Chapter 32
Teachers Learn How to Effectively Integrate Mobile Technology by Teaching Students Using Math Snacks Animations and Games

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ABSTRACT

The time for teachers to use mobile devices is now. However, in order to ensure that yet another technological transition in the classroom is as effective as possible, there is an undeniable need for effective professional development. The models the authors propose in this chapter offer teachers experiences that require curriculum design and delivery, experience with mobile hardware and software, and opportunities to consider the pedagogical implications of integration for effective teaching and learning. The Math Snacks Summer Camp Model and the Math Snacks 3-Day Gradual Release Model offer experiences where teachers and students work together to learn challenging mathematics concepts using mobile devices, laptop computers, and hands-on activities. A description of these models, including benefits and limitations is discussed. An adaptation of each model for pre-service teachers and higher education faculty is also included.

INTRODUCTION

According to the 2012 Horizon Report on the future direction of technology use, we are in the midst of the time frame where tablets and smartphones are becoming standard learning tools in many classrooms and adopting mobile devices in the classroom is becoming a must (Johnson, Adams, & Cummins, 2012). The availability, cost efficiency, and capabilities of these devices make their usefulness in and out of the classroom indisputable. The Horizon report goes on to say, "training in the

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supporting skills and techniques (for using these devices) is rare in teacher education," and digital literacy among practicing teachers is the exception and not the rule, highlighting the importance of effective professional development (Johnson, Adams, & Cummins, 2012). Other studies have also shown that the effective use of technology for student learning in the classroom is directly tied to the pre-service or professional development teachers receive when they are introduced to the technology as a teaching tool (Mouza, 2008; Zucker, 2009). Rubin (2000) stated that "following closely on the heels of curriculum integration as a necessary condition for technology implementation is professional development" (p. 15). Thus, it is imperative for practicing teachers, pre-service teachers and college faculty to understand how these tools can be used appropriately to enhance student learning at all levels.

Ironically, teachers, like the rest of the population, are increasingly using technology, including mobile devices, for their own personal use. However, most are not considering how these same tools can be used in the classroom. This may be due to the fact that much of traditional teaching, (stand and deliver and sit and listen) involves getting all of the kids in a classroom to do the same thing at the same time. When teachers who are used to teaching this way consider using technology, they may want all of the students on the same program at the same time progressing at a similar pace. According to Devlin (2011), this limits the effectiveness of the technology for student learning. Thus, before any technology, including mobile technologies, can be effectively utilized to enhance learning opportunities for students, the design and management of the learning environment must be re-conceptualized (Norton & Wiburg, 2007). Once a teacher understands how students can engage in project-based learning involving team and individual problem solving, the teacher has a way to integrate technology even if there is not a computer or tablet for every student. So changing teachers' beliefs from traditional sit and deliver methods to instruction that encourages multiple approaches to projects using technology in different ways may be the necessary condition for changing their practice to effectively integrate technology in a way that encourages student learning. Experience using mobile technologies with groups of students in different ways is something the teachers experience in the Math Snacks professional development experiences. This chapter will provide a description of two professional development models that have been used to successfully demonstrate the appropriate use of tablets and laptops with elementary and middle school teachers along with guidelines for how these models can be adapted for pre-service teachers and college faculty. Many professional development models used for technology integration consist of teachers attending a workshop with other teachers to learn the mechanics of how to use a specific application or piece of technology. This may be done in the summer, after school, or as a pullout program where teachers convene at a professional development center, attend a conference, enroll in a class, or convene online in a webinar or online course. Teachers are encouraged to use the technology when they return to their classroom, but often there is little transfer from the training to classroom practice. Additionally, if teachers are serving only as students in these professional development models, they may or may not understand the pedagogical implications of using these new devices in the classroom. The Math Snacks team believes that team teaching in a classroom-like setting with real students offers an ideal professional development experience for teachers as they learn how to use new technology to teach specific content. The assumption is that if teachers use the technology with actual students in an informal setting, when they try to use the same tools in their regular classroom it will not be as intimidating and the transfer of knowledge from the training to the classroom will be more successful and longer lasting.