Metacognitive Development in Professional Educators: NZ teacher experiences using mobile technologies in a tertiary education environment

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This research focuses on three areas: 1) The interaction between practising teachers' metacognitive knowledge and regulation skills in relation to their classroom practices using mobile technologies; 2) perceived barriers and facilitators to the successful integration and use of mobile technology in the classroom; and 3) the impact of introducing a professional development programme (iPads Professional Development Programme) (iPDP) aimed at developing tertiary teachers' metacognitive knowledge and regulation skills in order to improve their classroom practices. The main purpose of this study is to determine whether the development of teachers' metacognitive knowledge and skills improves teachers' pedagogical practices and integration of mobile technologies, such as iPads, and increases their proficiency using mobile devices for teaching and learning in tertiary blended classroom environments in New Zealand. This aligns with the "educational design research's" (EDR) characteristics of offering practical solutions to real-world problems from the perspectives of both the participants and the researchers.

Keywords: iPad use, Teachers' metacognition, Educational design research, Professional development, Tertiary education.

Research Background

It is argued that mobile technologies have the potential to be powerful teaching and learning tools (Al-Zahrani & Laxman, 2014; Herrington, Ostashewski, Reid, & Flintoff, 2014) . They have the potential to offer teachers a flexible, relevant, personalised, metacognitive, and innovative way of teaching and supporting students in the 21st century (Ertmer, 1999; Ertmer & Ottenbreit-Leftwich, 2010). In New Zealand, a growing number of mobile devices such as iPads are being used across the spectrum, ranging from an early childhood education and care setting (Spencer, Coutts, Fagan, & King, 2013) to schools that have made a strong commitment to iPads (Henderson & Yeow, 2012; Tasman-Jones, 2012). However, a review of the literature reveals that although teachers are considered key to transforming teaching and learning (Gong & Wallace, 2012; Kinash, Brand, & Mathew, 2012), little research has examined teachers' practices in relation to the opportunities technology provides, particularly in the tertiary education sector, where class sizes tend to be large, and the technological infrastructure is undergoing rapid change (King & Toland, 2014; Melhuish & Falloon, 2010; Ovens, Garbett, Heap, & Tolosa, 2013). In addition, examining the factors that influence technology integration indicates that teachers' metacognition is one of, if not the most, influential factor for adopting new practices (Borg, 2006; Zohar & Barzilai, 2015). Moreover, as tertiary education moves toward mobile learning, there is clear evidence that introducing technology without supporting professional learning can undermine the best of intentions (Cavanaugh & Hargis, 2013; Schuck et al., 2013). Given the scarcity of research on teachers' metacognition, and the lack of research analysing the relationship between developing teachers' metacognitive knowledge and skills and teachers' pedagogical practices and integration of mobile technologies, such as iPads, in tertiary classroom environments much more investigation is required.

Research questions

1. What is the relationship between practising teachers' metacognitive knowledge and skills and their classroom practices using mobile technologies in tertiary education?

2. What are the perceived barriers and facilitators to the successful implementation of mobile devices in the classroom?

3. To what extent will a supportive online professional development programme (iPDP) enhance teachers' metacognition in order to develop their practices with mobile technologies?

Description of proposed intervention

The current study identifies the iPDP as the intervention to be developed collaboratively by the researcher and teacher participants. It aims to enhance teachers' metacognitive knowledge and skills to improve their classroom practices. The intervention design will be guided by five major principles identified as a research hypothesis, focusing on the power of inner self "SELF", outer self "PEER", "COMMUNITY" and "CONTEXT". It will also be directed by two major theoretical frameworks: "Mobile Professional Learning Community (MPLC)"(Cochrane & Antonczak, 2013) and "Metacognitive Technological Pedagogical Content Knowledge" (M-TPACK) (Wilson, Zygouris-Coe, & Cardullo, 2015), which are based on the concept of "Situated Cognition theory" (SC) (Brown, Collins, & Duguid, 1989). The iPDP intervention will include a short 5- to 10-minute video, posted weekly on the Blackboard online system, as a practical guide to using iPads in different subject areas. Regular posting and the brevity of the video may encourage teachers improve their practices by enhancing their knowledge and applying what they have learned. It will also save time compared with traditional lecturer PD sessions. The content of each video will focus on an area such as iPedagogy, different practices with iPads, and keeping up with upcoming innovations and inspiration for creative practices with iPads. Before and during the implementation of iPDP, strategies such as online surveys, goal setting activities, self-observation and self-reflection, peer observation, and peer feedback will be used. A MPLC will also be established to help teachers interact with each other, share their experiences and learning, and get support from their peers.

Research design

This study will employ "educational design research" (EDR) (McKenney & Reeves, 2014a) to make learning research more relevant to classroom practices. Wang and Hannafin,(2005) defined EDR as "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually sensitive design principles and theories" (pp. 6–7). This study aims to provide an in-depth "picture" of teachers' experiences using mobile technologies as it occurs using questionnaires, think aloud sessions, observations, interviews, and focus groups. Data from these methods will be analysed using content analysis and thematic analysis strategies to examine the interaction between practising teachers' metacognitive knowledge and regulation skills in relation to their classroom practices using mobile technologies. A generic model for design research (GMDR) (McKenney & Reeves, 2014) will be used to provide an outline of the proposed study. The GMDR includes three central phases: analysis and exploration, design and construction, and evaluation and reflection, which lead to the two ultimate outputs of increased theoretical understanding and effective intervention maturation (see Figure 1).

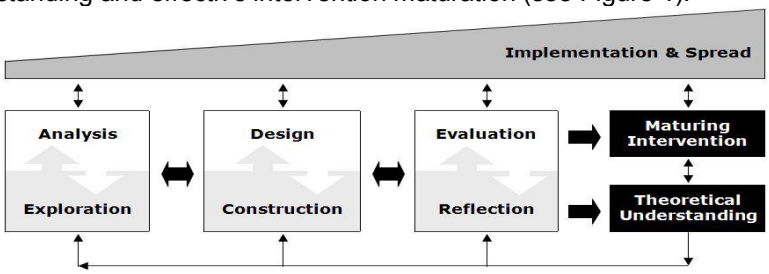

Figure 1 Generic model for conducting educational design research (GMDR) (McKenney & Reeves, 2014)

It is expected that the design of the project – Educational Design Research (EDR, and the intervention – iPDP may have direct benefits to participants. It will provide teachers with an opportunity to develop their own professional development strategies that match their needs, and offer a useful methodological toolkit to better understand variables within naturalistic contexts. In addition, research results will be beneficial for educating professionals and policy makers and contribute to wider public understanding of educational policy and practice.

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Note: All published papers are refereed, having undergone a double-blind peer-review process.