Barriers and solutions to innovation in teacher education

Authors

Kevin Burden
k.j.burden@hull.ac.uk

Reader in Educational Technology
Faculty of Education
The University of Hull, UK
HU6 7RX

Sarah-Louise Jones
sarah-louise.jones@hull.ac.uk

Lecturer
Faculty of Education
The University of Hull, UK
HU6 7RX"

This article proposes how mobile technologies are being employed innovatively in teacher education across the European Union, contributing to an adjustment in teacher training models. It identifies various barriers and challenges to innovation and illustrates how teacher educators have addressed these in the first year of an Erasmus+ funded project.

Tags

mobile technologies, teacher education, innovative pedagogies; barriers and challenges

1. Introduction

The modernisation of pedagogical practices in Higher Education is identified as a key Horizon 2020 priority by the European Union since it promises to enhance the skills and understandings of university graduates making them more employable and competitive in the global economy (European Commission, 2010). In Europe the preparation and development of new teachers is situated mainly within universities and therefore teacher education is seen as having the potential to make a major contribution to this European wide priority. This is apparent in the outcomes of the first Erasmus+ call (2013-2014) in which a project like the Mobilising and Transforming Teacher Educator's Pedagogies (www.mttep.eu) was funded to develop a mobile learning network for teacher educators to support them in transforming their pedagogical approaches and practices with mobile technologies. This article draws upon data collected from the first year of the project which focuses on the challenges and barriers that face teacher educators as they attempt to innovate their practice using mobile technologies.

2. Context

The MTTEP project brings together teacher educators from five universities in (UK, Norway, Germany and Australia), along with three school-based partners involved in the professional development of teachers (Norway, the Netherlands and Germany). It seeks to transform the pedagogical practices of teacher educators and teachers by encouraging them to join a European wide mobile learning network and use a variety of new resources (a mobile learning toolkit) to assist them in benchmarking, evaluating and developing their use of mobile learning pedagogies.

The project has adopted a design based research (DBR) methodology to develop and refine the first elements and phase of the mobile learning toolkit which is a series of exemplar eBooks (see Anderson & Shattuck, 2012); Mor & Winters, 2007; Sandoval & Bell, 2004; Spikol, Bergström, Eliasson, Nouri, Olofsson, & Lindberg, 2012). These illustrate a range of alternative pedagogical approaches in teacher education including the concept of knowledge building,

and authentic assessment. The purpose is to encourage teacher educators to reconceptualise their pedagogical practice by exploiting the affordances of mobile technologies to transform rather than replicate existing pedagogies. The following case studies are both drawn from data collected during the first year of the project (2014-2015) when teacher educators and their students have concentrated on the construction of eBooks. The first case study features two teacher educators from the UK who worked with approximately forty of their own preservice trainees in English and Science. They collaborated with two high school teachers from Norway and twenty of their 'A' level students studying science and English. The second case study features one teacher educator who worked with twelve preservice history teachers. The following narratives show how this has not been without its problems which highlights some of the challenges that face teacher educators in introducing innovative new practices into universities.

3. Case studies

In one example UK preservice teachers and teacher educators from two contrasting disciplines (English and Science) worked transnationally with their counterparts in Norway to co-author their own, unique eBooks designed for an audience of 'A' level students. The production of these books was preceded by a visit to a local aquarium in the UK where the preservice teachers worked as mentors with the Norwegian students to gather artefacts and data about the maritime environment to incorporate into their eBooks. They constructed the eBooks on their iPads using a simple, intuitive App, called Book Creator. The process involved several iterative stages of development including the acquisition of original multimedia artefacts (e.g. short videos, audio recordings, voice-overs, etc), the crafting and refinement of purposeful text and signposts (including some bilingual recordings) and the testing and evaluation of the final eBook. The iPads were also used to facilitate language translation issues, translating various terms and phrases that were needed to express scientific and technical terms, or expressing points with the appropriate level of formality or informality. This was considered to be a highly authentic task for both the preservice teachers who were working with real students and the Norwegian students who were able to work with native English speakers, thus improving their language skills.

The second example features the work of history preservice teachers in the UK who also used Book Creator to author an original narrative about the life and death of a hitherto unknown British soldier from the First World War. The tutor responsible for the group modified the assessment requirements for his programme to accommodate this new 'artefact of achievement', awarding marks for the quality of the eBook itself as well as a more traditional reflective piece of writing completed afterwards. To complete the task students were required to undertake authentic research, searching through online databases such as the Commonwealth War Graves Commission website to piece together the fragmentary evidence about their selected soldier. Students then participated in an educational visit to the battlefields and memorials of Belgium and France where they used their iPads to capture and record original material related to their chosen soldier such as their grave site and the locations around where they had fought and died [https://goo.gl/9Almm4]. Back in the university these digital artefacts were woven together as a coherent single eBook which some students took with them into their teaching practicums to use with pupils.

4. Barriers and solutions to innovation in teacher education

Although these case studies illustrate how the use of personal mobile technologies can support innovative pedagogies they are not unproblematic and this final section explores some of the more common barriers which teacher educators face when they work like this and some of the solutions which have proved effective.

Authoring and co constructing eBooks requires that preservice teachers have access to suitable hardware and software at the point and time when they need it, not just in an institutional computer lab. These were previously barriers to innovate work of this kind but students are increasingly likely to have their own mobile technologies capable of undertaking these activities in class thus requiring only minimal institutional and technical support such as the provision of robust and ubiquitous wi-fi connectivity, and the availability of loaned devices for those without access. Whilst in the past access to affordable software might have been a serious obstacle, the emergence of the App ecosystem has significantly reduced or even removed this barrier allowing students to author their own eBooks with intuitive and affordable or free tools such as Book Creator .

Shortage of curriculum time, however, has always been identified as a barrier to innovation of this kind and constructing

eBooks, particularly as a collaborative activity, is certainly more time consuming than traditional activities. In both of these case studies students were therefore required to undertake additional work outside of their formal teaching sessions but ultimately time can only be made available by the reprioritization of other activities and this has been one of the most significant transformations to date as teacher educators on the programme have reconceptualised the traditional role of large lectures and teaching sessions. Therefore first order barriers – those external to the teacher such as resources, infrastructure and time – have been significant but not intractable.

Second order barriers - those internal to the teacher such as their self confidence, personal skills and pedagogical beliefs and attitudes related to the use of technology – are more demanding, ongoing challenges. Those teacher educators involved in the case studies above are not typical innovators or early adopters but it is likely their own beliefs and attitudes about learning are sympathetically aligned with the constructivist philosophy which underpins the construction of eBooks. Hence they have also been more inclined to attend training and support sessions offered by experts within the Faculty and have found the time and space to teach themselves the basic skills required to stay abreast of what their students are doing. Extending these behaviors and mindsets across the Faculty and beyond is a major challenge that remains ongoing but it will be greatly accelerated by the very positive and encouraging feedback from the students and tutors who have worked on the project to date.

First order barriers (external)	Second order barriers (internal)
• Shortage of resources (e.g. mobile devices or software) • Infrastructure issues (e.g. lack of wi-fi) • Shortage of curriculum time	• Lack of self-confidence and belief • Shortage of skills in using mobile devices • Negative attitudes towards using technology in teacher education

Figure 1: Barriers to innovation in teacher education

5. Conclusion and next steps

To date the MTTEP project has demonstrated the motivational benefits of engaging preservice teachers in authoring and constructing their own eBooks which are popular with students and highly authentic as a form of assessment. The next stage of development will be to extend the scope of this activity beyond the early adopters and engage wider faculty in this process. The barriers to innovation which have been outlined in this article are unlikely to change but the outcomes reported here suggest that unlike previous technology initiatives some of the most persistent will not be technical or infrastructures issues (i.e. first order barriers) but rather second order issues such as the digital skills sets of lecturers and their prevailing attitudes and beliefs towards technology. Our findings indicate these are significant but not intractable barriers to innovation in universities.

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