THE INFLUENCE OF FACULTY BELIEFS ON ONLINE TEACHING

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ABSTRACT

The purpose of this mixed-method, explanatory sequential multiple case study was to understand how the beliefs of college of education faculty members about students and colleagues influenced their online teaching. The study focused specifically on beliefs regarding student preparedness and the theory of digital natives. It also considered faculty beliefs about colleague actions and institutional expectations of online teaching. The study used the Technological Pedagogical Content Knowledge (TPACK) framework as a lens for looking at online teaching. Methods of data collection included a survey completed by 65 participants. The survey was then followed by interviews with six individual faculty members. Results indicate that participants’ beliefs about students and colleagues did in fact influence their online teaching in a variety of ways and with differing teaching outcomes. In addition, the author suggests that digital veterans and digital novices, rather than digital natives and immigrants may more accurately reflect differences in technology skills due to their focus on experience rather than age. The results of this study have implications for those who teach online as well as those who support them.
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CHAPTER 1. INTRODUCTION

Teaching is a complicated endeavor. Teachers need to have deep understandings of the content of their field, knowledge of general teaching techniques as well as knowledge of how to best teach the content of their field (Shulman, 1986). With the rapid growth of online education in higher education, faculty are now forced to acquire yet another form of knowledge, how to effectively teach their content using the various technologies of distance education (Mishra & Koehler, 2006). An instructor’s abilities to teach online are critical to the quality of online education (K. Kim & Bonk, 2006) and significant amounts of time on the part of faculty and support staff are spent redesigning courses for online delivery. However, online students report that quality of instruction is a top concern regarding online course delivery (Noel-Levitz, 2013) and there is still significant pessimism among faculty regarding online learning (Allen & Seaman, 2012a). A better understanding of the factors that influence online teaching could assist in the adoption and improvement of distance education.

A considerable amount of literature has been published on the factors influencing technology adoption and use by K12 teachers and university faculty. In addition, a number of studies have found K12 teacher beliefs to have significant influence on their face-to-face teaching (Clandinin & Connelly, 1987; Nespor, 1987). However, little is known about the influence of faculty beliefs on their face-to-face teaching (Kane, Sandretto, & Heath, 2002), and even less on their online teaching. Therefore, Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, and Sendurur (2012) recommend researchers examine the influence of K12 teachers’ beliefs on technology adoption and use. The purpose of this study was to explore the influence of faculty beliefs on their online teaching.
Statement of the Problem

“The job of a good scholar and teacher is to continuously learn; and that is a tall, continuing order” (Schuster & Finkelstein, 2006, p.17). Nowhere is this truer than in the shift to distance education. The new modalities of distance education prevent faculty from teaching in their familiar ways and force them to rethink their teaching practices, as what worked in the traditional classroom often does not work in the online one (Diekelmann, Schuster, & Nosek, 1998). The rise of distance education has forced online faculty back into the role of a learner to develop new ideas about teaching and learning (Tallent-Runnels et al., 2006).

According to social learning theory (Bandura, 1976), learning is a cognitive process that takes place in a social context. Learning can happen as a result of one’s direct experience or through the observation of others. Learning influences one’s beliefs, which in turn influence behavior. In addition, it has been well established that social factors play critical roles in technology adoption and use (Rogers, 2003; Venkatesh, Morris, Davis, & Davis, 2003). In the university context, a faculty member’s colleagues and students are two social groups that have potential to influence faculty beliefs and behavior, in this case online teaching.

Furthermore, previous research has established that beliefs play a critical role in successful technology adoption and use in teaching (Churchill, 2006; Ertmer et al., 2012; Hermans, Tondeur, van Braak, & Valcke, 2008; Norton, Richardson, Hartley, Newstead, & Mayes, 2005) and that faculty views of teaching and learning are reflected in the ways they use technology in their courses (Ferguson, 2004). Additionally, because few faculty outside of teacher preparation are specifically trained to teach, and even fewer are taught to teach online, it may be more effective to evaluate faculty beliefs about teaching to find out what faculty knowledge of teaching actually is (Hativa & Goodyear, 2001).
Therefore, the purpose of this mixed-method, explanatory sequential case study was to understand how faculty beliefs about students and colleagues influence their online teaching.

**Research Questions**

The research questions guiding this study were:

1. How do faculty members’ beliefs about students influence their online teaching?
2. How do faculty members’ beliefs about their colleagues influence their online teaching?

**Significance of the Study**

The vast number of online resources available to students and instructors is drastically changing traditional education paradigms, positioning online learning to be one of the most influential change agents in higher education over the next five years (Johnson et al., 2013). This change is already being felt as online course enrollments in higher education are growing at a greater rate than in traditional courses (Parker, Lenhart, & Moore, 2011). Despite its recent growth, online delivery is still relatively new, and online courses vary greatly in quality. However because of its growth, more needs to be known about the factors that influence online teaching in order to offer the most effective teaching of online courses. A better understanding of the factors that influence online teaching could assist those who teach online and those who support online faculty, thereby leading to improvements in quality and experience for both instructors and students. This study aims to provide research in an area that is currently lacking, that of the influence of faculty beliefs on online teaching.
Conceptual Framework

This study investigated the influences of students and colleagues on online teaching. One of the key ways online teaching differs from traditional, face-to-face teaching is its dependence on technology as a medium through which communication flows. The Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006) provides a lens for looking at teaching infused with technology. The framework contains three core areas of teacher knowledge: technology knowledge, content knowledge, and pedagogical knowledge. The framework recognizes that these areas overlap and are fundamentally interconnected in effective teaching with technology. The strength of this model for this study is that it provided an organized framework for identifying the various and often complicated elements of teaching with technology, in this case teaching online.

One of the criticisms of the TPACK framework is that it does not take into account variables that have been shown to impact teachers’ integration and use of technology (Chen, Looi, & Chen, 2009; Voogt, Fisser, Pareja, Tondeur, & Van Braak, 2013) specifically teacher beliefs (Angeli & Valanides, 2009; Friedrichsen, Driel, & Abell, 2011; Niess, 2005). This study looked at the influence of teacher beliefs on online teaching and used the TPACK framework as a lens to interpret the data about online teaching.

Summary of Methodology

This was a mixed-method, explanatory sequential multiple case study investigating how faculty beliefs about students and colleagues influence their online teaching. An explanatory sequential research design is one that starts with a quantitative phase and follows up on specific results with a qualitative phase to explain initial results more deeply (Creswell & Plano Clark, 2011). In this study, a survey was initially made available to all faculty in the college to gather
general information about faculty technological tool choices, and beliefs about online teaching, students and support. Sixty five participants completed the survey. Reviewing the survey responses generated new and more specific research questions. Those questions were then investigated with six individual faculty through semi-structured interviews that included a card sort activity and descriptions of course-related documents. In Patton’s description of this methodology, “the quantitative data identify areas of focus; the qualitative data give substance to those areas of focus” (2001, p. 193). The substance in this case was provided through two approaches. The first approach was using mixed methods in both the sequential design (survey and interviews) and within the qualitative phase (interview and card sort). Using case study was the second approach to provide deeper insights. By focusing on a small number of faculty, this study’s aim was to “gain an experiential understanding of the case” (Stake, 1995, p. 41), specifically how faculty’s beliefs influence their online teaching. The data collected through the survey and the interviews were analyzed and written up as a multiple, cross-case analysis.

Participants in this study were faculty in a college of education. The 65 survey respondents came from the pool of 225 faculty in the college, while the interview participants were purposely sampled from this group to represent a number of departments and level of online teaching experience. However, the selection of the six faculty was not to reflect the demographic composition of the college faculty group, but was purposive to provide insight into the theory underlying the study.

**Role of the Researcher**

As the researcher, I am also the instructional designer for the study institution’s College of Education (COE). As such I am responsible for organizing professional development activities for COE faculty and I manage a small staff dedicated to supporting faculty with
technology integration and online teaching. I have been in the position for six years and have recently noticed a shift in what faculty request in terms of support. While those who use technology will always need support in the specifics of using individual tools, faculty have increasingly expressed the need for more assistance with the pedagogy of online teaching. These requests prompted my subsequent thinking of the broader context in which faculty are teaching online and the complexity of it as an endeavor. This study was an attempt to more deeply understand a set of particular faculty, not to “map and conquer [them] but to sophisticate the beholding of [them]” (Stake, 1995, p. 43). Since faculty support efforts need to take beliefs into account if they are to have lasting benefits for student learning (Samuelowicz & Bain, 2001), my hope was that this study would add to this more sophisticated view, both for myself and for others interested in online teaching. Insights into the complexity of online teaching can lead to more nuanced support of online faculty and ultimately better online experiences for faculty and students. That said, “it is the reader, not the researcher who determines what can apply to his or her context” (Merriam, 2009, p. 51).

Within this study there was a potential for bias in that I am also a faculty member in the college and therefore work with the study’s participants. As described by Onwuegbuzie and Leech (2007), researcher bias occurs when the researcher has personal biases or a priori assumptions that he/she is unable to bracket. While bias often comes into play in the data collection phase, it can affect a study at any stage.

Miles and Huberman (1994) identify two sources of researcher bias and ways to minimize them; the effects of the researcher on the participants, and the effects of the participants on the researcher. I attempted to mitigate the effects of the researcher on participants by making my research intentions clear throughout the process, making the survey
anonymous, and having the interviews conducted by others. To minimize the effects of the participants on the researcher, I maintained a conceptual framework, triangulated the study’s data, and kept my research questions firmly in mind throughout the process. In addition, I used Patton’s (2001) reflexive questions throughout the study in order to keep in mind a) the participants’ worldview and how they perceived me as a researcher, b) my own perspective and how it influenced my voice and interpretations, and c) the audience’s interpretation of my results and how I perceive them.

That said, I also believe that my role in the college may have served as a strength in this study. Being an insider, or a researcher that is a member of the group studied is often criticized for having potential to cloud a researcher’s judgment due to the inability to tease the researcher’s experience from that of the participants. On the other hand, outside researchers may be distrusted, resulting in participants unwillingness to share. I believe as a faculty member who provides support to other faculty that I inhabit what Dwyer and Buckle (2009) term “the space between” insider and outsider researcher. I believe that I am perceived as a known insider, trusted by the faculty. My hope is that this trust led faculty to speak freely knowing that my findings could lead to more effective support of them. In contrast, I believe I was also perceived as something of an outsider as I am not a member of any of the participants’ departments, and teaching is not one of my main duties.

**Definition of Key Terms**

This study will consistently use a number of terms. These terms will have the following definitions.

**Online.** Online courses are those in which at least 80 percent of the course content is delivered online (Allen & Seaman, 2013).
Belief. The personal convictions or ideas one holds (Haney, Lumpe, Czerniak, & Egan, 2002).

Technology integration. In its most simplistic terms, the US Department of Education (2002) defines technology integration as the proficient use of technology in the teaching/learning environment. However, they go on to more broadly describe it as a “process by which people and their institutional setting adapt to the technology that matters most. The process of technology integration is one of continuous change, learning, and (hopefully) improvement” (p. 75). For the purposes of this study, the term technology integration covers the use of technology in traditional face-to-face classrooms, and extends the definition into the online classroom. Online teaching requires both the use of technology tools as well as a process of adaption to those tools for teaching.

Summary

Online delivery is poised to dramatically change how courses are taught in higher education. Most faculty are not specifically taught how to teach online (Gabriel & Kaufield, 2008) and there is a lack of research into factors that influence online teaching. A deeper understanding of these factors could lead to improvements in delivery and support of online courses. This explanatory sequential, mixed method multiple case study examined how faculty beliefs about student and colleagues influence the online teaching of faculty in a college of education.

Chapter 2 will review the research literature on influences on traditional teaching, teacher beliefs and technology adoption and use. Chapter 3 will describe the methods for collecting and analyzing the data collected through the study. Chapter 4 will describe each of the six individual faculty participants of the study and relevant results from each. Chapter 5 will present the
findings from the analysis conducted across the six cases. Chapter 6 describes the data analysis as it specifically related to the TPACK framework. Finally, Chapter 7 discusses the conclusions of the study, how they relate to the research questions and current literature, and suggests directions for future research. Letters from the Institutional Review Board (IRB) granting approval for each of the study’s three data collection and analysis phases (survey, interviews and cross-case analysis) are located in Appendix A. All questions asked on the initial survey can be found in Appendix B. Appendix C contains the interview guide and Appendix D contains the items from the card sort activity that was conducted as part of the interviews. Appendix E contains the research protocol document used to guide the data collection procedures and finally, Appendix F displays the ranked card sort results from each of the six participants.
CHAPTER 2. REVIEW OF LITERATURE

This study explores how faculty beliefs about students and colleagues influence online teaching. As suggested in Chapter 1, there is a lack of research in the area of the influence of faculty beliefs on online teaching. A more thorough understanding of this area has the potential to improve support of online faculty and thereby the experience of online faculty and students. In order to situate this study in the context of existing educational research, this chapter will briefly discuss the role of technology in higher education. It will then review existing research on the influences of discipline and colleagues on teaching practices, factors influencing technology adoption and use, and the influence of beliefs on teaching. This study will use the technological pedagogical content knowledge (TPACK) framework for examining effective teaching with technology. TPACK suggests that effective teaching with technology requires not only technology expertise, but also knowledge of how to pedagogically incorporate technology to enhance student learning in particular subject areas. This chapter will provide a review of the TPACK framework and research conducted using the framework.

Technology and Online Delivery in Higher Education

One of the major roles of a university is to prepare students to become an educated citizen and skilled part of the workforce (Newman, Couturier, & Scurry, 2010). With technology rapidly changing the United States from an industrialized to a knowledge-based economy, higher education has experienced growing pressure to prepare students for the technology-rich world of the 21st century (Kukulska-Hulme, 2012). The rationale for using technology in higher education is multifold and includes: enhancing the quality of teaching and learning,
accommodating the learning styles of today’s students, increasing access to learning opportunities and flexibility for students, developing the skills and competencies needed in the 21st century, and improving the cost effectiveness of the system (Bates & Sangra, 2011). In particular, the vast number of resources available to students via the Internet is changing traditional education paradigms, positioning online learning to be one of the most influential change agents in higher education over the next five years (Johnson et al., 2013).

Currently, most institutions of higher education in the United States see online education as a critical component of their long-term strategy (Allen & Seaman, 2013). In 2011, 89% of four-year, public institutions offered online courses, and enrollment over the past 10 years has grown at a greater rate than in traditional courses (Parker et al., 2011). More recently, the proportion of all college students taking at least one online course was at an all-time high of 32% (Allen & Seaman, 2013). Despite initial reservations about the quality of online education, evidence from the US Department of Education suggests that online students perform “moderately better than those receiving face-to-face instruction” (Means, Toyama, Murphy, Bakia, & Jones, 2010, p. ix) and over three-quarters of university leaders believe online delivery is “just as good as” or better than face-to-face (Allen & Seaman, 2013). In addition, university students report that they prefer learning environments that include online delivery, claiming they better support their learning styles (Dahlstrom, 2012).

**Influences on Teaching Practices**

Two of the most important elements of teacher knowledge are knowing the concepts of one’s content area and knowing how to teach (Shulman, 1986). However, teaching happens in a context and contextual factors also influence teaching. In higher education, contextual influences on faculty include discipline, institution and colleagues. In their classic book
Academic Tribes and Territories, Becher and Trowler (2001) describe these as the territory (the discipline) and the tribe (the social context of faculty).

**Discipline and Institutional Context**

In higher education “teaching does not happen in a vacuum; it takes place in the context of, among other things, a discipline and a departmental (or other organizational entity) culture” (Roxå & Mårtensson, 2009, p. 548). Differences in teaching approaches in higher education have been found based on different disciplines (Becher & Trowler, 2001; Lindblom-Ylänne, Trigwell, Nevgi, & Ashwin, 2006; Neumann, 2001; Smeby, 1996; P. Trowler & Cooper, 2002). Trowler (2009) stresses that faculty are influenced by disciplinary traditions and other cultural structures constructed over time, termed “teaching and learning regimes” (p. 182). These regimes are made up of a constellation of rules, assumptions, practices and relationships related to teaching and learning issues in higher education” (P. Trowler & Cooper, 2002, p. 221).

Northedge and McArthur (2009) contend that the role of the teaching faculty member is as a required representative expert that mediates the discipline-centric “academic discourse” (teaching and learning process), keeping it from reverting to everyday discourse. A large part of what students learn from faculty are the “ways of thinking and practicing” particular to their discipline, and the teaching of these ways of thinking and practicing greatly influence how faculty teach (Hounsell & Anderson, 2009). When faculty are socialized into a department they are also socialized into distinctive approaches to teaching and learning (Neumann, 2001) as well as curricular planning activities (Smeby, 1996).

Institutional influences may be so strong that actions taken in teaching may actually be a compromise between what one believes and the place in which one teaches. Faculty at different institutions may have similar beliefs about teaching, but have been found to teach differently due
to the institutional context (Norton et al., 2005) In addition, the same faculty member in different contexts may adopt different approaches to teaching in those different contexts (Lindblom-Ylänne et al., 2006).

**Colleagues**

Within the context of higher education, collegial relationships are highly influential. Not surprisingly, within academic departments, individual faculty members strongly affect the department climate (Moran & Volkwein, 1988) and the relationships among faculty influence job satisfaction (Callister, 2006; Ponjuan, Conley, & Trower, 2011). Wright (2005) emphasizes that the informal practices and interactions within a department are as important in shaping a faculty member’s perceptions of their department as formal policies and procedures. He goes on to note that faculty who perceive themselves to be “at odds” with their department’s perceived organizational culture show higher levels of job-related stress, report less satisfaction in their positions, and spend less time on teaching.

As Puzziferro and Shelton (2009) assert, “creating contact in the form of a community of practice around academic resources, institutional accountability, teaching strategy and culture, and the academic discipline are critical to faculty success” (p. 5). Collegial relationships among faculty have such profound impact on faculty success that some researchers insist “the evidence is so compelling that if one were allowed only one line of inquiry to predict a faculty member’s success in the field it might well be “tell me about your colleagues” (Hitchcock, Bland, Hekelman, & Blumenthal, 1995, p. 1108).

In their study examining faculty interaction and its influence on teaching, Roxå & Mårtensson (2009) found that faculty members have serious and reflective conversations with trusted colleagues that can profoundly impact a faculty member’s teaching practice. The
common elements of these conversations are that they are private, tend to only happen with a small number of colleagues within one’s discipline or academic department, and include discussion of “important disciplinary content, and challenges about how to support students’ understanding” (2009, p. 553).

**Faculty and Technology Adoption and Use**

The introduction of technology into academia has redefined the role and work of the faculty member (Schuster & Finkelstein, 2006). Yet adopting and using technology in teaching is difficult, and university faculty have been among the last educators to experience the changes brought on by technology integration in education (Nicolle & Lou, 2008). This leads to the question “why are faculty not adopting technology?” Ertmer (1999) has categorized two sets of barriers impeding teachers’ technology integration efforts: external (first-order) barriers and internal (second-order) barriers.

External barriers are especially critical and when present make it nearly impossible to integrate technology. External barriers as identified by Ertmer and corroborated by additional studies include technology access (Oncu, Delialioglu, & Brown, 2008), reliability (Osika, Johnson, & Butea, 2009), quality training (Donovan & Green, 2010; Georgina & Olson, 2008), local support (Orr, Williams, & Pennington, 2009; Tabata & Johnsrud, 2008) and keeping up with rapid changes (Johnson, Becker, Estrada, & Freeman, 2014). Additional external barriers specific to teaching online include lack of time (Lesht & Windes, 2011; Panda & Mishra, 2007) and concerns over workload (Orr et al., 2009). External barriers at the institutional level include lack of clear institutional goals (Simpson, 2010), lack of departmental priority on integration (Georgina & Olson, 2008), and lack of respect for online teaching in tenure and promotion decisions (Allen & Seaman, 2012b).
In her examination of barriers to technology adoption and use, Ertmer (1999) documented that even if the first-order (external) barriers are resolved, “teachers do not automatically use technology to achieve advocated meaningful outcomes” (p. 51). It therefore becomes imperative to look at the second-order (internal barriers) impeding technology integration, as these have been shown to be even more difficult to overcome (Ertmer et al., 2012). Internal barriers relate to a teacher’s thinking about teaching and learning. Internal barriers commonly shown to be influential on teacher technology adoption and use are self-efficacy and attitudes (Van Acker, Buuren, Kreijns, & Vermeulen, 2013; Larbi-Apau & Moseley, 2012).

However, a criticism of many studies examining barriers and motivations for technology integration is that they only consider technology-related variables, such as attitudes toward computers, technology experiences, or specific skills (Hermans et al., 2008). Recommendations have been made for further research to look at a broader variety of factors influencing the adoption and use of technology (Lim, 2002; Tearle, 2003) including teacher beliefs (Ertmer et al., 2012).

**Teacher Beliefs**

Belief is a “messy” construct (Pajares, 1992) and is difficult to untangle from knowledge and attitudes. Beliefs have been described as the personal convictions or ideas one holds (Haney et al., 2002). Clusters of beliefs form attitudes or action agendas (Ajzen, 1985; Pajares, 1992) and therefore strongly influence behavior (Nespor, 1987; Pajares, 1992). As stated by Bandura “people regulate their level and distribution of effort in accordance with the effects they expect their actions to have. As a result, their behavior is better predicted from their beliefs than from the actual consequences of their actions” (1986, p. 129). With regard to the impact of beliefs on teaching, Nespor (1987) observes that:
in spite of arguments that people's "beliefs" are important influences on the ways they conceptualize tasks and learn from experience…little attention has been accorded to the structure and functions of teachers' beliefs about their roles, their students, the subject matter areas they teach, and the schools they work in. (p. 317)

In the years since his statement additional studies have examined the influence of teacher beliefs. Yet the varying definitions of the term “belief” often make it difficult to investigate this area of teacher cognition research (Kane et al., 2002). Pajares (1992) addressed this difficulty in his review on teacher beliefs,

They travel in disguise and often under alias—attitudes, values, judgments, axioms, opinions, ideology, perceptions, conceptions, conceptual systems, preconceptions, dispositions, implicit theories, explicit theories, personal theories, internal mental processes, action strategies, rules of practice, practical principles, perspectives, repertories of understanding, and social strategy, to name but a few that can be found in the literature. (p. 309)

Hermans et. al. (2008) describe a teacher’s belief system as consisting “of an eclectic mix of rules of thumb, generalizations, opinions, values, and expectations grouped in a more or less structured way” (p. 1500). For the purposes of this study, the general description of belief set forth by Haney et al (2002) “the personal convictions or ideas one holds” (p. 171) will be used.

In his review on teacher beliefs, Pajares (1992) emphasizes that they are established by earlier experiences and influenced by the professional context. In addition, by the time students enter teacher education programs, their beliefs are already shaped by their personal experiences as pupils. As a result, they appear to be relatively stable and resistant to change.
The bulk of research on teacher beliefs and their effects on teaching has primarily taken place with K12 teachers. However, more study needs to be done in higher education on faculty beliefs (Kane et al., 2002) because “fundamental changes to the quality of university teaching and learning are unlikely to happen without changes to professors’ conceptions of teaching” (McAlpine & Weston, 2002, p. 377). This may be in part because faculty’s beliefs about teaching and learning can limit their ability to change their teaching practices (Sunal et al., 2001). In fact, “some of the most critical barriers to change in educational processes are personal ones” (Taylor, 2003, p. 76).

Many have found that teacher beliefs play critical roles in successful technology adoption (Churchill, 2006; Ertmer et al., 2012; Hermans et al., 2008; Norton et al., 2005). Understanding beliefs regarding online teaching are especially important because at many institutions, teaching online has been a “bottom-up” effort in which the faculty have chosen to teach online rather than been required to do so by the administration (Lesht & Windes, 2011). Furthermore, willingness is critically important in order for teachers to adopt innovations into their practice (Ghaith & Yaghi, 1997).

Teacher beliefs about students appear to strongly influence teaching and technology integration. Studies looking at teacher beliefs and their influence on technology integration often focus on the effects of a teacher’s beliefs on how students learn (C. Kim, Kim, Lee, Spector, & DeMeester, 2013; Churchill, 2006; Ferguson, 2004; Liu, 2011).

The motivations of faculty who teach online often stem from student-centered concerns rather than financial or time compensation benefits (Orr et al., 2009). In fact, when transitioning to online teaching, faculty have been found to use student needs to guide their decisions more than research-based evidence (Price & Kirkwood, 2014).
Beliefs about how students learn have also been found to influence how faculty design their technology-based learning materials (Churchill, 2006) and use technology in their courses (Ferguson, 2004). Student-centered or more constructivist teacher beliefs have been found to be positively correlated with technology use in teaching (Ertmer, 2005; Hermans et al., 2008; Sang, Valcke, Van Braak, & Tondeur, 2010) versus teacher-centered or more traditional beliefs.

**Influence of Social Context**

Social context has been well documented as an influence on adoption and use of technology. In his highly influential book *Diffusion of Innovations*, Rogers (2003) emphasizes that an innovation spreads within a social system, or the context, culture and environment that an individual is in. He contends that the social norms and structure of a system strongly influence how an innovation infiltrates a population and a critical channel through which information about an innovation flows is person to person. With technology adoption and use in higher education, faculty who have adopted more technologies tend to have positions of influence in a department, and assist in spreading information across a department’s social network (Mirriahi, Dawson, & Hoven, 2012).

In 2003, Ventakesh and his colleagues examined eight of the most theoretical frameworks and models of technology adoption and use, distilling them down to a set of concepts they termed the Unified Model for Understanding Technology Acceptance or UTAUT (Venkatesh et al., 2003). UTAUT includes social pressure or the degree to which an individual feels the pressure from others to use a particular information technology as one of the key determinants of use. While useful when looking at general technology adoption and use, this theory was not specifically looking at educational contexts.
Nevertheless, when looking at the influence of context on technology change in schools, Frank et. al. (2004) found that teachers, regardless of their own beliefs, are more likely to implement technological change under social pressure, and with appropriate social support or access to colleague expertise. In their view, “members of an organization are likely to help and talk to one another because they share a common fate, and members of an organization can exert social pressure on one another because they affiliate with a common social system” (Frank et al., 2004, p. 162).

Li and Choi (2014) also found that social relations help develop teachers’ knowledge and skills and shape teachers’ behavior to bring about technology-related change in classroom contexts. They found the influence of access to colleague expertise and perceived social pressure to use computers to be at least as important as the perceived value of technology and the adequacy of resources, effects stressed in traditional diffusion models.

Not only do the social interactions between teachers influence technology adoption, but the beliefs themselves that teacher colleagues hold also influence technology adoption. In examining the impact of teacher beliefs on technology integration, Ertmer et. al. (2012) found that it was not an individual teacher’s own beliefs that were the biggest barrier to integration of technology in their schools, but that of other teachers.

When looking at the influence of the social context on online teaching in higher education, positive pressure from colleagues has been found to influence a faculty member’s decision to adopt online teaching (Osika et al., 2009). On the other hand, negative pressure from colleagues can act as a strong disincentive for faculty to teach online (Ulmer, Watson, & Derby, 2007). In addition, colleagues who share negative stories of online teaching can negatively influence the perceptions of faculty who have less experience teaching online (Tabata & Johnsrud, 2008).
Colleagues also play an important role in faculty learning about technology. In surveys and interviews faculty have ranked “sharing knowledge with colleagues” as the most influential source of learning about teaching and learning with technology (Price & Kirkwood, 2014), “asking colleagues” as the most effective way to learn new about computer-based technologies (Georgina & Olson, 2008), and chosen “learn best from my co-workers” when describing preferred ways to learn about new technology-based teaching methods (Bowe, 2011).

As asserted by Oncu et. al. (2008), “a colleague’s influence not only is a prompt for teacher awareness about the technology options available, but it also provides encouragement and reassurance for the teacher to see that things can be safely done as well as providing confirmation that the technology will, in fact, work in their classrooms” (p. 32). Teachers appear to be more willing to use a technology after observing fellow colleagues’ instructional choices with that technology (Adams, 2010). “Teachers feel more convinced of being able to use [digital learning materials] DLMs when they see their colleagues (who are probably as skilled as themselves) are successful in making use of DLMs in their courses” (Kreijns, Van Acker, Vermeulen, & van Buuren, 2013, p. 233).

This may be especially true for faculty faced with the prospect of teaching online. Allowing faculty to observe examples of successful online teaching and learning has proven to be an effective motivator to get faculty to teach online (Ragsdale, 2011).

**Digital Natives**

As previously noted, when transitioning to online teaching, faculty have been found to use student needs to guide their teaching decisions more than research-based evidence (Price & Kirkwood, 2014). Beliefs about how students learn have been found to influence how faculty design their technology based learning materials (Churchill, 2006) and use technology in their
courses (Ferguson, 2004). This leads to the question, what do faculty believe about their students’ needs and learning styles?

An extremely prevalent notion in popular media and subsequently in education is that of the “digital native.” The idea of the digital divide has most often been used to describe the disparity between socio-economic classes and their access to technology (Norris, 2001). Popular writers such as Marc Prensky (2001) and Don Tapscott (2008) have expanded on this idea suggesting that there is a digital divide between generations based on their technology uses and skill levels. Prensky describes this generation, those born after 1980 (Oblinger & Oblinger, 2005), as “digital natives” and those born before as “digital immigrants,” while Tapscott calls them the “Net Generation.” Tapscott claims that “the most significant change affecting youth is the rise of the computer, the Internet, and other digital technologies. This is why I call the people who have grown up during this time the Net Generation, the first generation to be bathed in bits” (Tapscott, 2008 p. 17).

Prensky (2001) claims that the rise of this technology-savvy generation creates “the single biggest problem facing education today” (p. 2) because “it is now clear that as a result of this ubiquitous environment and the sheer volume of their interaction with it, today’s students think and process information fundamentally differently from their predecessors” (p. 1) and “our digital immigrant thinkers, who speak an outdated language, are struggling to teach a population that speaks an entirely new language” (p. 2).

Proponents of the digital native theory suggest that the brains of digital native students are physically different, and that they therefore possess a unique set of learning characteristics including:

- Craving for speed and inability to tolerate slow-paced environment
- Desire or perceived need to multitask
• Preference for pictures rather than text
• Tendency to process information in nonlinear ways
• Preference for collaboration, constant connectivity and mixing of work and play
• Preference for learning through activity rather than reading or listening
• Expectation for immediate feedback and “payoff” for their efforts as found in games
• Preference for fantasy contexts as found in games and realistic TV and movies
• Expectation that technology is part of the landscape; difficulty with environments that lack technology
• Ability to scan text and process information quickly
• Loss of ability to read in linear manner
• Impatience with guided instruction (Thompson, 2013).

The theory itself has great intuitive appeal, partially because of emerging scientific evidence surrounding the neural plasticity of the brain (Thompson, 2013). The theory also continues to have influence on educators and administrators making curriculum and technology related decisions (Jones & Healing, 2010) and has “become embedded within the assumptions of contemporary research on student perceptions of emerging technologies at institutions both globally and locally” (Smith, 2012, p. 1). Indeed, when conducting a Google Scholar search for the term “digital native” between 1999 and 2014 (excluding patents) one receives 6,410 scholarly results, and the same search using the term “net generation” yields 23, 200.

Despite its popularity, many educational researchers contend the theory is based on scant anecdotal evidence and lacks empirical evidence (Bennett & Maton, 2010; Brown & Czerniewicz, 2010; Jones & Healing, 2010) and calls have been made for further research in the area (Bennett & Maton, 2010; Brown & Czerniewicz, 2010; Jones & Healing, 2010; Margaryan, Littlejohn, & Vojt, 2011; Thompson, 2013). Bennett et. al. (2008) made this comment on its influence in education,
Grand claims are being made about the nature of this generational change and about the urgent necessity for educational reform in response. A sense of impending crisis pervades this debate. However, the actual situation is far from clear…We argue that rather than being empirically and theoretically informed, the debate can be likened to an academic form of a ‘moral panic.’ (p. 775)

As suggested by Bennett et. al., the picture of digital natives is not perfectly clear. The idea of the digital native appears to be more complex than originally proposed, with the Pew Research Center claiming that digital natives may not always be “as technically savvy as we collectively believe them to be” (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). Indeed, those examining college students for “digital nativeness” have not found them to possess a ubiquitous set of technology attitudes, skills and abilities.

University students falling in the digital native generation age have actually been found to have a variety of technology skills levels (Brown & Czerniewicz, 2010). Technology use and skill differences among college students have been found to be based on familiarity and experience with technology, not age, and in fact, the differences could be bridged (Helsper & Eynon, 2010). A study conducted with more than 2000 pre-service teachers found no significant difference between university students in their technology competencies based on ages that corresponded to that of native and immigrant (Guo, Dobson, & Petrina, 2008). In fact, students in online courses who would be considered digital immigrants have been found to be better at knowledge application, were more participatory, and were more active with websites associated with the course (Ransdell, Kent, Gaillard-Kenney, & Long, 2011).

Others have found that despite the claims that digital natives use technologies for a wide range of applications, few go beyond basic communication usage (Bennett et al., 2008; Kennedy,
Judd, Dalgarno, & Waycott, 2010; Margaryan et al., 2011; Thompson, 2013; Waycott, Bennett, Kennedy, Dalgarno, & Gray, 2010). In their study of three Australian universities, Kennedy et al. (2010) found that only 14% of the 2096 students surveyed could be described as “power users” or those who use a wide range of technologies significantly more frequently that other users. The largest group at 45% was made up of “basic users” who used only standard web technologies and mobile phones on a regular basis.

Thompson’s (2013) study of 388 US college freshmen also found students using a narrow range of technologies, mainly rapid communication tools. Students were most often texting on mobile phones and using social networking tools such as Facebook. When using tools specifically for academic purposes they tended to perform fast web searches most often to “find the answer quick” (p. 21) and were not taking advantage of the learning affordances of the web for their course work.

Another assumption of digital natives is that they process information differently, crave speed, and are unable to tolerate slow-paced environments with guided instruction. But the issue of student learning styles is complex and to attribute one set of learning styles to an entire generation problematic (Bennett et al., 2008). Students appear to actually change their learning styles based on the requirements of a task and their previous experience with the learning style (Biggs & Tang, 2011). Contrary to popular belief, university students do not demand constant entertainment, and report that they learn from a variety of teaching methods including lecture (Thompson, 2013). A majority also report they prefer only a moderate amount of technology in their courses and state they would not “skip classes when materials from course lectures are available online” (Dahlstrom, 2012; S. D. Smith, Salaway, & Caruso, 2009).
The idea of digital natives and immigrants would additionally suppose differences in technology use in academic settings, based on age differences. Yet, Waycott et al. (2010) found that university staff and students both use similar technologies outside of school and for similar purposes, mainly for communication with friends and family and to pursue personal interests. In addition, they also use similar technologies within the academic context. When examined more closely, the differences in technology use in academic contexts depended not on their age but their differing roles at the institution, that of staff and student.

Digital native generation university students not only use a narrow range of well established tools, but they have also been found to lack the ability to apply technologies to their own learning process and depend heavily upon their instructors and fellow students for assistance (Margaryan et al., 2011).

Few would dispute that “today’s students need to know how to utilize technology more efficiently in order to succeed professionally” (Bowe, 2011, p. 1780). But today’s students may not be ready for technology-rich learning environments or online courses. The EDUCAUSE 2012 survey of 106,575 undergraduate students reports that “students recognize the value of technology but still need guidance when it comes to better using it for academics” (Dahlstrom, 2012, p. 1).

Even students agree that technical proficiency is vital to their academic success, but the majority report that it is very or extremely important to be better trained or skilled at using technologies to learn, study, or complete coursework (Dahlstrom, 2012). A survey conducted by the Babson Survey Research Group and the College Board found that 88% of the 2,820 chief academic officers surveyed reported that “students need more discipline to succeed in online courses” (Allen & Seaman, 2013, p. 29).
Furthermore, faculty report that many students do not have the prerequisite academic technology skills to be successful in online courses (Bowe, 2011). Faculty across disciplines consider student digital literacy, or “the ability to go beyond information processing and actually create meaning” (Schmidt, 2012, p. 10) as very important yet rate their students’ abilities quite low (Bury, 2011). Faculty are concerned about students’ inability to go beyond simple web searches to find information in their academic work, commenting “students have to be pushed to use anything but Google” (Bury, 2011, p. 50).

Faculty may make assumptions that because a student frequently uses one tool, for example Facebook, that they will be skilled with other tools for learning (Bennett et al., 2008; Kennedy et al., 2010). Because of the popularity of the digital native concept, faculty may begin to design their courses for that presumed audience (Jones & Healing, 2010).

When the student audience lack the presumed skills, this can negatively impact faculty members’ decisions to incorporate technology into their courses or teach online (Osika et al., 2009). This may be because faculty who use newer technologies need to spend time orientating students, thereby using instructional time on technical issues where the faculty is not an expert yet is the students’ first contact for assistance (Reid, 2012).

**Technological Pedagogical Content Knowledge**

Technological pedagogical content knowledge (TPACK) is a framework for examining teachers’ knowledge of technology, pedagogy and content. The framework, originated by Mishra and Koehler (2006) expands upon Shulman’s (1986) concept of pedagogical content knowledge (PCK). In order to explain TPACK, a brief description of Shulman’s PCK is appropriate.
**Pedagogical Content Knowledge**

Lee Shulman first introduced the idea of PCK or pedagogical content knowledge in his seminal 1986 article entitled “Those Who Understand: Knowledge Growth in Teaching.” Shulman was a teacher educator and evaluator asking the question, what is it that teachers need to know to be effective? In his 1986 paper he reflects on the history of trying to systematically measure teachers’ knowledge. He observes that the separation of content knowledge, or the subject to be taught, and that of pedagogy or the theories and methods of teaching is a relatively recent one. In fact, throughout most of history, mastery of a subject was measured though one’s ability to teach it. In the 1870’s teacher evaluation measures in the United States focused predominantly on content knowledge, and have since swung toward general pedagogy and classroom management with content “conspicuously absent” (p.6).

Shulman argues that effective teachers possess not only specific content knowledge and general teaching theories, but pedagogical content knowledge as well. Pedagogical content knowledge (PCK), as displayed in Figure 1, lies in the overlap of general pedagogy knowledge and content knowledge and is a teacher’s knowledge of how to teach particular content, “the ways of representing and formulating the subject that make it comprehensible to others” (p. 9). In other words, how one transforms content in order to teach it.

PCK includes understanding general concepts of a content area and a variety of ways to represent those concepts to different types of students “for the most regularly taught topics in one's subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations” (p. 9). This entails knowing about available curricular materials and how best to use them in instruction as well as knowledge of how to relate one’s own content to other content students may be learning either
simultaneously in other classes, or have learned in the past or will encounter in the future within one’s subject.

A teacher’s PCK includes understanding one’s students. This is knowledge of how one’s students tend to learn content and what they bring to the classroom based on previous experience or

an understanding of what makes the learning of specific topics easy or difficult: the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons. If those preconceptions are misconceptions, which they so often are, teachers need knowledge of the strategies most likely to be fruitful in reorganizing the understanding of learners, because those learners are unlikely to appear before them as blank slates. (p. 9)

![Figure 1. Shulman's (1986) pedagogical content knowledge.](image)

As shown in Figure 2, Shulman (1987) later elaborates on PCK to include a wider social context or as he puts it “knowledge of learners and their characteristics and knowledge of educational context, ranging from the workings of the group or classroom, the governance and financing of school districts, to the character of communities and cultures” (p. 8). He went on to
describe PCK as “that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding” (p. 8).

Figure 2. Shulman’s (1987) expanded pedagogical content knowledge.

Figure adapted from Ronau et al. (2012)

Cochran, DeRuiter and King (1993) expand upon Shulman’s PCK creating PCKg or pedagogical content knowing. In their view, Shulman’s core concepts were too static and did not reflect that teacher’s knowledge is continual. They define PCKg as “a teacher’s integrated understanding of four components of pedagogy, subject matter content, student characteristics, and the environmental context of learning” (p. 266).

Taking the constructivist view that knowledge is actively created by the learner, they then place an even greater emphasis on the importance of a teacher’s understanding of their learners. In addition, they also believe that learning does not bring one closer to an objective truth, but that knowledge is mediated by one’s experience. They therefore place more emphasis on the teacher’s understanding of the “social, political, cultural and physical environmental contexts
that shape the teaching and learning process” (p. 277). While PCKg was developed as a framework to guide teacher preparation, it is relevant as a model for faculty development as well.

**Technological Pedagogical Content Knowledge**

Mishra and Koehler (2006) expand upon Shulman’s idea, adding technology and a “T” to the PCK framework in an attempt to “capture some of the essential qualities of knowledge required by teachers for technology integration in their teaching, while addressing the complex, multifaceted and situated nature of teacher knowledge” (p. 2017).

Mishra and Koehler believe that because modern technologies are expected in today’s classrooms, offer such a variety of affordances, are changing so rapidly and disrupting the status quo requiring teachers to reconfigure their content and pedagogy, that expanding the PCK model to include technology as a core element was appropriate. They describe the resulting overlap of the TPCK elements as:

the basis of good teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students’ prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones. (Mishra & Koehler, 2006, p. 1029)

Arguments have been made (Brantley-Dias & Ertmer, 2013; Cox & Graham, 2009) that the addition of the “T” to PCK was not necessary as Shulman specifically includes technologies, or as he describes them “the alternative texts, software, programs, visual materials, single-concept films, laboratory demonstrations” (1986, p. 10). Mishra and Koehler (2006) acknowledge Shulman’s inclusion of these technologies, but argue that he did not explicitly discuss technologies in his PCK framework, and that the nature of today’s technologies makes
them different and therefore deserving of their own core category in the model. Their argument is that the technologies of Shulman’s time, for example textbooks, typewriters, and overhead projectors were so “commonplace” that they were not even regarded as technologies. They contend that today’s technologies have significantly changed the context of teaching (or have the potential to do so) and

thus, though Shulman’s approach still holds true, what has changed since the 1980s is that technologies have come to the forefront of educational discourse primarily because of the availability of a range of new, primarily digital, technologies and requirements for learning how to apply them to teaching. (Mishra & Koehler, 2006, p. 1023)

In addition, Mishra and Koehler point out that today’s technologies play a critical role in Shulman’s idea of a teacher’s “representational repertoire” (Shulman, 1987, p. 16) or a teacher’s variety of methods for representing key concepts of one’s subject matter to a variety of students.

Figure 3 represents the three core areas of teacher knowledge, technology knowledge (TK), content (CK) and pedagogy (PK) and their subsequent overlapping areas representing the interactions between and among them, technological pedagogical knowledge (TPK), technological content knowledge (TCK), and pedagogical content knowledge (PCK). It is the overlapping of each element in the center that represents technological pedagogical content knowledge (TPACK).
Figure 3. TPACK model depicting core concepts and interactions.

Content knowledge (CK) is what a teacher knows about the subject matter they will teach, for example concepts, theories and facts. Pedagogical knowledge (PK) is a teacher’s general knowledge of the practice of teaching, including how students learn, classroom management and assessment techniques. Pedagogical content knowledge (PCK) in Mishra and Koehler’s model is aligned with Shulman’s in being the knowledge of how to teach particular content.

Koehler and Misha (2009) observe that “technology knowledge is always in a state of flux…thus defining it is notoriously difficult” (p. 64). Therefore technology knowledge (TK) represents a fluency with technology versus a set of specific knowledge about technologies themselves. They suggest that technology knowledge is most like a literacy in which:

persons understand information technology broadly enough to apply it productively at work and in their everyday lives, to recognize when information technology can assist or impede the achievement of a goal, and to continually adapt to changes in information technology…[and that then] enables a person to accomplish a variety of different tasks
using information technology and to develop different ways of accomplishing a given task. This conceptualization of TK does not posit an “end state,” but rather sees it developmentally, as evolving over a lifetime of generative, open-ended interaction with technology. (Koehler & Mishra, 2009, p. 64)

Technological content knowledge (TCK) is the general knowledge of the impact of technology upon one’s discipline, as well as knowledge of how technology can enhance or detract from teaching one’s content. An example would be having an understanding of the impact of global positioning systems (GPS) on earth sciences and knowing when the use of GPS would be appropriate in teaching earth science. Technological pedagogical knowledge (TPK) is knowing how both teaching and learning change when particular technologies are introduced. This includes an understanding of how the technology might be used in various contexts, and how to adapt the technology for particular learning contexts. Koehler and Mishra (2009) point out that this knowledge is particularly important for teachers, as most popular software programs are not specifically designed for educational use.

Technology, pedagogy and content knowledge is therefore the knowledge that comes from the interaction among all three of the core concepts of content, pedagogy and technology.

TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students’ prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones (Koehler & Mishra, 2009, p. 66)

Koehler and Mishra (2008) acknowledge that effective technology integration is a “wicked problem” facing both teachers and teacher educators and describe it as “a complex and ill-structured problem involving convoluted interaction of multiple factors, with few hard and
fast rules that apply across contexts and cases” (p. 10). In response, they see TPACK as a flexible framework that does not treat technology as an oversimplified “add-on” and contend that the framework provides a method for identifying what is important in teacher knowledge surrounding technology use. They see the model as useful in each of the areas of theory, pedagogy, methodology and practice.

**TPACK in Use**

TPACK has been widely adopted within educational technology research with one review (R. N. Ronau, Rakes, & Niess, 2011) citing over 300 journal publications and conference proceedings published on the topic between its introduction in 2006 and 2011. The model has been used to guide a variety of educational technology study types including survey, case study, design research, evaluation, action research, mixed methods, and instrument design (Voogt et al., 2013).

Studies have been conducted looking at TPACK of teachers and teacher candidates at the secondary level (Hammond & Manfra, 2009; Niess, 2005; Niess et al., 2009) as well as at the elementary level (Harris & Hofer, 2009). TPACK has also been a popular framework for enhancing teacher education (Herring et al., 2013; Koh & Divaharan, 2011; Lu, Johnson, Tolley, Gilliard-Cook, & Lei, 2011) professional development for teachers (Doering, Veletsianos, Scharber, & Miller, 2009; Ozgun-Koca et al., 2010; Voogt et al., 2010), and professional development for education faculty (Burke, 2012).

At Iowa State University, TPACK is used as the framework for an introductory technology course taken by all preservice teachers (Baran, Chuang, & Thompson, 2011). The TPACK framework has additionally guided studies measuring of effectiveness of online teaching (Archambault, 2008; Archambault & Crippen, 2009) and the creation of instruments to assess the
TPACK knowledge of teacher candidates (Williams, Wetzel, Foulger, Kisicki, & Giacumo, 2011), as well as in-service teachers (Schmidt et al., 2009).

TPACK is also being used outside of formal research. In 2009, the San Diego Unified School District officially adopted TPACK as a part of their professional development model for effective teaching with technology (Devaney, 2009). In 2012, Microsoft Education invited a group of teacher educators from around the world to develop a TPACK building workshop for faculty who prepare teachers (Hofer, Lee, Slykhuis, & Ptaszynski, 2014).

**TPACK Criticisms**

Despite its popularity, a number of criticisms have been made of the model and modifications suggested. Some claim the model is not measurable due to its “fuzzy” boundaries making each of its individual elements difficult to measure in practice (Graham, 2011). Others suggest that the model is unduly complicated and putting the T for technology first in the name of the model may have focused too much attention on the technology, losing Shulman’s emphasis on content and pedagogy (Brantley-Dias & Ertmer, 2013).

While Mishra and Koehler (2008) argue that growth in TPACK implies growth in the three knowledge domains, Angeli and Valanides (2009) contend that TPACK is a distinct body of knowledge that can be independently developed and measured on its own. Attempts have been made to move the framework from a conceptual one to a more empirical or practical one that could be used to measure TPACK in practice (Cavanagh & Koehler, 2013; Koehler, Shin, & Mishra, 2012) and calls have been made to expand the theory to incorporate include other variables that have been shown to impact teachers’ integration of technology (Chen et al., 2009; Voogt et al., 2013) specifically teacher beliefs (Angeli & Valanides, 2009; Friedrichsen et al., 2011; Niess, 2005).
Summary

Online teaching is complicated and influenced by a multitude of factors. This chapter reviewed literature on the influence of discipline and colleagues on traditional teaching in higher education. It also summarized the factors found to influence technology adoption and use including teacher beliefs. A review of the concept of digital natives and related research studies was also included. Finally, the chapter reviewed the TPACK framework for effective teaching with technology. In the next chapter, these variables will relate to the research design and methodology for this study examining the influence of faculty beliefs about students and colleagues on online teaching.
CHAPTER 3. METHODOLOGY

The purpose of this mixed-method, explanatory sequential multiple case study was to understand how faculty beliefs about students and colleagues influence their online teaching. This chapter describes the design of the study and its participants and setting. It also describes the methods for collecting then analyzing data.

Research Design

This was a mixed-method, explanatory sequential case study investigating how faculty beliefs about students and colleagues influence their online teaching. The research questions guiding this study were:

1. How do faculty members’ beliefs about students influence their online teaching?
2. How do faculty members’ beliefs about their colleagues influence their online teaching?

An explanatory sequential research design is one that starts with a quantitative phase and follows up on specific results with a qualitative phase to explain initial results more deeply (Creswell & Plano Clark, 2011). Creswell and Plano Clark emphasize the importance of the close relationship between the two phases, the second phase builds directly from the first. In this study, a survey was initially administered to gain an overall understanding of faculty tool choices and beliefs about online teaching. From the survey’s results, areas for further investigation were identified. These areas formed the basis for refined research questions and led to six semi-structured interviews with faculty.

A mixed method design is one in which data collection involves “gathering both numeric information (e.g., on instruments) as well as text information (e.g., on interviews) so that the
final database represents both quantitative and qualitative information” (Creswell, 2002, p. 20). While the explanatory sequential design inherently uses mixed methods, an additional data set was collected through a card sort activity. The use of mixed and additional methods of data collection allows for a “richer and stronger array of data than can be accomplished by any single method alone” (Yin, 2014, p. 66).

Case study is the study of the particularity, the “critical uniqueness” (Stake, 1995, p. 44) of a single case. Case study differs from mixed methods in that it is defined by its focus on “an individual event, activity, episode or other specific phenomenon, not necessarily by the methods used for investigation” (Schram, 2005, p. 106). Merriam (2009) concludes that the most defining aspect of a case study is what is being studied, and that the what must be a system with boundaries. In this multiple case study, the six cases being analyzed were all located within a bounded system, a college of education. Including multiple cases within a case study helps strengthen analytical conclusions (Yin, 2014).

This study will look at six individual cases, or faculty members, within the college in order to gain a deeper understanding of the influence of students and colleagues on these faculty members’ online teaching. Case study was also appropriate for this study as it is the preferred method when attempting to answer questions about how or why a set of contemporary events has occurred within an intrinsically bounded group (Merriam, 2009), and the investigator has little control over the events (Yin, 2014).

Typically in explanatory sequential designs, more emphasis is placed on the initial quantitative data collected and less emphasis on the following qualitative (Creswell & Plano Clark, 2011). However in this study, the intent of the survey was to gain a general understanding of faculty tool use and online teaching beliefs. This initial data was always envisioned as a
starting point from which additional research questions would be generated. As described by Patton, in this order, “the quantitative data identify areas of focus; the qualitative data give substance to those areas of focus” (2001, p. 193). In addition, some suggest that case study should be as noninterventive as possible, meaning no tests or even interviews should be conducted if data can be collected via other means so as to not disturb the ordinary activity of the case (Stake, 1995). However, the nature of the research questions in this study required the more direct approach of surveying and interviewing participants. Interviews in particular are an effective way of accessing tacit knowledge such as beliefs (Samuelowicz & Bain, 2001).

**Conceptual Framework**

This study investigated the influences of students and colleagues on online teaching. The Technological Pedagogical Content Knowledge (TPACK) framework was used as the theoretical guide for interpreting the data regarding online teaching. The theory was appropriate as it provided a lens through which teaching infused with technology could be systematically examined. The seven individual elements of the framework were used as codes when analyzing the data and provided a context through which online teaching examples were explained.

**Participants and Context**

**Participants**

Participants in this study were faculty in a college of education. The 65 anonymous survey respondents came from the pool of over 225 faculty members on the college’s email list. Six interview participants were purposefully sampled from this group by the researcher in order to yield the most information (Teddlie & Tashakkori, 2008). In describing sampling for case study, Stake reminds us that while “balance and variety are important; the opportunity to learn is of primary importance” (1995, p. 6). In this case, balance and variety of participants were sought
by selecting two male and four female faculty at varying stages of their careers. One interview participant was at the assistant faculty level, four were at the associate level, and one was a full professor. In hopes of learning the most, subjects were chosen representing various COE departments and therefore differing colleagues and student populations. All participants had taught multiple classes online using synchronous and asynchronous methods as well as hybrid, or a blend of online and face-to-face. Selectees were known to the researcher for willingness to incorporate new technologies into their online teaching, for their thoughtful and engaging online work with students and finally for their likeliness to participate. The variety of participants was also considered in this study as a way to provide multiple perspectives on the theory guiding the study. As explained by Yin (2014), a small selection of cases should not be thought of as a sample reflecting a larger population but instead as “the opportunity to shed empirical light about some theoretical concepts or principles” (2014, p. 40).

IRB granted approval to all instruments and procedures used in each phase of the study and consent was gained from all survey and interview participants. IRB approval letters are located in Appendix A.

**Study Setting**

The setting of this study was a college of education (COE). In 2013 when the data for this study was collected, the COE was comprised of 10 departments, 225 faculty and 1,947 undergraduate and graduate students. This COE is the primary preparer of teachers going in to the state’s public school system. The college is a leader in distance education at its campus, with the highest number of distance programs of any college at its campus. This emphasis on distance education has been primarily driven by its need to prepare teachers living on islands spread throughout the Pacific. This need also prompted the COE to establish an Office of Technology
and Distance Programs in 2001 with the goal of promoting and supporting technology integration and distance education. This office currently employs two full-time faculty who serve as director and instructional designer as well as 17 full-time staff and 11 student workers.

**Instrumentation and Procedures**

This sequential study began with a survey, and followed up with semi-structured interviews to gather data from selected participants. The interviews additionally included a card sort activity. The overall study was conceived and planned by Dr. Ellen Hoffman and myself. As part of the data collection process, Dr. Hoffman and I co-taught a new mixed methods research course for educational technology (ETEC) doctoral students in which students would gain “real world” research experience by participating as co-researchers. Dr. Hoffman and I developed the survey, then as a research team, the students, guided closely by the instructors, developed research questions, instruments, a team protocol and a codebook for further data collection and analysis. Students collected data in pairs by interviewing an individual faculty member I paired them with, then individually coded and wrote up reports on their findings. While individual interviews were conducted and reported on by students as single cases, this study will look across all the data collected through the survey and six interviews. Figure 4 is a diagram of the process steps for this study.
Figure 4. Phases of the study.

Survey

The anonymous online survey consisted of 86 questions, 8 were demographic, 10 open-ended, and 68 were Likert scale or multiple choice. Questions asked about technology tools faculty used personally, used in professional work and teaching, and with students in courses. Questions also asked about beliefs and opinions on online teaching, online students and support. The survey questions are located in Appendix B.

The survey questions were developed by Dr Ellen Hoffman, a senior faculty member in the educational technology department and myself. The goal of the survey was to gather initial and broad data from COE faculty on tool choices and beliefs about online teaching. The intent of collecting this data was to generate discussion in the course to guide further inquiry.
The survey was reviewed by an expert and pretested using cognitive interviews prior to its dissemination. The pretesting of any survey instrument is a critical phase of planning a good study (American Statistical Association, 1997). A major problem with surveys is non-completion of questions leading to incomplete data (Drennan, 2003). Unclear or ambiguously written questions, even well-written questions, can lead to difficulty with question comprehension and retrieval of answers, to respondents answering in a socially desirable way, or for participants to unknowingly provide misleading responses (Desimone & Le Floch, 2004).

Cognitive interviews, also known as verbal protocols or think-aloud interviews are a method for cognitively validating an instrument by having participants talk aloud or keeping a running commentary as they complete the instrument, verbalizing any thoughts, confusion or problems (Trenor, Miller, & Gipson, 2011). This process allows the survey designer to view an instrument from the respondent’s perspective and is a particularly effective method for remedying the most common threats to survey reliability (Desimone & Le Floch, 2004). This is particularly important in educational technology research which has a history of using varied terms or differing definitions leading to confusion in the literature (Bebell, O’Dwyer, Russell, & Hoffmann, 2010; Desimone, 2009).

In order to refine and validate the survey prior to dissemination, it was reviewed by a senior educational technology faculty member and three cognitive interviews were conducted with faculty from differing disciplines, all of whom teach online. Two were from the COE and one from another UH campus. Revisions were made to the survey after receiving feedback in each of the four reviews.
Interviews

The semi-structured interview instrument consisted of four background information questions, 15 open-ended questions, a card sort activity, and a request to share course-related documents reflecting online teaching techniques. Open-ended questions asked about faculty’s opinions about teaching online, the influence of colleagues and college expectations, student preparedness, and technology support. The interview guide is located in Appendix C. Because pilot testing of interview questions is crucial (Merriam, 2009), three pilot tests were conducted with faculty members with expertise in online teaching. The instrument was revised based on this feedback prior to use with the six participants of the study. Figure 5 displays interview questions as they relate to the study’s research questions.
Research Question 1:
How do a faculty member’s beliefs about students influence their online teaching?

Q1. Card sort activity - sorting and ranking characteristics typical of their students.
Q2. What impact, if any, does this have on your online teaching?
Q3. How well prepared are your students for the technology used in your classes?
Q4. Have your teaching practices ever been impacted by students’ capacities or deficiencies with technology?
Q5. What do you believe is your role as an instructor in developing students’ technological skills?
Q6. How much do your perceptions of students affect your online teaching?

Research Question 2:
How do faculty members’ beliefs about their colleagues influence their online teaching?

Q1. How has the success-obstacles faced by other online instructors impacted your decision to teach an online class?
Q2. What role do your colleagues play in your decisions?
Q3. What do you think is expected of faculty in the college of education in terms of using technology in teaching?
Q4. How do these expectations affect your use of technology in teaching?
Q5. Where do you think you and your colleagues/department need to go with online teaching in the next few years?
Q6. How do you see this affecting your teaching?

Figure 5. Interview questions as they relate to research questions.

Card Sort and Documents

As part of the interview instrument a card sort activity was developed to collect data on faculty beliefs about their students. The basic idea behind a card sort is to ask respondents to sort things into groups. Card sorts are useful for identifying how participants categorize and “investigating commonality and differences between experts in the use of that categorization” (Rugg & McGeorge, 2005, p. 95). Card sorts are a common technique used in computer science, specifically information architecture usability testing, for example to test and refine web site navigation. Card sorts typically fall into two broad categories, open and closed. In an open card sort participants are given a set of cards and asked to sort them into groups they create and name.
In a closed card sort participants are given cards and told the names of the groups they should be sorted into (Tullis, 2007).

The card sort in this study was a closed, two-part sort. Fourteen characteristics that have typically been ascribed to digital native students were individually printed on cards and can be found in Appendix D. Participants were first asked to sort the characteristics into two groups, characteristics typical of their students and characteristics not typical of their students. Participants were then asked to rank the typical characteristics by “importance to how you have to think about your teaching.”

In addition to the interview questions and card sort activity, participants had been alerted during interview scheduling that they would be asked to “show an example of an online teaching lesson or module you use and explain why you think it is an interesting example of online teaching.”

**Research Protocol**

Having a research protocol is essential when conducting a multiple case study (Yin, 2014). As described by Yin, the research protocol is a four-part document including 1) an overview of the study including background, goals and theoretical framework, 2) data collection procedures, 3) data collection questions and 4) a guide for the case study report. A strong protocol assists in communication about the study and increases the likelihood of consistency. The research protocol developed for this study is located in Appendix E.

**Data Collection**

The data for this study was collected in the fall 2013 semester as part of the mixed method research methods course taught by Dr Ellen Hoffman and myself. Collection methods included a survey, semi-structured interview guide, and a card sort activity.
Survey

The survey was created using Google forms, and in first week of September 2013 an email requesting participation was sent to all members of the college’s faculty email list. To take the survey, participants clicked on a link that led to a consent form. After reading the consent form, participants were informed that proceeding to the next section was an indication of their consent. Clicking the “proceed” button led to the survey itself. Upon completion of the survey, respondents were asked if they would be willing to participate in follow up interviews. If so, a link led them to a separate survey that collected personal contact information. This contact information was not associated with the survey responses. The survey was open for three weeks and a reminder email was sent in the second week. The survey received 65 responses for a 29% response rate. Data were anonymous and the results were kept on the researcher’s password protected, encrypted computer.

Interviews

After closing the survey, as a class group we discussed the survey responses. This discussion included interesting or surprising findings, general frequencies and how the results confirmed or differed from related research we had been reading and discussing in class. Over the next three weeks we finalized research questions, the interview questions and the research study protocol document. During this time we also discussed interview techniques advocated by Merriam (2009) and Yin (2014) including interview etiquette, use of probes, active listening, staying adaptive, keeping research questions in mind, avoiding bias, and techniques for recording audio and observations. In class, the students conducted three pilot interviews of the interview guide with three faculty experienced in online teaching. Feedback on the interview guide and the
interviewers’ skills was provided by the pilot participants and guided subsequent instrument revisions.

I then selected and contacted faculty to participate in interviews. In contacting the participants I explained the goal of the study, how long the interviews would take and shared the protocol document and consent forms. Once confirmed, I put the students in touch with the participants to schedule and conduct the interviews. Interviews were conducted either online or in-person by pairs of students with one faculty member. The interviews typically took 90 minutes and were conducted over a four-week period in October and November of the fall 2013 semester. Interviews were recorded using various portable devices such as tablets or phones. The interviews were conducted by students as a requirement of the class, and as a way to mitigate possible bias that could have occurred had I personally conducted them, due to my personal relationships with participants.

**Card Sort and Documents**

A card sort activity took place as part of the interviews. As recommended by Rugg and McGeorge (2005), the card sort activity was clearly explained and the participants allowed to review the cards prior to the sorting. The sorted and ranked cards were photographed by the interviewers to record the results. Participants had been alerted prior to the interviews that they would be asked to share an example of what they considered interesting from their online teaching. Participants were asked to not share any information that could identify students. In some cases participants displayed and described their sample, in other cases they additionally sent files to the interviewers. Because only half of the participants sent files to the interviewers, only the verbal descriptions of the online teaching examples, as transcribed in the interview transcripts were used in the data analysis.
Data Analysis

Survey

The survey data was analyzed using standard quantitative analysis techniques. The primary purpose of the survey data was to prompt development of research questions to guide the interviews and is therefore not heavily emphasized in this final report.

Interviews

The interviews were transcribed and member checked by the students who conducted the interviews. Then each student pair in the course individually coded a single interview using the class codebook. While I listened to the audio recordings of the interviews and checked transcriptions for correctness, I did not go back to the student-coded interviews. In order to reduce the possibility of the student coding influencing my coding, I began my coding process with the interview transcripts only. These I coded using Saldana’s (2009) first and second coding cycles to look for patterns and themes within the data. My first round of coding used structural coding based on the theoretical propositions of the study. In the initial round I looked for references to the influences of students and colleagues and for the individual elements of the TPACK framework. Structural coding is a way to initially code and categorize data and is especially appropriate for studies involving multiple participants and semi-structured data gathering methods (Saldana, 2009). In addition, values coding was also included in the codes of the first round as they are appropriate to studies exploring values, attitudes, beliefs and interpersonal experiences and actions (Saldana, 2009). For second round coding I took Saldana’s recommendation of using “pragmatic eclecticism” (2009, p. 47) or keeping an open mind before deciding which additional coding methods were appropriate. I began coding with the existing codebook developed in the course as part of the single case studies as it had some
interrater reliability due to its use and refinement by our research team. I did however expand it further throughout the rounds of coding. A significant addition to the existing codebook was the individual elements from TPACK which were not included in the original. The codebook also grew with the addition of emergent codes that developed when performing the cross case analysis. The additional codes were checked for interrater reliability with a colleague from the educational technology department.

Analytic memos were also used to document my thinking process during coding. Saldana (2009) describes analytic memos as “sites of conversation with ourselves about our data” (p. 32). As described by Saldana, the purpose of analytic memos is to emphasize reflection upon the data in order to challenge assumptions and recognize how one’s thoughts and actions influence what one see in the data. He suggests writing analytic memos on numerous topics including how one relates to the participants, about the research questions, about code choices and definitions, patterns and categories, links in the data, association to theory and reflections on the final report.

**Card Sort and Documents**

Data from the card sort were looked at for patterns in the frequencies with which participants chose individual characteristics as representative of their own students. The card sort data was also analyzed with regard to answers about the influence these characteristics have on online teaching. As previously mentioned, participants described documents in the interviews and these descriptions were coded along with the rest of the interview transcripts.

**Data Management**

Standard office suite software was used for data management. The coding I conducted was handled using word processing techniques. Using a word processor kept the process
straightforward and allowed me to focus on the interpretation and meaning of my results. All data was kept in electronic format on my computer which was only used by me and was both encrypted and password protected to ensure privacy.

**Validity**

Yin (2014) describes four criteria for judging the quality of case studies: construct validity, internal validity, external validity and reliability.

**Construct Validity**

In addressing construct validity or “the identification of correct operational measures for the concepts being studied” (Yin, 2014, p. 46), I used “methodological triangulation” (Teddlie & Tashakkori, 2008) in the data collection process by collecting three types of data. In addition, I pilot tested all my instruments (Merriam, 2009) and invited participants to review a draft of the case study report (Yin, 2014).

**Internal Validity**

In addressing internal validity, or the credibility of my findings given the data presented (Merriam, 2009), I started, as suggested by Merriam (2009), by having the students conduct member checks of the interview transcripts to allow participants to assess the credibility of our account (Stake, 1995). I then began the data analysis by going through the data looking for information relevant to my theoretical propositions based on key issues from the literature. The theoretical propositions of this study are:

1. That faculty beliefs about their students influence their online teaching. Specifically, that the idea of the digital native student is not congruent with faculty’s experience of their online students and this has impacted their beliefs of online students and therefore their online teaching.
2. That faculty beliefs about colleagues influence their online teaching. Specifically, that observing the experiences of colleagues teaching online and beliefs regarding expectations to teach online has influenced their online teaching.

3. Online teaching can be analyzed using the seven elements of the TPACK framework. Using these propositions I created a matrix of categories into which evidence was placed and used pattern matching as an analytic technique to assist in linking my data to my propositions (Yin, 2014). According to Yin (2014), using theory and theoretical propositions in both the design of my study and the analysis of its results strengthened the analytic generalizations of my study. This, according to Yin, is because my cases were not a sample, but an opportunity to shed light on the theoretical principles that guided the study or arose due to its findings.

**External Validity**

In addressing external validity, or the degree to which my study’s findings can be generalized, I, as suggested by Yin (2014), used a case study approach to answer “how” questions about a particular phenomenon. In addition and as described previously, I used theory in designing the study and the methods for analyzing the results. Any generalizations made from the study are not a reflection of a sample representing a larger whole, but of the sample shedding light on the theory guiding the study.

**Reliability**

And finally, in addressing reliability, or the ability for this study to be replicated by others with similar results (Yin, 2014), I used a case study protocol to guide data collection, used a codebook with definitions during coding, and wrote analytic memos incorporating the theory guiding the study (Saldana, 2009) as well the resulting theoretical propositions (Yin, 2014).
Summary

This chapter has described the data collection and analysis methods used in this multiple case study. Descriptions of each case will be presented in Chapter 4. Chapter 5 will present and describe the patterns and themes that emerged across the individual cases. Chapter 6 will discuss the analysis as it specifically related to the TPACK framework. Chapter 7 discusses the results as they relate to the research questions, and existing literature. Chapter 7 will also include the study’s limitations, implications and suggestions for future research.
CHAPTER 4. CASE STUDIES

This chapter provides general descriptions of each of the six participants. The purpose of this chapter is provide context through which each of the participants will be viewed in subsequent chapters. As noted by Yin (2014), a strength of case study research is its ability to examine contextual conditions and its appreciation for the blurring that may occur between a case and its context. Educational psychologist David Berliner (2002) describes educational research as “the hardest science of all” due to the necessity and resulting complexity of contextual understanding. As he explains it,

In education, broad theories and ecological generalizations often fail because they cannot incorporate the enormous number or determine the power of the contexts within which human beings find themselves…It is the reason that qualitative inquiry has become so important in educational research. (p. 19)

In order to provide a contextual view, in this chapter each participant will be individually discussed using the following categories: background information and general views on online education, general beliefs about students and general beliefs about colleagues. Pseudonyms have been used throughout the study to ensure anonymity.
Participants

Figure 6 displays a summary of general information regarding each of the participants.

<table>
<thead>
<tr>
<th></th>
<th>KATE</th>
<th>STEPHANIE</th>
<th>TOM</th>
<th>JEAN</th>
<th>JACK</th>
<th>AMY</th>
</tr>
</thead>
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<td>5</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Years at COE</td>
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<td>24</td>
<td>24</td>
<td>22</td>
<td>9</td>
</tr>
<tr>
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<td>Statewide program</td>
<td>Pacific island students</td>
<td>Statewide program</td>
<td>Condition of hire</td>
<td>Statewide program</td>
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</tr>
<tr>
<td>Retiring within 5 years</td>
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<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

**Figure 6. Participant summary.**

Kate

“I really worry about online spaces being the spaces that allow the dumbing down of teaching in some way…My part is to make it a thoughtful and meaningful space so that meaningful learning happens.”

Kate is an associate professor that has taught online for four years. The majority of her online courses had been hybrid, but she had also taught completely online. Kate initially became involved with distance education by volunteering to teach a course in her department for students that lived in American Samoa.

In some of Kate’s courses her students that live on-island will attend face-to-face, and those who live off-island will attend online. Kate reported that she appreciated this format because it “it provides a depth of perspective that I think can’t otherwise be provided, you know, by having people from these different parts of the world participate.” This format inspired her to partner with a mainland university course “to focus around culturally responsive pedagogy and
the importance of place in teaching science.” Despite technology challenges, Kate found great value in the conversations her students were able to have via the technology. She said,

It allows for these really great conversations. The challenges of technology unfortunately got in the way of the students seeing the value of that. Unfortunately they were more just frustrated by the process, but when those conversations were able to work they were pretty phenomenal, so that piece is what I find to be the most valuable of it.

Kate mentioned many times how problems with the communication technologies had influenced her synchronous sessions, causing her to group students in ways she had not planned for, or permitting students to use other technologies to communicate in order to accomplish the sessions’ goals.

In discussing online learning, Kate focused on her use of collaboration saying,

For me that collaboration is my way of getting the in-person back, my way of getting the relationship that’s built in in an in-person environment but can be lost in an online environment. So I just don’t know how to do it without the collaborative aspects.

She also discussed her use of visuals online “I use a lot more images and PowerPoint structures in an online environment than I do in an in-person environment” as well as her reasons for their use.

I think pictures do a good job of situating an example or an explanation. And because I can’t always see, I can’t read faces in an online environment often. I like any tool that makes it more explicit the thing I’m saying. While in an in-person environment I can cheat, right, I can see the confusion on your face and I can do something to mediate that.

Kate felt the need for an overall balanced approach when considering distance education saying,

I think there is a pressing need to provide access to courses and programs to students. I don’t think online is the only way to do that. It’s one way to look at it. But it doesn’t necessarily mean we all have to immediately teach online, learn all the technologies, and engage them in a different way. I think it works in a balance. Right now, we need to
assess that balance, what do our students need, why folks sign on for our programs, what do they need to get out of the programs. Then move from there.

**On Students.** When discussing her students, Kate reflected that she had students with a variety of technology abilities saying, “I have such an age range of students… I mean it really depends.” She went on to say, “for some of my students, the technology piece it’s more distracting than the learning that can happen. But for others it is a vehicle by which to do communication, right?” In describing a current class of students she said “oh yeah it’s the most tech savvy class that I’ve ever had. They’re super fun. But, then there are other folks, we wanted them to search online, and they’re like ‘yeah, can I use a book?’”

She also explained that her technology-savvy students did not always want to use technology describing this incident:

This semester my most tech-savvy student really just wanted, wanted to do [the assignment] on the whiteboard because she wanted to be able to engage in a much more tactile kind of way, but she is a 100% a gamer, I mean she, her whole study is gamification of the classroom. So, but what she really wanted to do was draw pictures on whiteboard and write people’s ideas down. So I don’t know that she necessarily just lives in a technological world though it’s expected that the technology would be there if she wanted it. Does that make sense?

In reflecting on student technology characteristics and how they influence her own teaching Kate said,

You could do this, you could do mixing work and play by adding gamification to your classroom, if you are like my current student, who is a big gamer, and really gets the constructs and context, and really wants to do that. If you are me, you value that she has that experience and she wants that. But I instruct around something that I can really support. I don’t have the skills to do that [gamification]. And I don’t really want to learn.

Kate reported that not all of her students were prepared to use technology in learning environments. She did not attribute student success and failures to technology skills per se,
instead she explained, “it’s really more about a willingness to be tenacious and a willingness to be creative and inventive in solving the problems. Less so than a comfort with technology.”

However she did lament the instructional time it took to teach students technology skills saying,

It makes it very, very frustrating…it means that part of any of these online environment courses that I teach has to be about teaching how to use that environment, which takes away the time of, you know, in in-person classes I don’t teach people how to be an in class person… we don’t spend the first two class sessions being like “so, if you have a question you raise your hand like this”—so it’s inconvenient, you have to build that in knowing that you have to lose the class period, probably two. But if you don’t do it, you will lose considerably more time. Because every time you wanna do something, using one of these tools, you have to re-teach the tool.

She also reflected on the reasons her students chose distance courses when she said,

I think a number of our students that signed up for online learning because they think it’s something that’s gonna be easier. “Oh I don’t really have to show up at the class. I only have to do these assignments and I’ll turn in a couple of papers.” A few of them actually told me they think it would be greatly easier. I was like “I don’t know why you think that, but OK, that’s not true.” Some of them do it for convenience because it’s really hard to get here in time. You know, traffic and things, I get it. Very few have I met do it because they are really tech-savvy and that’s the means they’d like to engage through. I feel most of the students are doing it for accessibility or convenience, not necessarily because they know how to play with technology. So it creates considerable problems.

In addition she felt the need to balance “real” student needs with “perceived” needs when deciding to offer online courses. She explained this by saying,

We need to assess the needs of our students. And then try to meet these needs of our students in balance. Like my student this semester who just doesn’t want to have to bother parking at UH, I don’t think she needs an online environment. I’m not willing to give up what’s valuable about the in-person constructs in order to meet that perceived
need. On the other hand, if we are running statewide programs, then there is an actual need.

On Colleagues. Kate did credit her colleagues with influencing her online teaching saying “anything I know about, and the whole way I think about how to engage in an online environment comes from the impact of those conversations with colleagues. It’s not just stuff I made up.” However, when using the term colleagues she was referring to a wide group including those in her department, other departments, and the support staff in the college. She felt that online teaching was valued in the college but that it depended on who was in leadership. She also felt the administration did not explicitly stress an expectation of online teaching because “I think they are too smart to say you are expected to do anything because professors don’t like that…But it’s certainly encouraged.” Ultimately, regarding online teaching expectations she said, “I don’t think you will somehow be shunned if you refuse teaching online.”

Stephanie

“I think I almost have more one-to-one interaction with my students than I do in a regular classroom…I feel like I get to know my students better.”

Stephanie is a professor in a statewide teacher preparation program. Students in this program are “cohorted” and take courses together as a group throughout their two-year program. Stephanie’s students live on islands throughout the state but are required to come to multiple face-to-face weekend meetings throughout the program. Stephanie teaches undergraduate courses both online and face-to-face and is also a “cohort coordinator.” In this role, she is the main contact between her program and multiple cohorts of distance students. As such, she deals a wide variety of issues that arise for her distance students and is required to answer student
inquiries, provide programmatic information, assist with travel coordination, and moderate issues among students and between students and instructors.

Overall, Stephanie was positive about distance education, especially with regard to the opportunities it provides to students living off-island. She described it this way,

It makes becoming a teacher more accessible to students who live in rural areas of Hawaii. That they can continue to work and live in their own communities, and they’re people who want to teach in their school community. Personally, I feel like I’m doing a great service to the welfare of children and their education. There are islands with people who are from those communities, who are going to be their teachers. And there are people who really want to do this. You know, because it’s such a huge sacrifice for an adult returning to education, to invest in their education and the amount of time commitment. So I feel that that’s the thing I like the best about teaching online. It’s more of an equitable situation for people who want to continue their education, give back to their communities, raise their own earning potential, become a professional, etc. I think that’s the thing I think I like best, that sort of altruistic part.

Stephanie discussed how her online teaching has changed over time to incorporate efficiencies, both through expanded use of online tools, and new techniques.

**On Students.** Stephanie reflected that her students are not a homogeneous group. She described two main groups or “the 20-something regular college age student, with somewhat limited life experience” and the “adults returning to education who have had all different kinds of learning experiences.” She went on to say that, “I notice a big difference in those two groups of students.”

Stephanie’s beliefs about her students and the types of experiences she wanted them to have influenced her technology choices in teaching and cohort coordination. Specifically, she did not want to incorporate recording of face-to-face sessions. She felt strongly that students should be physically together during those times, doing interactive group work, and that making
recordings of sessions available online would discourage students from participating in the face-to-face sessions. “That’s not really what our program is. We’re not really set up for that. Things we do are of group interest… you know, that involve being together.”

Stephanie also had some reservations about using technology. She had concerns about student privacy and did not personally post student work online relying instead on students to post work themselves. In addition, while she got excited about new technologies and the affordances they offered her and her students as future teachers, she often did not use them. Her reasons included requiring students to buy expensive hardware or software, that the technology may change too quickly and would not “transfer to what they’re going to do” and finally that students would not have access to the tools in their future schools saying, “they don’t have the flexibility or the freedom just to download any kind of software…I like to try to use materials, even art materials, that I think they would be more likely to use.”

Stephanie did reflect on future plans for incorporating more technology into her teaching and cohort coordination. She wanted to use more audio applications for students to improve their writing, more web conferencing for students to share their progress, and more website building on the part of students for them to share their work. She also described her desire to create an online space that would allow her to “stay in touch with the graduates, encouraging them to continue to integrate the arts throughout the curriculum, and share ideas.”

On Colleagues. Stephanie stressed that the colleagues that had the most influence on her are those that teach in her program. She felt that her program expected her and her colleagues to use technology and that they were doing so, but that more could be done. She felt that if, as a group, the instructors in her program could identify additional tools and techniques for using them, that ultimately the students would benefit. “But I think it would require more commitment
from our instructors.” Stephanie’s distance students are required to take part in a face-to-face weekend course called “Skills for Distance Students” in which staff from the college install a common set of software applications on students’ laptops then teach them how to use them. However, she noted that the instructors in the program are not necessarily using the tools introduced in the course, creating an unmet expectation among students. Regarding this she said,

They [students] feel like they should know how to do, use the technology that they were introduced to, some of it. I think we don’t follow up with well enough to keep them knowing how to use it, with all of the things that they are introduced to. So again, I think it will be better if the instructors were using more variety.

Stephanie also felt that her program should become “more online than we are. Fewer requirements for traveling here. Because this is a hardship on our students that have children who leave their children all weekend.” However, in order to accomplish this she said the program would need to “get our instructors more into the use of the technology, then we could move in that direction” in which case the technology would need to provide “ways to make [the program] more interactive in a way that the instructors start to feel like the students can get as much out of it as they feel like they can get out of being here in person.”

**Tom**

“I've enjoyed having to rethink what I do. I'm a person who likes change.”

Tom is a professor in a teacher preparation program. He has been teaching at the college for twenty-four years, ten of which have included online teaching. Tom planned on retiring within three years. While he had taught courses that had been completely online, the majority had been hybrid. Tom was positive about the opportunities distance education tools offered to his students commenting that,
A lot of the people in teacher ed are trying to work to pay for their tuition, so, they can have more opportunities to do it at their own time. When I looked and saw when people were actually accessing [the course], sometimes it was two in the morning. So they would be working as a waitress, and when the restaurant or bar closed down, they could go home, and they were wide awake, so they started doing work on their projects because that would have been a better time for them. So just in general I see online offering an advantage to kids, they can make things work within their work schedule.

He also reflected that teaching online has forced him to reexamine his teaching methods and said,

I've been here for 20 years, so sometimes I've taught the same courses over and over again, and it can get old. And so part of what the move to online has done is it's broken up the routine. So now I stop and say: "Wait a minute—do I need to do this any more?" or "which way should I be doing it?" or "If I'm going to put it online, what format do I need to put it in?" And so that has, in some ways, enlivened regular teaching in a sense. I've enjoyed having to rethink what I do. I'm a person who likes change. So having to rethink what I do and not get into a rut, having gone to online has made me do that a little bit more.

Tom was enthusiastic about distance education and expressed a desire to further incorporate distance tools and techniques into his traditional classes. He explained, “But I really just want to make it a part of practice and say: in this particular course, we really need to meet eight meetings face-to-face, and the rest of the material, we could do just as effectively, if you work on your own time and get this schedule. I would like to see us go more to that model for our face-to-face.” Despite his use of distance tools, Tom expressed a preference for face-to-face saying, “I don't like things that are totally online, at all. Because I'm not sure that I, I have developed the ability to build a relationship with people online at all. I like face-to-face stuff. I like to see people's expressions and all of that.”
Tom also saw distance education as an inevitable consequence of the education marketplace saying,

We hate to talk about higher ed as being a business, but it is. If we don't get students and we don't have tuition coming in, we can't do things. And the truth is, what's offered, what's being offered, by much of the world now is online. And if we can't offer something compatible, or that has value, along with it, it's not even going to be competitive. It's a marketplace for people.

Tom saw a number of possible benefits to distance education, specifically, online modules for remediation.

When students come in and don't have the content background they need for the program…Rather than saying you're just not going to be admitted until you get all these extra courses, you don’t necessarily need all that. But if you do this and that and this, so [online tutorials/modules] are providing those options.

He also saw distance education as a way for himself and others to teach after retirement.

I'm not going to have an office anymore, and I wouldn't necessarily want to have to run in to campus every week…When faculty retire and are gone, we lose a whole lot of expertise. For them to be able to work part time and offer [courses] that way, it could, it could be interesting.

He also saw online information, MOOCs in particular, as a way to continue his own professional development after retirement and said, “as just somebody who likes to learn stuff, I look forward to that piece.”

**On Students.** In describing his opinions regarding his local students’ technology skills and his reaction to them he said,

The kids that I have now, on campus that are doing, they are better than we are at the technology. They know all about it and do all kinds of stuff that I don't even mess with…and I want them to teach me that. How did you do that? How did you get that to work that way? Show me how? Show me how you did that? And sometimes it's
laughable…So I'm not at all embarrassed that they know more than I do about it. And I want them to let the rest of us know.

While some of his students were technologically savvy with some tools, Tom saw it as his responsibility to teach students technology skills they may not have. He said,

If there is something I really want to do with technology, and they don't know how to do that, it's my job. I mean, either I have to change it and not use it, or I have to show them how to use it…I have the obligation to take the time to say, here's how we're going to use this piece.

In speaking about his students’ use of technology for learning Tom said “some people say their attention spans have changed, I don't think that is necessarily true. I just think they are used to getting stuff in a different format and they are comfortable getting stuff in a different format.”

But in speaking about technology-savvy students and their impact on the classroom and the future he commented,

Some people have talked about having a problem with their kids in classes pulling out the phone and texting. I think if you talk to them right they understand that is not going to happen, that's not appropriate at this time and this place. It's not that they are incapable of dealing with it, they can, they just need to know. I really wish we found, would find ways to take advantage of that. I still don't think, I think there is a mismatch between me living in an older world and them living in another world and I’m hoping that new faculty, the young folks coming in who we've got here who grew up with that actually have ways of thinking about that and using that and finding ways to make that work for them.

**On Colleagues.** In speaking about his colleagues, Tom noted that some have resisted change brought on by technology.

People complain about it and I just figure, it's supposed to change. I am a person who likes change, things are supposed to change. You move forward and, being here as long as I have, now I'm the old guy, so I expect stuff to change and I expect there to be new stuff. So for people who whine about the technology, they are living in an age that doesn't exist any more.
He felt the expectation levels were low for existing faculty to teach online, but he did note that “with anybody new that we would hire, there is probably at the department and at the college level, a clear expectation that you should be able to teach online. At least be willing to.”

However, when discussing his colleagues and discussions regarding his program’s collaboration with the an instructional design team to put their program online he commented that “we have some faculty saying, ‘I think we can do this ourselves’, and I'm saying, ‘I don't think they can.’”

Tom did mention a specific retired colleague he had collaborated with who had adopted technology saying, “he embraced this right from the beginning. He's the one who organized this whole project by the way, he's the founder of the project, and when you see people embracing it that way, I think it's real positive to see people do that.” However, he did not collaborate extensively with colleagues on technology and commented that “the only role they play is that they show me how things work. Sometimes we've collaborated on things, but not that often.”

Jean

“I feel like I am accomplishing more with the online… it’s really weird, I feel more connected to my students online, than I did the face-to-face, I just feel like I get to know them more intimately”

Jean is a professor that has taught online for four years. While she had taught at a distance previously it was through interactive television. She became involved in distance teaching due to the need for her program to license teachers throughout the state. Jean said support was key to her successful transition to online education. Her department gave her a course release to develop her first online class, and she attended trainings and received one-on-one support offered through the college.
Jean reflected on the differences between her face-to-face and online teaching. Jean appreciated the pace and interaction of online and seemed to prefer it to face-to-face delivery saying,

The learning is spread out more in the online, learning is more coherent and sequenced and ongoing, the way I have instructed anyway. Each week they are reading, doing, submitting the thing and then they go to next week. Where while I was doing face-to-face, we would meet three hours during the week, you would exchange and discuss, and that was it until the next week…I think the amount of time that you are involved with the students is more limited in face-to-face classes than the interaction that you have in online. Because you’re talking to them all week long, either via email or on Skype…I just think the contact is actually more personal and more involved in online than in face-to-face.

Jean also thought online provided a more equitable learning environment in which students interact and engage more than in a face-to-face classroom.

I get more and better responses from the students, more comprehensive, because everyone is having to do and submit what you are asking. Whereas in the face-to-face, there’s always the ones who respond, but then the majority are sitting there listening, you don’t know if they’ve gotten it or not. So I think I get a better understanding of what they are learning from the fact that they have to show me what they’ve learned that week. And everybody has to show me, it’s not just the ones who are willing to raise their hand that night in class.

Jean did however comment that the extra time spent teaching online, especially providing feedback to students was a challenge she had yet to master saying “I don’t know how handle it yet, because I’m spending my life sitting in front of the computer!”

On Students. Jean described many of her students as “more non-traditional older folks, they are out of the technology generation” mentioning that some had even been uncomfortable with using email. She said,
That was true. Especially when we first started. It is not so true now because we require everybody to come before class starts for a weekend for the 501 tech class. So at least they are trained, in how to use Laulima, Collaborate, how to word process, you know, they do go through training now. Some of them still struggle sometimes a little bit with the technology. But just in the past two years, I can tell a big difference from when we first started, that things are much better now. I think just more people use more technology and we require them to get training or test out. And testing out is harder than just coming and doing it.

At the time of the interview Jean was teaching an undergraduate course for the first time in three years and commented on how different those students were.

They are much more into themselves. They are much more, I don’t know, non-responsive to the regular interaction, they’re immature! (laughs) And I think they’re addicted to Facebook. I’m looking at them, just sort of going “how do you fight this, the instant communication, the instant hooking up with each other?”

Jean acknowledged that technology was a powerful tool for learning but reflected that newer faculty might be more prepared to leverage technology saying “new people coming in, that might be more of that ilk, probably will be able to handle them better. They all know how to circuit that for useful purposes. I’m not right there yet as to how I can use this.”

**On Colleagues.** Jean mentioned specific colleagues in her department and their expertise with technology. She saw their presence in her department as an asset saying “we are lucky in this department, that we’ve got all that support.” She also went on to describe collaborating with a colleague on a redesign of one of her own online courses. One of her colleagues had developed a framework for incorporating universal design for learning into online courses. She described their collaboration this way,

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So she came to me and said “would you like to apply this to [your course]?” We sat down and applied it and did an evaluation and everything and wrote it up. So this has become part of my research agenda. It’s part of my academic role. So personally, I get a
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lot of help, probably because I enjoy doing this. I have the support, and the training, and the new stuff comes, and they introduce it to me.

Jean expressed that new faculty should be expected to teach online and that the college should continue to grow its distance programs,

I think the old folks like me that are retiring, will be exiting, and those of us that are interested in it, followed up and did it, and are willing to keep updating and so forth. But what I see happening is that as we retire and the new people come in, I think there’s going to be more technologically-savvy new professors. I think they’re going to be more willing to jump into the online, as long as they know it’s expected. So I think the college needs to adopt a viewpoint that this is the wave of the future, and this is how it’s going to be done, especially if you’re in the middle of the Pacific ocean, duh!

Jean also stressed that technology skills also needed to be complimented with pedagogical knowledge of online teaching.

One thing that I think needs to be brought out is it’s not just the technology and the online stuff and what not, but the pedagogy, knowing how to use technology for teaching, I think that’s what needs to be stressed. Because I think a lot of people can come in with a lot of technology savvy, but they may not know how to like do the jigsaws and the groupings and the things that are actually the pedagogical part of teaching online.

She also emphasized that the college needed to create the expectation for online teaching and support it with professional development in order to stay competitive.

It’s going to depend on the directives of the people who are putting out the calls for hiring the new people. That, you know, this might be an expected part of your job, to know how to do good online teaching. And if you don’t, then we better have some professional development here to get them to do that, if that’s what they are going to be required to do. And I see that as, if we don’t, we are noncompetitive in this world of higher education. But you need to keep the quality too. We don’t need to just offer a matchbook degree, because you can read a book and write a paper on it!
Jack was a professor with over 30 years of traditional teaching experience and was scheduled to soon retire. He mainly taught graduate courses online and expressed concern over “putting undergraduates into a lot of these online situations” because some of them “probably still need to have a professor in front of them, or with them, beside them…” He was a producer of television media throughout his career and made the comparison between planning for television media and planning for an online class. He felt that he was hired to “lead the charge” for distance education in his department. He had experimented with teaching over the phone, over television and over the Internet. His teaching emphasis was on communication and “from early on I was determined to figure out how we would use this Internet in a way that would still allow for conversation.” In his online courses he likens his role to that of a TV or radio talk show host, a moderator whose job is to facilitate engaging discussion. His online teaching format centered around posting materials for students to watch or read, then to comment on asynchronously. He then used the students’ asynchronous comments to generate discussion in the required, weekly, synchronous class sessions. Students then reflected asynchronously in discussion boards after the class sessions. He stressed the importance of communication and of visuals to engage students, especially through storytelling and project-based learning.

Jack expressed some general skepticism about distance education.

I’ve seen a lot of distance ed that I consider inappropriate and bad. And I see high school students bored out of their gourds with packaged online courses. I see university students
absolutely bored. Boredom is the dread of education, and these online tools, if anything, can maybe exacerbate some of that, so I’m kind of a wary participant.

He feared that the “commodification of education into little packages that can be disseminated” resulted in a lack of interaction and that in the future “you may have a world that has a bunch of people with a bunch of credentials on their walls but I don’t know that they will be thoughtful and concerned and empathetic to the struggles of humanity. That really does worry me actually.”

**On Students.** Jack acknowledged great variation among his students’ technology skills and said,

We still teach lots of people who are not digital natives, and I’m not prepared to look at all the young people that are in our college and say that they’ve got a vast amount of knowledge about technology. I’m not sure that’s true. Our humanity is basically the same. I think some of these paradigms that suggest we’re really, you know, that the digital world has shaped our brains or has gotten you to radically think differently, I’m not prepared to acknowledge that.

When asked if this impacted his teaching he replied,

Many, many times. I think that’s a constant tug in this business. You know, you’re using technology as the, you know, you’re almost having to teach students how to learn. So you’ve kind of got two layers here. You’re teaching maybe a content and then you’re also having to support students to use technology to access that content. So, whereas, you know, for a traditional classroom, you wouldn’t be teaching someone how to use a pencil, that would’ve been learned, you know, early on in their education, or how to read a book.

Jack went on to comment that his students did not need more technology training per se, that they needed a different attitude toward learning about and using technology. He began by talking about himself saying,
I’ve learned how to learn, I guess. I know how to ask questions. I’m not shy about asking for help. I know how to go on YouTube and watch how-to videos, you know, I have this confidence that comes with that. I look at a lot of students and they’re used to being hand-fed.

When speaking further about the impact of his students’ abilities on his teaching he said, Impacted. Every day, in every way. Because I teach technology too. That’s my main gig, and I’m always looking at my students and asking, “Am I succeeding in this enterprise or not?” and if I’m not, I am trying to adapt and change and do something different. So, for me, I think my students have been my principal guide as far as how to design instruction.

**On Colleagues.** In speaking about the influence of his colleagues, he commented, “So, if the question is have I been influenced by my professional peer group? I pick my models pretty carefully. And my models are success models.” Jack said he prefers to surround himself with people with a passion for distance education and explained, “I don’t want to be around folks who are dragging me down.”

Jack acknowledged seeing his colleagues ‘suffer’ with online teaching and felt that some may be trying to directly transfer what they have done in their traditional classes to the online environment. “But I have this crazy belief that if you’re not a very good teacher in the face-to-face environment, you’re probably not going to be very good in the online environment either.”

He felt there was a strong expectation within the college and his department to teach online and that his colleagues were less present on campus because they were teaching from a distance. However, he felt this lack of contact could negatively impact the educational experience, especially for students, saying,

You are here as a person living in a community, you will rub shoulders with students and professors and God knows custodians and everybody else and after some years you will leave a different person. You will have been shaped by a culture.
Jack also expressed deep concern over the role of the instructor in the push for “prepackaged information” and lack of human engagement in distance education. With regard to himself he said,

I am kind of glad I’m retiring. Because I think I kind of fit the era in which I grew up, which was still to come to a place called school and have conversations around the water cooler kind of thing. I don’t get that with my smart phone, it’s not the same.

Jack then cautioned the interviewer, a student not from the United States, to not believe too strongly in prepackaged content. He said,

You want to go back and engage with your physical community. That’s my bet. If not, then I think you’re being misdirected. Because we won’t need you. If it’s just modules, we can find a better guy at Harvard.

Despite some skepticism about distance education, overall, Jack was passionate about his online teaching and its impact saying “those aren’t necessarily the reasons why I went into the field, saving money, being economical, that wasn’t what drove me into this field. I wanted to change the world.”

Amy

“It’s not the technology so much anymore as it is how can we harness the technology to meet the students’ needs and our needs”

Amy was an associate professor that had taught online for six years. She had taught both graduate and undergraduate courses online. Amy became involved in distance education through her program’s efforts to prepare teachers throughout the state.

Amy was positive about teaching online, and in particular said,

I like the fact that from my perspective, it forces me to have the course completely developed, all resources up, all assignments up, all the whole conceptual development
through the implementation, little implementation pieces, done at the beginning of the semester so you don’t have that as an ongoing part.

She reflected that while this preparation took quite a bit of upfront effort “there’s the time factor in frontloading involved” that she was then able to focus on providing students with feedback throughout the course “so it’s more or less what I’m doing from that point on is just reacting to students you know.”

She expressed a desire to incorporate more tools into her online teaching because, “I do believe that multimedia matters with this, with students, I’d like to have some more tools that I incorporate into it that maybe are doing some of the same things I’m doing now in print.”

However she expressed concerns over the time required as well saying,

It’s really a matter of time you know, in order to try something new like that. You’ve got to sit down, you’ve got to figure out what you’re going to do, you’ve got to figure out how you’re going to do it, and then you have to set it up. And I think more, you know, one-to-one availability of, of staff time to help with setting up some of the ideas I have would be very helpful. I haven’t asked and been denied, I just haven’t asked.

**On Students.** In describing her students Amy said,

I think my students are changing. I think students in general are more technology-savvy than they once were, even the ones that are a little older or non-traditional students. They once were, the older ones, were afraid of technology. And now everyone expects it and they like the access that technology provides.

She further emphasized that the increase in her students’ technology skills applied to both traditional and non-traditional students, commenting that,

The more non-traditional ones are obviously using media more. Whether it’s because the older people are getting into Facebook and Instagram and all of these other digital options. More and more students have smart phones, young and old. So I do think that the technology, the abundance of technology and social media options are influencing the
whole range of students, and making them maybe more comfortable with technology in general.

Amy’s experiences with her students and their feedback on course evaluations prompted her to make specific changes to her courses. She said that “I’ve found that from student feedback and from just the submission of their assignments, they need more contact time.” In response to this she incorporated more synchronous sessions into her course. “I had originally done relatively few Collaborate classes now I’m finding that I do them either every week or almost every week…I think it’s vital so that students feel that they’re actually part of a learning community.” In addition, she noted that her students were “very responsive to multimedia and so incorporating media is important to try to both increase their comprehension and their interest.” Amy therefore regularly incorporated media into her curriculum and said, “I try as often as possible to give them a YouTube or something to review that facilitates the discussion and I like to use ones that help get them get interested… rather than just reading a chapter.”

Amy noted that in her hybrid classes she observes a difference in her students when meeting face-to-face or online and said, “since it’s hybrid, we also have class time with these students, they are much more, responsive and will talk more when we’re face-to-face than in the Collaborate classroom.” In Collaborate sessions she noted that “they are very much driven to use the chat board to respond…if you throw out a question or ask for ideas. Instead of someone taking the microphone, the chat board lights up and everybody’s on that. So I think they’re not as prepared to actually talk and I don’t think that’s a technology thing…”

**On Colleagues.** Amy did not perceive her colleagues to be influential on her decision making in online teaching, but she did express a desire for more sharing between faculty saying, If we have the opportunity to ever discuss the way we’re using the technology or ideas for courses, if we have time to just chat for a bit...Their ideas influence me about what
maybe is working for them or how they’ve tried a tool and found it difficult, and then our discussion about whether I’ve tried it or not. So I think collegial discussions about what we’re doing would be really helpful.
She saw this as an important way for her department to make progress with distance education explaining,

What I would like to see in the next few years is, what I mentioned earlier, more departmental discussion and sharing on what’s working and what strategies are being used. It’s not the technology so much anymore as it is how can we harness the technology to meet the students’ needs and our needs. So I don’t think we are going to get there in, I mean, it’s hard to get there individually. I think we’ll get there if we start emphasizing it and discussing it, you know, with one another. So that then I think that, will help float everybody’s boat a little higher.

**Summary**

This chapter provided descriptions of each of the six participants in the study and their opinions on online education, students and colleagues. The purpose was to provide a wider view of the individuals and their beliefs regarding online teaching. Chapter 5 will describe the results from the study’s survey as well as the common themes that emerged from analysis across the six interviews. Chapter 6 will present the data analysis as it related to the TPACK framework and finally, Chapter 7 will discuss the study’s conclusions and implications.
CHAPTER 5. COMPARATIVE FINDINGS

Chapter 4 described general findings from the individual cases of six college of education faculty who teach online. This chapter looks at the results from the survey and subsequent interviews. The chapter will discuss common themes that developed in the interviews regarding beliefs participants shared, or did not share about their students and colleagues and how those influenced their online teaching.

Survey

Sixty-five of the college’s 225 faculty responded to the survey for a 29% response rate. Participants were 64% female and 73% reported to be 40 or older. Twenty-eight percent were tenured faculty, 22% were tenure-track, with the remaining in other types of faculty or instructor positions. When rating their general computer knowledge, 43% claimed to have intermediate knowledge and 46% proficient knowledge. Figure 7 displays the tools participants reported to use most frequently for personal uses and with students. Seventy-three percent of respondents had taught an online course before. Twenty-three percent reported that they taught exclusively online, while 38% had a mixed load, teaching both online and face-to-face classes.
<table>
<thead>
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<th>Tools I Use</th>
<th>Percentage</th>
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<td>Phone texting</td>
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<td>Google Drive (documents)</td>
<td>73%</td>
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<tr>
<td>Skype</td>
<td>67%</td>
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<td>YouTube</td>
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<table>
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<tr>
<th>Tools for Students</th>
<th>Percentage</th>
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<td>Email to students</td>
<td>99%</td>
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<td>Online journal articles</td>
<td>76%</td>
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<td>Online gradebook</td>
<td>68%</td>
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<td>Youtube</td>
<td>61%</td>
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<td>Online discussion board</td>
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Figure 7. Tools most frequently used personally and with students.

Results Leading to Research Questions

The overall survey results were discussed among the class group. Certain results were of particular interest and guided the discussion toward the study’s current research questions. With regard to students, the group was surprised by the variability faculty self-reported on their understanding of their students’ knowledge of technology for learning. These results are displayed in Figure 8.

Figure 8. Understanding of students’ knowledge of using technology for learning.

1 = Strongly Agree, 5 = Strongly Disagree
Another quantitative result that stood out was the variability on faculty beliefs about students being well prepared to use the technologies required for online learning. These results are displayed in Figure 9.

![Graph showing student preparedness to use online learning tools. 1 = Strongly Agree, 5 = Strongly Disagree.](image)

**Figure 9. Student preparedness to use online learning tools.**

1 = Strongly Agree, 5 = Strongly Disagree

It was of interest that faculty did not necessarily feel that they knew what their students’ abilities were for using technology for learning, and the amount of variation in whether they felt students were prepared to use the tools of online learning. From the open-ended questions, when asked what the greatest challenge to online learning was, we particularly noticed this answer “Students lacking the technology skills to truly strive as online learners.” Discussing these results led the group to the idea of digital natives and student technology abilities in academic settings. We decided to explore this issue more deeply, the result being a research question about how faculty beliefs regarding students influence online teaching.

Issues dealing with colleagues also arose in the survey data discussion. Of interest were the results displayed in Figure 10 regarding being encouraged by one’s department to teach online. While many participants felt they were encouraged, many remained neutral. When asked in the open-ended questions about the greatest challenge to online learning, one participant
answered “ignorance from administrators and colleagues,” while another answered “faculty acceptance.” These results propelled the discussion toward issues of teaching context, departmental and college expectations and collegial relationships. Ultimately, our second research question became how faculty beliefs about colleagues influence their online teaching.

![Bar chart](image)

**Figure 10. Departmental encouragement to teach online.**

1 = Strongly Agree, 5 = Strongly Disagree

**Interviews**

This section will look at themes that emerged from the interview data analysis regarding participants’ beliefs about students and colleagues and their impact on their online teaching.

**Students and the Digital Divide**

The idea of the digital divide has most often been used as a general term to describe the disparity between socio-economic classes and their access to technology. Pippa Norris (2001) is generally attributed with coining the phrase in her seminal work *Digital Divide: Civic Engagement, Information Poverty and the Internet Worldwide*. Within the broader definition of the digital divide, Norris more specifically describes a “global divide” as “the divergence of Internet access between industrialized and developing societies” as well as a “social divide” or
“gap between information rich and poor in each nation” (p. 4). Three of the six of the participants, Tom, Kate and Jack taught online classes to students living in Pacific island nations and described the impact of a global and social divide when teaching. Tom spoke about his students’ personal access to technology needed for coursework saying,

The computer that we provided for them was the first computer they ever had personally, ever. Many of them had access to computers at their schools or at their work. But they didn't have a personal computer. Now I would say it was probably two thirds of them.

In describing students who did not have basic technology skills and the time he spends in class working with them, Jack recalled, “I’ve taught courses to students in Micronesia. I mean, my God, we’ve had students from the Marshall Islands who’ve never probably touched a mouse. Well, they’re students too.”

When discussing the overall access of her students in American Samoa, Kate said,

When the American Samoans, they don’t, a good windy day, you don’t have Internet connection…It’s very, very frustrating. Whole classes just don’t happen. Or two people sign on, and the others just won’t. And you don’t know why. It’s hard to know why. Because they don’t have access right now? Or they just don’t want to be here? It’s just hard to know.

Tom described an impact of his students’ abilities and location on his teaching this way,

With the group, the Micronesian group that we were talking about, when we found out they struggled with certain kinds of things, you wouldn't even build that into the process any more. Because the learning curve, or trying to do it when we found out, because of the distance and the slow speeds, that you couldn't put video up. It would, even to do application sharing, it would take a spreadsheet, you know, little windows of it keep coming up, till you get the whole thing. So you try this and say, ‘Are there ways to do this in a different way without having to do?...’ Sometimes you would send it out earlier to them and say ‘We are going to use this tonight, try to look it up on your screen so we don't have to go to application sharing, you can just switch to a different application to see it right there, it's already loaded up.’ So those types of things.
As a result of his students’ technology abilities, or lack thereof, Tom would group students in various ways and said,

Some of the guys could never get how to use the tools…So when you're breaking them out into breakout rooms, sometimes you think about who do you need to have in that breakout room with them to remind them that they need to do this to get the textbox in there, or something.

Tom also made adjustments to his curricular materials based on his understanding of his online students and explained, “when I think about what am I going to put up there, it has to be engaging, it has to be an activity that, particularly for the population that I was dealing with, reading a lot of text and words, would have lost them.”

Kate also described having students in American Samoa and how the resulting technology difficulties influenced how she structured her class activities saying,

I really wanted the groups mixed up, and so I have students in person bring their computers so they can log on to Blackboard and then I could move them. Even though they’re in person, I would physically, I would move them to the virtual classroom space so they would be in groups with folks from American Samoa. The problem is when too many people are in Blackboard in the same room at the same time it didn’t, it just doesn’t go as well. I don’t know if it’s just too much, I don’t know why. I assume space on the server but it just didn’t go terribly well. So in the end more often than not, I’ll sort of just have all the people online be in their group to do all of the small group thing and then the people in person will be broken up into their groups and the groups will come back together and share. Which isn’t my ideal necessarily. When we can get the technology to do it, it’s great, but more often than not…
Students as Digital Natives and Immigrants

Figure 11 depicts which participants felt their students’ technology abilities related to their age. Tom, Jean and Stephanie acknowledged distinctions between their students that corresponded with age differences.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kate</td>
<td>N</td>
</tr>
<tr>
<td>Stephanie</td>
<td>Y</td>
</tr>
<tr>
<td>Tom</td>
<td>Y</td>
</tr>
<tr>
<td>Jean</td>
<td>Y</td>
</tr>
<tr>
<td>Jack</td>
<td>N</td>
</tr>
<tr>
<td>Amy</td>
<td>Y and N</td>
</tr>
</tbody>
</table>

Figure 11. Participants’ experience of age-based native and immigrant students.

Stephanie commented on her students’ differences due to varying amounts of life experience saying,

I feel like I work with two distinctly different groups of students. The twenty-something, regular college age student, with somewhat limited life experience. And then I have more like the adults returning to education who have had all different kinds of learning experiences…So you know they’re in the two different categories of whether they’re digital natives, or --what is the other term for? immigrants, yeah. So, I notice a big difference in those two groups of students.

When completing the card sort activity based on digital native characteristics, Jean commented that “What you’re doing is you’re separating my face-to-face class, my little young 20-somethings from my 40 and 50-somethings. It’s what you’re doing.” She also reflected that teaching the younger students was a challenge and said,

This is my first undergrad class in a long time, so I’m not used to the little twenty-somethings that are so technologically into the immediate stuff. So I am struggling with that because even before when I had face-to-face, they were usually older…and so I am used to that population more than these little Twitter kids.

Despite acknowledging digital native traits in their students, Jack and Tom both discounted the theory of physical changes in the brain. Jack stated,
I don’t know that we’re all that different in this world. I started teaching way back in 1973, so I’ve put in like a forty-year stint on this and I’ve have had a lot of students over my life. And ah, our humanity is basically the same. I think some of these paradigms that suggest we’re really, you know, that the digital world has shaped our brains, or has gotten you to radically think differently, I’m not prepared to acknowledge that. Tom also discounted the idea of changed brains and instead attributed student changes to familiarity with technology saying, 

I don’t know, I don't think their attention span, some people say their attention spans have changed, I don't think that is necessarily true. I just think they are used to getting stuff in a different format, and they are comfortable getting stuff in a different format.

Kate, Jack and Amy struggled with generally attributing digital native characteristics widely to students. While doing the card sort activity Kate said, “It just really depends on the person. Some of these are really hard. How do you like categorize the majority of your students?” While Jack said “I’m not going to say that these things are unique to digital natives, I think this goes back to just how a lot of human beings learn anywhere in the world.” Amy suggested “I guess because it’s situational, maybe that they don’t apply all the time right? And I find that, that these are very much more student specific.” Yet at another point in her interview, Amy also commented on the difficulties her older students had experienced with technology saying “So they have trouble with those two things, multimedia and then just pdfs, that’s where I’m seeing it, and it particularly happens with the older and more non-traditional student that hasn’t spent a lot of time using Web-based materials.”

**Student Preparedness**

Figure 12 represents participant opinion on having digital native and immigrant students, notes on if students had technology training from the college and how these impact online teaching.
<table>
<thead>
<tr>
<th>Participant</th>
<th>Student Abilities</th>
<th>Student Action</th>
<th>Participant Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kate</td>
<td>Abilities mixed</td>
<td>Students have failed due to lack of skills</td>
<td>Takes responsibility to teach technology skills Uses class time to train students</td>
</tr>
<tr>
<td>Stephanie</td>
<td>Better than past</td>
<td>Students take ETEC 501</td>
<td></td>
</tr>
<tr>
<td>Tom</td>
<td>Abilities mixed</td>
<td></td>
<td>Takes responsibility to teach technology skills Uses class time to train students Groups low and high ability students</td>
</tr>
<tr>
<td>Jean</td>
<td>Better than past</td>
<td>Students take ETEC 501</td>
<td></td>
</tr>
<tr>
<td>Jack</td>
<td>Abilities mixed</td>
<td>Students lack intrinsic motivation to learn tech skills</td>
<td>Takes responsibility to teach technology skills Uses class time to train students Groups low and high ability students</td>
</tr>
<tr>
<td>Amy</td>
<td>Better than past</td>
<td>Students take ETEC 501</td>
<td>Guides students to technology assistance resources</td>
</tr>
</tbody>
</table>

**Figure 12. Participants’ perception of student preparedness and impact.**

Participants that taught students who had been through the College’s ETEC 501 - Skills for Distance Students course, Stephanie, Jean, and Amy, commented that their students were better prepared to use the technology required in their courses. Stephanie said “traditional program students don’t know how to do a lot of the things that my statewide students know how to do with technology…then I realize that they didn’t have that ETEC 501 class.” Amy also commented that “I think the mandatory 501 class saw an immediate improvement when we started that” and when talking about students encountering technical difficulties, Jean stated, “That was true. Especially when we first started. It is not so true now because we required everybody to come before class starts for a weekend for the 501 tech class.”

Those who taught students that had not received the College’s training noticed great variability in their students’ technology abilities. In speaking about a current group of students Kate said, “It’s the most tech savvy class that I’ve ever had. They’re super fun. But, then there
are other folks that we wanted to search online and they’re like ‘Yeah, can I use a book?’” Jack felt that the technology differences he experienced were not age-based saying,

I’m not prepared to look at all the young people that are in our college and say that they’ve got a vast amount of knowledge about technology, I’m not sure that’s true…So let’s not, you know, assume somehow that we have a prototypical student that represents all of us, because that is NOT a fact.

Despite an overall feeling from all six participants that over time students were becoming generally more prepared to use technology in their courses, all commented that students still lacked requisite technology skills. Kate, Tom and Jack described the impact on their teaching most clearly. Kate expressed general frustration on the topic saying “You know, it kind of drives me crazy, people sign up for online programs but then actually have a really hard time trying to learn computers. I’m like, ‘what did you sign up for?’” She went on to say that two of her students’ lack of skills had prevented them from completing her course explaining that,

Trying to troubleshoot is phenomenal. And it’s unfortunate. You know, there were two people that couldn’t finish the course, because they kept wanting me to log them on. I said ‘folks, this is not how this works’. They don’t understand why can’t you just log my computer on. I said ‘no I can’t. There are certain things that I can’t do for you.’

Jack felt that his students lacked the intrinsic motivation to learn on their own saying, “You totally know that it’s spooky, I mean, what you can’t learn now [online]. But I have students still, who are not just natively going out and saying, ‘I can become a self-constructed learner.’ And then as a teacher, you don’t want to embarrass those people, and you want to provide supports for them.”

Jack, Kate and Tom felt it was their duty as an instructor to provide technology training for their students, and they lamented the amount of time it took away from teaching their content. Tom stated,
If there is something I really want to do with technology, and they don't know how to do that, it's my job. I mean, either I have to change it and not use it, or I have to show them how to use it. So I don't mind saying, ‘It's not their fault if they don't know certain things’ I would say. So if they don't know how to do certain things, then I have the obligation to take the time to say, ‘here's how we're going to use this piece’… If you don't know how to use it, it isn’t going to be effective unless you teach someone how to use it, and it takes time to show it to you, and that's my time.

Kate and Jack also mentioned that lack of student preparedness and the technology training they then have to provide to students impacted their online but not their face-to-face courses. Kate put it this way,

It means that part of any of these online environment courses that I teach has to be about teaching how to use that environment, which takes away the time of, you know, in-person classes I don’t teach people how to be an in-class person…we don’t spend the first two class sessions being like ‘so, if you have a question you raise your hand like this.’ Online you have to say ‘click this little button here, OK, everybody practice raising your hands.’ And that takes time…So it’s inconvenient, you have to build that in, knowing that you have to lose the class period, probably two. But if you don’t do it, you will lose considerably more time. Because every time you want to do something, using one of these tools, you have to re-teach the tool.

Jack described it this way,

You know, you’re almost having to teach students how to learn, so you’ve kind of got two layers here. You’re teaching maybe a content and then you’re also having to support students to use technology to access that content, so, whereas, you know, for a traditional classroom, you wouldn’t be teaching someone how to use a pencil, that would’ve been learned, you know, early on in their education, or how to read a book.

Amy on the other hand did not feel it was her responsibility to train students directly, and that her role was to help students to help themselves with technology. She explained it this way,

I feel that my role as an instructor is to help guide them toward resources that can help them. So I will give them the help line, the ITS help line. I’ll go and ask a question to
the resource staff, the technology resources staff that we have and then try to help them
work through some of these problems. I don’t feel like my, that’s not my role in, as the
instructor of, it’s not my role as a professor. However, I feel that the only way to
facilitate their learning is to help them figure out how to access their content. So to that
degree I’m a go-between or a broker for them to get the help they need.
Tom and Jack both described considering their students’ technology skills in how they
design activities and group students together. Jack said,

I try not to ground my teaching down to the lowest common denominator, you know, the
old risk of if someone’s never touched a mouse, then you’re going to teach everyone how
to use a mouse. Well, that’s a terrible way to teach but you sure think about how to
organize students so that maybe someone with skills can be sharing them with someone
who has fewer. Ways to help people save face.
While Tom said,

Some of the guys could never get how to use the tools. When you do the text box and
type stuff in. Because we'd ask them for feedback and then sometimes they wouldn't
have, they could hear but they couldn’t talk. So we'd have to ask them, even in the
breakout rooms, to use the text box. So when you're breaking them out into breakout
rooms, sometimes you think about ‘Who do you need to have in that breakout room with
them to remind them that they need to do this to get the text box in there?’

In the card sort activity, participants were asked to choose the characteristics of digital
natives that represented their online students, then rank the importance of those characteristics on
their online teaching. The frequencies and ranking order of the card sort activity is shown in
Figure 13.
Preference for learning through activity rather than reading or listening
Preference for collaboration
Preference for pictures rather than text
Mixing of work and play
Craving for speed and inability to tolerate slow-paced environment
Expectation that technology is part of the landscape; difficulty with environments that lack technology
Expectation for immediate feedback and “payoff” for their efforts as found in games
Novelty of technology may be distracting
Impatience with guided instruction
Preference for constant connectivity
Desire or perceived need to multitask
Ability to scan text and process information quickly
Tendency to process information in nonlinear ways
Loss of ability to read in linear manner
Preference for fantasy contexts as found in games and realistic TV and movies

Figure 13. Digital native characteristic frequency.

Three characteristics of digital natives were most frequently chosen by participants and most highly ranked as having impact on their online teaching. Overall results of the card sort choices and ranking by individual participants can be found in Appendix F. Preference for learning through activity rather than reading or listening was the only characteristic chosen by all six participants. It was also the most highly ranked as having the greatest impact on their online teaching. Tom and Jean ranked it first as having the most impact on their teaching, while Kate, Stephanie and Amy each ranked it second. Preference for collaboration was chosen by five participants and was the second most highly ranked for impact. Preference for pictures rather than text was also chosen by five participants and was the third most highly ranked. These three characteristics also emerged as themes when participants described their online teaching.

Preference for Learning Through Activity Rather than Reading or Listening

Figure 14 displays where each of the participants ranked in the card sort activity preference for learning through activity rather than reading or listening.
Each of the online teaching examples described by participants emphasized students participating in activity. These are summarized in Figure 15.

| Preference for Learning Through Activity Rather than Reading or Listening |
|-----------------------------|-----------------------------|-----------------------------|
| Kate            | Design lesson plan, must teach with live students |
| Stephanie       | Create multimedia “art walk” |
| Tom             | Interview a cultural expert |
| Jean            | Synchronous, interactive jigsaws facilitated by flipped content delivery |
| Jack            | Build “photo-voice story” about a child |
| Amy             | Complete IRB training modules |

Kate reflected that the nature of the online environment required more reading and listening but in a more active way saying,

I think there tends to be more reading and listening involved in activities online, even though they are not meant to be reading or listening activities. But the nature of how the interaction happens. It happens in a more active way and a more active space.

The teaching activity Kate described involved her students designing a lesson plan, however, in order to receive full credit she explained that ‘I tell them at the beginning of the class…that if they want the A they can go on and teach the unit’… Largely because I want them to put stuff into action.”

Stephanie asked her students to create a multimedia “art walk” in which students use imagery to lead viewers through an artist’s work. Tom had his students interview a cultural historian...
expert in their community. Jean discussed redesigning her synchronous sessions from lecture-based to ones in which students interact to teach each other through jigsaw activities. In order for students to receive the necessary content, she replaced lectures with a “flipped” style class in which students were provided with online, multimedia-enhanced content to review prior to the synchronous sessions.

In her research methods course, Amy described having her students complete the online training modules provided by the university’s institutional review board. Jack described assigning his students to create a multimedia piece about a child with a disability. In describing his overall teaching style he explained, “I tend to be more of an older style teacher who, I like projects. I don’t do a lot of busy work with my students. I want them to self-define a project, set some goals and deliver.” He also felt that it was important for instructors to model activity for their students saying, “Don’t talk about it. Get out and do something. Model for your students the same kind of stuff that you ask them to do…So if you’ve got a professor who is teaching you to do qualitative research, who is not doing qualitative research, then you have a mismatch there.”

**Preference for Collaboration**

Preference for collaboration was chosen by five of the six participants (all but Amy) and was the second most highly ranked student characteristic influencing online teaching. Figure 16 displays the ranking of preference for collaboration as important in online teaching.
This characteristic also emerged as a theme in participants’ descriptions of their online teaching. It was likewise in their descriptions of collaborative activities that participants most often referred to specific technology tools they used in their online courses. A summary of the tools used and collaborative activities described by the participants is listed in Figure 17.

<table>
<thead>
<tr>
<th>Preference for Collaboration</th>
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<tbody>
<tr>
<td>Kate</td>
</tr>
<tr>
<td>Stephanie</td>
</tr>
<tr>
<td>Tom</td>
</tr>
<tr>
<td>Jean</td>
</tr>
<tr>
<td>Jack</td>
</tr>
<tr>
<td>Amy</td>
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</tbody>
</table>

Kate described an activity in which she worked with a teaching colleague in New York to have their students collaboratively design a lesson plan about science concepts related to New York and Hawaii. She used synchronous sessions in Blackboard Collaborate (BBC), Ning, Skype and Blogs in this project. She described collaboration in her courses as a way to regain the in-person elements lost through the online medium. She said,
I actually don’t know how to do an online environment that is not collaborative. I don’t like them if they are not (laughs)... Because I really only do it in a synchronous format. In some way they have to be collaborative because you have to respond to each other, you have to say something you like about each other. For me that collaboration is my way of getting the in-person back, my way of getting the relationship that’s built-in in an in-person environment but can be lost in an online environment. So I just don’t know how to do it without that collaborative aspect.

Stephanie had her students collaboratively design lesson plans using Google docs and Skype simultaneously to encourage real-time collaborations. Jean also emphasized collaboration when describing redesigning her overall pedagogy of online teaching from a lecture-based format in her synchronous sessions to one in which students have to interact. This switch was prompted by feedback from students requesting more collaboration and interaction. She also felt that the online medium itself fostered interaction saying “I think it makes the students more comfortable sharing and discussing and letting me know where they’re at.”

Like Kate, Jack also stressed collaboration as a way to regain aspects of in-person, but he actually emphasized the in-person saying,

Even with online instruction, if someone lives on Oahu, I always invite them to come in here and just sit with me. I always have some students who would rather be with me, even if we’re online and talking to the students around the state. They like the physical warmth of being with a person, and I actually would rather be in here with people than by myself too.

Amy was the only participant who did not choose preference for collaboration in the card sort as a characteristic of her students. She did however stress the importance of contact and community among students, and had redesigned her online course to incorporate more synchronous sessions using BBC. On this she said,

I had originally done relatively few Collaborate classes, now I’m finding that I do them either every week or almost every week. Because I’ve found that from student feedback
and from just the submission of their assignments, they need more contact time...They often sense a lack of connection to the program, to the course, if they don’t have contact time with the instructor and with each other, that’s why I’m having more Collaborate sessions and I’m having them very regularly, it helps build more of a sense of community.

Preference for Pictures Rather than Text

Preference for pictures rather than text was also chosen by five of the six participants (all but Stephanie) and was the third most highly ranked characteristic impacting online teaching. Figure 18 displays where each of the participants ranked preference for pictures rather than text in the card sort activity.

![Figure 18](image)

**Figure 18. Ranking of preference for pictures.**

When describing teaching in the online environment, participants described activities that incorporated a student’s preference for visuals and also emphasized the visual nature of the medium itself. This often expressed itself in the incorporation of media as a content delivery method. A summary of techniques participants used in their online teaching that reflect visual course design is displayed in Figure 19. Despite the fact that Stephanie did not choose preference for pictures rather than text as a characteristic of her students, her described teaching methods incorporated visuals and media and are therefore included in Figure 19.
### Preference for Pictures Rather than Text

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kate</td>
<td>Uses more images, videos and PowerPoint presentations</td>
</tr>
<tr>
<td>Stephanie</td>
<td>Assigns multimedia “art walk”, students video own performances</td>
</tr>
<tr>
<td>Tom</td>
<td>Limits amounts of reading at a time</td>
</tr>
<tr>
<td>Jean</td>
<td>Puts less text on course pages, writes more concise directions, includes multimedia elements in content</td>
</tr>
<tr>
<td>Jack</td>
<td>Assigns students to create story of own life through photographs</td>
</tr>
<tr>
<td>Amy</td>
<td>Includes multimedia elements in every module</td>
</tr>
</tbody>
</table>

Figure 19. Examples of visual course design.

When describing teaching online, Kate explained that she uses more visuals than in face-to-face and said,

Yeah, it’s a visual space. I use a lot more images and PowerPoint structures in the online environment than I do in an in-person environment...So while I would probably use videos and things in any course, I use more of them online...Things that would just be discussion, just building more visuals than I would maybe for another course if it was an in-person kind of thing.

Stephanie did not choose preference for pictures rather than text as a characteristic of her students, but described an assignment in which she had students extensively incorporate visuals, as well as an activity in which student video recorded themselves. Tom described teaching to his Pacific island students and designing online curriculum for them this way,

So when I think about what am I going to put up there, it has to be engaging, it has to be an activity that, particularly for the population that I was dealing with, reading a lot of text and words, would have lost them. Now, you could give it to people over a period of time, but they had very different rates of reading and understanding and comprehending stuff, so…

Jean stressed that she tried to incorporate multimedia elements and video into her courses as much as possible. She also mentioned that her students could be easily overwhelmed by too much text or too many links on course pages. She also said students did not appreciate lengthy instructions saying “I’ve learned to try to keep the directions a little more precise, again from
student feedback. They say ‘we had a hard time following your directions, there’s just too
many!’”

In describing his own teaching, Jack said “I teach very visually.” He described a number
of assignments in which students created pieces of multimedia incorporating images, video,
music, narration and text. When describing a teaching example he said, “I’m just pulling this up,
not to show you a module, but to maybe at least express how much I value the power of visual
communications.”

Amy also stressed the importance of including multimedia for her online students saying
“they are very responsive to multimedia and so incorporating media is important to try to both
increase their comprehension and their interest.” She also explained how this impacted the
design of her course saying “So I try to use something wherever possible that uses some kind of
multimedia as part of what they review rather than just reading a chapter.”

**Collegial Influence**

Three of the six participants, Kate, Jean and Stephanie, described relationships with their
colleagues that had influenced their online teaching. Figure 20 displays a summary of
participants’ opinions on if colleagues influenced their online teaching and statements reflecting
these views.

| Colleagues Influence my Online Teaching |
|-----------------|-----------------------------------|
| Kate            | Y                                 |
|                 | “Anything I know about, and the whole way I think about how to engage in an online environment comes from the impact of those conversations with colleagues.” |
| Stephanie       | Y                                 |
|                 | “Well gee, I need to learn how to do that.” |
| Tom             | N                                 |
|                 | “The naysayers I don’t care anything about.” |
| Jean            | Y                                 |
|                 | “Personally I get a lot of help.” |
| Jack            | N                                 |
|                 | “I don’t want to be around folks who are dragging me down.” |
| Amy             | Y/N                               |
|                 | “I think collegial discussions about what we’re doing would be really helpful.” |

Figure 20. Participants reports of collegial influence.
Kate mentioned that she discussed challenges and possible solutions with her colleagues. She also went on to say that “Anything I know about, and the whole way I think about how to engage in an online environment comes from the impact of those conversations with colleagues. It’s not just stuff I made up.”

Jean described collaborating with a colleague with expertise in universal design to redesign one of Jean’s online courses. The collaboration was so successful that they jointly wrote up the experience as a journal article and online teaching has become a new part of Jean’s research agenda. Jean also specifically listed members of her department who have online teaching and technology expertise saying “So we are lucky in this department, that we’ve got all that support.”

Stephanie discussed seeing colleagues using new technologies saying “I’ve seen a lot of things that I think are more innovative than what I currently do.” She also felt that she ought to learn these new tools and techniques and said “more recently, my colleagues are starting to use science notebooks, they’re using a stylus with writing and drawing, you know on the iPad? And since I’m an art teacher I think, ‘Well gee, I need to learn how to do that.’”

Conversely, the other half of the participants, Tom, Amy and Jack, felt their teaching was less influenced by their colleagues. Tom talked about his colleagues who resist technology saying, “The naysayers I don't care anything about. People complain about it and I just figure, it's supposed to change… So for people who whine about the technology, that's just, they are living in an age that doesn't exist anymore.” He also commented that his colleagues did not have the requisite knowledge to successfully redesign courses for online delivery. He said “we have some faculty saying, ‘I think we can do this ourselves’, and I'm saying, ‘I don't think they can.’ I think they've done stuff online, but to me when I see it, it's been more taking what I did face-to-
face and just putting it on...it hasn't been really a reconceptualization.” In specifically talking about the role his colleagues play in his online teaching Tom said, “The only role they play is that they show me how things work. Sometimes we've collaborated on things, but not that often.”

Amy and Jack both saw themselves as leaders in their department regarding online teaching. When asked if her colleagues influenced her online teaching, Amy answered “Absolutely no, because I was one of the first people, and I’ve done more than probably 90% of the people on this faculty with the majority of my work being online. There are some people (whispers) that are just getting there. (laughing).” Jack felt that online teaching was something that had been expected of him as part of his job and said, “When I was hired here, I was expected to show leadership. I mentioned that. That was part of my hire. I was supposed to know something about distance education.” He went on to describe his observations of colleagues, saying,

I confess I’ve taken no pleasure in seeing others struggle. I’ve seen a lot of professors I think try to export their face-to-face teaching into the online environment…I believe technology changes the way you behave, it alters communication…So when I see others struggling, narrating some PowerPoint, thinking that now I can just put it on the web instead of boring my students in the classroom, my brain goes, ‘it didn’t work probably in your face-to-face class, and it’s going to work worse on the internet because the students won’t watch it.’ They’ll feign watching it, you know, they’ll skim it or do some crazy thing. So, if the question is have I been influenced by my professional peer group? I pick my models pretty carefully. And my models are success models… I don’t want to be around folks who are dragging me down.

While Amy thought of herself as a leader of distance education in her department, she did express a desire for more sharing among the faculty about their practices in online teaching. She said,
If we have the opportunity to ever discuss the way we’re using the technology, or ideas for courses that, you know, so if we have time to just chat for a bit...So I think collegial discussions about what we’re doing would be really helpful. More of that, more time devoted to that, would be really helpful.

**Expectations to Teach Online**

Figure 21 displays participants’ opinions on if online teaching is expected by their college or department and if so, who specifically is expected to teach online.

<table>
<thead>
<tr>
<th>Name</th>
<th>Expectation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kate</td>
<td>Faculty in my program are expected to teach online</td>
</tr>
<tr>
<td>N</td>
<td></td>
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<tr>
<td>N</td>
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**Figure 21. Participant reports of online teaching expectations.**

Two participants, Tom and Kate both felt that online teaching was not specifically expected of faculty by the COE administration. Kate thought online teaching was valued by the administration but not specifically expected, saying, “I think they are too smart to say you are expected to do anything because professors don’t like that.” She went on to say “I don’t think you will be somehow shunned if you refuse teaching online.” Tom also did not feel an expectation for COE faculty to teach online and said, “an expectation that you have to teach a class online? I don't think there is one. In fact, I think we have often asked people: ‘would you do this online?’ I don't think there is an expectation that you will do it online.”

Stephanie was less sure about online teaching expectations. While she expected it of herself and felt it was an expected part of her statewide program, she was less sure about the overall college saying “I don’t remember it ever being, is it written down anywhere?...So I don’t know what, I guess I don’t know what the expectation is. I know what I would expect. I would expect everybody to use it.”
The three faculty who mentioned they would be retiring within five years, Tom, Jean and Jack, emphasized the changing nature of teaching and that the new, incoming faculty would be expected to solve the challenges inherent to online teaching. Jack said,

And you know it’s happening and it’s not going to stop. But, I’m kind of glad I’m retiring. Because I think I kind of fit the era in which I grew up, which was still to come to a place called school, and have conversations around the water cooler kind of thing. I don’t get that with my smart phone, it’s not the same.

Jean thought the new faculty would be better able to use technology with students who expect it saying,

What I see happening is that as we retire and the new people come in, I think there’s going to be more technologically-savvy new professors. I think they’re going to be more willing to jump into the online as long as they know it’s expected…I think new people coming in, that might be more of that ilk, probably will be able to handle them [digital native students] better. They all know how to circuit that for useful purposes. I am not right there yet as to how can I use this.

Tom also hoped the new faculty would be better able to engage students commenting,

I think there is a mismatch between me living in an older world and them [digital native students] living in another world and I’m hoping that new faculty, the young folks coming in who we've got here, who grew up with that, actually have ways of thinking about that and using that and finding ways to make that work for them.

**Summary**

This Chapter discussed the themes that emerged as a result of the interview data analysis. Chapter 6 will present the analysis with regard to the specific elements of the TPACK framework and Chapter 7 will discuss the conclusions and implications of the study.
CHAPTER 6. TPACK ANALYSIS

Overview

Chapter 5 reported the comparative results and themes that developed in the analysis of data across the six faculty cases. This chapter specifically looks at the themes described in Chapter 5 and how they relate to the TPACK framework. This chapter also explores each of the seven elements of the TPACK framework and results of the study that correlate with these elements.

Overview of TPACK in Relation to Online Teaching and the Major Themes

This section will discuss each of the seven elements of the TPACK model as they emerged in the participants’ descriptions of their online teaching. It will also relate each of the major themes discussed in Chapter 5 to the elements of the TPACK model. One of the criticisms of the TPACK model is that its boundaries are fuzzy, making TPACK in practice difficult to specifically measure (Graham, 2011). This fuzziness did present itself in the cross case analysis and subsequent decisions about how to relate the major themes to the TPACK elements. As previously mentioned, teaching is a complicated endeavor, an intricate interplay of multiple elements making isolation and measurement of those elements problematic. While one of the strengths of the TPACK model is its acknowledgement of the interplay between content, pedagogy and technology, this interplay also made it challenging to definitively relate themes into the individual elements of TPACK as there was often overlap. Themes will therefore be discussed in relation to the most relevant TPACK elements, however, they may also have substantial relationships with other elements of the model. How the online teaching descriptions
reflected the three core elements of the TPACK model, displayed in Figure 1, will be discussed first. This will be followed by a discussion of how the online teaching descriptions reflected the four areas of interaction between the core TPACK elements. These areas of interaction are displayed in Figure 2. Both Figures 22 and 23 additionally provide summaries of the online teaching descriptions and relationships to their respective TPACK elements.

<table>
<thead>
<tr>
<th>Content Knowledge</th>
<th>Lack of student preparedness resulted in student technology training becoming part of course content</th>
</tr>
</thead>
</table>
| Pedagogical Knowledge | Beliefs about “good teaching” transferred from face-to-face to online  
Online techniques influenced face-to-face teaching |
| Technological Knowledge | Lack of technological knowledge inhibited innovation, disrupted class meetings, communication |

Figure 22. Three core elements of TPACK and their descriptions in participants’ online teaching.

**Content Knowledge**

**Student Preparedness.** The level to which participants felt their students were prepared to use technology tools for learning became a major theme in the discussions of online teaching.
Half of the participants, Amy, Stephanie and Jean, had students who had received specific training from the College on the technology tools that would be used in their programs. The three participants whose students had not had specific training, Tom, Kate and Jack, put more emphasis on a lack of student skills having an impact on their online teaching. They each described feeling obligated to provide students with the necessary technology training as a part of their courses, taking valuable time away from teaching content. Tom put it this way “If there is something I really want to do with technology, and they don't know how to do that, it's my job. I mean, either I have to change it and not use it, or I have to show them how to use it.”

In essence, technology skills training became part of the content of their course, became the “CK” or content knowledge that they needed to know and teach to their students. The three who provided training themselves explained that if they did not include it as part of their course content, there would be significant negative consequences, mainly students’ not being able to participate, or in Kate’s extreme case, two students who failed her course due to lack of technology skills.

**Pedagogical Knowledge**

The participants’ general beliefs about pedagogy also influenced their online teaching. For example, Amy felt that creating the sense of a learning community in her course would improve her students’ experience and performance. She therefore increased the number of synchronous sessions to facilitate community-building activities. Jack on the other hand felt that learning happened best through conversation and therefore envisioned his role in his online courses as that of a talk show host facilitating and guiding discussions among himself and his students. Jack also believed that people are inherently interested in learning through stories and
storytelling and therefore designed many of his online activities and assignments as ways in which students shared stories about themselves and others.

Kate explained that her beliefs about what she felt student teachers ought to know helped guide her online teaching decisions. For example, when discussing the digital native characteristics and their influence on her teaching she said,

Some of these are going to be my own personal value structure however, because it’s how I want them to think about teaching…So some of the impact of them, some of these are my own value structure…What I’m saying is, part of me taking them into account is based on my own value structure of what’s important…These are the constructs that I want teachers to come away with no matter with technology or without technology. So these would always come first for me. That’s because I push the integrated, real-world, problem-solving, project-based teaching.

Interestingly, three participants, Amy, Tom and Jean specifically mentioned that their online teaching had begun to influence how they taught in their face-to-face courses. Amy appreciated the organizational structure for online courses in the course management system and was replicating it in her face-to-face courses. Jean joked that she preferred the online feedback methods saying “I am struggling with the face-to-face class (laughs), I want to just say ‘Do this, and submit it on Laulima and let me give you feedback!’” Tom explained that he now rethinks his face-to-face courses and personally asks himself “How much of what we used to do in class face-to-face really needs to be done that way?” He also mentioned that he would like his program faculty to consider online delivery techniques saying,

I really just want to make it a part of practice and say, ‘In this particular course, we really only need to meet eight meetings face-to-face, and the rest of the material, we could do just as effectively if you work on your own time and get this schedule. I would like to see us go more to that model for our face-to-face.
Technological Knowledge

Participants clearly acknowledged that their technological knowledge, or in the case of Kate, Amy, Tom and Stephanie, their lack thereof, slowed their own innovations and had negative outcomes when in synchronous sessions. Stephanie mentioned that she would like to incorporate more narration saying “I guess if it were easier to do, it seems kind of cumbersome. I don’t do them myself. I think there’s a lot more that I could try.”

Tom knew that technology offered affordances to his teaching but said “I’m just not aware of what the technology can do.” Kate also acknowledged that she knew she could do more with technology tools in her courses saying, “To be truthful, there is so much more I could do. Some of it will take a whole lot more time. I just don’t know how to do it yet.” Amy also said that “As far as Collaborate, I think I under, I’m sure I under use it. I’m sure I could use it more effectively.” But she too mentioned the time it would take to gain more technological knowledge saying “But I’d need, it’s just, it’s really a matter of time you know, in order to try something new like that you’ve gotta sit down, you’ve gotta figure out what you’re gonna do, you gotta figure out how you’re gonna do it, and then you have to set it up…”

Koehler and Mishra (2006) proposed that technology integrated teaching “has foregrounded technology in ways that could not have been imagined a few years ago. Thus, knowledge of technology becomes an important aspect of overall teacher knowledge” (p. 1024). This holds particularly true for online teaching as the means of communication are mediated through technology.

Lack of technological knowledge was often discussed by participants in terms of its impact on the synchronous experience. Technological knowledge in these cases became imperative for class to continue smoothly. Most participants recalled experiences in which technical difficulties disrupted synchronous sessions. They described feeling that if they had had
more specific knowledge to troubleshoot the situation, perhaps the negative impact could have been mitigated. Amy specifically described the fear of failing with technology in front of a group of synchronous students this way,

I mean it, it really inhibits both the experience of the student and the professor when you start running into some kind of technical problem…the fear of it not working inhibits me more than anything. Fear, I don’t mind failing, but not when the students are all there going like (sighs). You can hear the collective sigh.

Both Jack and Kate commented on how much technological knowledge they should actually have as instructors. Jack felt he should be a model of technology use saying,

So, yeah I’ve tried in my classes to walk the walk. I don’t want to give my students fifty different technologies to change the world if I haven’t used forty-nine of them. I’d rather share three that I use, introduce them to a few of my colleagues that use a couple more, and let them go read about the other forty-six thousand million that someone is writing about at a distant place.

Kate described her responsibility toward technological knowledge this way, “I think as a novice person, my role is sort of to learn as much as I need to know, and to be as supportive as I need to be for my students.”
Figure 23. Interactions of TPACK elements and their descriptions in participants’ online teaching.

**Technological Content Knowledge**

Faculty use of technology in online teaching serves as model for student teachers

**Pedagogical Content Knowledge**

Digital divide issues impact online teaching
Digital native characteristics recognized and influenced online course design
Activity-based assignments used by all participants

**Technological Pedagogical Knowledge**

Online recognized as visual environment and online teaching used less text, more multimedia
Collaboration spurred use of additional tools

**Technological Pedagogical Content Knowledge**

Strongest TPACK examples demonstrated teaching that blended technology, pedagogy and content to create optimal student experiences that could not have happened without technology

Technological Content Knowledge

Technological content knowledge is partially defined by Mishra and Koehler (2006) as “the manner in which subject matter can be changed by the application of technology” (p. 1028).

As previously mentioned, the general content area of all participants was teacher education.
While participants varied in their particular focus, for example secondary science methods or special education, all participants are engaged in preparing teachers. To this end, the tools chosen and ways implemented in online teaching serve as a model of pedagogical technology use for the student teachers. Participants’ use of technology in teaching their courses becomes technological content knowledge. While perhaps not consciously addressed on the part of the participants, the modeling of technology use not only serves as a powerful form of teacher knowledge for these future teachers but the exposure to technology modeling will also increase their confidence in using technology as teachers themselves (Hare et al., 2002).

**Pedagogical Content Knowledge**

Beliefs about students is one of the areas in which the defining boundaries between elements in TPACK and PCK are fuzzy. While both models definitively include understanding of students as a part of a teacher’s knowledge base, it is not clearly placed in either TPACK or PCK. Shulman included “knowledge of learners and their characteristics” as a category of a teacher’s knowledge base when expanding on the idea of PCK in his 1987 article *Knowledge and Teaching: Foundations of the New Reform*, while Mishra and Koehler (2006) include “the nature of the target audience” (p. 1027) under pedagogical knowledge, and “knowledge of what the students bring to the learning situation” (p. 1027) under pedagogical content knowledge. For this study, themes regarding beliefs about students have been placed under pedagogical content knowledge. While they are also related to pedagogical knowledge on its own, the interplay of the participants’ content areas actually being pedagogy-related makes the influence of student beliefs more relevant to the wider area of pedagogical content knowledge.

**Students and the Digital Divide and Students as Digital Natives and Immigrants.**

Chapter 5 described ways in which participants’ experiences with, and beliefs about their
students’ technology abilities and access influenced their online teaching. These beliefs align not only with Shulman’s conception of PCK (1986) and Mishra and Koehler’s (2006) TPACK but also with Cochran et al.’s (1993) concept of pedagogical content knowing (PCKg), which places more emphasis on teachers’ understanding of students and of the environmental context of learning. Cochran et al. stress the importance of these two factors because, as they explain it, “learning is created by the student, not the teacher, with the students’ understandings and learning setting forming the contexts for that learning” (p. 267).

In online teaching, the faculty member’s understanding of the student and his/her learning context is especially critical. In a technology-mediated environment of teaching, the lack of contextual cues normally present in a traditional classroom can lead to miscommunication and feelings of isolation. In addition, an understanding of students and the ways to best teach them is essential for student success. Participants of the study identified characteristics of their students and their contexts and adjusted their teaching accordingly. As such, they were engaging in what Shulman (1987) describes as “adaptation” and “tailoring.” Adaptation being “the process of fitting the represented material to the characteristics of the students” and tailoring being “the fitting of the material to the specific students in one’s classrooms rather than to students in general” (p. 17).

The adaptation and tailoring of participants’ online teaching was influenced by general beliefs about students whether online or traditional, as clearly explained by Tom in this statement, “my perceptions of my students affect my teaching period, whether it is online or not.” Adaptation and tailoring were also balanced by what participants valued pedagogically and felt comfortable doing. Kate made this observation,

Right. You could do this. You could do mixing of work and play by adding gamification to your classroom. If you are like my current student, who is a big gamer, and really gets
the constructs and context, and really wants to do that. If you are me, you value that she has that experience and she wants that. But I instruct around something that I can really support. I don’t have the skills to do that [gamification]. And I don’t really want to learn.

**Preference for Learning Through Activity Rather than Reading or Listening.**

Preference for learning through activity rather than reading or listening was discussed by participants as a characteristic of students that influenced the design and teaching of their online courses. Preference for learning through activity may also be an instance of foundational pedagogical beliefs about how to teach in one’s content area transferring from a face-to-face environment into the online one. Active learning is often cited as a powerful form of teaching and is included as one of Chickering and Gamson’s (1987) *Seven Principles for Good Practice in Undergraduate Education*. Active learning is especially important in teacher education as a method to facilitate linkages between theory and practice (Darling-Hammond, 2013). Each of the participants described online teaching activities or assignments that were activity based. While they were not specifically asked, it is likely their traditional face-to-face courses also include activity-based assignments.

**Technological Pedagogical Knowledge**

**Preference for Pictures Rather than Text.** This theme was discussed by participants in relation to student characteristics and their influence on online teaching and could therefore be classified under pedagogical content knowledge. But it has been placed here due to participants also having described their increased use of visuals as a result of beliefs about how to best teach within the online medium itself. As described in Chapter 5, participants explained that teaching online prompted them to use more pictures, more videos, less readings, less text on course pages and more concise written directions. In this way, participants were demonstrating their technological pedagogical knowledge or “how teaching might change as a result of using
particular technologies...strategies for using the tool’s affordances, and knowledge of pedagogical strategies and the ability to apply those strategies for use of technologies” (Mishra & Koehler, 2006, p. 1028). In this case, the online medium itself, including all the individual tools and strategies implemented within it become the “tool” in question and their teaching with this “tool” becomes a reflection of their technological pedagogical knowledge.

Preference for Collaboration. Participants most often discussed the affordances of specific tools and their impact on teaching and learning activities when discussing collaboration. Tools used to foster collaboration included BBC, Ning, Skype, and Google docs. It was often a participant’s desire to encourage collaboration that prompted them to gain more technological knowledge, raising their awareness of the tool’s affordances for teaching, thereby increasing their technological pedagogical knowledge.

Technological Pedagogical Content Knowledge

Technological Pedagogical Content Knowledge represents the coming together of each of the three core elements and underlies “truly meaningful and deeply skilled teaching with technology” (Koehler & Mishra, 2008, p. 66). Participants in this study described a number of teaching activities and techniques that could be considered reflections of their TPACK knowledge. However, it is the descriptions of using technology to create a meaningful and student-tailored learning experience that would not have been possible without the integrated technology that stand out as the strongest examples of applied TPACK. The first is Tom’s assignment in which students throughout the Pacific interview cultural experts on ways they use math in their practices. Students then share their findings in a multimedia and synchronous format with the rest of the class. He had this to say about that project,

It was one of the kinds of things where the technology provided them the possibility to present back. I'm not sure we could have gotten that any other way. We couldn't have
brought that cultural person here...the richness was that they got to share with each other. Some of these folks didn't even realize that some of the things that they do on one island nation, you know it’s a different country now—is very similar to what they do. And they even use some words that are quite similar. So there are these connections across cultures that came through in the things that they found through the cultural experts…And again, we could not have done that face-to-face. So that was rare. Without the technology, I don't think, well, the project could not have happened.

Kate’s example involved pairing with another teacher educator in New York to focus on culturally responsive pedagogy and the importance of place in science teaching. Students in each state collaboratively designed and taught a lesson using science concepts from their own location. Kate emphasized that the types of conversations her students had with one another, with each student remaining in their own location but communicating in real time provided a completely unique learning experience that could not have occurred had the students been physically together. The physical distance between the students became central to them reaching new understandings of the concepts she was teaching, while the tools she chose simultaneously bridged that distance to allow synchronous communication and sharing. She described these conversations as “pretty phenomenal” and credited the ability to share with others outside of one’s physical location as providing “a depth of perspective that I think can’t otherwise be provided.”

It is in these examples that the participants simultaneously integrated their knowledge of technology, pedagogy and content to create unique learning solutions. These examples reflect participants’ “nuanced understanding of the complex relationships between technology, content and pedagogy, and using this understanding [to] develop appropriate, context-specific strategies and representations.” (Mishra & Koehler, 2006, p. 1029). The solutions are arrived at as an outcome of “satisficing” (Simon, 1969 as referenced in Mishra and Koehler, 2006), due to the
complexities and often conflicting demands of student characteristics and contexts, pedagogical techniques and goals, and available technology tools.

Mishra and Koehler (2006) also note that TPACK is most often gained by teachers through the processes of trial and error. Participants in this study all referred to changes in their online teaching over time and based on experience, reflection, student evaluations, student feedback, and growing awareness of the affordances of newer tools. This process aligns with Shulman’s (1987) model of Pedagogical Reasoning and Action in which a teacher must transform their content knowledge into “forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by the students” (p. 15). In this case though, the teacher must also consider the added complexities and continual changes of the online medium in which they teach. Tom expressed this transformative thought process for designing his online courses when he said

Part of what the move to online has done is it's broken up the routine. So now I stop and say, ‘Wait a minute, do I need to do this any more?’ or ‘Which way should I be doing it?’ or ‘If I'm going to put it online, how do I get this in a format that's more understandable?’

This description was perhaps the most direct reflection of Shulman’s (1986) definition of pedagogy or “the ways of representing and formulating the subject that make it comprehensible to others” (p. 9).

**Bounding Context of TPACK Framework**

The placement of the influence of colleagues on online teaching within the TPACK framework falls within the dotted line depicting the “contexts” in which technology infused teaching takes place. Within higher education, colleagues are a large part of the faculty’s context.
Colleagues. As described in Chapter 5, half of the participants, Kate, Jean and Stephanie described ways in which their colleagues directly influenced their online teaching. Amy stated that her colleagues did not influence her teaching but that she would like to see more sharing of best practices among faculty.

It is interesting that the two faculty who placed the least importance on collegial influence, Tom and Jack, are the two male participants, and both were planning to retire soon. Kate, who most strongly attributed collegial influence as impacting her online teaching, was the youngest of the participants, the most recently hired to the COE, and had only recently been granted tenure.

While Tom and Jack did not see their colleagues as having direct influence on their online teaching, they were aware of what their colleagues were doing, and had strong opinions about their colleagues’ abilities, techniques and effectiveness in online teaching.

Expectations to teach online. Kate and Tom felt most strongly that COE faculty were not explicitly expected to teach online. While both had taught individual online courses, their courses are not part of a larger online program. The four who felt online teaching was expected came from programs that are online or from a department with multiple online programs. It is possible that not being part of an online program influenced their perceptions of online teaching expectations.
CHAPTER 7. CONCLUSIONS

Overview

Chapter 6 described the analysis of the data as it related to the TPACK framework. This chapter now presents the study’s conclusions and consists of four parts. Part 1 will discuss the study’s final conclusions. Part 2 will outline the resulting implications, and parts 3 and 4 will discuss the limitations of the study and make suggestions for further research in the field.

Conclusions

Beliefs about Students

This study was looked at the influence of faculty beliefs about students on online teaching, specifically beliefs relating to the idea of digital natives. The digital native theory suggests that technology skill level differences are based on age, and that natives or those born after 1980 inherently have enhanced and more varied technology skills than those who are older. Despite the popularity of the notion, educational research has shown that digital native generation aged students have a variety of technology skills levels (Guo et al., 2008; Waycott et al., 2010) and that most actually use a limited set of technologies (Bennett et al., 2008; Kennedy et al., 2010; Margaryan et al., 2011; Thompson, 2013; Waycott et al., 2010).

The descriptions of students provided by the participants in this study did not uniformly align with these findings. Three of the six participants reported that they experienced age-based differences in their students’ technology skills. Two participants’ descriptions aligned more closely with the research in that they strongly discounted technology skills differences as age-
based, and attributed differences to differing levels of technology experience. One participant reported age based differences as well as differences related to experience.

Despite the fact that half of the participants described age-based differences among their students’ technology skill levels, all commented that their students, regardless of age, lacked requisite technology skills to be successful in online courses. This finding corresponds with other reports that college-aged students often lack the prerequisite academic technology skills to be successful in online courses (Bowe, 2011; Dahlstrom, 2012) and are unprepared to apply technologies to academic work (Bury, 2011; Dahlstrom, 2012; Thompson, 2013).

The three participants whose students had taken the Skills for Distance Students course did report experiencing fewer student technology issues that impacted their online teaching than they had prior to the course being offered. This supports findings that differences among digital native generation aged student technology skills are experience, not age based (Brown & Czerniewicz, 2010) and can be bridged through training (Helsper & Eynon, 2010). Online students lacking requisite technology skills depend heavily on faculty for assistance with technology (Margaryan et al., 2011). Participants whose students had not taken the Skills for Distance Students course felt, as reported by other online faculty (Reid, 2012), obligated to give up valuable class time to teach technology skills.

The digital native notion assumes that students born after 1980 have been “bathed in bits” (Tapscott, 2008), making them multitasking natives, expecting constant speed and visuals and using a wide variety of tools. The reality of the situation appears more complicated with students experiencing a range of technologies and that variety playing a more influential role than originally expected. Perhaps a more accurate paradigm for considering technology skill
differences might be to call those with more technology experience “digital veterans”, and those with less technology experience “digital novices”.

**Beliefs about Colleagues**

As previously mentioned, the influence of colleagues within one’s department and college have been shown to be highly influential on departmental climate (Moran & Volkwein, 1988), job satisfaction (Callister, 2006; Ponjuan et al., 2011; Wright, 2005), academic success (Hitchcock et al., 1995; Puzziferro & Shelton, 2009) and approaches to teaching (Lindblom-Ylänne et al., 2006; Neumann, 2001; Norton et al., 2005; Roxå & Mårtensson, 2009). Social systems and interactions are highly influential on adoption of technologies (Rogers, 2003; Venkatesh et al., 2003) especially in academic settings, both K12 (Ertmer et al., 2012; Frank et al., 2004; Li & Choi, 2014) and higher education (Osika et al., 2009; Tabata & Johnsrud, 2008; Ulmer et al., 2007).

The findings in this study were split, in that three of the six participants reported that their online teaching was influenced by their colleagues, and three did not see themselves as influenced by colleagues. Two of the three who felt influenced by colleagues described seeking out colleagues for specific advice on online teaching and one described collaborating extensively with an expert colleague to improve her online course. This aligns with the large body of research on the general influence of colleagues as well as findings that faculty prefer to learn about new technologies and technology-based teaching methods from colleagues (Bowe, 2011; Georgina & Olson, 2008; Price & Kirkwood, 2014).

The third participant who felt influenced by her colleagues, described feeling inspired to try new tools and techniques after seeing colleagues successfully use them. Others have also reported that teachers who see their colleagues successfully using technology in teaching feel
reassured that the tools could work in their own teaching (Oncu et al., 2008), that they too could be successful with the technology (Kreijns et al., 2013), and that they are then more willing to use the technology (Adams, 2010). In addition, observing examples of successful online teaching has proven to be a motivator to get faculty to teach online (Ragsdale, 2011).

Despite this, half of the participants in this study reported that their online teaching was not influenced by their colleagues. One possible explanation for this is the culture of the institution itself. Faculty at research oriented institutions tend to experience far greater levels of autonomy and personal control over decision making than those at state or community colleges (Austin, 1990) and may be less likely to be influenced by others.

Also, each of these three saw themselves as leaders in distance education within their programs or departments either due to higher levels of online teaching experience or specific roles charging them with leading online teaching efforts. It may be that their experience or leadership role placed them in a position of influence rather than one of being influenced by others. As described by Mirriahi et al. (2012), faculty

who have adopted a greater number of technologies tend to be in an intermediary position in their department network and, hence, assist with the spreading of information across a departmental social network…and therefore [have] the potential to influence adoption decisions of their colleagues. (p. 34)

And finally, the three who felt least influenced by colleagues described seeing their colleagues struggling with online teaching and lacking the skills and knowledge base to design effective online courses. As previously described, seeing successful examples of technology-infused teaching can be highly influential. However, in this case, if these faculty were seeing their colleagues struggling with online teaching, and in their opinion not designing courses of the highest quality, they may have been less likely to be influenced by them.
Implications

Faculty beliefs about students should be examined over time. Participants’ beliefs about students did influence their online teaching. The beliefs about online students that had the most impact on the online teaching described in this study were based on experiences surrounding student preparedness and access. However, participants also had overall beliefs about students and pedagogy that applied in both online and face-to-face environments. Many of those beliefs about students were formed over entire careers in which their experiences with students took place primarily in face-to-face environments. As time goes by, faculty will increasingly have experiences with students in online environments, and as they observed, students are becoming more generally tech-savvy and potentially more prepared for online environments. Therefore, faculty beliefs about students have the potential to change or be different in the future, which may change future online teaching. This study is describing a snapshot of faculty beliefs at one moment in time. But if understanding faculty beliefs about students will lead to more effective online course design and delivery, and these beliefs may be changing over time, then this issue should be of continued future interest to those concerned with online teaching.

Student preparedness should be addressed above the individual course level. The participants whose students had not completed the College’s technology training were the ones to most clearly describe the negative teaching impacts of students’ lack of technology skills. They were also the ones that felt responsible for providing technology training themselves, taking time away from course content. Assessing student technology skills upon entry to the College, and requiring training for those who need it would relieve online faculty of this training burden and has been shown to increase online student retention rates (Ali & Leeds, 2009).
Online teaching faculty might also be more likely to incorporate tools into their online teaching if they felt confident their students knew how to use them.

**Digital native characteristics may provide inspiration for innovations in online teaching.** Participants in this study recognized digital native characteristics based on age differences, yet also acknowledged that some characteristics were true of all learners regardless of online or face-to-face. They also saw tremendous variability in technology skills among students of all ages based on a variety of factors. While some characteristics of digital natives did influence online teaching and course design, participants also saw the characteristics as inherent to the online medium itself. The characteristics attributed to digital natives may better serve educators as a basis for considering the opportunities a technology-infused or online environment affords, rather than as assumptions about learners within those environments.

**Professional development for online faculty should include experienced colleagues.** The findings of this study have implications for professional development of faculty teaching online. As previously mentioned, most faculty are not taught how to teach, much less to teach online. Professional development often focuses on the “how-tos” of using specific pieces of software that are not designed for educational purposes. A “leap of faith” is then made in assuming that faculty will be able to transform how-to technological knowledge into meaningful integration with content and pedagogy. As noted by Mishra and Koehler (2006) this emphasis on the technology itself leaves faculty on their own to develop integration strategies through trial and error.

Half of the participants in this study learned from more experienced colleagues about online teaching. The two who reported that they did not collaborate with colleagues felt confident in their own online teaching abilities and described their colleagues as struggling, and
lacking the skills and knowledge to reconceptualize their teaching for the online environment. One participant reported that her colleagues did not influence her but that she felt more sharing of best practices in online teaching would be helpful. The findings in this study suggest that an effective format for online faculty professional development would be one that places less emphasis on specific tool training and more on the sharing of best practices and practical advice from experienced and trusted colleagues. Colleagues within a discipline or department are more likely to share common pedagogical beliefs (A. Trowler, 2009) and faculty who can align technology uses with their existing pedagogical beliefs are more likely to use the technology themselves (Ertmer, 2005). After observing and discussing their colleagues’ vetted online teaching techniques, online teaching faculty may be motivated to gain the additional technological knowledge to use those techniques. As seen in this study, participants felt that increased technological knowledge would spur online teaching innovations and smooth communications with students.

**TPACK an effective model for analysis of online teaching.** The placement of technology on the same level as pedagogy and content reflects the tremendous influence technology has to both positively and negatively impact online teaching. As seen through the participants’ descriptions, skillfully integrating technology into sound pedagogical representations of content can result in unique teaching and learning experiences that would have otherwise been impossible without the use of technology. On the other hand, technology failures in an online environment can create insurmountable barriers for both instructors and students. These failures can completely halt both online teaching and learning. Placing technology on the same level as pedagogy and content and providing a systematic framework for categorizing the
resulting interactions and complexities makes TPACK a particularly effective lens through which to examine online teaching.

**TPACK can build teaching case knowledge across disciplines.** In this study, the content area of the participants was education. However, the TPACK model’s focus on the multifaceted knowledge base needed for effective teaching with technology in any discipline make it applicable across subject areas. The overlapping of technology, pedagogy and content, and subsequent subcategories make the framework more complex and as some have argued harder to measure in practice. But it is precisely this complexity that makes the model able to capture the authentic intricacies of teaching with technology by focusing on teacher knowledge and practice. As suggested by Shulman (1986), most frameworks focus on decontextualized, theoretical principles that “gain their economy precisely because they are decontextualized, stripped down to their essentials, devoid of detail, emotion, or ambience. Yet to be remembered and then widely used, it is precisely the detail and the context that may be needed” (p. 11). Mishra and Koehler (2006) accept Shulman’s framework of Pedagogical Content Knowledge and value of its intersections of content and pedagogy, but contend that the rise of modern technologies make it necessary to now add the intersections of technology with pedagogy and content. In specifically examining teacher knowledge and practice with technology and accounting for its inevitable complexities, the TPACK framework provides a method for documenting the theoretically based case knowledge Shulman argued was essential to “guide the work of the teacher, both as a source for specific ideas and as a heuristic to stimulate new thinking” (1986, p. 12).
Limitations

The conclusions and implications of this study must be considered within the limitations of the study itself. The first and perhaps most limiting factor is the small number of participants in the study. Its findings therefore cannot be generalized to larger populations (Stake, 1995). This is because the individual cases are not “sampling units” (Yin, 2014, p. 40) from which generalizations to a larger population can be made. However, a small number of participants is a hallmark of the case study approach with its strength being greater depth rather than breadth (Stake, 1995). Using interviews as a method of collecting data also has limitations in that responses can be distorted by personal bias, anger, anxiety, politics, and recall error as well as self-serving answers or the emotional state of interviewee and their reaction to the interviewer (Patton, 2001). In this study, the participants were discussing their beliefs and online teaching and were not expected to become anxious or angry, emotional or overtly political. Personal bias, another limiting factor, is an acceptable and expected result as participants were asked to discuss their personal beliefs. In addition, participants were interviewed by people whom they had not met before. My hope was that being interviewed by a stranger could mitigate personal bias toward me as a known colleague and at the same time reduce any emotional reaction to them as the interviewer. Also, to dispel any anxiety over participation, participants were assured confidentiality of their answers and anonymity in the study’s write up. Collecting documents also has limitations in that they may vary in quality and detail, or be incomplete or inaccurate (Patton, 2001). In this study however, the documents collected were described and explained by the participants and served as prompts for participants to discuss their ideas about interesting online teaching techniques. Inconsistencies were expected and there were no “accurate” answers.
Recommendations for Future Studies

Shulman states that “teaching is conducted without an audience of peers. It is devoid of a history of practice” (1987, p. 12). Because of this he believed teacher knowledge needed to be more thoroughly documented and aggregated to create “a foundation of a scholarly literature that records the details and rationales for specific pedagogical practice” (Shulman, 1987, p. 11). Shulman (1986) felt this could be partially accomplished through the development of richly detailed teaching cases aligned with theoretical principles.

More recently and specifically, Cox and Graham (2009) proposed that “the field would benefit from detailed examples of teachers’ knowledge in practice and how it fits within the TPACK framework” (p. 69). While this study is a small step in this direction, more case studies should be conducted to document effective uses of technology and their alignment with content and pedagogy. This study and more detailed future studies on TPACK application will contribute to the documentation of the critical part of the teacher knowledge base Shulman (1987) calls the “wisdom of practice” (p. 11).

Further documentation and analysis of TPACK principles in teaching would also serve to strengthen the framework’s applicability for educators and begin to address the criticism that TPACK is difficult to measure in practice (Graham, 2011). Documentation of online TPACK application would provide those who teach online with valuable examples of pedagogically sound and theoretically aligned online teaching practices. Because this study only asked participants to describe online teaching activities as one piece of a larger study, further studies should gather a larger number of and more thoroughly document online teaching practices and the rationale for their design.
The participants in this study all came from the field of education. Further studies should investigate the beliefs of faculty from a variety of academic disciplines about students and colleagues and compare and contrast the influence those beliefs may have on online teaching. This study also limited itself to beliefs about students and colleagues while future studies could identify beliefs about other factors that play a role in online teaching.

**Summary**

This study has looked at the impact of faculty beliefs about students and colleagues on their online teaching using TPACK as a guiding framework. It has addressed the need for further study on the impact of beliefs on faculty online teaching as well as the criticism that TPACK does not fully consider contextual factors known to impact teaching (Chen et al., 2009; Voogt et al., 2013). In particular and as identified as a need by Chai et al. (2014), it has considered beliefs about the multiple levels of context with the potential to impact TPACK. In terms of Bronfenbrenner’s (1994) ecological approach, this study addresses faculty beliefs regarding both the micro-level (students) and the meso-level (colleagues) factors suggested by Chai et al. to impact TPACK.

As technology evolves and online higher education continues to grow, the factors impacting online teaching will be of continued interest to those involved with online teaching.
APPENDIX A – IRB APPROVALS

March 12, 2014

TO: Ariana Fischberger
Principal Investigator
Educational Technology

FROM: Denise A. Lin-Deshler, MPH, MA
Director

SUBJECT: CHS #21991- “Technology Use For Online Teaching in the COE Phase 3”

This letter is your record of the Human Studies Program approval of this study as exempt.

On March 12, 2014, the University of Hawaii’s (UH) Human Studies Program approved this study as exempt from federal regulations pertaining to the protection of human research participants. The authority for the exemption applicable to your study is documented in the Code of Federal Regulations at 45CFR 46.101(b)(Exempt Category 2).

Exempt studies are subject to the ethical principles articulated in The Belmont Report, found at http://www.hawaii.edu/irb/html/manual/appendices/A/belmont.html.

Exempt studies do not require regular continuing review by the Human Studies Program. However, if you propose to modify your study, you must receive approval from the Human Studies Program prior to implementing any changes. You can submit your proposed changes via email at uhhirb@hawaii.edu. (The subject line should read: Exempt Study Modification.) The Human Studies Program may review the exempt status at that time and request an application for approval as non-exempt research.

In order to protect the confidentiality of research participants, we encourage you to destroy private information which can be linked to the identities of individuals as soon as it is reasonable to do so. Signed consent forms, as applicable to your study, should be maintained for at least the duration of your project.

This approval does not expire. However, please notify the Human Studies Program when your study is complete. Upon notification, we will close our files pertaining to your study.

If you have any questions relating to the protection of human research participants, please contact the Human Studies Program at 956-5817 or uhhirb@hawaii.edu. We wish you success in carrying out your research project.
October 23, 2013

TO: Ellen Hoffman  
Principal Investigator  
Educational Technology

FROM: Denise A. Lin-DeShetler, MPH, MA  
Director

SUBJECT: CHS #21673: “Technology Use for Online Teaching In the COE (Phase 2)”

This letter is your record of the Human Studies Program approval of this study as exempt.

On October 23, 2013, the University of Hawai‘i (UH) Human Studies Program approved this study as exempt from federal regulations pertaining to the protection of human research participants. The authority for the exemption applicable to your study is documented in the Code of Federal Regulations at 45CFR 46.101(b)(Exempt Category 2).

Exempt studies are subject to the ethical principles articulated in The Belmont Report, found at http://www.hawaii.edu/irb/html/manual/appendices/A/belmont.html

Exempt studies do not require regular continuing review by the Human Studies Program. However, if you propose to modify your study, you must receive approval from the Human Studies Program prior to implementing any changes. You can submit your proposed changes via email at uhirb@hawaii.edu. (The subject line should read: Exempt Study Modification.) The Human Studies Program may review the exempt status at that time and request an application for approval as non-exempt research.

In order to protect the confidentiality of research participants, we encourage you to destroy private information which can be linked to the identities of individuals as soon as it is reasonable to do so. Signed consent forms, as applicable to your study, should be maintained for at least the duration of your project.

This approval does not expire. However, please notify the Human Studies Program when your study is complete. Upon notification, we will close our files pertaining to your study.

If you have any questions relating to the protection of human research participants, please contact the Human Studies Program at 956-5007 or uhirb@hawaii.edu. We wish you success in carrying out your research project.
August 7, 2013

TO:       Ellen Hoffman  
Principle Investigator  
Educational Technology

FROM:    Denise A. Lin-DesSheler, MPH, MA  
Director

SUBJECT:   CHS #21481: “Technology Use for Online Teaching in the COE”

This letter is your record of the Human Studies Program approval of this study as exempt.

On August 7, 2013, the University of Hawai‘i (UH) Human Studies Program approved this study as exempt from federal regulations pertaining to the protection of human research participants. The authority for the exemption applicable to your study is documented in the Code of Federal Regulations at 45CFR 46.101(b)(Exempt Category 2).

Exempt studies are subject to the ethical principles articulated in The Belmont Report, found at http://www.hawaii.edu/rb/html/manual/appendices/A/belmont.html.

Exempt studies do not require regular continuing review by the Human Studies Program. However, if you propose to modify your study, you must receive approval from the Human Studies Program prior to implementing any changes. You can submit your proposed changes via email at uhirb@hawaii.edu. (The subject line should read: Exempt Study Modification.) The Human Studies Program may review the exempt status at that time and request an application for approval as non-exempt research.

In order to protect the confidentiality of research participants, we encourage you to destroy private information which can be linked to the identities of individuals as soon as it is reasonable to do so. Signed consent forms, as applicable to your study, should be maintained for at least the duration of your project.

This approval does not expire. However, please notify the Human Studies Program when your study is complete. Upon notification, we will close our files pertaining to your study.

If you have any questions relating to the protection of human research participants, please contact the Human Studies Program at 956-5007 or uhirb@hawaii.edu. We wish you success in carrying out your research project.
APPENDIX B – SURVEY INSTRUMENT

Demographics

Male/Female

Age: Less than 30, 30-39, 40-54, 55 or over

Department (if split, check tenure home)

Position:
- Faculty: Asst, Assoc, Prof;
- Tenure track/tenured specialist with required teaching duties
- Tenure track/tenured specialist non-teaching, teaching only on overload
- Instructor, contract or part-time teaching (non-tenure)
- Other

Total years teaching credit courses in higher education

Total years teaching (including K-12 and other training activities)

Technology Learning and Skills

At what level would you rate yourself in using computers in general:
- Novice
- Intermediate
- Proficient
- Expert

Do you own (or regularly use) any of the following mobile devices (check all that apply)
- iPhone
- Android phone
- Other smartphone
- iPad
- Other tablet computer

rate from strongly agree to strongly disagree
I am confident in using technology and digital media:
- to meet the needs of my professional career
- to communicate with students and colleagues
- to find literature to use in my research
- to locate content materials to use in my teaching
to find tools to use in my teaching
to design a course or module for online learning

I am confident in using these tools for teaching: rate strongly agree to strongly disagree
Laulima course management system
Blackboard Collaborate (formerly Elluminate)
Second Life
Social media
LCD projector

rate strongly agree to strongly disagree
I am confident in choosing technologies to use in my teaching.
I am confident that I understand the knowledge my students have about using technology for learning.
I regularly find materials online that I can use in planning my courses.
I regularly find materials online that I share with my students.

Rate your use (personal and professional) of each of the following online tools: Use often … use rarely or never
Facebook
Twitter
Youtube
Second Life
Linked In
Kindle
iBooks
Skype
Google hangouts
Google Drive (docs)
Google Forms
Google+
Weebly or web site building tool
Phone texting
computer instant message
Zotero or Endnote

How often do you use the following tools in activities for students (in class or for assignments)?
Use often … use rarely or never
etextbook
live text chat
live Collaborate sessions
UHM library resources
online journal articles
recorded lectures (your own)
one online videos (including YouTube)
online tutorials you created
Facebook
Twitter
Second Life
online discussion board
online simulations or games
online tests/quizzes

Branch here for use Laulima/do not use Laulima
Check the following that you use in Laulima in your teaching (check all that apply):
  share syllabus with students
  calendar or scheduling for class
  create modules
  include teacher-created materials
  provide links to external content
  post assignment requirements
  collect assignments (students upload)
  grading
  discussion board
  live chat
  blog
  email
  class surveys
  online tests/quizzes
  post announcements
  track student participation

What do you think is most useful about using Laulima with your students?

What are your greatest concerns or problems with Laulima?

Branch here for use Collaborate/do not use Collaborate.

How often do you use the following tools in Collaborate? Use often … use rarely or never
  Live video of participants and/or instructor
  Polls
  Text chat
  Recording for future access online
  Drawing/text whiteboard tools
  Application sharing
  Web tour
  PPT slides

Have you used Collaborate with a mobile device (smartphone, ipad)? yes/no

What do you think is most useful about using Collaborate? (open ended)
What are your greatest concerns/problems in using Collaborate? (open ended)

As you need to learn new features or skills related to technology for teaching, what are the top three (3) ways you prefer to learn? [check three (3) that are most applicable]

- Formal coursework or training sessions
- Individual tutor
- Ask a support person
- Colleagues at COE/UHM
- Professional networks/colleagues external to my work site
- Online self-paced modules
- Youtube videos (or other online videos)
- Follow written text tutorial (book, handbook, manual, worksheet)
- On my own
- Other (please list ____________________________________________)

I generally am able to find the support I need for using technology in my teaching.

strongly agree to strongly disagree

The COE offers excellent training and support for using digital tools in the classroom.

strongly agree to strongly disagree

UHM offers excellent training and support for using digital tools in the classroom.

strongly agree to strongly disagree

Approximately how many COE technology workshops have you attended?

None   1-2   3-5   More than 5

In general, how would you rate the COE technology workshops you attended?

Very helpful…Not helpful

**Attitudes toward Online Learning**

My teaching has changed as I have implemented online learning.

strongly agree to strongly disagree

My face-to-face teaching has improved because of my experiences teaching online.

strongly agree to strongly disagree

Given a choice, I prefer to teach (choose one):

- Face-to-face
- A mix of face-to-face and online
- Fully online
- No preference
Teaching online requires more work than teaching face-to-face classes.
   strongly agree to strongly disagree

Online courses are better when there are at least some sessions that are real-time with the students.
   strongly agree to strongly disagree

Having students meet face-to-face at least once is the preferred way to create community in an online course.
   strongly agree to strongly disagree

Teaching online requires more time communicating with students than face-to-face.
   strongly agree to strongly disagree

Teaching online requires more time for planning than face-to-face courses.
   strongly agree to strongly disagree

Online teaching is necessary to meet student needs.
   strongly agree to strongly disagree

Students can learn equally well in online classes as in face-to-face classes.
   strongly agree to strongly disagree

Students are well prepared to use the technologies required for online learning.
   strongly agree to strongly disagree

My department encourages me to teach online.
   strongly agree to strongly disagree

In my opinion online learning is _____________________________ (open ended)

**Online teaching experience (branch here if no)**

Have you ever taught a fully online course? Y/N
Fully online meaning via the Internet, no f2f meetings, not on HITS, may include online real-time meetings using web conferencing such as Collaborate

How many courses have you taught online that included only one face-to-face with students (orientation or classroom session)?

How many courses have you taught which included a mix of fully online sessions and some face-to-face sessions? ______

How many courses have you taught that included online, real-time, live sessions?______
(synchronous class: typically using video or audio conferencing tools like Collaborate)
How many courses have you taught that did not include any real-time sessions? ____
(asynchronous class: typically using online modules, discussion boards, email, recorded lectures).

Have you taught online for any higher education institution other than UH? yes/no

Are you teaching a fully online course in the Fall 2013 semester?
Yes No Hybrid Not teaching fall

When did you teach your first online course (including hybrid, i.e., some face-to-face sessions)?
In past year
2-3 years ago
4-5 years ago
6-10 years ago
More than 10 years ago

Over the past two years, what part of your teaching load has been online (including hybrid)?
    All courses online
    Part of my courses online
    Only one or two courses online
    No online courses in past two years

What do you like best about teaching online? (open ended)

What do you see as the greatest challenges of teaching online? (open ended)

Branching to new survey:

Would you be willing to be interviewed about your experiences in teaching online for a future part of this study on technology use in teaching?

If yes, will branch to new survey so cannot be connected to anonymous responses. Will ask for name and contact information.
APPENDIX C – INTERVIEW GUIDE

Background information:
1. How long have you been teaching online classes?
2. How did you get started teaching online classes?
3. What online classes have you taught recently? Are these undergraduate or graduate classes?
4. Do you use an online web conferencing system like Blackboard Collaborate or Skype as part of your online teaching (i.e., a tool in which you are able to interact through video or audio in real time with students)? How do you use this in your classes?

Interview Questions

1. What do you like about teaching online? Are there technologies that make it easy or enjoyable to teach this way?

2. Would you be willing to show us an example of an online teaching lesson or module you use and explain why you think it is an interesting example of online teaching?

3. Would you be willing to share an example of student work from an online class with us, and explain how it shows student learning? Please do not show us anything that would identify an individual student.

4. Card Sort Exercise (see Appendix D)

5. How well prepared are your students for the technology used in your classes?
   a. Have your teaching practices ever been impacted by students’ capacities or deficiencies with technology?
   b. What do you believe is your role as an instructor in developing students’ technological skills?
   c. How much do your perceptions of students affect your online teaching? Do you think students now are different because of their technology uses today?

6. What type of institutional/departmental support do you need or receive for your online teaching?

7. How do you get information about new technologies?
   a. How has the success/obstacles faced by other online instructors impacted your decision to teach an e-learning class?
   b. What role do your colleagues play in your decisions?

8. What do you think is expected of faculty in the college of education in terms of using technology in teaching? How do these expectations affect your use of technology in teaching?
9. Where do you think you and your colleagues/department need to go with online teaching in the next few years? How do you see this affecting your teaching?

APPENDIX D – CARD SORT

Question 1: Which of the following do you think are true of the students you teach in terms of their technology knowledge and uses? [give them the cards].

Instructions:
Step 1 - Sort into those you think apply versus those you don’t think are typical of your students

Step 2 - Put the ones you put in the “apply to your students” pile into a ranked order with those most important to how you have to think about your own teaching at the top (photo to be taken of ranked order)

Question 2: What impact, if any, does this have on your online teaching?
   Prompt: could be applied in a particular class or activity

Characteristics of digital natives*
(each characteristic printed on an individual card for sorting)

- Craving for speed and inability to tolerate slow-paced environment
- Desire or perceived need to multitask
- Preference for pictures rather than text
- Tendency to process information in nonlinear ways
- Preference for collaboration
- Preference for constant connectivity
- Preference for learning through activity rather than reading or listening
- Mixing of work and play
- Expectation for immediate feedback and “payoff” for their efforts as found in games
- Preference for fantasy contexts as found in games and realistic TV and movies
- Expectation that technology is part of the landscape; difficulty with environments that lack technology
- Ability to scan text and process information quickly
- Loss of ability to read in linear manner
- Impatience with guided instruction
- Novelty of technology may be distracting
A. Overview of the Case Study

1. Objectives

Goal
The goal of the ETEC 780 case studies is for pairs of students in the class to interview individual faculty members using a set of standardized questions. Analysis of the interviews will be written up and submitted as an assignment in the class. The study will include interviews with seven faculty members who teach online in the College of Education to develop a set of case studies on the influences in their selection and uses technology in online teaching.

Problem
Higher education faculty are increasingly expected to incorporate technology into their teaching, especially online teaching. While technology tools are easily accessible, faculty are often challenged to integrate technology into their teaching. We need to better understand the factors that influence faculty’s tool choices and challenges they face with technology integration in order to provide effective professional development and support. In particular, we are interested in the how each faculty member perceives the influences of their immediate community (faculty, staff, and students) on those decisions.

Purpose
The purpose of this qualitative mixed-method multiple case study is to understand faculty members who teach online in the College of Education by developing a set of case studies on the influences in their selection and uses technology in online teaching. Online faculty for the purposes of the case studies includes those who teach classes in which students do not attend face-to-face as well as those in which a maximum of two sessions are face-to-face classes.

2. Case Study Research Questions

Research questions for the case studies are:
1. How do a faculty member’s beliefs about of students influence his/her online teaching?
2. How do a faculty member’s beliefs about their colleagues impact his/her online teaching?

3. Theoretical Frameworks

TPACK will be used as a framework which provides a way of thinking about the relationship between pedagogy and technology integration in teaching based on content area. This can be seen as more than knowledge but perceptions about how content, pedagogy (including understanding how students learn), and technology are interrelated. But based on the findings, case studies may need to relate to a different theoretical framework.

4. Relevant Literature
B. Data Collection Procedures

The overall case study design
The case study design involves a semi-structured interview with a COE faculty member conducted by two students. The interview sessions is projected to take approximately 90 minutes. Seven faculty members will be interviewed in this study. Interviews will be audio recorded during face-to-face interview sessions, transcribed, and analyzed using standard qualitative coding techniques (Merriam, 2009). Each student pair will produce a single-case study reporting on the interview which they conducted. Multiple case analysis will be provided by Ms. Eichelberger following Yin (2014) and Stake (2006).

Who will conduct the interviews
The interviews will be coordinated by the applying researcher (Ellen Hoffman) and COE Assistant Specialist Ariana Eichelberger. The interviewers will be 14 doctoral students in a course on mixed methods research, ETEC 780. All students in the class have jointly developed the interview protocol following Yin (2014) with the lead researchers, have studied appropriate and ethical interview techniques, and have completed IRB required CITI training.

Training for interviewers
All interviewers were involved in a multi-session development of this protocol over four class periods in September 2013, including the design of the interview questions. Articles on doing interviews were assigned to improve interview skills.

Pilot interviews
Student groups interviewed three faculty members from educational technology on October 9, 2013. These pilot interviews were used to test the questionnaire, develop initial coding schemes, and ensure each interviewer could apply needed probe questions to prompt for additional detail.

Issues in interviewing for consideration by interviewers
Considerations in questioning
Mental line of inquiry – Level 1 - Research Questions
  Questions to keep US on track, research questions (and their sources of evidence)
Verbal line of inquiry – Level 2 -
  Questions to ask the interviewees

How will the interviews be set up
Once approval has been received from IRB for the study, Ariana Eichelberger will make initial contact with the faculty in the study, and for those who express interest, send them a follow up email with information about the questions, process, and a sample of the informed consent form. Once they respond positively to the recruitment email, each student interviewer pair will be assigned a faculty member to contact and set up a time for the interview. Students should arrange for a location to conduct the interview that is comfortable and quiet to accommodate the recording equipment.
The interview process
One interviewer will serve as the lead for asking questions while the other takes care of recording and note taking. Either interviewer may ask follow-up questions as needed. Interviewers need to be respectful of the 90-minute time limit and arrange to cover questions in this period if possible. The ideal is to move on and cover all questions rather than have long discussions of just the first ones. As a start to the interview, the interviewers will briefly review the purpose and general issues that will be covered after introducing themselves.

Audio recording
The interviews will involve audio recording. The audio recordings should not include the names of the participants. No video will be used. The recordings will be recorded and transcribed by the student interviewers, who have been instructed on ensuring these are securely stored to ensure confidentiality. Once transcription has been completed, recordings will be sent to the interviewee for a member check. The interviewee will be asked if the transcript is accurate, and if they want to elaborate, can do so as an addition rather than changing the transcript. All recordings will be turned over to Ms. Eichelberger, who will store them in a secure location and will destroy them when the study is completed.

Resources and equipment needed
Printed copies (2) of the informed consent form
Printed copy of the interview questions
Cards for card sort
Computer/tablet to record the interview
Computer/paper to take notes
Camera to record card sort results

Timeline
See ETEC 780 class schedule

C. Data Collection Questions
Located in Appendix C and D

D. Guide for the Case Study Report
Each student will individually write up a case study report using the formal structure of a research report. Information on reporting is covered in the materials for the ETEC 780 course in Laulima. This means there will be two reports for each faculty member interviewed. Student pairs will also develop a short presentation for the class telling about what they found.

A standard process for analyzing results will be developed based on the initial coding of the pilot interviews. This process requires that best practices in qualitative analysis be applied and that all analysis is conducted with validity in mind.

In addition to analyzing the results of the case studies on technology use as part of the coursework for the class, the intent is to report on the results in journal articles and conference
presentations. Each student may use the material from their single case study for a conference presentation. Through jointly authored reports, doctoral students and faculty will be able to contribute more broadly to the research on online learning. In addition, the results will be shared with the COE Technology and Distance Programs unit to help improve professional development efforts in the College.
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