



Feature Article

"Am I Doing What I Think I'm Doing?": The Importance of a Theoretical Frame when Integrating Tablets in Teacher Education

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Abstract

In the following self-study, we share our investigation of the shifts in faculty pedagogical beliefs, instructional practices, and curricular decision-making while engaged in a cycle of reflection on tablet-focused teacher education course. We conducted this inquiry into our practice, using Technological Pedagogical Content Knowledge (TPCK) and the Substitution-Augmentation-Modification-Redefinition (SAMR) model as frameworks to examine data from interviews and reflective writing. We conclude the need for the explicit connection of technology professional development, specifically tablet technology, with a meaningful theoretical framework, in order for faculty to engage in effective integration. We also share our model for examining the development of instructor's thinking about integrating technology, including influences on thinking and classification of instructional decisions into the SAMR taxonomy.

Keywords: Tablets, educational technology, teacher education, technological pedagogical content knowledge, samr model

Introduction

In recent elections for the Los Angeles school board, a program designed to provide an iPad to every student became a critical issue. Since the adoption of the tablet program, L.A. Unified, the second largest district in the country, has

experienced problems with start-up, planning, and intended use of tablets for learning (Blume, 2015). The trend of providing tablet devices to students has migrated to higher education with the hope of transforming student learning and faculty teaching practices (Moran, Hawkes and Gayer, 2010). In early 2014, Fresno State committed to making this

move through the development of a tablet program. The tablet program at our institution began as an initiative from the university president, connecting to efforts to reduce costs and integrate technology. We all participated in the program and teach courses in the teacher education program that integrate tablet technology.

Tablet technology has potential for a significant impact on teaching and learning, but not without appropriate professional development and support. Beavis (2014) noted that tablets in the classroom can have transformational impact on learning, but also recognized the need for training and support to facilitate effective use. Moran, Hawkes and Gayer (2010) suggest that students also need preparation in order to increase the success rate for tablet integration. Additionally, they found differences in students who used tablets at their own discretion and those who were required to use the tablets. In a study investigating university students' perceptions of technology, van Oostveen, Muirhead and Goodman (2011) found little evidence that tablet integration impacts students' attitudes about learning. The researchers of this study contend that despite student familiarity with the technology, that technology by itself cannot lead to the redefinition of educational practice.

In a study looking at tablet integration in a teacher education course, Geist (2011) found that preservice teachers primarily used tablets for reading eBooks and finding resources through the web browser. The preservice teachers expressed that they hoped to use the technology in their future classrooms. The researcher concludes that there is value in incorporating mobile technology into the classroom and suggests that there is a need for faculty support regarding this implementation. While this study found the tablets to be a useful tool in teacher education, the tablets themselves did not transform the course.

Expanding on Beavis's (2014) call for training and development accompanying tablet implementation, we assert the need for

meaningful reflective practice by faculty on the entire experience. In this self-study, we investigate the impact of our participation in a tablet program and professional development opportunities on our instructional practices and pedagogical beliefs in our work with preservice teachers.

Purpose

The purpose of this self-study was to investigate changes in faculty beliefs and decisions about pedagogy, curriculum and instructional practices in relationship to the integration of tablets into course design. We used two research questions to focus the study.

1. What changes occurred to our pedagogical beliefs, curricular decisions, and instructional practices?
2. What experiences, including professional development, contributed to these changes?

These questions were examined through a model for faculty conceptions of reflection developed by Nelson (2015), which uses Schwab's (1973) commonplaces as influences on faculty thinking.

Background

The authors of this paper were involved in a campus-wide initiative to integrate tablets in teacher education courses at Fresno State, a regional comprehensive public university. The tablet initiative is currently in its third year. The first year of the program included 40 participants from various colleges and departments across campus. The program expanded in its second year to around 70 participants. Prior to teaching their tablet-based courses, the faculty involved in the initiative participated in a faculty learning community that met regularly throughout the academic year. During the summer immediately before teaching a tablet-based course, the faculty members engaged in a week-long summer academy. The faculty learning community and the summer academy focused on introducing faculty to tablet technology and different apps that could be integrated into coursework and instructional practices. In the summer academy, the faculty

created learning activities and a tablet-based course syllabus. Participating faculty members were required to teach one tablet-based course in the academic year following the completion of the summer academy. Faculty were supplied with a tablet of their choice – iOS, Android or Windows – and also received a stipend and professional development funds. Students who enrolled in tablet courses received a subsidy from the university to offset the cost of their tablet.

Fresno State serves a diverse population. Demographics for Fall 2015 included 45.8% Latino, 22.4% White, 14.0% Asian, 3.3% African American, 2.9% two or more, 0.3% Native American, and 11.3% Other. The Federal government has designated the university as a Hispanic Serving Institution (HSI) and an Asian American Native American Pacific Islander-Serving Institution (AANAPISI). The university reports that first generation college students make up over two thirds of the undergraduate population.

Theoretical Framework

This study draws upon the constructs of Technological Pedagogical Content Knowledge (TPCK) and the Substitution-Augmentation-Modification-Redefinition (SAMR) model as a theoretical frame. TPCK, which looks at the intersections between content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK), provides a space for these deliberations on curriculum and pedagogy to occur (Mishra & Koehler, 2006). While historically, teacher education focused on content knowledge, more recently this shift has been to pedagogical knowledge. Shulman (1987) claimed that these two areas of CK and PK were not mutually exclusive and could not be treated in such a way, leading to the construct of Pedagogical Content Knowledge (PCK), sometimes operationalized as knowledge for teaching (Ball, Thames, & Phelps; 2008). Similar to the way that content and pedagogy cannot be considered mutually exclusive, educational technology should also not be viewed as separate from pedagogy and content (Mishra & Koehler, 2006). TPCK requires understanding of

technological integration to best support already effective pedagogy and a depth of content knowledge.

In addition to TPCK, the SAMR model helps to inform the investigation of technology integration. Developed by Puentedura (2013), SAMR serves as a classification system for identifying the level of technology integration based on learning activities. The SAMR model includes the following four levels of technology integration:

- Substitution: technology acts as a direct substitute with no functional improvement.
- Augmentation: technology acts as a direct substitute with functional improvements.
- Modification: technology allows for task redesign.
- Redefinition: technology allows for new tasks that were previously not possible.

For example, simply providing an electronic text without any examination of the new ways of interacting with text afforded by an e-reader would be classified at the substitution level (Puentedura, 2013). An evolution in the beliefs and practices of teacher educators must first occur in order for tablet technology to have an impact on TPCK and understanding of the SAMR model when used with preservice teachers. (Geist, 2011).

Methodology

This inquiry takes the form of a self-study, in which we consider our own experiences as instructors implementing tablet technology in a teacher education program. Zeichner (1999) called the development of self-study research “probably the single most significant development even in the field of teacher education” (p. 8). Self-study researchers focus on significant issues in teacher education and utilize a variety of methods to reveal and investigate complexities of the field. Zeichner (1999) acknowledged that self-study is a form of research that could potentially transform teacher education.

For this investigation of our practice, we drew upon reflective processes and self-inquiry in order to situate ourselves at the center of our study.

Hamilton and Pinnegar (1998) define self-study as “the study of one’s self, one’s actions, one’s ideas, as well as the ‘not self’” (p. 238). Self-study problematizes the individual along with personal and professional practices with the goal of reframing these practices (Feldman, 2002). Barnes (1998) identified three characteristics of self-study research: collaboration, openness, and reframing of practice. Self-study cannot be conducted in isolation because it involves collective reflection and meaning making. This collaborative component requires that participants are open to sharing experiences and considering the ideas of others. The final characteristic involves applying the new ideas and insights to reframe the individual’s practice. Reframing can allow for significant shifts to occur in beliefs and perspectives.

Participants

At the time of the self-study, the five participants were assistant professors who worked in teacher education at the university, teaching courses in various parts of the teacher credential program. Prior to participation in the tablet initiative, the five participants integrated various levels of technology in their instruction, ranging from teaching online and computer-based courses to teaching traditional face-to-face courses.

Libbi Miller taught curriculum, instruction and educational technology in the secondary teacher education program. Prior to participating in the tablet initiative, she taught all of her courses in a computer classroom setting and regularly used educational technology as a tool for instruction. She participated in the tablet initiative beginning in its second year.

Frederick Nelson taught courses in science methods and instructional theory and was a member of the first cohort of faculty to use tablets with students. He regularly integrated tablets into his science methods courses over the two years since the inception of the tablet initiative. He also taught an introductory

course on curriculum, instruction, and technology.

Cathy Yun taught in the early childhood education teacher education program and master’s program. As part of the master’s program, she instructed an advanced course in educational psychology. Prior to participating in the tablet initiative, she primarily used slide presentations, video footage, and websites as tools for teaching and learning.

Lisa Bennett coordinated the elementary teacher education program and taught early literacy methods courses. Prior to participating in the tablet initiative, her use of educational technology as a tool for instruction consisted primarily of PowerPoint presentations and videos.

Emy Lopez Phillips taught curriculum, instruction and educational technology in the secondary teacher education program. Prior to participating in the tablet initiative, she served as a Director of Instructional Technology at the K-12 level for the local county office of education. Her experiences included training K-12 educators on the use of technology for teaching and learning. She participated in the tablet initiative in its final year of grant funding.

Methods

We found that qualitative methods of data collection and analysis most closely aligned with the purpose of this study. We conducted self-study focus groups and used critical incident reflective writing as methods of data collection.

Focus Groups

We conducted two focus groups which utilized dialogue as a mode of inquiry. In self-study, dialogue is more than a conversation and often involves more than two participants (East, Fitzgerald & Heston, 2009). Dialogue as a method allows for participants to jointly create meaning and expand individual ideas and perspectives (Wells, 1999). The act of participating in dialogue can also be an impetus for immediate change in

the participants' practices or teaching. In order to meet the scheduling needs of all of our group members, we held two focus groups. There were three participants present in each focus group. One participant attended both focus groups. We followed a semi-structured protocol and used guiding questions to direct the conversation.

Reflective Writing

We also used reflective writing as an additional tool for data collection. We drew on the concept of critical incidents to provide a stimulus for reflection. Griffin (2003) suggests that critical incident reflection "provides a deeper and more profound level of reflection because it goes beyond a detailed description of an event that attracted attention, to analysis of and reflection on the meaning of the event" (p. 208). As researcher participants, we individually participated in reflective writing based on the following prompt:

Identify a "critical incident" that you experienced at any phase during [the tablet] program that influenced the way you perceive the role of technology in teacher education.

Prior to our second focus group, each participant read all of the group member's reflections. We found the reflective writing process to be useful in advancing our focus group discussion.

Data Analysis

Data from the focus groups and reflective writing were dual coded to allow themes to emerge from the data (Strauss & Corbin, 1990). A list of themes was developed in the initial round of open coding. We conducted a second round of focused coding to solidify the themes identified during open coding (Esterberg, 2002). Themes were reviewed with all of the participants in the study.

Trustworthiness

We accept the need for an approach that is committed to checking our interpretations with each other to increase the credibility of our conclusions (Bullough & Pinnegar, 2001; Whitehead, 2004). For this project, we used member checking to review our findings and to

explore conclusions. We also engaged in peer debriefing to refine and redirect our work. As the inquiry is a self-study, transferability is enhanced through purposive sampling of the participants, since we are all providing rich detail about our experiences (Erlandson, Harris, Skipper, & Allen, 1993). We also analyzed data both independently and collaboratively to contribute to trustworthiness of the inquiry.

Findings

We found that our thinking about integrating tablet technology was influenced by several factors that align to Schwab's commonplaces of instruction – teachers, subject matter, learners, and the milieu (Schwab, 1973). This corresponds to Nelson's (2015) model for the development of reflection by teacher educators, where the influences of the commonplaces function as input on personal conceptions of reflection that are then reified in the intended curriculum. In this model, an instructor's formal education, personal experiences outside of schooling, and professional experiences inside of schooling all inform the teacher commonplace. The influences of learners, subject matter, and the milieu of instruction comprise the other commonplaces. The magnitude of each of these factors is fluid, based on the individual instructor and the teaching episode. Figure 1 illustrates this model, with larger shapes indicating greater magnitude of the influence of particular commonplaces. The instructor's thinking about technology integration, representing TPCK (Mishra & Koehler, 2006), is manifested in the choices made about learning experiences in coursework. These individual assignments can then be classified according to the SAMR taxonomy (Puentedura, 2013). In the following sections, we examine the experience of one faculty member, Nelson, in more depth through the application of this model for examining thinking about technology integration. We will also share the thinking of four other faculty members who participated in the tablet project.

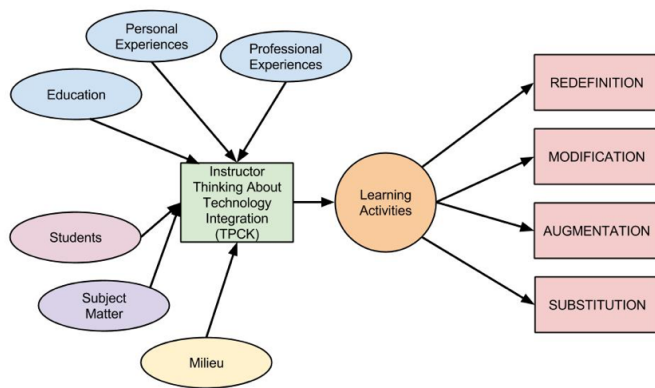


Figure 1. Influences of learners, subject matter, and the milieu of instruction

Shape Shifters

Nelson experienced tension about his instructional decisions, based on his desire to provide a learner-centered experience for students and his lack of expertise in tablet applications.

Learner-centered teaching is a central aspect of his beliefs about teaching and learning, where power and responsibility are shared with students (Weimer, 2013). When teaching the tablet course, Nelson experienced dissonance between his belief in learner-centered instruction and his insecurity due to a lack of self-efficacy about his tablet skills. Initially, he treated the use of tablets as an “add on” to his other assignments. The first learning activity in the science methods course instructed students to write a review of an application that could be used in teaching science, a substitution-level activity in the SAMR model. He focused on technical skills and teaching the students how to use various apps such as Evernote and Explain Everything. While he embraces learner-centered education and constructivist teaching, he experienced discomfort when he realized that the students had a better understanding of the technology than he did. This realization provided the impetus for a shift in the way that he integrated the use of tablets into his course. He no longer teaches how to use the tablet or particular apps, but he uses the tablet as a tool to engage his learner in collaboration. These

tensions that Nelson experienced are characterized in his reflective writing:

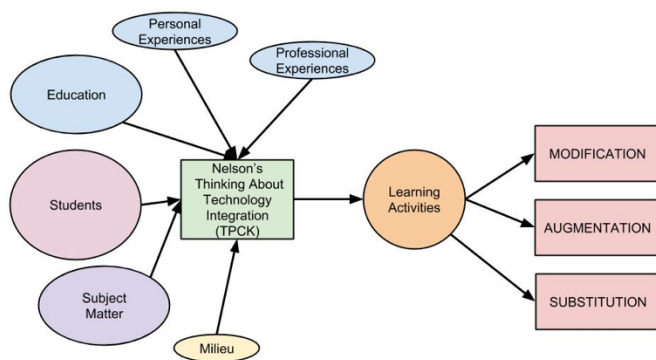
At first, I was anxious about my lack of expertise in these various applications. This should not have been an issue for me, as my instructional decisions are typically very learner-centered and inquiry-oriented. The newness of using a tablet as a pedagogical innovation seemed to cause me to default to a more teacher-centered mode of authority for content. I soon came to the realization that I could not be an authority on all of these applications, but could instead rely on the expertise of my own students, based on their own interests and experience.

Nelson’s thinking about technology integration in this experience is represented by the model in Figure 2. The major influences on his TPCK come from the commonplaces of the teacher, the students, and the subject matter. In Nelson’s own formal education, a learner-centered approach to teaching had a significant impact, as characterized by this statement from his syllabus about grading on an assignment: “The community of learners will determine the criteria for evaluating this assignment.” The education influence is, therefore, of greater influence than personal experiences, professional experiences, or the milieu. Actually, Nelson rejected the influence of tablet technology professional development, instead relying on the expertise of his own students, as indicated by the relative sizes of these influences in the model. Finally, Nelson explicitly focused on how preservice teachers in the course could use tablet technology in science teaching and learning, including data collection and analysis, as shown by the larger size of the subject matter influence in the model.

Nelson’s thinking about integrating TPCK informs his decisions about the design of learning experiences in his courses. These learning experiences can then be classified into different SAMR categories. An example of his thinking includes the choices of techniques afforded preservice teachers in the course in the completion of the Inquiry Lesson Plan, such as collaboration via Google Docs or data collection

using wireless temperature probes. These technology tools allow a significant redesign of the task; the Modification level of the SAMR model. While no assignments were categorized in the Redefinition level, most fit into the Augmentation or Modification levels. As with other taxonomies, Nelson's purpose was not to move all activities to the highest level, but rather to engage in thoughtful examination of the diversity of his instructional choices.

Figure 2. Nelson's thinking about technology integration



Bennett's professional experience while teaching in the tablet program also led to a shift in her practice. In the end, the integration of tablets was transformative for Bennett's practice, but this shift occurred in several phases and was facilitated by reflection. The first course Bennett taught in the tablet program was outside of the teacher credential program. In this course, she reports using the tablet to remove the focus from herself as the instructor and to create a more learner-centered classroom. However, the next semester when she began using tablets in a teacher credential course, her approach changed.

And then the next semester, I taught the tablet course with my credential class, and I had this idea in my mind that I had to shift from using the tablet as a vehicle to helping teachers think about how they would use a tablet in their classroom. And I think it set me back a whole semester because I

was starting to use it just as a gadget and not as a transformational tool, so, for example, I taught them a lot of really useful apps... it took me an entire additional semester to then get to the place where I was using the technology in a more transformational way so that the students were engaging differently, and I wasn't the disseminator of knowledge.

Initially in the credential course, she focused on teaching her students the applications they could use once they entered the teaching profession. Like Nelson, she later shifted her teaching approach to become more learner-centered. She stopped teaching her students how to use the tablet and began integrating it into the design of her instruction.

The Critics

Both Miller and Phillips were instructors of educational technology. We found that their education and professional knowledge heavily influenced their experience in the professional development opportunities that were provided in the tablet program. Miller found herself critiquing the program's professional development for its lack of a strong theoretical frame and focus on developing pedagogical beliefs. Without these elements, she feared that the tablet initiative would neglect to truly transform classroom practices across campus. In the focus group, she shared her concern: "I wonder, if we look at how people are using tablets across campus, if they're really changing what they're doing. Or if it's mostly just a substitute."

In addition to her education and professional experience, Phillips's critical perspective was influenced by her understanding of our students and the societal milieu along with personal experience in the geographic area. Our university serves a high population of disadvantaged students with many residing in rural areas with limited access to technology. Phillips was initially drawn to the program because she felt it would provide students living in outlying areas affordable access to technology. The university also has a

partnership program, which allows preservice teachers to take classes off campus often in rural areas. She hoped that the tablets would be a valuable resource for our preservice teachers who have limited access to campus, while also serving as a tool during their student teaching experience. Once the program stopped funding tablets for students, Phillips became concerned about issues of equity and access related to enrollment in a tablet course and the tablet program.

The Seeker

Participation in the tablet program provided us with the opportunity to reflect on our practice as teacher educators. We found that the educational theories and pedagogical approaches that we personally value were not always present in our teaching. This led us to begin to shift the theories that influence our practice from being personal to more observable. While this reflective experience was shared by all of the researchers, the impact on Yun's practice was the particularly notable.

Yun's educational and professional background is in cognitive psychology, and she indicates that she is always seeking a theoretical frame. While Miller critiqued the professional development, Yun sought more information, and the tablet program provided a new source of stimuli for reconsidering her practice as a teacher educator. She began to rethink whether or not the instructional practices that she was implementing in her teaching were truly aligned with her pedagogical beliefs. In a focus group discussion, Yun reflected on her practice and the growth that she experienced by participating in the tablet program.

Before I was like, "Yeah, of course I'm a constructivist." But it's not like I explicitly sat down and thought about the tenets of a constructivist lesson. I didn't do that explicitly. My thinking didn't reach that far. Because it didn't, it was this implicit, vague application of this theory, I was not as critical of my own pedagogy."

The tablet program also resulted in Yun seeking a new framework for understanding her teaching and deepening her practice. In the tablet

professional development, the SAMR model was briefly introduced. After initially learning about this taxonomy, Yun began to seek out more information about SAMR. She consulted with colleagues in educational technology and also did additional readings on the topic. Now Yun uses the SAMR model as a tool for reflecting on her teaching and classroom activities.

Implications

Our self-study has important implications for teacher education faculty who seek to move beyond simple substitution of technology to a level of redefinition, enabling the creation of new learning experiences that were previously inconceivable (Puentedura, 2013). Various forms of technology are being implemented across disciplines at universities nationwide. Often these tools come with great promises such as the ability to revolutionize teaching, engage students and increase achievement. As faculty engage with these innovations, we conclude the need to carefully consider our own fundamental ideas about teaching and learning. In order for technology to be an integral component of transformative teacher education, it must move beyond technology integration and become entangled with pedagogical content knowledge. Without this core, we can become stuck in the "app" model by focusing on the tools instead of our pedagogical and instructional beliefs.

The model for instructor thinking about technology presented in this study (Figure 1) is useful in encouraging thoughtful consideration of the ideas and values that faculty bring to their pedagogical and curricular decisions. The model provides a structure for working backwards from enacted learning experiences to examining the SAMR level and significant influences on the integration of technology. These analyses bring focus to the importance the theoretical and practical rationale that faculty use in the design of instruction, affording a lens into the TPCK brought to bear.

As we asserted in the introduction to this article,

professional development is necessary for faculty to successfully integrate technology into their courses (Beavis, 2014; Geist, 2011). We conclude that a strong theoretical frame must be present in this professional development. Professional development itself does not have the ability to transform practice. We are not advocating on behalf of any particular framework, be it TPCK, SAMR, learner-centered teaching, and so on. We do posit that when the explicit theoretical frame is absent, practice is left to be informed only by personal and professional experiences of the faculty member. Learning activities developed based on what has been previously done are unlikely to transform the learning environment.

References

- Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching what makes it special? *Journal of Teacher Education*, 59(5), 389-407.
- Barnes, D. (1998). Looking forward: The concluding remarks at the Castle conference. In M. L. Hamilton, with S. Pinnegar, T. Russell, J. Loughran, & V. LaBoskey (Eds.), *Reconceptualizing teaching practice: Self-study in teacher education* (pp. ix-xiv). London, UK: Falmer Press.
- Bullough, R. V., Jr., & Pinnegar, S. (2001). Guidelines for quality in autobiographical forms of self-study research. *Educational Researcher*, 30(3), 13-21.
- Beavis, G. (2015, March 14). *An Apple for teacher: How tablets are changing education*. Techradar. Retrieved from <http://www.techradar.com/us/news/mobile-computing/tablets/an-apple-for-teacher-how-tablets-are-changing-education-1288300>
- Blume, H. (2015, May 13). In L.A. Unified races, there's one issue where charter schools and teachers union agree. *Los Angeles Times*. Retrieved from <http://www.latimes.com/local/education/la-me-laUSD-election-20150513-story.html>
- East, K., Fitzgerald, L. M. & Heston, M. L. (2009). Talking teaching and learning: Using dialogue in self-study. In D. L. Tidwell, M. L. Heston, & L. M. Fitzgerald (Eds.), *Research methods for self-study of practice* (55-72). New York, NY: Springer.
- Erlandson, D. A., Harris, E. L., Skipper, B. L., & Allen, S. D. (1993). *Doing naturalistic inquiry: A guide to methods*. Newbury Park, CA: Sage.
- Esterberg, K. G. (2002). *Qualitative methods in social research*. Boston, MA: McGraw-Hill.
- Feldman, A. (2002). Becoming a teacher educator, In C. Kosnik, A. R. Freese, & A. P. Samaras (Eds.), *Making a difference in teacher education through*

- self-study. Proceedings of the fourth international conference on self-study of teacher education practices*, Herstmonceux Castle, East Sussex, England (Vol. 1, pp.66-70). Toronto, ON: OISE, University of Toronto.
- Geist, E. (2011). The game changer: Using iPads in college teacher education classes. *College Student Journal*, 45(4), 758.
- Griffin, M. L. (2003). Using critical incidents to promote and assess reflective thinking in preservice teachers. *Reflective Practice*, 4(2), 207-220.
- Hamilton, M. L., & Pinnegar, S. (1998). Preface. In M. L. Hamilton, S. Pinnegar, T. Russell, J. Loughran, & V. K. LaBosky (Eds.), *Reconceptualizing teaching practice: Self-study in teacher education* (p. viii). London, UK: Falmer Press
- Mishra, P., & Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *The Teachers College Record*, 108(6), 1017-1054.
- Moran, M., Hawkes, M., & El Gayar, O. (2010). Tablet personal computer integration in higher education: Applying the unified theory of acceptance and use technology model to understand supporting factors. *Journal of Educational Computing Research*, 42(1), 79-101.
- Nelson, F. L. (2015). What we see when we look in the mirror: Conceptions of and intentions for reflection by science teacher educators. *Cogent Education*, 2(1), 1122139.
- PuenteDura, R. R. (2013). *Paths to technology integration: SAMR & TPCK in context*. Retrieved from <http://www.hippasus.com/rrpweblog/archives/2013/05/29/PathsToTechnologyIntegration.pdf>
- Schwab, J. J. (1973). The practical 3: Translation into curriculum. *The School Review*, 81(4), 501-522.
- Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1-23.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research* (Vol. 15). Newbury Park, CA: Sage.
- van Oostveen, R., Muirhead, W., & Goodman, W. M. (2011). Tablet PCs and reconceptualizing learning with technology: a case study in higher education. *Interactive Technology and Smart Education*, 8(2), 78-93.
- Weimer, M. (2013). *Learner-centered teaching: Five key changes to practice*. San Francisco, CA: Jossey-Bass.
- Wells, G. (1999). *Dialogue inquiry: Toward a sociocultural practice and theory of education*. Cambridge, UK: Cambridge University Press.
- Whitehead, J. (2004). What counts as evidence in self-studies of teacher education practices? In J. Loughran, M. L. Hamilton, V. K. LaBoskey, & T. Russell (Eds.), *International handbook of self-study of teaching and teacher education practices* (Vol 2, pp. 871-903). Dordrecht: Kluwer Academic Publishers.
- Zeichner, K. M. (1999). The new scholarship in teacher education. *Educational Researcher*, 28(9), 4-15.

