Chapter 46

Synthesizing Technological and Pedagogical Knowledge in Learning Design:
A Case Study in Teacher Training on Technology Enhanced Learning

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ABSTRACT

Based on a design rational for constructivist pre-service teacher training on Technology Enhanced Learning (TEL), in this paper the authors consider teachers as designers of innovative digital educational content. Under this lens, the selection of appropriate technologies is considered as a threefold process that concerns the availability of technological tools for implementing a virtual classroom that facilitates communication, collaboration, and administration, the enabling technologies for serving specific learning purposes, and the technologies or tools that support trainees to design effective TEL-based courses. A number of questions emerge as the authors are looking for the most appropriate technologies for cultivating certain competences related to class operation, learning design and student engagement in a constructive manner. As a first step, in this paper, they investigate how trainees combine particular technologies with pedagogical tools to cultivate specific competences i.e. certain types of Technological Pedagogical Content Knowledge. Lastly, factors that trainees perceive as influential when adopting TEL tools in practice are revealed by their study.

1. INTRODUCTION

Integrating technology in teaching offers many opportunities for engaging learners and strengthening the learning process. However, it also introduces constraints on functions that particular technologies can serve as well as on actions or activities that can be performed in real educational contexts (AACTE, 2008). An important issue in this process is understanding how teaching and learning are transformed when particular technologies are adopted to encourage specific learner behavior. In that respect, the pedagogical affordances and constraints for a range of technologies within specific contexts (involving parameters such as discipline, target group, location) need to be carefully considered. When it comes to teacher training, in particular, where frameworks such as TPACK-the Technological Pedagogical Content Knowledge (Mishra and Koehler, 2006) are adopted, constant interplay between teachers' understanding of technologies and pedagogical content knowledge is required to create effective technology-enhanced learning experiences. In this context, the main challenge is to engage teachers in activities that will lead to new experiences in classrooms, such as learning through virtual worlds, Web 2.0 technologies or other digital environments that many of the teachers had never experienced as students. Other challenges in this respect involve bridging the gap between technology and pedagogy, areas that are traditionally ruled by different specialties. To this end, it is important to prepare teachers for designing learner-centered courses that integrate technologies appropriate for their subject matter as well as for using technologies that support processes, such as communication, collaboration, class interaction, and administration.

To address these challenges, we design blended learning teacher training courses that build on the concept of learning design. Trainees are presented with appropriate technological and pedagogical tools in order to work collaboratively (synchronously and asynchronously) in the field of their expertise towards the development of a tangible and usable learning design, effectively addressing the needs of their future students. In this paper, we focus on the main features of the technologies required to support blended learning in teacher training contexts. We specifically examine how specific technologies can support various types of learning outcomes and relevant types of activities, and consequently how technological knowledge may interact with pedagogical knowledge and pedagogical content knowledge. Furthermore, we investigate teacher trainees' perceptions on the various types of knowledge that they develop during training. Our analysis is based on quantitative and qualitative data collected from training sessions with teachers studying towards a postgraduate certificate in education. Lastly, factors that trainees perceive as influential for the adoption of these Technology Enhanced Learning (TEL) tools in real educational contexts are identified.

2. TECHNOLOGICAL KNOWLEDGE IN TEACHER TRAINING

The selection of appropriate technologies for a teacher training course looks like a problem-solving task. In this context, technology is perceived as a three-dimensional scheme: it provides trainees the means for designing a course that exploits TEL, the means for implementing a virtual classroom enabling communication, collaboration, and administration processes, and the enabling technology applications for serving particular learning purposes.

In Papanikolaou, Gouli & Makri (2014) we have proposed a design rational for constructivist pre-service teacher training on TEL, based on a view of teachers as designers of innovative content working individually and collaboratively, discussing and interacting with the instructor and their peers. This ra-

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