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Incorporating Contextual Knowledge in Faculty Professional Development for Online Teaching

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Online learning has become an important component of the higher education landscape in the United States. However, faculty are often either ill-prepared in using cutting-edge educational technologies in the classroom or have reservations about online teaching. Mishra and Koehler's (2006) Technological Pedagogical and Content Knowledge (TPACK) model, often used in K-12 settings to describe the role of technology in the pedagogical process, can be adapted to meet the professional development needs of faculty. The model we propose, TPACK-ConK, adds another layer of knowledge, context knowledge, to the model in order to account for the specific professional development needs of faculty in higher education. TPACK-ConK can be used by Centers for Teaching and Learning to better construct professional development for faculty engaged in online teaching.

Introduction

Online learning has become an important component of the higher education landscape in the United States. Nearly one-third (32%) of postsecondary students now take classes online, a considerable increase from years past (Allen & Seaman, 2013). Despite the growth of online education, faculty continue to have concerns about the nature of online learning (Allen & Seaman, 2013; Cherry & Wiles, 2010; Halvorson, Crittenden, & Pitt, 2011). Scholars have suggested that for faculty to overcome their concerns and have positive and effective online teaching experiences, faculty need better, more intentional professional development (Cherry & Wiles, 2010; Downing, 2013; Halvorson, Crittenden, & Pitt, 2011; Horvitz, Beach, Anderson, & Xia, 2015;

McDaniel & Kules, 2011; Meyer, 2012; Mitchell, 2012: Moore-Adams, Jones & Cohen, 2016; Rice & Dawley, 2009; Rovai, 2000).

Some have argued that Mishra and Koehler's (2006) Technological Pedagogical and Content Knowledge (TPACK) model can serve as a framework for developing faculty competency for online education (Alsofyani, bin Aris, & Enyon 2013; Arinto, 2013; Kushner Benson & Ward, 2013; Meyer & Murrell, 2014). TPACK has been praised and broadly applied to professional development for preservice teachers, inservice teachers, and higher education faculty because of its universality. Some researchers have adapted the model for consideration in specific contexts including Universal Design for Learning, Information and Communication Technologies, as well as experiential knowledge and learning (Angeli, Valanides, & Christodoulou, 2016). However, as Angeli et al. (2016) state, "there are already enough TPACK frameworks, or variations of them, in the literature, and that no more research efforts and resources should be invested toward this direction" (p. 23).

In contrast to Angeli et al. (2016), we argue that continuous development of new technologies coupled with the distinct variations in context fully justify the development of an adapted TPACK framework specifically to meet the needs of faculty across disciplines for teaching online and to assist those who are working in faculty development programs. We will first examine the literature on faculty concerns for online teaching, highlighting the primary barriers that inhibit faculty from engaging in online teaching. Next, we will explore the TPACK model, highlighting its strengths and applications. We identify the limitations of the TPACK model based on the core concerns of faculty regarding teaching online and posit the addition of context knowledge (ConK). Our modification, TPACK-ConK, accounts for the specific concerns of faculty preparing for online teaching, as well as the contextual factors that impact faculty professional development for online learning.

The Context: Faculty Professional Development for Online Teaching

This literature review explores barriers faculty face when transitioning to online education and ways scholars and institutions have developed programs for online faculty development. While there are other factors that inhibit faculty from fully engaging in online teaching, a number of scholars have suggested some primary barriers. These barriers include concerns about the legitimacy of online learning, the time it takes to design and teach

an online course, and the technological competency needed to navigate online learning settings.

Faculty Concerns Regarding the Legitimacy of Online Education

According to Allen and Seaman (2013), positive perceptions of faculty toward online teaching increased from 27.6% to 30.2% across a ten-year period (2002-2012). In a recent survey, though, only 29.1% of faculty surveyed accept the value and legitimacy of online education ("Online Report Card," 2016). Despite some studies that indicate positive faculty attitudes toward online teaching (Maguire, 2009; Rockwell, Schauer, Fritz, & Marx, 1999; Wessel, 2016), many instructors nonetheless struggle to accept the legitimacy of teaching online. Voogt, Fisser, Pareja Roblin, Tondeur, and van Braak (2013) hypothesize that faculty struggle to accept the legitimacy of online education due to epistemological or ontological concerns. Voogt et al. (2013) suggest that "the ways specific technologies represent reality provide limitations but also offer new possibilities to understand the world that could not be realized otherwise" (p. 35). Online education thus assumes an educational philosophy that may not cohere with that of faculty. Some scholars have asserted that faculty struggle to accept the legitimacy of online education due to a lack of quality professional development in online teaching (Cherry & Wiles, 2010; Halvorson, Crittenden, & Pitt, 2011). Thus, attention needs to be paid to the intentional design of professional development programming for faculty who engage in online teaching and learning.

Faculty Conerns Regarding Preparation and Teaching Online

A primary concern for faculty who teach online is adequate time to prepare and design online courses. Tabata and Johnsrud (2008) found that time and workload were among the chief concerns for faculty creating online courses. Similarly, Zhen and Garthwait (2008) discovered that time to prepare online courses was paramount in effectively designing and implementing online courses. A number of studies have confirmed that time spent on designing, developing, and implementing online courses is perceivably high among faculty, and thus, presents a barrier to effective professional development for online teaching (Cavanaugh, 2005; Hislop, 2001; Hislop & Ellis, 2004; Pachnowski & Jurczyck, 2003; Spector, 2005; Tomei, 2006; Van ve Vord & Pogue, 2012).

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Pachnowski and Jurczyck (2003) conducted a survey to determine how many hours faculty spend in developing online courses. Over half of their respondents noted that they spent 30 hours or more in developing online courses while spending less time preparing online courses they had taught previously (Pachnowski & Jurczyck, 2003). Cavanaugh (2005) discovered that faculty spent an average of 62 hours on the in-person courses and 155 hours on online courses for both designing and implementing courses. The primary reason for such disparity between the types of classes was personal communication with students. Cavanaugh (2005) concluded that online teaching was still more convenient and less burdensome for the professor, despite faculty perceptions. Similar to Pachnowski and Jurczyck (2003) and Cavanaugh (2005), Van ve Vord and Pogue (2012) contend that "technology has been advancing, along with increased mainstreaming of online education which brings with it more experience and better institutional support structures" (Discussion section, para. 1). The literature thus indicates that initial course development is a timeconsuming matter for faculty, but online course development becomes easier over time due to the ability of faculty to replicate courses and become able users of online course technology (Van ve Vord & Pogue, 2012). All courses take time to develop and despite the ease in replicability of course structures in online formats (Pachnowski & Jurczyck, 2003), the literature still indicates that perceptions of the time required for course development online to be negative (Spector, 2005; Tomei, 2006; Van ve Vord & Pogue, 2012).

Faculty Conerns with Technology

Educators often face challenges integrating technology into their teaching practices. Banas (2010) states that "deeper level learning and transformation

that occurs when technology is strategically integrated from a pedagogical standpoint is lacking" (p. 115). Chen (2003) studied how faculty integrate web-based pedagogies into regular teaching. Out of a sample of 79 faculty, 45 cited technological difficulties as hindering their efforts to integrate web-based teaching methods into their daily teaching practice. Chen (2003) cited the availability and compatibility of technical equipment and the lack of teacher support and technical assistance as the primary barriers faculty face when transitioning to teaching online. In a study conducted by Panda and Mishra (2007), faculty identified inadequate technical support and instructional designs as two primary weakness of institutional, professional development for online teaching. Meyer (2012) discovered that difficulties experienced with technology had a negative effect on faculty satisfaction with online teaching. Mishra and Koehler (2006), suggest that simply "introducing technology to the educational process is not enough, because educators must consider what they need to know in order to appropriately incorporate technology into their teaching" (p. 1018). Thus it is important for institutions to offer specific professional development for faculty in the area of educational technology.

While there are a number of barriers that inhibit faculty from fully engaging in online teaching, the barriers we have named and described are those that the literature has highlighted most frequently. Online education has acquired a stable foothold in higher education, though faculty professional development continues to lack conceptual clarity. Professionals assisting in the development of faculty training programs for online teaching are in need of a guiding model that accounts for the many challenges faculty face when developing and teaching online courses. In the next section, we will explore how the TPACK model can serve as a useful starting point for constructing a model for faculty development, a model for online teaching that accounts for the specific challenges and contextual factors pertinent to faculty when developing and teaching online courses.

Technological Pedagogical and Content Knowledge (TPACK)

In this section, we explore the Technology, Pedagogy, and Content Knowledge (TPACK) model in depth. We will first describe the foundations of the TPACK model and explore the various components of the model. Next, we will examine how practitioners apply the model in teaching and

learning settings. Finally, we address critiques of the TPACK model that will serve as the basis for our adaptation of the model based on the concerns and contexts of the faculty.

Description and Foundations of TPACK

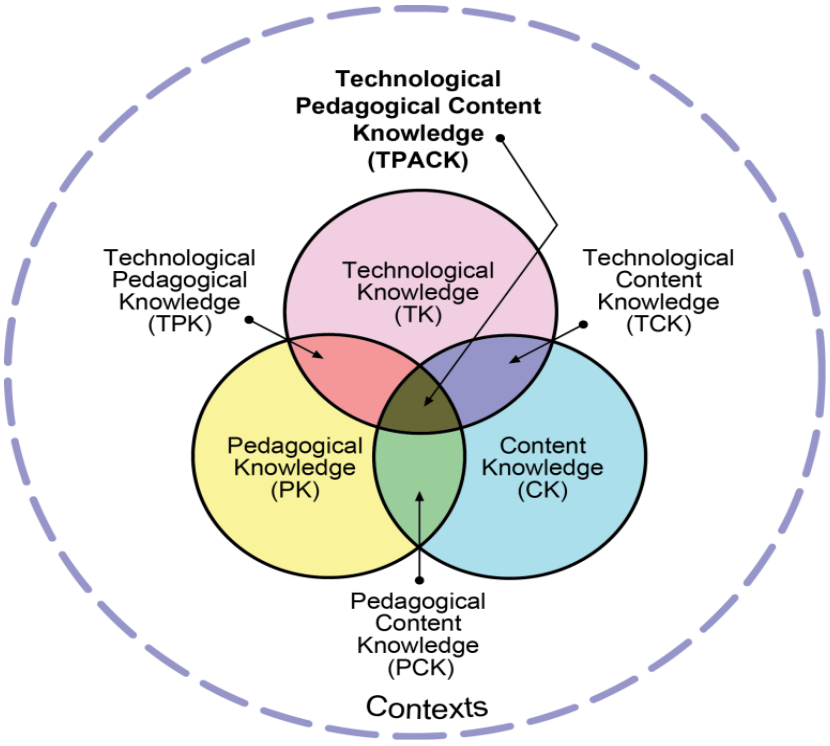
Koehler, Mishra, and Yahya (2005) note that "intelligent pedagogical uses of technology require the development of a complex, situated form of knowledge" (p. 741), which comes from a constantly evolving connection between content, pedagogy, and technology. TPACK is the interaction that results from the intersection of these three distinct kinds of knowledge. Skilled educators exhibit this combined knowledge when they navigate the unique spaces created by pedagogy, content, and technology every time they teach (Koehler & Mishra, 2009). For example, an educator might apply varied or specific pedagogy practices when teaching certain kinds of content to make that content more accessible to their learners. That same educator may represent their content using certain technologies without specifically considering pedagogy, or in contrast, they may align their use of technology specifically with their applied pedagogy regardless of the content (Angeli, Valanides, & Christodoulou, 2016). These examples and their intersections are represented by TPACK.

Mishra and Koehler (2006) developed the Technological Pedagogical Content Knowledge (TPACK) framework to help capture the role of technological knowledge in the pedagogical content knowledge relationship (Shulman, 1986). Mishra and Koehler (2006) addressed a lack of scholarly focus on the integration of technology into teaching and learning. Because technological advancements are rapid in today's age, the nature of integrating technology into teaching and learning, especially in the area of online teaching, is also constantly in flux. Thus, professional development in the area of online teaching and relevant technologies is necessary (Koehler, Mishra, & Cain, 2013).

As Figure 1 demonstrates, several factors interact in order to comprise the TPACK framework. *Technology Knowledge (TK)* is one's knowledge of technological tools that can enhance the learning process. *Pedagogical Knowledge (PK)* refers to the teacher's understanding of the pedagogical process, including aims, processes, values, planning, and development. *Content Knowledge (CK)* relates to the knowledge base that a class or discipline needs to cover. *Pedagogical Content Knowledge (PCK)* is the synthesis and interplay between content and pedagogy, which occurs as the teacher interprets the subject

matter, finds multiple ways to represent it, and tailors materials to students' prior knowledge. *Technological Content Knowledge (TCK)* is the interplay between technology and content development. For instance, as technology develops, new methods of inquiry emerge, thereby contributing to disciplinary knowledge and practice. *Technological Pedagogical Knowledge (TPK)* acknowledges how technology inevitably affects pedagogy and vice versa. At the center of the model is TPACK, which is the interaction of all these forms of knowledge. This integrative view of knowledge is essential to the educational process as it helps educators "optimally engage students of diverse needs and preferences in learning" (Angeli, Valanides, & Christodoulou, 2016, p. 16).

Figure 1
Technological, Pedagogical, and Content Knowledge (TPAC) framework.*



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At the apex of TPACK is integration, which strengthens the educational process. In the TPACK framework, the development of technological skills should not be in isolation but a strategic part of teaching design (Mishra & Koehler, 2006). Mishra and Koehler (2006) posit that the TPACK model essentially argues that "learning environments that allow students and teachers to explore technologies in relationship to subject matter in authentic contexts are often most useful" (p. 1045). Teague (2017) provides a pertinent example of how TPACK functions in practice. She writes:

> [O]nline teachers must know the pedagogy (technology/pedagogy knowledge) of combining shorten subject matter content bursts and abbreviated hyperlinks (technology/content) for the best rendering on a mobile device screen. S/he must know how to craft a concise and engaging discussion prompt or reply to a learners' discussion forum post (pedagogy/technology/content) and when to comment to add depth to an online class discussion board or real-time synchronous discussion (technology/pedagogy/content). (p. 27)

Teague (2017) further argues that TPACK is a "necessary framework to measure online teaching and learning because it captures what teachers currently do to increase student engagement" (p. 27). While some have suggested that TPACK does not account for every aspect of the instructional design process (Koh, Chai, & Tsai, 2014), others have suggested that TPACK's strength is its ability to account for the interaction of types of knowledge (technological, pedagogical, and content knowledge) in the instructional design process (Watson & Murin, 2014; Watson, Murin, Vashaw, Gemin, & Rapp, 2013).

The employment of TPACK has varied but is particularly prominent in the literature of K-12 pre-service and in-service teacher development (Baran & Uygun, 2016; Jen, Yeh, Hsu, Wu, & Chen, 2016; Koh, Chai, & Tsai, 2014; Kramarski & Michalsky, 2010; Moore-Adams, Jones, & Cohen, 2016). While more common in teacher education programs, TPACK has also been applied to the design of professional development initiatives for non-teacher education faculty members (Herring, Meacham, & Mourlam, 2016). In higher education settings, some scholars have argued for the use of TPACK as learner-centered pedagogy (Alsofyani, bin Aris, & Enyon, 2013; Arinto, 2013; Kahveci, Gilmer, & Sutherland, 2008; Kushner Benson, & Ward, 2013; Meyer & Murrell, 2014), an evaluative tool for assessing faculty integration of tech-

nology (Shih & Chuan, 2013), and as a framework for the developing of faculty competency in educational technology (Arinto, 2013; Meyer & Murrell, 2014). However, scholarly work on TPACK development in non-teacher education programs of higher education is scarce (Herring, Meacham, & Mourlam, 2016).

Critiques of TPACK Based on Faculty Concerns and Contexts

While Mishra and Koehler (2007) cite TPACK's framework for highlighting and tackling the complex necessity of meeting student needs while integrating technology, the framework contains a number of limitations that prohibit its use in faculty development settings. First, while the core of TPACK is *technological knowledge* (TK), many faculty question the legitimacy of technological integration in educational contexts, as several scholars have suggested (Allen & Seaman, 2013; Cherry & Wiles, 2010; Halvorson, Crittenden, & Pitt, 2011).

TPACK also assumes that teachers are seeking technological integration, which in some cases may be true (Kramarski & Michalsky, 2010; Moore-Adams, Jones, & Cohen, 2016), but not necessarily true for the majority of faculty members. However, since many institutions highly encourage their faculty to teach online courses (Shea, 2007), faculty members must accept this shift in the educational landscape. While some have lauded TPACK as potential model for faculty professional development (Alsofyani, bin Aris, & Enyon, 2013; Arinto, 2013; Benton-Borghi, 2013; Meyer & Murrell, 2014), the current model is not sufficient for addressing the technological needs and concerns of faculty.

Second, while some studies have demonstrated that the time it takes faculty to design and implement online courses has decreased over time, the perception exists that preparing and teaching online courses requires more time than faculty can give (Spector, 2005; Tomei, 2006; Van ve Vord & Pogue, 2012). The TPACK framework does not account for this concern, though some studies involving TPACK have implied the need to address this perception (Archambault, Wetzel, Foulger, & Williams, 2009). Contrary to these scholars, Koehler, Mishra, Hershet, & Peruski (2004) suggest that the process of working with faculty to design online courses is "spontaneous, unpredictable, messy, creative . . . hard to define" and "does not offer easy solutions" (p. 32). To overcome the perception that online course preparation and teaching take more time than face-to-face instruction, faculty professional development for online teaching must demonstrate that online course preparation

can be done in a time-efficient manner (Downing, 2013; Mitchell, 2012; Van ve Vord & Pogue, 2012). While TPACK acknowledges the importance of integrating technology in education settings, the model does not address the need to ensure that faculty have the resources, skills, knowledge at their disposal in order to ensure efficient and effective online course development and implementation.

Third, and related to the second concern, the *technological knowledge* (TK) component of TPACK is vague, does not necessarily account for the "protean, unstable, and opaque" nature of new educational technologies (Koehler, Mishra, & Cain, 2013, p. 14), and fails to acknowledge institutional responsibility for faculty professional development (Chen, 2003; Panda & Mishra, 2006). In addition, while TPACK emphasizes the need to integrate technology into teaching practice, the model fails to account for how institutions may lack the professional resources that enable faculty to adapt to developments in education technology. Moreover, while full-time, tenure-track faculty will have access to professional development resources, contingent faculty, depending on the sector, may not have such access (Shea, 2007).

These limitations of TPACK lead us to consider the importance that context plays in the development of TPACK-based professional development activities. A primary criticism of TPACK is its underdeveloped notion of context (Mishra & Koehler, 2006). Mishra and Koehler (2006) acknowledge the role that context plays in TPACK, while discussing how its lack of specificity requires refinement:

> Context-neutral approaches to technology integration encourage generic solutions to the problem of teaching. However, technology use in the classroom is context bound and is, or at least needs to be, dependent on subject matter, grade level, student background, and the kinds of computers and software programs available. Our argument is not that such generic uses are never useful. However, despite valuable generic uses of technology (such as grade books), such approaches do not avail the full potential of technology for teaching specific subject matter. Finally, such generic solutions do not value the individual teacher—their experience, teaching style, and philosophy—by assuming that all teachers teach the same way and hence would use technology the same way. (Mishra & Koehler, 2006, p. 1032)

The need for effective professional development to address faculty concerns is eminent. Because TPACK is a contextually bound foundation, these concerns can be recognized *and* addressed through a more intentional adaptation of context. We posit that TPACK cannot be effectively applied to faculty development for online teaching without an explicit discussion dedicated to the specific contextual factors that encompass both the expressed faculty concerns in addition to the main components of context outlined by Mishra and Koehler (2006).

TPACK-ConK: A Model for Faculty Development for Online Teaching

We contend that a revised version of the TPACK model can account for faculty concerns and provide effective experiences for faculty development for online teaching by emphasizing the various components of context embedded in higher education. For online learners to have engaging and effective experiences, online teachers must provide high-quality online courses. We assert a fourth level of knowledge—*Context Knowledge*—should be developed to achieve TPACK. Three contextual themes—resources (*R*), legitimacy (*L*), and positionality (*P*)—provide a foundation for institutional leaders and professional development planners to recognize and address the aforementioned faculty concerns.

The adaptation of TPACK to include Context Knowledge (ConK) will help faculty across disciplines by acknowledging teachers' unique perspectives while building their digital wisdom and appreciation of virtual spaces, thereby creating positive online experiences both for faculty and for students. By categorizing contextual factors into three themes that impact faculty's engagement in online teaching, we adapt TPACK for specific application in the design and implementation of faculty professional development for online teaching while maintaining the ability to be applied across higher education sectors and disciplines.

Within the overarching contextual themes of resources (*R*), legitimacy (*L*), and positionality (*P*) are nine factors whose interconnectivity create ConK. We derived these nine factors from our review of the literature on faculty teaching in online education. We included these specific contextual factors because they consistently emerged from our review of the literature and represented a significant modification to the existent TPACK framework. *Preparation and design (R)* encompass the time it takes to develop an online course (Cavanaugh, 2005; Van ve Vord & Pogue, 2012). *Teaching and engagement (R)*

represent the time it takes to teach an online course and engage with students (Cavanaugh, 2005; Van ve Vord and Pogue, 2012). An additional resource factor is *availability and access to technology (R)* which is a number of technological resources available to faculty to employ, in addition to ease of accessibility (Meyer, 2012; Paloff & Pratt, 2011).

The extent to which an institution supports faculty development for online teaching in the form of finances and professional resources and training falls under the contextual knowledge category of institutional supports. *Institutional supports (R/L)* also account for an institution's position of online learning as a legitimate endeavor (Cherry & Wiles, 2010; Halvorson, Crittenden, & Pitt, 2011; Rovai, 2000). Also impacted by the *sector is legitimacy (L)*—the extent to which a sector (e.g. institutional type) supports online teaching as legitimate or illegitimate (Allen & Seaman, 2013; Halvorson, Crittenden, & Pitt, 2011), *discipline (L)*—the extent to which a discipline supports or encourages online teaching (Allen & Seaman, 2013; Halvorson, Crittenden, & Pitt, 2011), and *role (L)*—how a faculty member's employment status (i.e. full-time, part-time, tenure-track, contingent, etc.) affects their ability to engage in online learning activities (Allen & Seaman, 2013; Halvorson, Crittenden, & Pitt, 2011) in which a faculty member is situated. Finally, *epistemology* and *ontology (P)* recognize how a faculty member believes one obtains knowledge and what a faculty member considers "legitimate" knowledge (Allen & Seaman, 2013; Halvorson, Crittenden, & Pitt, 2011). Figure 2 shows a series of nine interconnected factors that influence ConK for faculty engaging in online teaching.

Reflecting on and building understanding of each of the factors and how they contribute to or impact the web of ConK can help faculty have more authentic and engaging experiences in professional development programming. The inclusion and development of ConK in the TPACK framework helps us achieve two things. First, acknowledging ConK and developing the web of interrelated factors that influence it to help us make a more intentional transition to the use of TPACK for faculty development in higher education. Koh and Chai (2016) note the importance of recognizing TPACK's contextually situated nature:

> Physical, cultural-institutional, interpersonal, and intrapersonal factors that occur within school contexts all influence TPACK. Teachers' focus on cultural/institutional considerations such as classroom logistics and processes can negatively affect their consideration of TPACK whereas teachers' beliefs, pedagogical considerations, and

> the quality of design facilitation positively influence teachers' consideration of TPACK. (pp. 246-47)

By building in an acknowledgment of the specific factors relevant to higher education that lie within those stated by Koh and Chai (2016), we can recognize faculty barriers to effective online teaching and be more intentional about the development of professional development experiences that address or connect with some of those factors/barriers. Figure 3 shows the foundational nature of ConK and its influence over the development of TPACK for higher education faculty engaging in online teaching.

Figure 2
Context Knowledge (ConK)

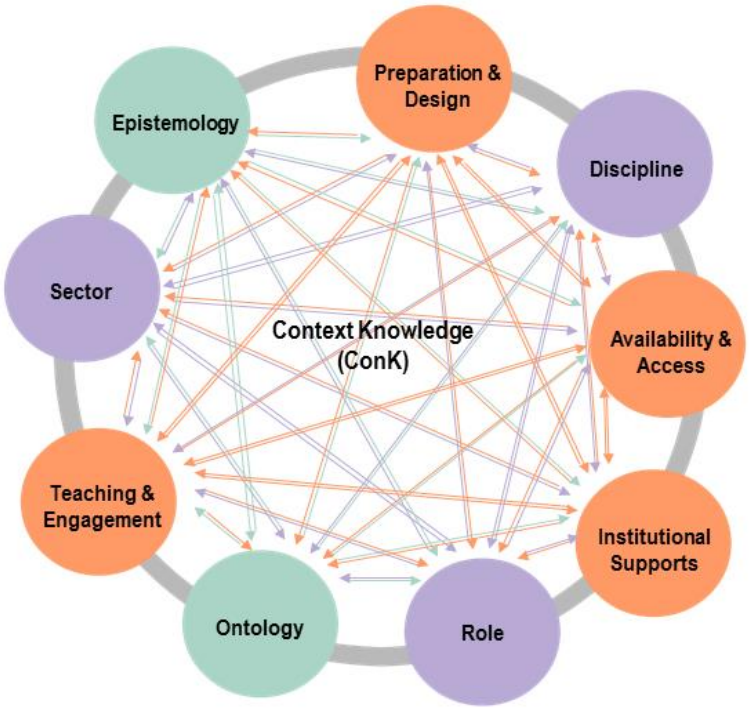
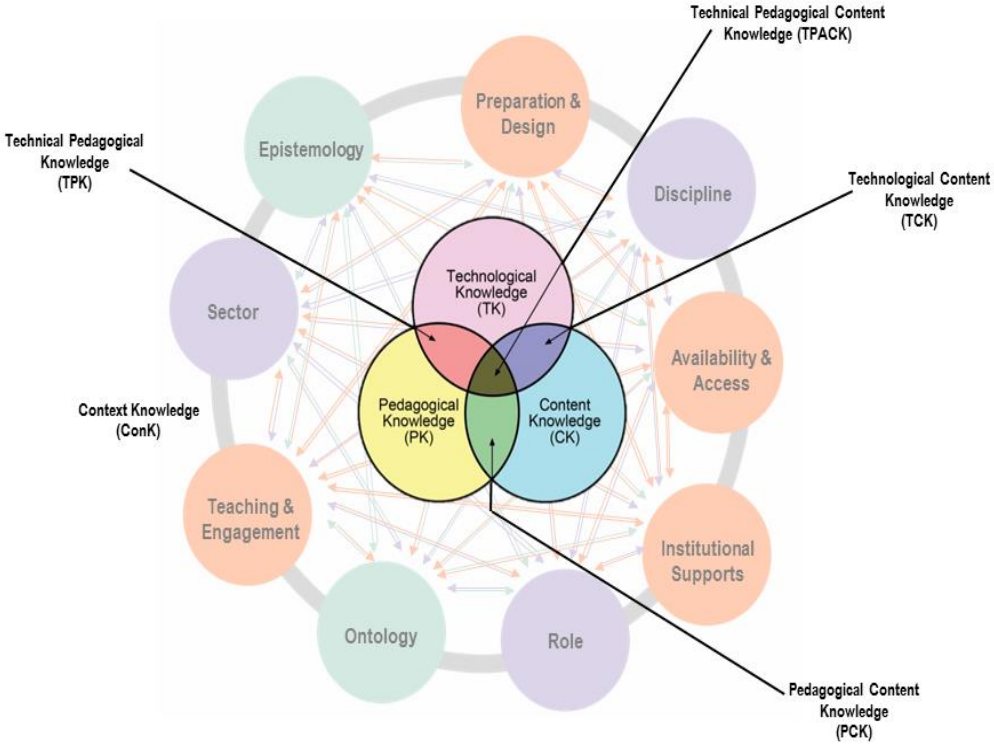


Figure 3
TPACK-ConK Framework



Second, building ConK into the TPACK model helps faculty members engage in critical reflection and self-assessment about not only their current level of TPACK, but also about their unique positionality, thoughts on legitimacy, and available resources. Intentional self-assessment can be a source of data that faculty can use for "evidence-based decision making about online teaching practices and for basing self-efficacy judgments of teaching competence" (Kennedy, 2015, p. 148). Kennedy (2015) found that TPACK and the breakdown of knowledge domains already add value to the reflection process, especially as each domain is dynamic in context. She touts that TPACK must be modified when applied to teaching in online environments

and calls for an adapted instrument for higher education that includes facilitation, learner, and context knowledge. Our inclusion of ConK to the TPACK framework is a starting point for adoption into higher education use and explicit acknowledgment of the factors that impact knowledge of self and context, which in turn influence the development of TPACK in faculty for online teaching.

Herring, Meacham, and Mourlam (2016) write that "faculty must have opportunities to learn about the TPACK framework for them to reflect upon and think through their content knowledge and teaching practices using the lens of technology to identify what TPACK can mean in their discipline" (p. 212). Faculty professional development activities including, but not limited to, workshops, mentorships, co-teaching, professional learning communities, book clubs, lesson study, action research, and curriculum development initiatives must be designed in a manner that gives faculty the opportunity to "enhance their own instruction through purposeful integration of each TPACK domain in their own instruction" (Herring, Meacham, & Mourlam, 2016, p. 212). Other research supports the idea that learning environments are not stagnant, but rather are multifaceted and continually evolving. To prepare educators for changing learning environments, professional development programs and spaces must provide opportunities for faculty to plan, apply, and reflect on individualized experiences related to integrating technology in authentic contexts (Tondeur, van Braak, Sang, Voogt, Fisser, & Ottenbreit-Leftwhich, 2012).

Conclusion

In this paper, we have examined the concerns that faculty have regarding online teaching and learning and developed a new model based on TPACK which incorporates these concerns into the contextual dimension of the TPACK model. As several scholars have articulated (Cherry & Wiles, 2010; Downing, 2013; Eib & Miller, 2006; Halvorson, Crittenden, & Pitt, 2011; McDaniel & Kules, 2011; Mitchell, 2012; Paulus et al., 2010; Rovai, 2000), strong professional development can help faculty overcome their concerns regarding online teaching and succeed as online teachers. Moreover, since TPACK derives from the K-12 settings, our model provides an inlet for direct application in higher education. Centers of Teaching and Learning in higher education can use and/or adapt this model for programming, strategy, and best practices in faculty development for online teaching. Further research is

needed to explore how this model (and other conceptual models) functions empirically.

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