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INTRODUCTION TO SPECIAL ISSUE: MOBILE TECHNOLOGIES AND LEARNING

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The ways that mobile technologies are used for learning needs to be examined. Mobile technologies are a relatively recent addition to the way we communicate and engage with the world. They allow flexible ways to interact with people and in a diversity of environments and contexts. They have the potential to bring the world into our hands. Does this flexibility and potential in communication transfer to education? When digital technologies first entered onto the education landscape much was made of their promise to transform the learning process. In his seminal work *Mindstorms: Children, computers and powerful ideas,* Papert (1980) identified potential for digital environments to reshape the way that learning was engaged with, and hence for understanding to emerge in alternative ways (Calder, 2011). But has this potential been realised? Are educators using the same pedagogies but through digital media or are there fundamental changes in the way learning is occurring? Are mobile technologies opening up new ways of learning that might appeal to a more diverse range of learners? In this special issue, the focus is on mobile technologies and learning. The articles explore the use of mobile technologies in a variety of contexts, across a range of curriculum areas.

The ways to learn and think through mobile technologies and apps exists in a dynamic space, with the uptake of mobile devices and connectivity also increasing markedly. There are emergent mobile technologies that might quickly come into common usage. Virtual reality is developing rapidly, as are artificial intelligence and robotics. The potential for visual, interactive engagement, coupled with the haptic, oral and aural affordances of the technology, change the nature of the learning experiences. For instance, the ability to use in-built video and audio tools, allows users to capture authentic phenomena in their everyday world and use these for informing, modelling, or presenting student inquiries. Research has highlighted the haptic affordance in embodied cognition (e.g., Sinclair & Heyd-Metzuyanim, 2014) while being able to process *in situ* also changes the nature of the learning experience.

With mobile technologies being increasingly utilised for teaching and learning, there is a need to conduct research into their use in schools and for this research to be considered in a coherent manner. Some researchers (e.g., Larkin, 2015) have noted a lack of theoretical rigour regarding the use of mobile technologies in relation to their effectiveness. This lack of rigour is further compounded by the lack of time and expertise for teachers to accurately evaluate their use. Meanwhile, others have noted their influence on student engagement and learning (e.g., Attard, 2015), while Hutchison, Beschorner, and Schmidt-Crawford (2012) identified advantages when using iPads in literacy learning.

Mobile technologies do offer vast potential to enhance learning. Central to learning with mobile technologies is the manner in which the tools and the apps are engaged, and the relationship between the technology and the socio-cultural fabric within which the technology is embedded. What we might consider as a socio-technical assemblage (Calder & Murphy, 2017). While there is frequently a focus in schools, and in the media, on 'consumable' apps, that is those where students follow a set task at a specified level, more recently there has been a focus on apps that enable students to create screencasts and enable students to create visual, dynamic representations of situations and their learning process.

Articles in this special issue explore the learning potential from a range of educational sectors (primary, secondary and tertiary) and education settings. The potential for learning and the possible issues and constraints are considered for different devices. There are examples of different apps, and an eclectic range of approaches such as podcasts, screencasting and mixed reality. The first six articles are contextualised in curriculum areas, with the next four considering more general elements

drawn from specific settings. The final three are opinion articles that might both evoke, and gesture towards, further potential opportunities

Aguayo and Eames discuss how the potential of mobile technologies could be realised in free-choice educational settings, where learners are free to choose what they learn in settings such as museums and zoos. In particular, the article focuses on how learning experiences that integrate classroom and free-choice settings could be designed to incorporate mobile learning to enhance ecological literacy. In their article, Khoo and Otrel-Cass report findings from a research project concerned with how e-networked tools can support authentic science inquiry in junior secondary classrooms. The findings highlight three key themes that illustrate the advantage of using mobile phones as part of the classroom culture.

In her article outlining research investigating the possible influence iPads have on learning and engagement in reading, Roser found that although the influence on achievement was inconclusive, using the devices as e-readers was beneficial for reading. The features of the iPad and the app enabled the students to adapt the text to suit personal reading preferences. Meanwhile, Rashid, Watson, and Cunningham's article explores the impact of smartphones, and a task-based language teaching (TBLT) approach, on students and teachers' motivation in improving English writing skills in Pakistan. The results of the study indicate that using smartphones combined with a TBLT approach improves students' engagement in learning tasks as well as their self-expression in English. It also helped the teacher in providing individual feedback to the students.

While considering a broad range of German educational settings in their article, Schrieber and Klose examine the process of creating audio-podcasts to strengthen understanding of various mathematical topics. They found that students benefit from the production of audio-podcasts, as it triggers them to reflect on topics and create a deeper understanding of the content learnt during class. Often learners were in possession of their own device (BYOD), to use for both recording and researching information for the podcasts. Tolosa's article reports on research that evaluates the introduction of iPads in a pre-service foreign language teacher education course. The report indicates how the pre-service teachers grappled with how to use the technology, as well as the study of pedagogy, in becoming teachers of a foreign language.

Investigating the impact of introducing BYOD devices and teachers' adoption of practices in relation to the SAMR model, Rae, Dabler and Mackey present findings from a case study of three teachers and their experiences in classrooms. While the findings suggest some enhancement of the teachers' pedagogy in relation to the SAMR model, factors, such as technical issues, time constraints, and the need for further professional development, were identified as impeding progress. Drew and Forbes' study investigated student ownership and the use of mobile technologies within a tertiary institution. The results indicated some conflicting assumptions between tutor perceptions and students' use, with some suggestions made for managing devices in a way that might enhance digital literacy and develop pedagogy. Hodge, Robertson, and Sargisson also examine students' use of mobile technology devices, in this case intermediate school students. This paper reports on four main themes: restrictions, student-led technology use, bypassing the restrictions, and connectivity as a need, with the findings suggesting that young people should be included to a much greater extent in discussions about teaching practices. In their article reporting on an aspect of the use of mobile technologies in primary mathematics classrooms, Willacy, West, Murphy, and Calder focus on personalised learning. The article considers how personalised learning was evidenced through video data of the classroom practice of three teachers, with four pathways to personalised learning emerging.

Allen contributes the first of the opinion articles. It discusses the use of show and tell or screencasting software apps for the simultaneous acquisition of pāngarau/mathematics language and pāngarau/mathematics content and concepts. These apps allow students to capture their communications using multiple visual and audio representations and share these with others, with the students able to share explanations of the strategies or solution methods they use to solve problems. Meanwhile, Lemon's article focuses on 'talknology' initiatives supporting the revitalisation of te reo Māori. The paper discusses the ways that various digital media can be used to facilitate engagement with te reo Māori and enhance its use, with an aim to raise awareness about existing and upcoming 'talknology' initiatives.

In the final opinion article, Jowsey and Aguayo describe a project that engages both students and the public in an exploration of atmospheric science through mixed reality experiences that integrated science and art. This integration of the different media and disciplines was used with students aged 8 to 10 years old, and the article presents some key learning outcomes in relation to the exploration of air and nature.

The consideration of learning experiences is critical, as they indicate potential new ways of teaching and learning. As a community, we need to continue to explore the edges, while incorporating the generic ways these innovations inform practice and reshape the learning experience in ways that might enhance students' thinking. Yet we do not know where the potential of mobile technology, as a pedagogical medium, is heading. How might the landscape evolve during the next few years, let alone in 10 years?

It is not possible, nor wise, to ignore the role that mobile technologies can play in enriching the teaching and learning process. Therefore all educators need to be alert to the potential that they can provide to enhance student learning while recognising any associated constraints. The articles in the Special Issue contribute to teaching and learning by providing readers with opportunities to reflect on their practice.

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References

Attard, C. (2015). Introducing iPads into primary mathematics classrooms: Teachers' experiences and pedagogies. In M. Meletiou-Mavrotheris, K. Mavrou, & E. Paparistodemou (Eds.), *Integrating touch enabled and mobile devices into contemporary mathematics education* (pp. 197–217). Hershey, PA: IGI Global. https://doi.org/10.4018/978-1-4666-8714-1.ch009

Calder, N. S. (2011). *Processing mathematics through digital technologies: The primary years.* Rotterdam, The Netherlands: Sense. https://doi.org/10.1007/978-94-6091-627-4

Calder, N. S., & Murphy, C. (2017). How might the use of apps influence students' learning experiences? Exploring a socio-technical assemblage. In A. Downton, S. Livy, & J. Hall (Eds.), *We are still learning! Proceedings of the 408th annual conference of the Mathematics Education Research Group of Australasia* (pp. 125–132). Melbourne, Australia: MERGA.

Hutchison, A., Beschorner, B., & Schmidt-Crawford, D. (2012). Exploring the use of the iPad for literacy learning. *The Reading Teacher, 66*(1), 15–23. https://doi.org/10.1002/TRTR.01090

Larkin, K. (2015). "An app! An app! My kingdom for an app": An 18-month quest to determine whether apps support mathematical knowledge building. In T. Lowrie & R. Jorgensen (Eds.), *Digital games and mathematics learning: Potential, promises and pitfalls* (vol. 4, pp. 251–276): Rotterdam, The Netherlands. Springer. https://doi.org/10.1007/978-94-017-9517-3_13

Papert, S. (1980). *Mindstorms: Children, computers and powerful ideas.* Brighton, England: Harvester Press.

Sinclair, N., & Heyd-Metzuyanim, E. (2014). Learning number with TouchCounts: The role of emotions and the body in mathematical communication. *Technology, Knowledge and Learning, 19*(1–2), 81–99. https://doi.org/10.1007/s10758-014-9212-x

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