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The development of pre-service teachers' knowledge: A contemplative approach

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ABSTRACT

This study investigates the effects of meditation on enhancing pre-service teacher knowledge based on the framework of technological pedagogical content knowledge (TPACK) by deepening the reflective process. Participants were students enrolled in an ICT literacy course during the fall 2014 semester. Pre- and post-course surveys indicated that the teachers had significant growth in TPACK and other types of teacher knowledge and in the depth of their reflective practice. Post-course interviews indicated positive effects from their reflective practice, showing that meditation helped the teachers prepare themselves for learning, conduct cognitive and affective tasks, and improve self-efficacy and inner strength. Several implications were noted for the future direction of teacher education programs and research.

1. Introduction

To teach effectively in this information-based and technology-driven world, pre-service teachers (PSTs) need comprehensive teacher knowledge to help address students' needs. Due to easy access to technology, students are accustomed to searching for information through online search engines or acquiring it via on-line social networking sites. Thus factual knowledge may be acquired outside as well as inside the classroom. Namely, students expect an all-embracing learning environment in which teachers are aware of their circumstances and are prepared to adopt appropriate instructional strategies to address their learning needs.

Passive learning instructional strategies which are heavily reliant on memorization and recall do not meet the needs of the 21st century. Therefore, teacher-centered approaches which tend to disregard students individual needs must change. To meet this challenge, teacher knowledge has resurfaced as a key factor in effective teaching in classrooms. Shulman's (1987) seminal work defined teachers' professional knowledge as consisting of pedagogical knowledge, content knowledge, and pedagogical content knowledge. Mishra and Koehler (2006) added technological knowledge to this, and thus the combined technological pedagogical content knowledge framework emerged in teacher education.

Today this has become the framework which defines the dynamic interplay of the various types of knowledge required of teachers.

Good practice and teacher knowledge depends on context (Edge & Richards, 1998). Although the technological-pedagogical-content-knowledge (TPACK) framework is comprehensive, the nature of teaching is interpretative (Liou, 2001), and therefore teachers are required to be aware, mindful, and flexible so as to make immediate, spontaneous decisions on modifying teaching strategies based on student feedback and the context (Whitcomb, Borko, & Liston, 2008). Thus, reflection plays a key role in teacher development and has been drawing much attention in teacher education for decades (Schön, 1987; Whitcomb et al., 2008; Zeichner & Liston, 1996).

Reflective practice may be essential in teacher education, but training PSTs to be reflective is no easy task. Reflection, by its nature, is ambiguous and when it is turned into following technical steps, it loses its original purpose (Lee, 2002). So, what instructional strategies can develop PST reflection? The key lies in what we want PSTs to reflect upon and how we want them to do it (Zeichner & Liston, 1996). Furthermore, reflection is mentally complex and requires one to be aware of and reflect upon one's own experience.

There has been increasing interest in integrating meditation into higher education (Bush, 2006) and in how it can benefit learners cognitively and affectively (Shapiro, Brown, & Astin, 2011; Waters, Barsky, Ridd, & Allen, 2015). To help PSTs acquire professional knowledge and become reflective practitioners, therefore, this

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study integrated meditation into PST training. As such, this study investigated the effects of a course, which was rooted in a contemplative transformative stand, by adopting meditation to facilitate reflection for knowledge development. PST perspectives were investigated as well. Following are details on this study's theoretical framework, rationale, research method, and findings.

2. Theoretical framework

2.1. Reflection vs. teacher knowledge

Shulman (1986) maintained that content knowledge, pedagogical knowledge, and pedagogical content knowledge are the components of teachers' professional knowledge. With the Internet and other interactive technology becoming increasingly widespread in education, researchers (Mishra & Koehler, 2006; Niess, 2005) have added technological knowledge to Shulman's original domains. Teacher knowledge has thus expanded into seven dimensions: pedagogical knowledge (PK), content knowledge (CK), technological knowledge (TK), pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and technological pedagogical content knowledge (TPCK). These domains overlap with and are not exclusive of each other. For ease of pronunciation, TPCK became TPACK, and became the dynamic interplay of knowledge domains related to teaching with technology for an assigned subject or grade level (Mishra & Koehler, 2006). Furthermore, TPACK has been recognized as an effective framework to help PSTs conceptualize their professional knowledge (Chai, Koh, & Tsai, 2013), and many researchers measure the development of TPACK in various contexts reporting positive effects on the knowledge growth of in-service or pre-service teachers. For example, Chai, Koh, and Tsai (2010) investigated the effects of 12 2-h training sessions on 889 Singapore PSTs' knowledge development through the TPACK framework. The results indicated that the PSTs had significantly higher perceived levels of TPACK after the cohort training. Tokmak, Yelken, and Konokman (2013) used the TPACK framework to develop 22 Turkish pre-service elementary teachers' understanding of instructional material design. Their results indicated that the PSTs significantly gained understanding, skills and changed their perceptions of instructional technologies. Additionally, Mouza and Karchmer-Klein (2013) reported that 58 PSTs' in the U.S. gained TPACK knowledge through designing technology-integrated lessons. Their results indicated that the PSTs made significant gains through the TPACK framework regarding professional knowledge and were equipped to design and implement technology-integrated lessons.

With these cases serving as examples, one can conclude that TPACK is contextual, multi-faceted, and transformative (Harris, Mishra, & Koehler, 2009; Koehler & Mishra, 2009). To transform the foundation knowledge (TK, PK, CK) into TPACK, PSTs must develop capabilities of self-reflection to become reflective practitioners. A substantial body of teacher education literature has focused on enhancing PSTs practice of reflection (Harford & MacRuairc, 2008) as a means for enabling the growth and development of teacher knowledge (Perkins, 2013; Trede & Smith, 2012). It is worth noting here that in addition to western scholars (i.e., Dewey, Schön) interest in reflection, thousands of years ago the Chinese educator Confucius also advocated reflection in his book "The Great Learning" (Year Unknown) as a route to wisdom:

> Only after knowing what to abide in can one have stability. Only after having stability can one be tranquil. Only after having achieved tranquility can one be at ease. Only after being at ease can one reflect. Only after reflecting can one attain wisdom.

On the other hand, some findings, such as Bain, Ballantyne, Mills, and Lester (2002) and Cohen-Sayag and Fischl (2012) have shown that PSTs do not reach significant levels of reflection during training. Conducting reflective practice may help to transform teacher education, and the practice has been proposed for PSTs to examine their personal and professional beliefs (Zeichner & Liston, 1996). Through reflective practice, PSTs can become more aware and mindful, preparing themselves to teach students in dynamic classrooms (Whitcomb et al., 2008). Therefore, integrating reflection into the development process of teacher knowledge is the focus of this study.

2.2. Reflective practice vs. meditation

Reflection is a complex cognitive process, and reflective practice has been recognized as being essential to developing reflective practitioners (Schön, 1987; Zeichner & Liston, 1996). Reflective practice includes critical thinking, self-directing, problem solving, and emotion regulation (Chant, Heafner, & Bennett, 2004; Lee, 2002; Stanley, 1998). To achieve such ends, teacher education programs adopt a variety of techniques, including writing learning journals (Killeavy & Moloney, 2010; Kruta, Bergman, Flores, Mason, & Jack, 2014), writing classroom observation reports (Lee, 2002), creating teaching portfolios, using meta-analysis to make reflection visible (Watts & Lawson, 2009), modeling reflective practice (Fletcher, 1997), and using action research to assess reflective practice (Hagevik, Aydeniz, & Rowell, 2012).

In addition to managing cognitive tasks, reflection requires exploration of the inner self and the ability to regulate one's emotions (Intrator, 2006). Clearly, teaching requires inner strength, but current teacher education programs lack contemplative education and tend to neglect to focus on conceptual tools or theories to equip PSTs with the mental strength to manage the challenges of being a teacher (Whitcomb et al., 2008). Contemplative education through the practice of meditation is expected to be able to meet the call for developing PSTs' inner strength in teacher education, since meditation can develop "whole students" evidenced through improved scholastic outcomes, increased well-being, and enhanced social competency (Waters et al., 2015). Furthermore, integrating meditation into higher education has been attracting interest and is becoming more common (Bush, 2006; Waters et al., 2015).

Meditation is defined as the act of regulating attention through observing body states, thoughts, or emotions (Zylowska et al., 2008) and does not have to be related to any particular religious belief (Kabat-Zinn, 1990). Studies have indicated that meditation can enhance recovery from negative mental symptoms (Johnson et al., 2009; Zylowska et al., 2008) and can influence student achievement by enhancing the regulation of emotion and mindfulness (Shapiro et al., 2011; Waters et al., 2015). Growing evidence suggests that meditation is associated with a variety of cognitive and affective benefits (Johnson et al., 2009). Furthermore, meditation has been recognized as effective in fostering attention and awareness, helping trainees gain consciousness to be aware of both themselves and their environment (Shapiro, Carlson, Astin, & Freedman, 2006; Waters et al., 2015). Regarding using meditation to enhance reflective competency in teacher education, to the researcher's knowledge no empirical research study has been conducted. As such, in this study meditation was integrated as an intervention in an attempt to enhance reflective practice.

Individual differences always exist in any classroom (Jonassen & Grabowski, 1993). Studies indicate that gender, for example, does not seem to have an impact in technology-integrated learning environments (i.e., Heemskerk, Dam, Volman, & Admiraal, 2009; Yukselturk & Bulut, 2009), but it is not clear whether gender is a factor in PST education. While PSTs of varying academic levels have