Chapter 3

Instructional Technology and Meaningful Learning: A Synthesis for Teacher Educators for the 21st Century

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ABSTRACT

The use and importance of technology in teaching and learning processes is well established in teacher training programs and teaching literature; however, integration of technology in meaningful ways remains a challenge. For teacher candidates to be able to effectively integrate technology in the classrooms, they need to experience meaningful technology pedagogical practices during teacher training. This chapter synthesizes well-established and relatively new technology pedagogical strategies that could be used with teacher candidates. The aim is to provide a summary of research-based strategies for teacher educators interested in improving technology integration in their teacher training programs.

INTRODUCTION

Meaningful learning is defined in different ways depending on the discipline and the audience. In this chapter meaningful learning is defined from the perspective of the learner. It implies the ability of the learner to retain information and apply what they learned to solve problems in different contexts beyond the classroom. Schwartz and Schmid (2012) note that, “When learning is of high quality, it is well integrated and deep, and capable of being transferred to new problems and applications beyond the original context in which the learning takes place” (p. 397). It is the position of the authors that learning is considered high quality only if it is meaningful to the learner and if the learner can understand the application of what they learn in real life situation(s). In this chapter the learner refers to the teacher candidate who is
expected to apply theory into practice during field experiences, teaching residency, and in the teaching profession, after graduating from college.

Research indicates that teacher candidates grapple with applying what they learned in authentic classrooms (Judson, 2006; Hughes, 2006; Pajares, 1992; Korthagen, Loughran & Russell, 2006). Some of the areas they struggle with include, but not limited to the following areas; application of culturally relevant pedagogy, inclusive pedagogy, authentic technology integration in the classroom, science methods, mathematics methods, universal design of learning etc., (Shannon, 2016; Lei, 2014). When teacher candidates graduate, most of them leave the teaching profession within the first three years (Fantilli & McDougall, 2009). Due to this attrition, many are left to question if there is authentic and meaningful learning during teacher preparation that necessitates teacher resilience and persistence in the teaching profession. Teaching profession stress, among other factors, has been recently researched to explain teacher attrition. In trying to minimize this problem, research is now focusing on the utility of technology as a tool to bridge the gap between theory and practice. Schwartz & Schmid (2012) asserts that, one way to ensure that learning is of high quality is to design learning environments that strategically utilize processes and tools that support meaningful learning. Technology in academia is broad, for the purposes of this chapter; the authors focus on strategies that use technology tools connected to the internet such as smartphones, tablets, laptops, and various mobile apps.

**OBJECTIVE OF THE STUDY**

Over the past three decades, there has been proliferation of technology tools that have the capability to bridge the gap between theory and practice in teacher education, if appropriately and meaningfully integrated in the teacher training programs. This chapter synthesizes technology tools and technology pedagogical strategies for teacher candidates that are imperative in teacher preparation courses. This chapter is organized in the following ways, first, existing literature is synthesized to provide a background for understanding the challenges that teacher candidates experience in the classroom, second, the chapter provides summary literature review of the importance of meaningful learning, and discusses meaningful learning theoretical framework with the goal of displaying effective technology pedagogical strategies that are informed by such a theoretical framework. In addition, the chapter discusses how specific technology can minimize challenges, and could be successfully used to enhance the processes and outcomes of learning. The limitations of the use of technology tools and ways to minimize the limitations are discussed. As a whole, this chapter provides teacher educators with knowledge of technology pedagogical strategies that support teacher candidates’ ability to transfer theory into practice. It is important to note that, the authors used a qualitative approach to arrive at two broad categories of meaningful learning and technology pedagogical strategies. The following section offers summary background for understanding teacher candidates’ challenges in the classroom during field experiences and teacher residence.

**CHALLENGES THAT TEACHER CANDIDATES EXPERIENCE IN THE CLASSROOM**

There are a plethora of challenges bedeviling teacher education. Current research indicates that most teacher preparation programs are not preparing teacher candidates in a meaningful way, due to a disconnect
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