Chapter 39
Using Mobile Technologies to Co-Construct TPACK in Teacher Education

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ABSTRACT

How student teachers might benefit from using their mobile technologies during teaching experiences is a timely question for teacher educators. This chapter describes efforts to use the TPACK framework (Mishra & Koehler, 2006) to investigate how students use iPad computers during their student teaching and design appropriate supports. A design-based approach (Sandoval & Bell, 2004) was used over two years with two cohorts of student teachers (N=60). Descriptions of the use of the TPACK framework in this endeavor and findings from surveys and field notes about how and to what degree mobile technology can facilitate activities and interactions in planning, teaching, reflecting, and sharing are included. The case is made for co-learning and co-constructing by student teachers and teacher educators of the various TPACK domains of teacher knowledge in the context of mobile technology. Implications for developing supportive learning environments for 21st century student teachers are also discussed.

INTRODUCTION

During the past two decades, digital tools have transformed most knowledge-related professions as well as many jobs that do not, at first glance, seem data-dependent. Throughout higher education, as predicted, students have adopted mobile devices rapidly and are beginning to view these tools, including laptops, smartphones, and tablet computers, as critical for effective learning (Alexander, 2004; Chen & Denoy-

elles, 2013). Since their students increasingly rely on personal technologies, colleges and universities are moving quickly to incorporate technology as part of the learning environment (Dahlstrom, 2012). The question is how specific university programs, such as teacher education, will integrate these tools to prepare their graduates to begin careers in teaching more effectively.

The transformative potential of personal technologies is especially apparent in pre-professional programs such as education and medicine. These programs often require novices to complete internships that call for rapid application of knowledge that they have been accumulating over an extended sequence of coursework. Medical schools are trying to discern what the affordances of personal digital devices might be in these settings (George, Dumenco, Doyle, & Dollase, 2013; Shurtz, Halling, & McKay, 2011). In teacher education programs, several studies have tried to gauge the role that mobile devices might play in pedagogical coursework as well as in clinical teaching experiences (Amador-Lankster & Naffziger, 2013; Geist, 2011; Maher, 2013; Newhouse, 2006; Swenson, 2011).

In this chapter, we seek to add to this discussion by describing our efforts to integrate mobile devices, including iPad tablet computers, into learning environments for English, mathematics, and science secondary student teachers. We begin by describing our approach based on the recognition that the knowledge necessary for teaching is complex and that student teachers learn by engaging in the professional work of teaching. We then describe our efforts to provide student teachers with iPads to use during their student teaching experience as well as our efforts to integrate iPads into our classroom observations and seminar activities. We will share observations and survey data on how student teachers used iPads during student teaching, and discuss how these data inform subsequent efforts to help student teachers enhance their experiences through the use of mobile technology. We are interested in what features of mobile technology can be incorporated into the teaching experiences and coursework that can help student teachers bridge the gap between personal uses and using these and other technologies effectively with their students in their respective learning environments.

BACKGROUND

Teaching is a challenging profession. Shulman (1986) explained that teachers must address a multitude of student needs almost simultaneously, and to do this they must bring to bear several different types of knowledge. Furthermore, they must be able to anticipate the effects of their actions ahead of time and make quick adjustments in the act of teaching (Dolk, 1997). This requires teachers to have strong capacity for reflecting on action and in action. We are interested in establishing skilled planning as well as reflecting on action and moving this toward reflecting in action. Labaree (2004), explained that there are four main reasons why "teaching is an enormously difficult job that looks easy":

1. Aim of teaching is to change the behavior of the client. Thus, the success of teaching depends on the willingness of the client to cooperate.
2. Client is brought into the relationship under compulsion. A major job for the teacher is to manage the emotions that are inherent to this relationship.
3. Teachers must carry out their practice (of convincing the client to cooperate) in conditions of structural isolation.
4. Teachers must live with chronic uncertainty about the effectiveness of their efforts to teach.

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