to do this. We had the USB microphone recorders but you can also get dictation apps on iPads or android tablets that do the same thing. There is also a voice recorder built into windows that could be used. I felt the USB microphones were easiest for the age of the students. Students then had to do three reading aloud activities. They had to read one on one with me, they had to read aloud to a partner and they had to record themselves reading. We didn't substitute any other activity to use the technology but built it into the way students demonstrated their abilities.

When we were focusing on making to 10, students had to find examples of objects that paired to make 10. They were able to do this using MAB blocks and UNIFIX blocks. They were also able to use the cameras to take photos of groups of objects both inside and outside of the classroom to add together. The interactive TV was set up with a page that had groups of objects so they had to move all the groups around until they were paired in groups of 10.

When studying our big book I scanned the pages and pasted them onto the computer. I was then able to use the drawing tools on the TV to cover words and ask students to predict what the missing word was. Or I could highlight all the double letters (or whichever sound blend we were studying that week). I could also use different colours to highlight other letter combinations that had been studied in previous weeks.

The downside

Technology sometimes fails. There will always be a time where the battery is flat, or the computer is updating and it can't be used. If our focus is on the educational outcome then this becomes less of a problem because, as capable teachers we are experts in adapting, we just do the activity in a different way using concrete materials. It's different and sometimes slower but the students still learn. We always have a range of backup plans in our head when working with students, for the students that don't get it or for early finishers. We just need to have a backup idea for when the technology fails.

Preparation time and workload are always highlighted as issues. These will be significant problems if too much is attempted. By trying to start using technology in every aspect of our teaching all at once we are setting an unachievable goal. When I ran a 1:1 laptop program we set a reasonable timeline where term 1 was learning the mechanics of the laptop, term 2 was using it in English and term 3 was to start using it during maths. Setting realistic goals is an important part of success.

In addition there was effort put into working out how technology could make other tasks more efficient. When planning my maths activities I worked out that I could exchange one hour of time spent at the photocopier for one hour of preparing an activity on the interactive TV. The greatest benefit of this was that I could click save and this resource was now able to be used by my colleagues, reused as a template for other topics and then reused again the following year (with minor adjustments).

I had a battle with some colleagues to get understanding that completing activities on the interactive TV was not 'playing' and achieved the same outcome as cutting and pasting paper into an exercise book (except quicker, cleaner, and cheaper). This did not mean we never cut and paste paper into exercise books again, just that the educational value was the same.

Demonstrating work has always been important for parents to see what their children are doing, to justify assessments and reports, and even sometimes to prove to the school management that I was actually doing my job. Figuring out how to celebrate students' work and demonstrate it to others is an important part of an early years classroom. It is not possible to put digital screens on every piece of the wall so sometimes the technology was put to the side so that we could make posters to hang on the wall. The students' connection to the room by having their work displayed is an important thing and sometimes this will determine whether or not a piece of technology is used for the activity. In this case if technology is used it may just be as a way for me to demonstrate or introduce a topic rather than the way students complete it.

Conclusion

I went to university and earnt a degree to learn how to be an effective teacher. Using a piece of technology can't replace that. Our focus should always be to use the technology as a tool to achieve a result. The educational outcome should always be driven by the teacher but the way it is achieved doesn't always matter. Our goal is for the students to learn new skills. Where technology makes this easier or more explicit there is a great benefit to building this in to our classroom. Where technology becomes a distraction and doesn't actually have an educational purpose then there is an opportunity for us to reflect on what we are doing and improve what we are doing.

There are a great many tools that allow us to engage students more and make their learning explicit. As teachers our role is to help them achieve their potential. Why wouldn't we use all the tools at our disposal to do this?

Further Reading

https://www.rm.com/_rmvirtual/media/downloads/easiteach_literacy_3.3.pdf
http://www.rlisd.org/ourpages/auto/2010/7/15/48288769/Easiteach%20Training%20Guide.pdf

For your BOOKSHELF

A new book for teachers (in-service and pre-service) on Teaching and Digital Technologies has been published by Cambridge University Press. The editors are DLTV member Dr Michael Henderson, and ICTEV Life Member Prof Geoff Romeo. Many of the chapter authors are also DLTV and ACCE (our parent association) members. Indeed, the book is uniquely Australian in its focus with all of the authors being notable figures from across Australian. Many of the topics are particularly relevant for Australian contexts, including a commentary on the history educational technology in Australia and the implications of Computational Thinking and the Australian Curriculum.

Unlike most teaching resources, this book assumes that the work you do requires considerable orchestration and risk taking. This book peels back some of the myths, and highlights the risks, while also giving you some arguments for why, in the harsh light of day we should still persist with digital technologies.

Below are extracts from the book – reprinted with permission from Cambridge University Press. First a preface by Prof Stephen Heppell and then an introduction to the book by the editors.

The book is available via most online stores, and can be found in an ebook format. If you wish to purchase from Cambridge University Press directly please quote "HENDERSON15" to receive a 10% discount for DLTV Journal subscribers (valid until 31st December - to place an order contact enquiries@cambridge.edu.au or call (03) 8671 1400).

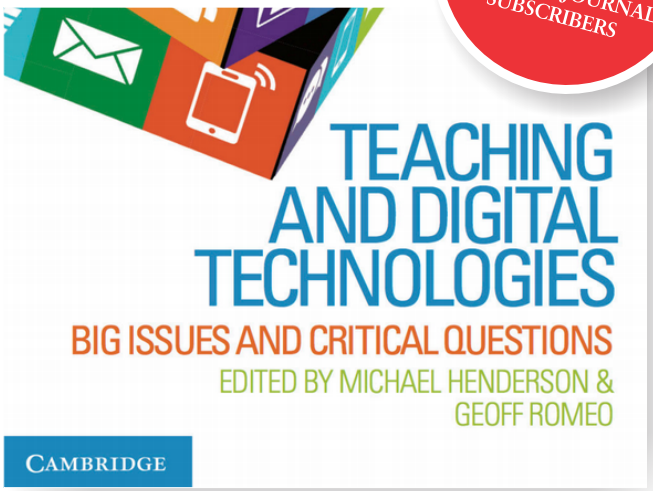
Teaching and Digital Technologies: Big Issues and Critical Questions

EDITORS:
Michael Henderson, Monash University, Victoria
Geoff Romeo, Australian Catholic University, North Sydney

Cambridge University Press
ISBN: 9781107451971
Publication Date: September 2015
PAPERBACK - 352 pages
RRP AU$ 84.95 | NZ$ 93.95
To place an order please contact Customer Service:
enquiries@cambridge.edu.au / (03) 8671 1400.

http://www.cambridge.org/au/academic/subjects/education/education-history-theory/teaching-and-digital-technologies-big-issues-and-critical-questions

10% DISCOUNT FOR DLTV JOURNAL SUBSCRIBERS



Preface: "Teaching and Digital Technologies: Big Issues and Critical Questions"

Professor Stephen Heppell

www.heppell.net
@stephenheppell

Felipe Segovia Chair of Learning Innovation at Universidad Camilo José Cela, Madrid.

Chair in New Media Environments, CEMP, Bournemouth University.

My last week has included both a dinner with an education minister and a live media interview. What characterised both these events was a shared question: "What is the single most important thing in teaching with new technologies?" And of course therein lies the problem: there is no single uniquely important thing, no silicon bullet. Schools and other institutions of learning are complex places - single events like a road accident, or a windy day, can and do change the nature of the school community. Students are all individuals, and yet cohorts too have their own character. Teachers themselves also vary, and thank goodness; our best learning memories usually have a unique teacher as part of the mix. None of this is simple.

And, underpinning all this, the conveyor belt of innovation whisking us further forwards into this millennium accelerates in both the power and the choices we are offered year on year. We face, as has often been observed, the certainty of uncertainty and some kind of constancy of change. It is hardly surprising that in amongst all this politicians and others ask for simple answers, for "the single most important thing", or revert philosophically to an earlier less complex era, or to childhoods

remembered. It is no help at all that companies too sometimes, suggest that they actually have "the most important thing": adopt our solution, trust our anecdotes, keep taking our tablets...

Learning professionals, parents and children know better of course, and they will love this book; it is cogent, reflective and, crucially, it embraces the extraordinary complexity of making learning better in this exhilarating Third Millennium. Chapters can be dipped in an out of, or it can be enjoyed cover to cover, for its narrated insights.

Why would all this matter? Well firstly, in a world where many (although not all) may live way beyond 100 years, and where newly emerging complex problems occur seemingly weekly, a lifetime's passion for learning has never been more important. The educational stability of earlier eras cannot prepare us for the problem solving we need to tackle the exogenous change and stochastic shocks of eras to come. A mere decade and a half or so of full time learning must leave you ready and hungry to learn delightedly throughout a lengthy lifetime.

Secondly, for a significant swathe of the world's 2.2 billion children, education has not delivered what they need. Shortages (or often a complete absence) of teachers, partial information, war, famine, bigotry and more have isolated them from any real chance of a traditional school education. We have to believe that technology has the ability to transform learning to make it affordably better for everyone. If so, surely it is helpful to start with a detailed look at the Big Issues and Critical Questions provoked by teaching with digital technologies.

Children, teachers, parents and technology have to lie at the beating heart of a vibrant new approach to learning. We need everyones' algorithmic thought; the world needs our collective digital ingenuity. New learning has the ability to mend this world. This book is not a bad place to start on the repair.

Introduction: *Why focus on* big *issues and* critical *questions?*

Michael Henderson and Geoff Romeo

The use of digital technologies in education, and more specifically for learning, is complex. Digital technology cannot be simply applied without consequences; effective use requires teachers and leaders to be aware of the underlying big issues and to ask critical questions. This is particularly important with the Australian Curriculum (and state derivatives) mandating the effective integration of digital technologies (ICT as a General Capability) for all students Foundation to Year 10 (F-10) and the introduction of Digital Technologies as a compulsory subject for all students (F-8). Not only do we need to understand what the curriculum is asking of us as teachers, but also the reasons for the curriculum pressure, and the implications for our practice and for student learning.

Pre-service, graduate, and in-service teachers need to use digital technologies in their practice, but are they being exposed to the debate about if, *when* and *why* and given the opportunity to ask probing questions about the efficacy of existing, emerging and new technologies in the classroom?

It is important to note that this book and its authors, while adopting a critical perspective of digital technologies, contend that such technologies can benefit education. However, rather than focusing on what buttons to press, each chapter aims to empower the reader to understand why they should (or should not) use digital technologies, when it is appropriate (or not), and what new implications arise.

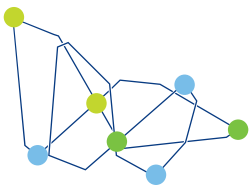
Instead of trying to teach rapidly out-dated technical skills, such as showing how a blog can be used in teaching, this book enables readers to ask, "What opportunities and risks do blogs afford me?" There are numerous resources online and in print to support teachers to learn how to set up a technology, such as a blog, for their class. We encourage you to hunt down those resources, which will change from year to year as the technologies change, but keep in mind the critical perspective offered in this text. Those resources often celebrate the *potential* of the technology, such as making claims of how that technology can positively influence students. However, such claims of potentiality need to be balanced by a critical awareness of the implications, assumptions and complications surrounding the use of the technology.

Indeed, there is an even more fundamental question underlying our decisions to use technology that need to be questioned: why should we include technology in the classroom at all? Any glib or simple answer should be treated with suspicion. For instance, not all students are expert or motivated by all technologies. Despite this obvious, but often obfuscated fact, the myth of Digital Natives (see chapter 2) abounds in schools and in tertiary settings with the direct and troubling consequence of teachers making decisions about technology founded on misconceptions of student affinity rather than pedagogy. There are also political, socio-cultural, economic, curriculum and policy pressures that influence our decisions as teachers, often without us even being conscious of them. Moreover, there are ethical, safety, and pedagogical concerns that need to be explicitly interrogated. This book aims to bring these broad ranging issues and questions to the foreground so that teachers (at all levels, and in all disciplines) are able to make informed decisions about their use of technology.

Digital Learning and
Teaching Victoria
Statewide Resources Centre
Level 2, 150 Palmerston Street
Carlton VIC 3053 Australia

Phone: +61 3 9349 3733

Email: office@dltv.vic.edu.au
www.dltv.vic.edu.au



Digital Learning and Teaching
Victoria