Deep Learning:
Enriching Teacher Training through Mobile Technology and International Collaboration

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ABSTRACT

This article presents results from an international collaboration between college students and pre-service teachers in Norway and the UK. This research is part of a large, international project exploring and developing the interrelationship between mobile technology and teachers’ perceptions of teaching and learning. Data was collected for this study through an on-line survey of 37 pre-service teachers followed by six semi-structured, in-depth interviews. The data analysis revealed the themes of collaboration, authenticity and professional learning through the use of mobile technology in the data. The collaboration enabled the use of the affordances of mobile technology to enhance the pre-service teachers’ professional learning and the data suggested that this enhanced their emergent conceptions of teaching and learning.

KEYWORDS

Authenticity, Collaboration, eBooks, Education, iPads, Mobile Technology, Pedagogy, Pre-Service Teachers, Professional Learning, Teacher Training

INTRODUCTION

This paper is based on collaborative work using mobile learning between pre-service teachers in two different subject areas, English and science, working with Norwegian college students, who studied both subjects. This research was nested within a larger international project, Mobilising and Transforming Teacher Education Pedagogies (MTTEP). This three year (2014-2017) Erasmus+ funded project focused on exploring and developing teacher education pedagogy through the use of mobile technology. A pilot for this study was undertaken with the same cohort of English and science pre-service teachers (Naylor & Gibbs, 2015), exploring the possibilities of collaboration using mobile technology between different subject areas within the field of pre-service teacher education. For the study that is the focus of this article, the collaboration was taken further by adding Norwegian college students to the mix, to enable the pre-service teachers to take their ideas from the pilot and develop them with these students. The focus of this specific research project is the use of iPads in particular, as all the pre-service teachers in this cohort were given iPads by the university to use throughout their training year (see Burden & Hopkins (2016) in the special issue of this journal devoted to Mobile Learning in Teacher Education). Specifically, the App Book Creator was chosen as the medium for this work. Using Book Creator enabled the pre-service teachers and the college students to produce eBooks as a focus for their work and as an output for them to work on collaboratively. This paper explores two questions: the first being about how the process of constructing eBooks using iPads
impacted on the pre-service students’ perceptions of teaching and learning and the second, exploring what relevant skills and competencies the pre-service teachers perceived they gained from constructing eBooks using the iPads.

LITERATURE REVIEW

As digital technology advances, it follows that teachers and pre-service teachers need to understand the ways that their students consume and produce knowledge, which is increasingly via mobile technology (Burden & Hopkins, 2016). Mobile technology is defined as portable, handheld devices and mobile or m-learning is the process of learning mediated by a mobile device (Kearney et al., 2012). Baran (2014) in her review of research into mobile learning in teacher education, analysed various definitions of mobile learning and distilled the various qualities that different authors have attributed to mobile learning; mobility (Sharples et al., 2009), access (Parsons & Ryu, 2006), immediacy (Kynäslahti, 2003), situativity (Cheon, Lee, Crooks, & Song, 2012), ubiquity (Kukulska-Hulme et al., 2009), convenience (Kynäslahti, 2003), and contextuality (Kearney, Schuck, Burden, & Aubusson, 2012). According to Sharples et al., (2009), mobile learning includes the characteristics of mobility in physical, conceptual, and social spaces. Baran (2014 p.3) identifies a definition that she pinpoints as defining what is unique to mobile learning, which is that the “relationship between the context of learning and context of being” is very specific to mobile learning, as learning may occur in independent, formal, or socialized contexts (Frohberg et al., 2009, p.313). The research for this particular study focused on pre-service teacher training and the use of mobile devices, specifically iPads, so three themes in the literature will now be examined which are of particular relevance to this paper; the types of knowledge needed by pre-service teachers, the use of iPads as a tool for learning and models of mobile learning.

DOMAINS OF KNOWLEDGE FOR PRE-SERVICE TEACHERS

As developing professionals, pre-service teachers need to understand their subject matter in a profound and flexible manner. In the 1980s Shulman suggested three categories of content knowledge that teachers need to master to be successful in order to communicate with their students and support them with their learning. Koehler et al., (2013) have developed and extended Shulman’s framework by adding technology to the domains of the knowledge that teachers, and pre-service teachers, need to possess in order to successfully develop their students’ understanding. They argue that new digital technologies are ‘protean, unstable and opaque’ (2013, p. 14). Unlike older technologies such as pencils and microscopes, which are unlikely to change very quickly, digital technology changes very quickly, is ‘protean’, as well as being difficult to understand in terms of its mechanics, ‘opaque’, so consequently these technologies are more challenging to integrate into teachers’ instruction. The blending of content knowledge and pedagogy (PCK) provides an understanding of how particular aspects of ‘subject matter are organized, adapted and represented for instruction’ (Mishra & Koehler, 2006, p. 1021). It follows that if pre-service teachers are to become successful at their profession they must develop in equal measure all three aspects of Shulman’s domains of knowledge. Further, they argue that there is a multiplicity of different affordances available via different digital technologies, so that understanding how these are applied in an educational environment is ‘not straightforward’ (2013, p. 14). Given the complexity of this situation Koehler et al., identify a new domain of knowledge to be added to Shulman’s original conception and have added Technological Content Knowledge (TCK) to the original conception (see Figure 1). Technological content knowledge (TCK) is knowledge about how the manner of technology and content are related. So, teachers need to know how the subject matter can be changed by the application of technology (Mishra & Koehler, 2006). Technological pedagogical knowledge (TPK) is the knowledge of the capabilities of digital technology in teaching and learning settings, which includes the ability to select a tool that is fit for purpose. Technological
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