2019

Assessing a Mid-Sized University with HE-TPACK

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Assessing a Mid-Sized University with HE-TPACK

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A Dissertation

Presented to the Faculty of

The College of Education and Human Services

Department of Educational Studies, Leadership, and Counseling

At Murray State University

In Partial Fulfillment of the Requirements

For the Degree of Doctor of Education

P-20 & Community Leadership

Specialization: STEM

Under the Supervision of Assistant Professor Dr. Teresa Clark

Murray, KY

August 2019

Abstract

The dissertation research project has the goal of looking at a mid-sized regional university and assessing the faculty in the college of education and human services to see how faculty members self-assess themselves with the higher education technological pedagogical and content knowledge (HE-TPACK) instrument while attempting to determine whether or not there is a difference between digital immigrant faculty and digital native faculty. The study also looks at the self-perception of what digital group faculty members think they belong in. The study examined (n=13) faculty members, including digital immigrants nine and digital natives four. According to the findings, there was no statistical significance in terms of the HE-TPACK results. However, both the digital immigrants and digital natives had self-perceptions that they belonged to the other group even though their age placed them in the opposite group. This finding supports other studies indicating that individuals can move between these groups based on their experiences with technology rather than a defined age.

Table of Contents

List of Tables

List of Figures

Appendices

CHAPTER I

Introduction

Context of the Problem

In the current higher education environment, the adoption of instructional technology in the classroom has become almost a necessity to relate to the present generation of students (Schrader, 2008). Instructional technology has become a pivotal tool with which faculty must be proficient. Faculty members are expected to possess the technological pedagogical content knowledge (TPACK) to be able to use technology in such a manner in the classroom that it enriches the students' overall learning experience and keeps the students engaged (Berk, 2009; Shepherd & Sheu, 2014). Celik and Keskin (2009) conducted a study that looked at student learning objectives taught with and without instructional technology. The researchers found that students were able to master the learning objectives faster with the incorporation of instructional technology (Celik & Keskin, 2009).

Students from the 21st century are more adapted to technology and have grown up with it (Palfrey & Gasser, 2008). However, ensuring or encouraging faculty to use instructional technology in the classroom can be a challenge because faculty members have different levels of TPACK. The ascertained TPACK can be from exposure, professional development, and personal knowledge. Georgina and Hosford (2009) surveyed faculty from 16 Midwestern colleges and universities to determine how faculty training on instructional technology impacts the adoption of technology in the classroom. The researchers found that faculty members who completed the training and were comfortable with the technology were more likely to implement the technology in their classroom (Georgina & Hosford, 2009). However, effectively integrating instructional technology in the classroom often requires the faculty to commit time, engage in professional development, and adapt their pedagogy (Watty, McKay, & Ngo, 2016; Georgina &

Hosford, 2009; Somekh, 2008). With these extra requirements (e.g., advice, research, and training for faculty), educational professionals are often reluctant to change and effectively use technology in the classroom (Koehler & Mishra, 2008; Watty et al., 2016). Faculty members have also stated that, with the adoption of technology in the classroom and digital communication, their workload has increased, as they have to create content for classes and manage all the related digital communications (Allen & Seaman, 2012).

Other research has suggested that this gap in the use of instructional technology in the classroom could be based on generational differences between digital natives and digital immigrants (Watson & Pecchioni, 2011). Although there is not a definitive age range for digital natives, most researchers consider a digital native an individual born after 1982 with a few years of leeway in either direction (Tuttle, 2012). Millennials, Generation Y, and the Net Generation are some of the groups that make up this cohort (Egnatoff, 1999; Bennett, Maton, & Kervin, 2008; Berk, 2009; Prensky, 2001).

Digital immigrants can be classified as anyone with a birth year before 1982 (Berk, 2009; Prensky, 2001). Typically, digital immigrants have not been inundated with technology their entire lives like digital natives (Berk, 2009). Often, students are referred to as digital natives, and faculties are the digital immigrants (Berk, 2009). With digital immigrants' reluctance to adopt instructional technology, it is critical to ascertain their self-assessment of their technology knowledge (TK) and experiences using technology in their teaching and learning (Johnson, 2018). Obtaining their self-evaluations will help identify what works for them and the underlying issues they are experiencing with technology.

Both digital natives and immigrants live in a technologically driven world and have the same access to technology, but they come from different eras, which has affected how their

brains have developed with respect to how they store information; thus they produce different results when recalling information (Vodanovich, Sundaram, & Myers, 2010; Autry & Berge, 2011). Understanding how these two groups have developed through their lifespan is critical because digital natives have always had fast-paced, instant gratification with technology devices. In contrast, the digital immigrants grew up in a time when technology was not always available (Egnatoff, 1999; Vodanovich et al., 2010; Mäntymäki & Riemer, 2014). Researchers have argued that the age of digital immigrants should not limit these individuals, as a digital immigrant could possibly become a digital native (Akçayır, Dündar, & Akçayır, 2016; Helsper & Eynon, 2010). Other researchers have stated that they do not believe that the generational gap between digital natives and immigrants actually exists (Lai & Hong, 2015; Margaryan, Littlejohn, & Vojt, 2011). Nevertheless, having an understanding of these groups is critical in comprehending their strengths and weakness in relation instructional technology.

Statement of the Problem

With the increasing need for TPACK, it is critical for more in-depth research to be conducted to understand faculties' true experiences with and knowledge of instructional technology. Research in this area is critical since faculty members can obtain tenure and become long term assets to the university, and it is critical to evaluate and foster their skills in instructional technology to assist them in engaging this generation of students (Hainline, Gaines, Feather, Padilla, & Terry, 2010; Stonebreaker & Stone, 2015). This generation of students is connected at all times, and they are multitaskers because they strive to accomplish their educational endeavors (Lawrence, 2015; Koehler, 2012; Johnson, 2018).

Today's students have a "Nintendo mentality," meaning that they learn by trial and error and expect instant feedback (Berk, 2009, p. 11). With this mentality, students are not satisfied

with the traditional classroom setting or their educational experience overall (Berk, 2009). With students being so in tune with technology, educational professionals need to learn how to use instructional technology in their classes, as well as to help mitigate some of their fears of technical issues and incorrect usage (Stoerger, 2009). Being able to ascertain these experiences through self-assessments of the faculty is essential in promoting instructional technology and providing the resources necessary for the faculty to be successful.

Another danger that educators face with instructional technology is knowing how to evaluate instructional technology they want to use and implement in their classrooms (Koehler & Mishra, 2005). Faculty members need to know how to implement the technology most optimal for their teaching pedagogy and class content (Koehler & Mishra, 2008). One framework that faculty members can apply is the technological pedagogical and content knowledge (TPACK) tool to evaluate instructional technology. The TPACK instrument focuses on how faculty can use instructional technology with their pedagogy and content knowledge (CK) to provide an enriched learning experience for their students (Mishra & Koehler, 2006). The TPACK tool emphasizes how the areas of technology, pedagogy, and CK all intertwine instead of looking at each one separately (Mishra & Koehler, 2006). The TPACK framework has also been the foundation for the higher technological pedagogical content knowledge (HE-TPACK) self-evaluation framework, which focuses on faculty member's perceptions of their TPACK knowledge areas. Having a way to evaluate and understand the trials and tribulations that educators have when using effective instructional technology is critical in developing the ability to address their needs and providing students the best learning environment possible. Providing adequate instructional technology resources for faculty to integrate into the classroom is essential. This can be a challenge at small or medium-sized universities with restrictive budgets.

Purpose of the Study

This study serves as a response to other HE-TPACK studies by Garrett (2014), Huffman (2016), Johnson (2018), and Hruska (2018) to further the research of the HE-TPACK instrument and research on digital natives and immigrants. This study constitutes a replication of Garrett's (2014) study but targets faculty members in the college of education at a mid-sized regional university to evaluate their self-assessment results in their technological, pedagogical, and content knowledge, as well as the technology training they have available. The second purpose of the study is to continue Johnson's (2018) study and identify if there are any differences between digital immigrants and natives among the faculty, as well as to learn how they identify themselves with those terms.

In order to contribute to the literature on the HE-TPACK instrument a replication study at a mid-sized university needed to be conducted since both Garrett (2014) and Johnson (2019) studies were conducted at a large flagship university. Research has also found that smaller departments are often content with their research and academic environment, and at larger departments, faculty members tend to engage in more research and innovation (Kyvik, 1995). Determining whether or not this trend is true in terms of the HE-TPACK tool can help provide an understanding of faculty at both types of universities. The ability to ascertain how educators interweave instructional technology is critical in identifying the types of professional development, support, and additional resources needed to promote the success of the faculty in the classroom. This study examines the instructional technology experiences of educators with respect to instructional technology in the classroom, and takes an in-depth look at how they use instructional technology for teaching and learning. Faculty members also completed the HE-TPACK self-assessment to establish a baseline for their technological pedagogical and content

expertise. Gathering this information helped illuminate any differences between digital immigrants and natives among the faculty, thus providing more insight into how a mid-sized regional university's digital immigrants and natives performed on previous HE-TPACK assessments completed by Garrett (2014) and Johnson (2018).

Significance of the Study

The goal of this study is to identify the level of technological, pedagogical, and content knowledge of faculty members and to see how they self-assessed their technological pedagogical and content knowledge. In order to accomplish this self-assessment of faculty the HE-TPACK instrument was used (Garrett, 2014). Additional questions were added to the assessment to determine if faculty rank or generation had any effect on their use of instructional technology in the classroom. Gaining a deeper understanding of the experiences and self-assessment of the faculty members helped shed light on educators' experiences with instructional technology at a Midwestern university.

Conceptual Framework

There is one major underlying framework for this study for understanding the faculty's pedagogical, content knowledge and technology knowledge; the TPACK framework. The HE-TPACK is a self-assessment instrument based on the TPACK framework, and it was used to collect information about faculty members' perceptions of their technology, pedagogy, and CK (Mishra & Koehler, 2006; Garrett, 2014; Johnson, 2018).

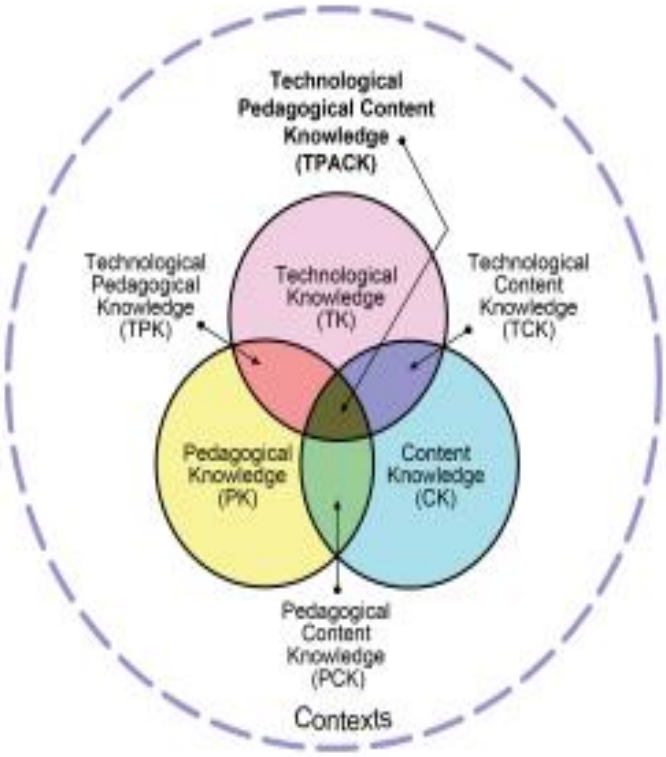

Figure 1. TPACK model obtained from www.tpack.org.

Research Questions and Hypothesis

RQ_0: Based on faculty members' HE-TPACK self-assessments, is there a difference between digital native faculty members and digital immigrant faculty members?

H_0: There will be no difference between digital natives or digital immigrant faculty members.

RQ_1: Are faculty members' self-perceptions of their digital native or immigrant status in line with their generational cohort classification?

H_1: Digital immigrant faculty members will perceive themselves as digital natives.

Assumptions of the Study

The study assumes that the participants answered the survey questions truthfully without bias. Another assumption is that participants have basic computer literacy that the participants

would provide an accurate representation of their technological, pedagogical, and content knowledge. The study also assumes that faculty use their campus email address and would find their invitation to the study in their inbox.

Definition of Terms

1. *Content knowledge (CK)*: the subject content being taught by the instructor (Koehler & Mishara, 2006).
2. *Digital immigrant*: the term used to describe a person who did not grow up with technology. These individuals were also born before 1982 (Berk, 2009; Pensky, 2001). Boomers and Generation X are the groups that digital immigrants fall into (Johnson, 2018).
3. *Digital native*: people who have grown up with technology their entire lives. Digital natives were born after 1982 and are often classified as Millennials, Generation Y, and the Net Generation (Berk, 2009; Prensky, 2001).
4. *Faculty:* educators who teach courses for university credit (Tuttle, 2012).
5. *Higher education technological pedagogical content knowledge (HE-TPACK)*: a self-assessment tool for faculty to see their perceived knowledge in the seven TPACK domains with a higher education focus (Mishra & Koehler, 2006; Garrett, 2014).
6. *Instructional technology*: any technology used in the teaching and learning process (Tuttle, 2012).
7. *Mobile devices:* electronic devices that can be used for both voice and data communications. An example would be smartphones, laptops, or tablets. These devices are often used in higher education classrooms.

8. *Pedagogical content knowledge (PCK):* the ability to apply teaching techniques and styles to the CK (Koehler & Mishra, 2008).
9. *Pedagogical knowledge (PK)*: faculty's understanding of the processes and methods of teaching and learning (Mishra & Koehler, 2006).
10. *Technology knowledge (TK)*: faculty's understanding of technology across the spectrum and being able to apply it correctly in the classroom while also being able to stay up to date on technology (Koehler & Mishra, 2008).
11. *Technological pedagogical content knowledge (TPACK):* the intertwining of content, technology, and pedagogy knowledge areas intertwine (Koehler & Mishra, 2008; Johnson, 2018).
12. *Technological pedagogical knowledge (TPK)*: the understanding that instructors' pedagogy has to be altered or adapted for the use of technology for teaching and learning (Koehler & Mishra, 2008).

Summary

With the constant change in instructional technology, it is crucial to ascertain the experiences and self-perceptions of faculty to understand their true instructional technology needs in the class (Johnson, 2018). Having this information can help work toward bridging the generation gap between faculty and the students, thus allowing for a more engaging classroom environment that promotes student success (Berk, 2009). When working with digital natives who have been immersed in technology all of their lives, it is crucial for digital immigrants to be able to take pedagogy and content knowledge and intertwine those elements with technology to appeal to digital natives (Koehler & Mishra, 2008). The HE-TPACK instrument can help researchers grasp the faculty's technology, pedagogy, and content knowledge, and it is a valid

method to evaluate the way instructional technology is used in the classroom (Mishra & Koehler, 2006; Garrett, 2014). Further research on how digital immigrants self-assess their own technology and learning skills is critical in learning about their technology and learning experiences (Johnson, 2018).

Chapter II

Literature Review

History of Instructional Technology and Design

Understanding the history of how instructional technology and design came into higher education is important for learning from the past and working toward the future. The origins of instructional technology and design can be traced back to World War II, when there was a need for an efficient education system to train military personnel (Olsen & Bass, 1982). The instructional technology solution that the government developed was training films, and some argued that this method was not an instructional technology but rather instructional media (Saettler, 1986). However, the creation of these instructional films helped spur the development of instructional technologist jobs (Saettler, 1986). The next major growth in instructional technology occurred during the 1950s when B.F. Skinner popularized the concept of programmed instruction (Morgan, 1978). Programmed instruction looks at behavioral objects, small frames of instruction, self-paced learning, active learning, and immediate feedback on the correctness of response (Skinner, 1953). Ultimately, programmed instruction methods could be applied to media on a large scale to create macro systems of instruction (Heinich, 1970).

In the United States the 1960s was a period of rapid growth in instructional technology and development (Shrock, 1995). The extreme growth that occurred during this time can be attributed to the articulation of the components of instructional systems and their properties (Shrock, 1995). The first major breakthrough that occurred during the 1960s consisted of Robert Glaser including the development of the term ‘instructional systems’ and identifying the components (Glaser, 1962). Glaser’s work is critical because he promoted the development of instructional technology as a science. The other major breakthrough came when Robert Gagne wrote *The Conditions of Learning*, a critical work connecting learning objectives to different

classes and how to relate these objectives to instructional design (Gagne, 1962). Notably, during the 1960s, the federal government supported the development of instructional systems and helped fund several laboratories through the Elementary and Secondary Education Act (ESEA) to help develop instructional systems (Shrock, 1992). One of the other major trends during the 1960s was that educational leaders began to promote the use of audiovisual (AV) instruction to help expand instructional technology (Schuller, 1986).

In the 1970s, the growth of instructional design and technology continued in terms of developing instructional design models. One of the major changes that occurred with the instructional design models involved the addition of needs assessment to instructional design (Kaufman, 1972). Education also began to change in the 1970s, as the study of instructional system design grew in graduate programs (Shrock, 1992). In addition, the *Journal of Instructional Development* was founded toward the end of the 1970s (Shrock, 1992).

The 1980s was a period of major growth for instructional technology due to the advent of microcomputers and the rapid adoption of instructional systems (Shrock, 1992). Mechanical testing systems can be traced back to as early as 1925 when Sidney L. Pressey, a professor of psychology at the Ohio State University, developed and demonstrated such as system before the idea gained momentum (Olsen & Bass, 1982). With the wide adoption of microcomputers in the 1980s, the microcomputer system became a pivotal advancement for instructional technology (Shrock, 1992). However, with the popularity of performance technology during this decade, compromises to instructional technology were made to utilize non-instructional solutions to human performance issues (Shrock, 1992). Overall, the 1980s were a period of great growth for instructional technology (Shrock, 1992).

In the 1990s, more rapid growth in technology, as computers became more available, Internet usage became more common, and the interest in and use of instructional technology expanded (Reiser, 2001). The push to use the Internet for instructional purposes was critical to sparking the development of distance learning, which had been used in previous decades but more through correspondence courses via mail. People have taken correspondence courses through the mail since 1873, thus allowing universities to reach a multitude of students (Caruth & Caruth, 2013). In 1995, only 22% of higher education institutions offered distance learning and asynchronous Internet-based technologies, but by 1997–1998, the offerings had increased to 60% (Lewis, Snow, Farris, Levin, & Greene, 1999). Computer access also became more widespread in this era; for example, a survey completed in 1995 on computers available in schools reported the presence of one computer for every nine students in schools, but by 1998, the number of computers had increased to one computer per every six students (Anderson & Ronnkvist, 1999). Even though there was an increase in technology in schools, it was still difficult to determine how the technology was being utilized for instructional purposes.

Even if the availability of technology access was an issue in the 1990s, usage increased because of interactive abilities (Reiser, 2001), which can be broken into three categories: interactions between learner and content, between learner and instructor, and among learners themselves (Moore, 1989). With the evolution of technology, students can interact with the instructor's content, whereas before, students only watched films; now, they could interact with content (Moore, 1989). The Internet also helped revolutionize how instructors interact with students through email, chatrooms, and discussion boards (Moore, 1989). Formerly, all interactions between the instructor and student would have been in person, by telephone, or through mail correspondence.

In the new millennium, instructional technology experienced another major leap due to the decreased cost and increased access. In the years 2000–2001, 90% of institutions offered some type of distance learning course (Waits & Lewis, 2003). To aid in accessing distance learning courses, learning management systems (LMS) became more heavily used. An LMS can be summarized as a web-based platform used to facilitate anytime-and-anywhere access to course content (Black, Beck, Dawson, Jinks, & DiPietro, 2007). The LMS concept originally described a management system component of the PLATO K-12 learning system (Watson & Watson, 2007). However, people often blend the LMS concept with the term 'course management systems' (CMS), which is used for online and blended classroom environments.

A CMS provides the instructor with the resources necessary to build an online course and the tools to manage the course and communications with the students (Watson & Watson, 2007). Another popular term used to capture both the LMS and CMS concepts is the 'learning content management system' (LCMS). The LCMS focuses on creating, managing, and delivering course content to students, whereas the LMS focuses on managing the learner's activities and competencies (Oakes, 2002). The LMS and LCMS complement each other in that the LMS provides the rules, and the LCMS provides the content (Connolly, 2001).

In the 21st century, bring your own device (BYOD) became another major trend at higher education institutions (Afreen, 2014). Since computers and mobile devices became more inexpensive, students had easier ways to acquire the technology, use it in the classroom, and complete assignments. EDUCAUSE, a nonprofit organization with the purpose of advancing higher education, conducted a student survey in 2012 and found that 86% of students owned laptops and that there had been a 15% increase in tablets and a 62% increase in smartphone ownership (Afreen, 2014). With the integration of LMSs and BOYD, student response systems

(SRS) have become a trend and are being used in the classroom in higher education since students are carrying electronic devices and have wireless networks for connectivity. The SRS allows the instructor to request feedback from the audience and collect their responses through the SRS. These SRSs can be used both in the classroom and for distance learning. Using the SRS helps promote interactions in the classroom and provides students and instructors real-time feedback on how the instructor is conveying the material and how the students are understanding the content (Stav, Nielsen, Hansen-Nygard, & Thorseth, 2010).

Consequently, mobile devices and laptops can also be considered a distraction in the classroom if the devices are not being used for productivity purposes (Tindell & Bohlander, 2012). From the 1960s to the present, instructional technology has evolved from film to online synchronous learning with the help of technologies such as computers and the Internet. Universities can now reach students all around the world and offer educational opportunities through the use of learning management systems to provide students with a propitious learning environment. Instructional technology is always changing and requiring educators to develop their knowledge on the latest instructional technology (Koehler & Mishra, 2008). In the next section, TPACK is introduced with an in-depth look at each of the domains that constitute the triad of TPACK.

Introduction to TPACK

The TPACK framework was designed to show how faculty knowledge of technology, pedagogy, and content are linked together (Mishra & Koehler, 2006). These three areas of technological, pedagogical, and content knowledge are critical for faculty to successfully implement instructional technology in the classroom (Mishra & Koehler, 2006). Mishra and Koehler (2006) derived the TPACK framework from the theory of pedagogical content

knowledge (PCK) that Shulman (1987) developed. Mishra and Koehler (2006) took Shulman's PCK and expanded it to include technology content and pedagogical knowledge. Mishra and Koehler's (2006) TPACK framework can be broken into the following eight domains.

- Content Knowledge (CK)
- Technology Knowledge (TK)
- Pedagogical Knowledge (PK)
- Pedagogical Content Knowledge (PCK)
- Technological Content Knowledge (TCK)
- Technological Pedagogical Knowledge (TPK)
- Technological Pedagogical Content Knowledge (TPACK)
- Technology Training

TPACK Domain Details

One of the first TPACK domains that needs to be discussed to truly understand the TPACK framework is CK, which is simply the faculty's knowledge on the subject being learned or taught in the class. Faculty having the CK is critical for the success of the class. Shulman (1986) described this CK as the knowledge of concepts, theories, ideas, and well-established practices. Faculty are known for being experts in their fields and continue to develop their knowledge through professional development opportunities (Lux, Bangert, & Whittier, 2011). The TK domain refers to a common understanding that technology in today's society is an ever-evolving area and that faculty members have to work at keeping themselves up to date in terms of TK (Koehler & Mishra, 2008). Educators also have to use their TK to infuse pedagogy and content in their courses. Technology can consist of a wide variety of resources from something as simple as a pen and paper to a digital system (Koehler & Mishara, 2008; Johnson, 2018). The

pedagogical knowledge (PK) domain focuses on the faculty understanding the process and methods used for teaching and learning (Johnson, 2018). Faculty need to be able to take their knowledge and implement a learning process they can share with students to teach them the content and knowledge (Koehler, 2012; Garrett, 2014). Educators who master the PK domain often have a more positive disposition toward teaching and welcome new learning experiences that help them develop new teaching techniques (Koehler, 2011; Garrett, 2014).

The pedagogical content knowledge (PCK) domain encompasses the areas of content and pedagogy knowledge. This domain means that the faculty members know what teaching techniques to use to clearly communicate the content they are covering to students in the most effective manner possible (Koehler & Mishra, 2008). This domain also means that faculty members have a great understanding of their pedagogy, and they often reflect on their teaching outcomes and make sure that their course content is accessible at various cognitive levels (Lux et al., 2011; Garrett, 2014).

The technological content knowledge (TCK) domain has the goal of using technology to enhance the content of the course and to make a more advanced learning process for students. The TCK domain also has a focus on promoting active learning in the classroom to help engage students and to extend course content in new ways that were not possible before new technology was available (Koehler & Mishra, 2008). In order to accomplish these challenges, educators have to use their in-depth knowledge of the content to see how technology can enhance content for students to create an active learning environment to engage students more (Koehler & Mishra, 2008).

The technological pedagogical knowledge (TPK) domain requires faculty members to understand that there is the possibility that traditional teaching strategies may or may not work

with technology when combined. Having knowledge of the TKP domain means that there is an understanding that the technology is there to help enhance the educator's pedagogy. An example that Koehler and Mishra (2008) used is faculty members being aware of all the different technological tools available but not selecting the most appropriate one to use for the most effective instruction.

The TPACK domain is often considered the last domain in the TPACK framework, which is simply the triad formed when the knowledge, pedagogy, and content areas work together. Koehler and Mishra's (2008) talk about how critical it is for faculty to understand how the framework's purpose is to harness all three together to provide the best teaching and learning process possible for students and faculty. Koehler and Mishra (2008) best described the failure to use the TPACK concept: If educators employ these domains separately, then they are not teaching effectively; therefore, it is critical for faculty members to understand how the TPACK framework works and how to utilize it to be the most effective teacher with technology (Johnson, 2018). The true last domain of the TPACK framework is technology training. which is often in a separate section of the instrument from the other seven domains. This domain looks at technology training and would help enhance faculty members' teaching if they have received technology training (Johnson, 2018).

Mishra and Koehler (2006) introduced the TPACK framework as a way to measure and evaluate the technology, pedagogy, and CK of instructors. However, there is still much dispute on how well the TPACK framework works and the actual skills of the faculty because of the vagueness of their knowledge of the TPACK domains (Mishra & Koehler, 2006). Continuing the research with the TPACK studies in a higher education environment is critical to help promote technologically enhanced pedagogy growth (Garrett, 2014).

HE-TPACK

Garrett (2014) was the first to consider the higher education TPACK, or HE-TPACK. The HE-TPACK framework, as it came to be known, was based on the TPACK framework that Mishra and Koehler (2006) developed. Lux, Bangert, and Whittier (2011) created the survey for the TPACK framework that Garrett used for part of the HE-TPACK survey. The other portion of the HE-TPACK survey came from Georgina and Olson's (2008) technology training instrument. The HE-TPACK instrument, with these two sections, has 56 survey items and uses a 5-point Likert scale to measure the responses. Garrett (2014) combined the two sections to create the final instrument to focus on higher education because the TPACK framework originally focused on K-12 schools. In K-12 schools, faculty members are often required to attend workshops to enhance their technology training through professional development (Garrett, 2014).

Based on the experiences of Garrett (2017), higher education faculty have more academic freedom and autonomy, which allows more opportunities to select workshops and use resources available to them that they want to use to enhance their technology skill sets. This freedom provides faculty to use technology more spontaneously, in the classroom, which can lead to the faculty poorly integrating the technology into their courses or not at all. The HE-TPACK instrument was developed for faculty in higher education to be able to self-assess their technology, pedagogy, and CK to improve their ability to integrate technology into the classroom to enhance students' education (Garrett, 2014). Since Garrett (2014) developed the HE-TPACK instrument and conducted the original study, several studies have employed the HE-TPACK instrument, as discussed in the following section.

Synthesis of HE-TPACK Studies

The first original HE-TPACK study was conducted by Garrett (2014). She developed the HE-TPACK instrument and used it to assess the faculty with the TPACK framework and their technology training at a Southeastern university (Johnson, 2018). Garrett (2014) conducted multiple linear regression analyses on the results of the HE-TPACK and found significant differences in the pedagogical knowledge, content, knowledge, PCK, and the technological, pedagogical, and content knowledge in relation to faculty members' rank (Johnson, 2018). Garrett (2014) had the faculty participants' ranking broken into two groups: tenured and non-tenured. Garrett (2014) found that the TPACK domain tenured faculty average (n = 53) was 1.950, and it was 2.234 for non-tenured instructors (n = 75), with a 95% confidence interval, and the differences were .062 and .498, respectively. For the PCK domain for tenured faculty (n = 53), the average was 1.664 and 1.834 for non-tenured faculty (n = 75). These are just examples of a few of the differences Garrett (2014) found while conducting the multiple regressions on the HE-TPACK data. Garrett (2014) also noted that the HE-TPACK instrument needed a revision in the technology training section to add more validity for it and the other domains.

The next researcher to use the HE-TPACK to evaluate faculty was Huffman (2016), who discovered that faculty had a positive outlook and understanding of instructional technology. Huffman (2016) conducted the study at a university in the Southeast of the United States that had a student enrollment of 36,155 and 416 faculty members. The study used a mixed-methods design and explanatory-sequential analysis to review the results received from the 13% of the faculty members from the education college who responded. To follow up, Huffman conducted interviews with nine faculty members for a deeper understanding of the results.

Another researcher to use the HE-TPACK instrument to assess faculty was Johnson (2018), who conducted a study at a Southeastern research university that had a student enrollment of 38,092 and 1,868 faculty members. Johnson managed to secure a sample of 223 participants in the study. Johnson (2018) focused on seeing if there was a difference between digital natives and digital immigrants in their use of instructional technology in the classroom. Johnson (2018) used a revised version of the HE-TPACK instrument that was modified to focus on face-to-face interactions in the classroom. Johnson (2018) used an item-to-total correlation to determine the significance of each question. This study found no significant difference in digital immigrants and natives, except in the category of the use of links to online resources. Johnson (2018) discovered that digital immigrants use links to online resources more often than digital natives.

In another study, the HE-TPACK instrument was employed at a newly established university in Texas. Hruska (2018) conducted an assessment to determine the perceptions of tenured and non-tenured faculty members on the TPACK domains in face-to-face, blended learning, and online environments. Hruska identified significant differences in academic college and academic status in the TPACK domains of pedagogy knowledge and technology pedagogy knowledge. Hruska (2018) also promoted the use of the HE-TPACK instrument by administrations to help grasp the current climate at the university regarding how instructional technology is being used, as well as to use HE-TPACK as a tool to help promote the use of instructional technology.

Garrett's (2014) HE-TPACK instrument is more widely accepted and used to determine the faculty's self-efficacy with instructional technology (Huffman, 2016; Johnson, 2018; Hruska, 2018). A synthesis of the studies that have used the HE-TPACK instrument found that faculty

members had less confidence in the domain of technology pedagogy knowledge (Garrett, 2014; Huffman, 2016; Hruska, 2018). Huffman's (2016) qualitative data indicated that most educators viewed instructional technology as a tool with the purpose of making courses more efficient and communications more effective. Huffman (2016) asked the faculty members who agreed to do the interviews to give examples of how they employed technology in the classroom to enhance student learning, and five of the interviewees could not give a specific example (Johnson, 2018). Huffman's (2016) qualitative findings support the work of Johnson (2018), who requested faculty members to participate in interviews to ascertain their experiences and determine how different the results would be compared to those of the HE-TPACK study. Garrett (2014) stated that faculty members in higher education have more freedom and do not utilize all the training and technology resources available to them. In addition, Hruska (2018) explained how the HE-TPACK instrument can be used by administrations to see how best to utilize training and technology resources most effectively in terms of budgeting resources and costs.

Understanding Faculty Background in Instructional Technology

Although faculty members are specialized experts in their fields of study, they often are not knowledgeable about other academic areas outside their doctoral focus (Lux, Bangert, & Whittier, 2011). This process of academic isolation occurs during graduate school (Golde & Dore, 2001). A report by the PEW Charitable Trust stated that about half of the doctoral students surveyed wanted to take classes outside their disciplines (Golde & Dore, 2001; Garrett, 2014). Higher education institutions need to support the faculty's desire to take classes outside their area of study to help promote innovation and preparation to become faculty upon graduation (Golde & Dore, 2001).

Allowing faculty to do so would help promote collaboration and interdisciplinary knowledge for a more well-rounded faculty (Golde & Dore, 2001). Higher education institutions should encourage doctoral students to take classes, such as ones on instructional technology, that could benefit them as they transition from students to faculty members. Most disciplines have not incorporated curricula to instruct their doctoral students on how to interweave instructional technology into their courses (Golde & Dore, 2001). Archambault and Crippen (2009) agreed that doctoral students should be taught the pedagogy and strategy to teach the content of their fields, along with the day-to-day planning for teaching and integration. In order to help new faculty coming into a department, expectations and guidelines for instructional technology usage should be defined. Having this clear and established pathway on the acceptable usage of instructional technology for all instruction methods and providing feedback would set them up for success (Golde & Dore, 2001).

Faculty Perceptions of Adopting Instructional Technology

Gaining an understanding of faculty perceptions of adopting instructional technology skill is critical in identifying how they adopt and use instructional technology in their courses. Using instructional technology in the classroom requires the faculty to learn and understand instructional technology and be prepared to continuously learn as the technology updates and changes (Koehler & Mishra, 2008). One issue that researchers have found is that faculty members often do not adopt new instructional technology because they do not want to commit their time to learning a new instructional technology (Watty, McKay, & Ngo, 2016). Another reason educator is hesitant to adopt instructional technology in the classroom is the lack of support (Watty et al., 2016). Both technical support and integration support are needed to help faculty work through technical issues and to train them on the technology in order to get them to

adopt the technology in the classroom (Watty et al., 2016; Hruska, 2018). In order to encourage faculty to adopt instructional technology, it is critical to make them believe that it is valuable to their instruction and that it will help enrich their course content and pedagogy (Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010).

Educators need to want to incorporate instructional technology into their courses because they feel motivated to learn and implement instructional technology into their course (Hruska, 2018). In order to foster the faculty's desire to learn and implement instructional technology into their courses, higher education institutions need to have quality technology, support for learners, and training to evaluate when instructional technology is worth implementing (Butler & Sellbom, 2002). By providing faculty with these resources, there is a higher chance for them to learn when to adopt instructional technology into their courses (Butler & Shelbom, 2002). These services will help faculty become early adopters of instructional technology because they can see how the instructional technology can benefit students and help add value to their courses (Beggs, 2000).

Synthesis of Digital Immigrants and Digital Natives

The terms "digital immigrant" and "digital native" were first introduced by Prensky (2001), who defines digital natives as individuals who have always had technology integrated into every aspect of their lives. In contrast, digital immigrants are individual who were not born in the digital world but have adopted technology into their lives (Pensky, 2001). Both digital immigrants and digital natives vary in their appetites for integrating and learning about the technology that they use in their everyday lives (Zur & Zur, 2011; Toledo, 2007). With this difference in appetite for technology, both digital immigrants and digital natives can be broken down into subgroups to further describe these differences. Zur and Zur (2011) grouped digital

immigrants into three categories: avoiders, reluctant adopters, and enthusiastic adopters. Digital natives can also be grouped into three groups: avoiders, minimalists, and enthusiastic participants (Zur & Zur, 2011).

The digital immigrant group of avoiders are the individuals trying to live a technology-free life or one with very minimal contact with technology (Zur & Zur, 2011). People in this group often do not see the value in social media and other technologies. The reluctant adopters among digital immigrants have an understanding that technology is part of everyday life, but using it still feels foreign to them (Zur & Zur, 2011). The reluctant adopters group makes up the majority of the digital immigrant group. Reluctant adopters are defined by their cautious and tentative attitude toward technology instead of their willingness to attempt to use it (Zur & Zur, 2011). The final group that digital immigrants could be a part of is the enthusiastic adopters. If classified as an enthusiastic adopter, the digital immigrant is the type of individual who enjoys technology, has a personal interest in technology, and can keep up with the digital natives in technology usage (Zur & Zur, 2011; Toledo, 2007). The enthusiastic adopters often have jobs that require them to be immersed in technology; they develop a strong interest in technology, and they are excited to see the new technology that comes out. Digital immigrants can change between these groups; most often, if change occurs between the groups, it is the reluctant adopters changing to become more enthusiastic adopters (Zur & Zur, 2011).

Digital natives also have a grouping known as avoiders. Like the digital immigrant avoiders, the digital native avoiders try to limit their technology usage and do not feel drawn to use technology (Zur & Zur, 2011). Digital native avoiders are a small portion of the digital native classification. Minimalists digital natives are the group that understand that technology is part of everyday life, but try to engage it minimally and only when it is necessary (Zur & Zur,

2011). The minimalist group prefers more social interaction instead of relying on technology to resolve their issues or questions (Zur & Zur, 2011). An example of this would be them preferring to call and ask for directions instead of using a map tool to direct them to their destination. The final type of digital native group is the enthusiastic participant group. The enthusiastic digital native groups thrive on technology and enjoys integrating it into every aspect of their life (Zur & Zur, 2011). The enthusiastic group enjoys social media and relies on technology to resolve their queries and they thrive on the instant gratification of having the ability to send instantons communication and searches (Zur & Zur, 2011). Enthusiastic group prefers texting over more traditional forms of communication and texting has caused them to have less proficiency in professional writing. Understanding how the enthusiastic digital native group prefers to communicate is critical in understanding the best way to work with them in an efficient and effective way (Zur & Zur, 2011). Ascertaining that there are differences within the digital immigrant and digital native groups and how it is possible for the members to shift around to different internal groups illuminates the possibility that maybe a digital immigrant could become a digital native.

Researchers have debated that idea of being a digital immigrant and digital native is just a myth and that there is no real divide between the two groups other than their generation they were born in (Berk, 2009; Vodanovich, Sundaram, & Myers, 2010; 2010; Johnson, 2018). Researchers suggest that the boundary is not the age of the individual, but it is their willingness to use technology and their own personal experiences with technology that creates the boundary between the two groups (Lai & Hong, 2015). In order to test this theory that it is the experiences with technology that creates the barrier between digital immigrant an instrument called Digital Natives Assessment Scale (DNAS) was developed to determine the technology proficiency (Teo,

2013). The DNAS instrument consist of a 21-item, four-factor scale assessment that is designed for students in the age range of 13-16 (Teo, 2013). The four factors that the scale uses are the following:

- Grow up with technology
- Comfortable with multitasking
- Reliant on graphics for communication
- Thrive on instant gratification and rewards

Several researchers that have used the DNAS to test student populations to try and determine if the students are digitals natives because of their birth year or because of technology experience (Akcayir et al., 2016; Young & Gates, 2014; Lai & Hong, 2015). In Akcayir et al.'s (2016) study they used the DNAS to assessment to determine the technology proficiency of the higher education students that were considered digital natives because of their age. The students in the study were from Kyrgyzstan and Turkey and the sample size was 560. What Akcayir et al.'s (2016) found in the study was that there was a positive and significant correlation between academic year and technology usage. Students scored higher on the DNAS who were upper classmen, which supports the theory that the more experience one has with technology determines their digital status.

In Young and Gates (2014) study they were assessing pre-university students experience in using digital technology to determine if they are digital natives. The 135 pre-university students who agreed to participate in the study were given the DNAS assessment through Moodle. The researchers determined that the pre-university students were digital natives (Young & Gates, 2014). Interestingly, the study also revealed that the pre-university students had heavy

Internet usage results and that they all had access to smartphones, mobile computers, and broadband Internet.

Another similar study was conducted at New Zealand University in 2012 with 799 undergraduate and 81 post-graduate students to determine their use of technology and to identify any patterns or trends (Lai & Hong, 2015). Lai and Hong (2015) found no evidence to support that more experience using technology was any different between generational cohorts and that many forms of technology are not used for learning. Cameron (2005) suggested that even students born in the digital native time range still had issues using technology in the classroom.

Similarly, another study was conducted with a sample of 299 Slovenian university students to see if digital native students were able to handle information and communication technologies in a natural way (Šorgo, Bartol, Dolničar, & Boh Podgornik, 2017). The study intended to identify what factors impacted information literacy for the university students and if the students classified as digital natives would automatically have digital literacy. The researchers concluded that digital natives do not necessarily have literacy, and to combat this issue, courses should be offered to promote it through hands-on learning (Šorgo et al., 2017).

Overall, the idea of digital immigrants and digital natives being a myth can be argued in both directions, and more research still needs to be done to determine if the idea is actually real or not (Akcayir et al., 2016; Johnson, 2018). Even if age is not used as the classification method for selecting digital immigrants and digital natives, and the overall technology exposure experience is used for the classification of the two groups, it is critical to understand both. In addition, there is a need to make sure that educators understand how to reach students today through the use of instructional technology in the classroom.

Summary

Instructional technology has gone through many stages of development to evolve into what currently is in the classrooms that faculty and students use. Faculty need to utilize the TPACK framework to help interweave their content knowledge and pedagogy into their use of instructional technology, which is what the framework was designed for (Mishra & Koehler, 2006). The HE-TPACK framework was designed by Garrett (2014) to serve as a tool to help faculty assess themselves to gain a better understanding of how to improve their pedagogy and use of instructional technology in the classroom. Other studies by Huffman (2016), Johnson (2018), and Hruska (2018) have expanded on how to employ the HE-TPACK instrument for further research and development. These studies aim at helping promote the efficient and effective use of instructional technology in the classroom.

The one major idea in the field concerns the difference between digital immigrants and digital natives. Many believe that the difference between these two groups depends on the generational cohort a person was born into. Researchers also believe that digital immigrants could become digital natives if they work at becoming avid users of technology (Akçayır, Dündar, & Akçayır, 2016; Helsper & Eynon, 2010). However, Zur and Zur (2011) contended that there are subgroups within the digital immigrant and digital native groups and that the experience of technology usage is what determines the classification. Other researchers have also argued that it is not the age that defines the digital immigrant or digital native but rather their life experiences with technology that classify them into the groups (Akcayir et al., 2016; Young & Gates, 2014; Lai & Hong, 2015). Teo (2003) designed the DNAS as an assessment that high school students could take to see if the idea of digital natives was true. Several studies suggest that even students born in a year that would classify them as digital natives are often not in tune

with technology as much as researchers previously thought (Akcayir et al., 2016; Young & Gates, 2014; Lai & Hong, 2015). Either way, whether the digital immigrant and digital native myth is true or false, faculty need to work to better utilize instructional technology to make their teaching efficient and effective.

CHAPTER III

Methodology

This study seeks to identify the level of competency that digital native and digital immigrant faculty members perceive they possess, based on a self-assessment tool, and whether that perceived competency corresponds to their experience using technology in their classrooms. Extensive research has been conducted on the area of digital natives and digital immigrants. In this research project, the digital natives are faculty members from the era in which technology has been used since these individuals were born, and the digital immigrant faculty members have had to adapt to technology throughout their lives (Akçayır, Dündar, & Akçayır, 2016; Helsper & Eynon, 2010). This study provides insights into digital native and digital immigrant faculty members' self-efficacy in their technology competency with the CK and pedagogy utilizing instructional technology.

This study provided faculty members the opportunity to check their self-efficacy in their technology competency and technology pedagogy using an instrument call the HE-TPACK, an instructional technology survey. This research was conducted with the goal of evaluating both the digital natives' and digital immigrants' self-efficacy in TK and pedagogy through a survey instrument. This chapter focuses on the study setting, sample, procedures, and data analysis. The following research questions were formulated to guide this study:

1. Based on faculty members' HE-TPACK self-assessments, is there a difference between digital native faculty members and digital immigrant faculty members?

   H_0: There will be no difference between digital natives or digital immigrant faculty members.

2. Are faculty members' self-perceptions of their digital native or immigrant status in line with their generational cohort classification?

H_1: Digital immigrant faculty members will perceive themselves as digital natives.

Setting

The site of study was a mid-sized, public university that, as of the fall of 2018, had an enrollment of 9,465 undergraduate and graduate students (Office of Institutional Research & Assessment at a Midwestern University, 2019a). There are currently 8,148 undergraduate students and 1,317 graduate students (Office of Institutional Research & Assessment at a Midwestern University, 2019b). The university is organized into six academic colleges.

- College of Business
- College of Education and Human Services
- College of Humanities and Fine Arts
- School of Agriculture
- College of Science, Engineering, and Technology
- School of Nursing and Health Professions

Out of these six colleges, there are six associate programs, 60 bachelor programs, 11 graduate certificates, 37 master's and specialist programs, three specialist degrees, and three doctoral programs. The university also has five regional campuses and online learning programs for both undergraduate and graduate students (Office of Institutional Research & Assessment at a Midwestern University, 2019a). The study site was selected for the convenience for the researcher and the ease of data collection.

The study site includes a faculty development center with the goal of helping faculty develop their pedagogy, professional development, and training for new resources. The faculty development center accomplishes these goals through one-on-one and group consultations, classroom visits, faculty learning communities, workshops, and conferences. These resources are

available to help keep faculty abreast of instructional technology used in the classroom. The faculty development center has three full-time staff members, including the director, program development assistant, and instructional technology and pedagogy support personnel. The faculty development center often partners with the university's Information Systems department and University Library department to provide the best technology training possible to the faculty and staff. The main instructional technologies used on the study site are Canvas, Yuja, Zoom, and Google Productivity products. The faculty development center offers many robust services to the faculty on their campus to keep them abreast of the instructional technology. The following are some examples of the professional development services that the faculty development center offers that demonstrate these efforts.

1. 12 Gadgets: This is an event that Faculty Development Center, the Information Systems department, and the University Library department host after finals week to showcase new technology. This event allows faculty and staff to walk around the library and interact with different presenters to learn about the new technology they are using on campus, as well as what works and does not work when using the technology in the course or classroom.
2. Blitz Week: The Faculty Development Center hosts this event before the first week of the semester. Blitz Week is an opportunity for faculty to make presentations on different topics, such as teaching and learning, leadership and change, and effective technologies and tools.
3. This Works for Me Virtual Summit- This is a weekly video that the Faculty Development Center sends out via email to all the faculty, highlighting strategies that have worked for other faculty members. These strategies typically focus on the following areas: teaching

and learning, innovative technologies, leadership, tenure and promotion, research, and service.

Participants

According to the National Center for Education Statistics, the total number of faculty at the study site was 458 in the fall of 2017 (National Center for Education Statistics, 2019). The researcher decided only to contact faculty members who had been at the study site for longer than one year and who were classified as instructors, as well as non-tenured or tenured faculty. The researcher also chose to focus on faculty participants from the College of Education and Human Services at the study site. There are currently 67 faculty members in the College of Education and Human Services, including instructors, as well as non-tenured and tenured faculty. The faculty members were invited to complete a survey and participate in an interview via an email to the College of Education and Human Services listserv. This college at the study site was selected because it is medium in size compared to the other colleges at the study site. Another reason for the focus on the faculty of the College of Education and Human Services is because, in Garrett's (2014) study, the highest participation came from the College of Education, with 35% of the participants coming from that college. Huffman's (2016) HE-TPACK study also focused on the College of Education but was focused on the faculty members who taught pre-service secondary education majors. With such a small faculty base on the study sites campus, it became critical to focus on participants who would complete the survey.

Instruments

HE-TPACK

For this study, the HE-TPACK instrument was be used to gather responses from the faculty. The HE-TPACK instrument was developed by Garrett (2014), who modified the Pre-

service Teacher Technological Pedagogical Content Knowledge (PT-TPACK) instrument that Lux, Bangert, and Whittier developed (2011). The PT-TPACK instrument was originally developed to measure the self-assessed levels of teaching and technology of pre-service teachers (Lux, Bangert, & Whittier, 2011). The PT-TPACK instrument consisted of 45 survey items categorized by the TPACK domains. The technology portion of the survey consisted of 24 items that had the purpose of measuring the faculty members' perspectives on higher education training (Garret, 2014). These items were derived from a faculty perception-based technology training survey that Georgina and Olson (2008) developed.

Just like the PT-TPACK, the HE-TPACK instrument consists of a 5-point Likert scale to measure the response of the 56 survey items (Garrett, 2014). The Likert scale ranges from "strongly agree," "agree," "neither agree nor disagree," "disagree," to "strongly disagree." The Likert scale that the PT-TPACK survey uses is negative coded, which results in higher mean averages in the findings of PT-TACK studies (Garrett, 2014). Often, the HE-TPACK survey Likert scale is coded according to the preference of the researcher and the survey tool; thus, no anomalies can be determined between HE-TPACK and PT-TPACK, but it could explain why there are lower modes and means with the HE-TPACK survey. The higher the score, the more positive the response from participants indicating confidence on the subject is.

The HE-TPACK instrument consists of 56 items that includes the demographic information (seven items) and the seven domains of TPACK and technology training section. The survey is broken down into these eight sections, and each section has a set amount of questions. The following is a list of the domains with the number of questions on the HE-TPACK instrument.

- Content Knowledge (CK)- six question

- Technology Knowledge (TK)- seven questions
- Pedagogical Knowledge (PK)- four questions
- Pedagogical Content Knowledge (PCK)- six questions
- Technological Content Knowledge (TCK)- six questions
- Technological Pedagogical Knowledge (TPK)- six questions
- Technological Pedagogical Content Knowledge (TPACK) – eleven questions
- Technology Training- four questions
- Demographics- seven questions

In technology knowledge domain, there are seven questions, and these focus on the faculty's knowledge of technology hardware and software that they can use for teaching. The next domain is the pedagogy knowledge domain, which has four questions and focuses on how the faculty can assess students' learning. The domain has six questions and they focus on the faculty content knowledge of what they are teaching. The pedagogical content knowledge domain has six questions that pertain to the faculty members' ability to tie their content to their teaching methods. The technological content knowledge domain has six items on the survey that look at the faculty's choices of instructional technology, as well as the pros and cons of using it in the course. The technological pedagogical knowledge domain contains six questions to assess the faculty's ability to understand that using technology can affect their teaching and the students' learnings. The TPACK domain has 11 questions. This section focuses on the faculty understanding that they can use technology to present their content and pedagogy in different ways. The final section of the HE-TPACK framework is the technology training portion, and it has four questions focused on how technology training could help the faculty.

HE-TPACK Validity and Reliability

The validity of the HE-TPACK instrument was checked using two methods. The first was to ensure that internal consistency was accurate since the HE-TPACK is a modified version of PT-TPACK using Cronbach's alpha (Garrett, 2014). The second method of checking the validity was having the content assessed. In the HE-TPACK, 22% of the survey items are negatively worded to help with the validity (Garrett, 2014). Content validity for the HE-TPACK instrument was reviewed by five experts in TPACK and/or technology training (Garrett, 2014). The reviewers attempted to make sure that the HE-TPACK instrument met all the TPACK and technology concepts that Crocker and Algina (1986) suggested in their instrument review guidelines (Garrett, 2014). The reviewers provided an evaluation, and the recommended changes were made to the HE-TPACK instrument to establish its validity (Crocker & Algina, 1986).

Cronbach's alpha was used to establish the reliability of the seven domains of TPACK and the technology training of the HE-TPACK instrument (Garrett, 2014). Cronbach's alpha is an index of reliability that ranges in value 0 to 1 and is often used for dichotomous or multi-point formatted questionnaires' or scales (Santos, 1999). In Cronbach's alpha, the higher the score, the more reliable the scale is (Santos, 1999). A score of 0.7 is considered a acceptable reliability coefficient, and sometimes lower thresholds appear in the literature (Nunnaly, 1978). The HE-TPACK instrument was tested, and the only domain that was not above the 0.7 coefficient of reliability was the technology training value, which was at .57 (Garrett, 2014). The highest reliability coefficient was the TPACK domain at .92. The HE-TPACK instrument was deemed reliable.

Data Collection

The dissertation chair emailed a link to the survey on the researcher's behalf to the College of Education and Human Services listserv. The email sent out to the listserv was approved by IRB 19-132 and can be seen in Appendix A Invitation; the IRB approval letter can also be seen in Appendix B IRB Approval letter. In the email, there was a link to the Google survey for the HE-TPACK assessment and the survey can be seen in Appendix C. Since this survey was created using a Google survey under the study site's Google domain, the site already had the system configured to strip out the participant's identifiable information. The Google survey also was configured so that the participant could only take the survey one time, and this was configured through the survey system to only allow one entry from each Google account. The results of the survey information were stored in a Google spreadsheet. The data was secured the usage of the Google form system and only the researcher had access to the data generated from the survey. The data is secured through Google and the security policies applied by the study site university. The data will be maintained for one year after the study. The survey also collected demographic information, such as age, academic ranking, number of years teaching, and gender. The survey would stay available to the participants for one month, starting April 14, 2019, and stay available until May 14, 2019. This email was sent out one additional time to the College of Education and Human Services listserv as a reminder to participate in the survey.

The survey was sent out by April 14, 2019, and a follow-up email was sent out again a week later to remind all the possible participants that the survey was there and that it would be closing in two weeks. In order to add some incentive for faculty to complete the survey, they had the opportunity to enter a drawing for a $50 Amazon gift card. The drawing process for the gift card consisted of a separate survey process after completion of the first survey. Once participants' completed the survey, a link was in the closing details of the survey directing them

to another survey where they could enter their email addresses and answer the following question correctly: “What academic college are you a part of?” The possible choices are School of Agriculture and College of Education and Human Services, with College of Education and Human Services being the correct choice. If the participant failed to answer the question correctly or left it blank, they would be removed from the drawing. All of the participants that had the correct answer and entered their email address, which were then copied over into an online randomization tool used to select a participant at random to be the winner of the Amazon gift card. The drawing process took place during the first week of May, after the study had closed.

Data Analysis

The following research questions were formulated to guide the study.

RQ_0: Based on faculty members’ HE-TPACK self-assessments, is there a difference between digital native faculty members and digital immigrant faculty members?

H_0: There will be no difference between digital natives or digital immigrant faculty members.

RQ_1: Are faculty members’ self-perceptions of their digital native or immigrant status in line with their generational cohort classification?

H_1: Digital immigrant faculty members will perceive themselves as digital natives.

Once the data were collected using the HE-TPACK survey, the results were analyzed using SPSS version 25 (IBM SPSS Statistics, Armonk, NY, USA). Following Johnson’s (2018) analysis method for research question 1, frequencies were used to examine the results and to check for possible errors in the data. An ANOVA was also ran to determine if there was any significance between the HE-TPACK domains and because the sample size was so small.

Summary

The methodology chapter's intent was to describe the process and methods used to complete the study. This study used the HE-TPACK instrument to provide faculty an opportunity to assess their self-efficacy in their ability to use instructional technology. The results from the faculty responding to the HE-TPACK survey were analyzed using frequencies and a ANOVA test to determine if the results had any significance.

CHAPTER IV

Data Analysis

The purpose of this study is to allow faculty at a mid-sized regional university to self-assess their technological, pedagogical, and content knowledge, as well as the technology training they have available. The second purpose of the study is to identify if there are any differences between digital immigrant and digital native faculty, as well as to learn how they identify themselves with those terms. This study compares and contrasts the faculty self-assessments from a mid-sized university compared to a large flagship university to see if a being a digital immigrant or native has any impact along with other demographic data. The study design consisted of an online Google Forms survey for data collection, and SPSS 25 was used for the analysis of the data. The following research questions were formulated to guide the study.

RQ_0: Based on faculty members' HE-TPACK self-assessments, is there a difference between digital native faculty members and digital immigrant faculty members?

H_0: There will be no difference between digital natives or digital immigrant faculty members.

$RQ:_1$ Are faculty members' self-perceptions of their digital native or immigrant status in line with their generational cohort classification?

H_1: Digital immigrant faculty members will perceive themselves as digital natives.

Sample

The sample consisted of 13 faculty members at a medium-size regional campus. The sample size is small because the study focused on one college, the College of Education and Human Services, with an emphasis on the education faculty. Demographic information collected included the following: gender, academic ranking, tenure status, number of years of full-time status, number of instructional technology training sessions attended, self-alignment with digital

native or digital immigrant status, and age. The sample consisted of 30.8% males and 69.2% females. The academic rankings were as follows: 53.8% assistant professors, 30.8% associate professors, 7.7% professors, 7.7% lecturers, and 0% adjunct professors. In the category of tenure status, 46.2% were tenured, 38.5% were on a tenure track, and 15.4 % were neither tenured nor on a tenure track. The breakdown in terms of the total number of years as full-time faculty is as follows: 1–4 years, 23.1%; 5–9 years, 23.1%; 10–14 years, 30.8%; 15–19 years, 7.7%; and 20+ years, 15.4%. When faculty members were asked how many technology training sessions they had attended in the last year, 53.8% responded that they had attended 1–3 training sessions, and 23.1% said that they had not attended any. Faculty also said that 15.4% had attended 4–6 technology training sessions and that 7.7% had attended over 10 training sessions in the last year. Table 1 provides a visual representation of all the demographics collected from participants.

Table 1
Demographic Information

	Responses	*n*	%
Gender	Male	4	30.8
	Female	9	69.2
Academic Ranking	Professor	1	7.7
	Associate Professor	4	30.8
	Assistant Professor	7	53.8
	Lecture	1	7.7
Tenure Status	Tenured	6	46.2
	Tenure-track	5	38.5
	Neither	2	15.4
Total Number of Years as Full-Time Faculty	1–4	3	23.1
	5–19	3	23.1
	10–14	4	30.8
	15–19	1	7.7
	20+	2	15.4
How many technology training sessions have you attended in the last year?	0	3	23.1
	1–3	7	53.8
	4–6	2	15.4
	7–9		0
	10	1	7.7

In terms of asking faculty which of the following they thought they aligned with most, and defining what a digital native and digital immigrant is, 76.9% aligned with the digital immigrant category, and 23.1% aligned with the digital native one. The sample of faculty indicated their ages as follows: 30.8% aged 30–39, 30.8% in the 40–49 range, 30.8% aged 50–59, and 7.7% in the 70+ range. Table 2 provides a visual representation of the age demographics and whether the faculty indicated they aligned with the digital native or digital immigrant identity.

Table 2
Age and Digital Immigrant/Native Status Demographic Information

	Responses	*N*	%
Which of the following do you think that you align with the most? Digital immigrant—a person who did not grow up with technology. Digital native—a person who has grown up with technology since birth.	Digital Native	3	23.1
	Digital Immigrant	10	76.9
Which age group best describes you?	30-39	4	30.8
	40-49	4	30.8
	50-59	4	30.8
	70+	1	7.7

Research Question 1

The first research question explored the following question: "Based on faculty members' HE-TPACK self-assessments, is there a difference between digital native faculty members and digital immigrant faculty members?" Participants were asked to complete a self-assessment on their capability to utilize technology, pedagogy, and content in their courses. This assessment was conducted with a HE-TPACK survey instrument that is based on a 5-point Likert scale that is positively coded where 1 = "strongly agree," 2 = "agree," 3 = "neither agree nor disagree," 4 = "disagree," and 5 = "strongly disagree." This scheme was used through the eight domains of the HE-TPACK instrument.

Technology Training

The technology training domain portion of the survey focused on asking the faculty participants their views on the technology training resources available to them. These questions consisted of survey items 8, 9, 10, and 11. Both the digital natives and digital immigrants agreed that technology training would enhance their teaching. With the digital immigrant participants, an even balance strongly agreed 33.3% and agreed 33.3% existed. With digital native participants, 50.0% strongly agreed that the university should not make technology training a

requirement for faculty. Both digital immigrants (55.6%) and natives (50.0%) strongly agreed that technology training should be offered within the academic departments. Table 3 illustrates the frequency percentages for technology training.

Table 3
Technology Training Frequency Percentages (n = 13)

Survey Question	Group	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
8. Technology training would enhance my teaching.	Digital Immigrant	33.3	33.3	33.3	0	0
	Digital Native	25.0	50	25.0	0	0
9. It is the university's responsibility to train me to use technologies that will enhance my teaching.	Digital Immigrant	0	66.7	0	22.2	11.1
	Digital Native	25.0	25.0	25.0	25.0	0
10. The University should not make technology training a requirement for faculty.	Digital Immigrant	11.1	11.1	33.3	22.2	22.2
	Digital Native	50.0	25.0	25.0	0	0
11. Technology training should be offered in each academic department at my university.	Digital Immigrant	55.6	11.1	22.2	0	11.1
	Digital Native	50.0	25.0	25.0	0	0

Pedagogy Knowledge (PK) Domain

The portion of the HE-TPACK instrument that consist of the PK domain is items 12, 13, 14, and 15. The PK domain frequency percentage table illustrates that both digital immigrants and natives agree that they are confident in their pedagogy. With digital immigrants, 55.6% agreed that they had access to a wide range of practices, strategies, and methods to use for

teaching. Both digital immigrants, with 77.8%, and natives, with 75.0%, agreed that they knew how to motivate students to learn.

Table 4
Pedagogy Knowledge (PK) Domain Frequency Percentages (n = 13)

Survey Item	Group	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
12. I have a clear understanding of pedagogy (e.g., designing instruction, assessing students' learning).	Digital Immigrant	33.3	66.7	0	0	0
	Digital Native	25.0	75.0	0	0	0
13. I am familiar with wide range of practices, strategies, and methods that I can use in my teaching.	Digital Immigrant	44.4	55.6	0	0	0
	Digital Native	25.0	75.0	0	0	0
14. I know how to assess student learning.	Digital Immigrant	44.4	55.6	0	0	0
	Digital Native	25.0	75.0	0	0	0
15. I know how to motivate students to learn.	Digital Immigrant	22.2	77.8	0	0	0
	Digital Native	25.0	75.0	0	0	0

Technology Knowledge (TK) Domain

In the HE-TPACK instrument, the TK section consists of questions 16, 17, 18, 19, 20, and 21. Digital immigrants, with 66.7%, and natives, with 75%, both agreed that they were familiar with a variety of hardware, software, and technology tools. When asked if they could recognize that technology use can have positive or negative effects, digital immigrants, with 77.8%, strongly agreed, and 100% of digital natives selected "disagree". Digital immigrant

faculty members, with 55.6%, agreed when asked if they knew how to troubleshoot technology problems. Digital natives were split, with 50% agreeing and 50% not sure on the same question.

Table 5
Technology Knowledge (TK) Domain Frequency Percentages (n = 13)

Survey Item	Group	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
16. I am familiar with a variety of hardware, software, and technology tools that I can use for teaching.	Digital Immigrant	11.1	66.7		22.2	0
	Digital Native	0	75.0	25.0	0	0
17. I know how to troubleshoot technology problems when they arise.	Digital Immigrant	11.1	55.6	11.1	11.1	11.1
	Digital Native	0	50.0	50.0	0	0
18. I do not know how to use technology in my everyday life.	Digital Immigrant	0	0	11.1	11.1	77.8
	Digital Native	0	0	0	100	0
19. I recognize that technology use can have positive and negative effects.	Digital Immigrant	77.8	11.1	11.1	0	0
	Digital Native	0	0	0	100	
20. I cannot decide when technology can be beneficial to achieving a learning objective.	Digital Immigrant	0	0	0	55.6	44.4
	Digital Native	0	25.0	25.0	50.0	0
21. I can decide when technology may be detrimental to achieving a learning objective.	Digital Immigrant	33.3	22.2	22.2	22.2	0
	Digital Native	0	75.0	25.0	0	0

Content Knowledge (CK) Domain

Questions 22, 23, 24, 25, 26, and 27 were used in the HE-TPACK portion for the CK domain that can be seen in Table 6. Among digital natives, 100% strongly agreed that they had a

comprehensive understanding of the curricula they taught, and digital immigrants 66.7% strongly agreed as well. When presented with the statement, “I can make explain to students the value of knowing concepts in my discipline,” 77.8% strongly agreed, and 100% of digital natives strongly agreed. The following statement also stood out: “I can make connections between the different topics in my discipline.” Digital immigrants, with 88.9%, strongly agreed with the statement, and 100% of digital natives strongly agreed.

Table 6
Content Knowledge (CK) Domain Frequency Percentages (n = 13)

Survey Item	Group	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
22. I have a comprehensive understanding of the curriculum I teach.	Digital Immigrant	66.7	33.3	0	0	0
	Digital Native	100	0	0	0	0
23. I understand how knowledge in my discipline is organized.	Digital Immigrant	66.7	33.3	0	0	0
	Digital Native	100	0	0	0	0
24. I am familiar with the common preconceptions and misconceptions in my discipline.	Digital Immigrant	55.6	44.4	0	0	0
	Digital Native	75.0	25.0	0	0	0
25. I can explain to students the value of knowing concepts in my discipline.	Digital Immigrant	77.8	22.2	0	0	0
	Digital Native	100	0	0	0	0
26. I can make connections between the different topics in my discipline.	Digital Immigrant	88.9	11.1	0	0	0
	Digital Native	100	0	0	0	0
27. I stay abreast of new research related to my discipline in order to keep my own understanding of my discipline updated.	Digital Immigrant	55.6	33.3	11.1	0	0
	Digital Native	75.0	25.0	0	0	0

Pedagogy Content Knowledge (PCK) Domain

For the PCK section of the HE-TPACK instrument, questions 28–33 were used in the PCK domain, and the questions can be seen in Table 7. The number of participants has declined. One of the faculty in the digital native category declined to answer this set of questions. Digital immigrants, with 77.8%, and digital natives, with 25%, strongly agreed that they understood that there is a relationship between content and the teaching methods used to teach that content. Digital immigrants, with 55.6%, as well as 50%of digital natives, strongly agreed that they understood what topics or concepts are easy or difficult to learn. Similarly, digital immigrants, with 55.6%, as well as 50% of digital natives, agreed that they could provide multiple representations of content in the form of analogies, examples, demonstrations, and classroom activities.

Table 7
Pedagogy Content Knowledge (PCK) Domain Frequency Percentages (n = 12)

Survey Item	Group	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
28. I understand that there is a relationship between content and the teaching methods used to teach that content.	Digital Immigrant	77.8	22.2	0	0	0
	Digital Native	25.0	50.0	0	0	0
29. I can anticipate students' preconceptions and misconceptions.	Digital Immigrant	22.2	66.7	11.1	0	0
	Digital Native	25.0	50.0	0	0	0
30. I can address students' preconceptions and misconceptions.	Digital Immigrant	66.7	33.3	0	0	0
	Digital Native	50.0	25.0	0	0	0
31. I understand what topics or concepts are easy or difficult to learn.	Digital Immigrant	55.6	44.4	0	0	0
	Digital Native	50.0	25.0	0	0	0
32. I can provide multiple representations of content in the form of analogies, examples, demonstrations, and classroom activities.	Digital Immigrant	55.6	44.4	0	0	0
	Digital Native	50.0	25.0	0	0	0
33. I can adapt material to students' abilities, prior knowledge, preconceptions, and misconceptions.	Digital Immigrant	55.6	44.4	0	0	0
	Digital Native	50.0	25.0	0	0	0

Technology Pedagogy Knowledge (TPK) Domain

The TPK domain portion of the survey consisted of questions thirty-four through thirty - nine with 12 participants taking the survey. However, on question 35, one of the digital native participants did not answer. Digital immigrants, with 66.7%, as well as 50% of digital natives, agreed that they understood how teaching and learning change when certain technologies are

used. In response to the statement, “I understand that in certain situations, technology can be used to improve student learning,” 77.8% of digital immigrants strongly agreed, and 75% of digital natives were not sure.

Table 8
Technology Pedagogy Knowledge (TPK) Domain Frequency Percentages (n = 12)

Survey Item	Group	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
34. I understand how teaching and learning change when certain technologies are used.	Digital Immigrant	22.2	66.7	11.1	0	0
	Digital Native	0	50.0	25.0	0	0
35. I do not understand how technology can be integrated into teaching and learning to help students achieve specific pedagogical goals and objectives	Digital Immigrant	0	0	33.3	33.3	33.3
	Digital Native	0	0	25.0	25.0	0
36. I do not know how to be flexible with my use of technologies to support teaching and learning.	Digital Immigrant	0	11.1	11.1	44.4	33.3
	Digital Native	0	0	0	25.0	50.0
37. I know how to be flexible with my use of technology to support teaching and learning.	Digital Immigrant	22.2	55.6	11.1	11.1	0
	Digital Native	50.0	25.0	0	0	0
38. I cannot reconfigure technology and apply it to meet instructional needs.	Digital Immigrant	11.1	22.2	0	44.4	22.2
	Digital Native	0	0	25.0	0	50.0
39. I understand that, in certain situations, technology can be used to improve student learning.	Digital Immigrant	77.8	11.1	11.1	0	0
	Digital Native	0	0	75.0	0	0

Technology Content Knowledge (TCK) Domain

The TCK domain portion of the survey instrument included questions forty through forty-five. Digital immigrants, with 44.4%, were not sure that they understood how the choice of

technologies allows and limits the types of content ideas that can be taught. However, 50% of digital natives agreed. Digital immigrants, with 44.4%, answered, “I am aware of how different technologies can be used to provide multiple and varied representations of the same content.” With the digital native participants, 50% agreed. When asked question 45 (“I understand that I need to be flexible when using technology for instructional purposes”), 88.9% of digital immigrants and 75% of digital natives strongly agreed.

Table 9
Technology Content Knowledge (TCK) Domain Frequency Percentages (n = 12)

Survey Item	Group	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
40. I cannot select and integrate technological tools appropriate for use in specific disciplines (or content).	Digital Immigrant	0	11.1	11.1	22.2	55.6
	Digital Native	0	0	0	25.0	50.0
41. I understand how the choice of technologies allows and limits the types of content ideas that can be taught.	Digital Immigrant	22.2	33.3	44.4	0	0
	Digital Native	25.0	50.0	0	0	0
42. I do not understand how some content decisions can limit the types of technology that can be integrated into teaching and learning.	Digital Immigrant	0	11.1	33.3	22.2	33.3
	Digital Native	0	0	0	25.0	50.0
43. I am aware of how different technologies can be used to provide multiple and varied representations of the same content.	Digital Immigrant	44.4	33.3	22.2	0	0
	Digital Native	25.0	50.0	0	0	0
44. I cannot select specific technologies that are best suited for addressing learning objectives in my discipline.	Digital Immigrant	0	0	33.3	22.2	44.4
	Digital Native	0	0	0	25.0	50.0
45. I understand that I need to be flexible when using technology for instructional purposes.	Digital Immigrant	88.9	0	11.1	0	0
	Digital Native	75.0	0	0	0	0

Technology Pedagogy Content Knowledge (TPCK) Domain

The TPCK domain is the last section of the HE-TPACK instrument. This portion of the instrument includes questions forty-six through fifty-six. The total number of participants who completed this portion of the survey was. For question 46, 55.6% of digital immigrants and 25% of digital natives agreed that they could effectively integrate educational technologies to increase student opportunities for interaction with ideas. Digital immigrants, with 55.6%, as well as 75% of digital natives, agreed that they could use teaching methods that are technology-based to teach content and provide opportunities for learners to interact with ideas. Digital immigrants, with 66.7%, as well as 50% of digital natives, agree what makes certain concepts difficult to learn for students and how technology can be used to leverage that knowledge to improve student learning. The rest of the frequencies can be seen in Table 10.

Table 10
Technology Pedagogy Content Knowledge (TPCK) Domain Frequency Percentages (n = 12)

Survey Item	Group	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
46. I can effectively integrate educational technologies to increase student opportunities for interaction with ideas.	Digital Immigrant	11.1	55.6	22.2	0	11.1
	Digital Native	25.0	25.0	0	25.0	0
47. I have different opportunities to teach specific curriculum content topics with technology.	Digital Immigrant	11.1	66.7	11.1	0	11.1
	Digital Native	0	75.0	0	0	0
48. I can use appropriate instructional strategies to teach specific curriculum content topics with technology.	Digital Immigrant	33.3	55.6	0	0	11.1
	Digital Native	50.0	25.0	0	0	0
49. I cannot determine when a technology resource may fit with one learning situation in my discipline and not with another.	Digital Immigrant	0	11.1	0	44.4	44.4
	Digital Native	0	0	0	0	75.0
50. I can flexibly incorporate new tools and resources into content and my teaching methods to enhance learning.	Digital Immigrant	33.3	44.4	11.1	11.1	0
	Digital Native	50.0	25.0	0	0	0
51. I understand how digital technologies can be used to represent content in a variety of formats.	Digital Immigrant	44.4	22.2	33.3	0	0
	Digital Native	25.0	25.0	25.0	0	0
52. I can use teaching methods that are technology based to teach content and provide opportunities for learners to interact with ideas.	Digital Immigrant	33.3	55.6	0	11.1	0
	Digital Native	0	75.0	0	0	0
53. I understand what makes certain concepts difficult to learn for students and how technology can be used to leverage that knowledge to improve student learning.	Digital Immigrant	0	66.7	22.2	11.1	0
	Digital Native	0	50.0	25.0	0	0
54. I do not understand how to integrate technology to build upon students' prior knowledge of curriculum content.	Digital Immigrant	0	11.1	22.2	44.4	22.2
	Digital Native	0	0	0	50.0	25.0
55. I know how to operate classroom technologies and can incorporate them into my particular discipline to enhance student learning.	Digital Immigrant	33.3	55.6	11.1	0	0
	Digital Native	25.0	50.0	0	0	0
56. I know how to integrate the use of educational technologies effectively into curriculum-based learning.	Digital Immigrant	22.2	55.6	11.1	11.1	0
	Digital Native	25.0	50.0	0	0	0

Domain Analysis

In order to determine if any true differences exist between digital immigrants and digital natives, the questions were set up as scales in SPSS to conduct an ANOVA test to determine if

there was any significance in each of the domains based of the questions in each domain section in the HE-TPACK instrument. Tables 11 and 12 provide the descriptive statistics and ANOVA. There was no statistical difference found in any of the domains: Technology Training, $F(1,11) = 1.473$, $p = .250$; Pedagogy Knowledge (PK), $F(1,11) = .213$, $p = .653$; Technology Knowledge (TK), $F(1,11) = .224$, $p = .645$; Content Knowledge (CK), $F(1,11) = 1.692$, $p = .220$; Pedagogy Content Knowledge (PCK), $F(1,10) = .027$, $p = .872$; Technology Pedagogy Knowledge (TPK), $F(1,10) = .161$, $p = .696$; Technology Content Knowledge (TCK), $F(1,10) = 1.250$, $p = .290$; and Technology Pedagogy Content Knowledge (TPCK), $F(1,11) = .055$, $p = .820$.

Table 11
Descriptive Statistics of HE-TPACK Domains

						95% Confidence Interval for Mean			
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
Technology Training	1	9	2.5278	.60524	.20175	2.0625	2.9930	2.00	4.00
	2	4	2.0625	.71807	.35904	.9199	3.2051	1.00	2.50
	Total	13	2.3846	.65044	.18040	1.9916	2.7777	1.00	4.00
PK	1	9	1.6389	.43501	.14500	1.3045	1.9733	1.00	2.00
	2	4	1.7500	.28868	.14434	1.2907	2.2093	1.50	2.00
	Total	13	1.6731	.38709	.10736	1.4392	1.9070	1.00	2.00
TK	1	9	2.6111	.92796	.30932	1.8978	3.3244	1.50	4.50
	2	4	2.3750	.47871	.23936	1.6133	3.1367	2.00	3.00
	Total	13	2.5385	.80264	.22261	2.0534	3.0235	1.50	4.50
CK	1	9	1.3333	.50000	.16667	.9490	1.7177	1.00	2.00
	2	4	1.0000	.00000	.00000	1.0000	1.0000	1.00	1.00
	Total	13	1.2308	.43853	.12163	.9658	1.4958	1.00	2.00
PCK	1	9	1.3889	.48591	.16197	1.0154	1.7624	1.00	2.00
	2	3	1.3333	.57735	.33333	-.1009	2.7676	1.00	2.00
	Total	12	1.3750	.48265	.13933	1.0683	1.6817	1.00	2.00
TPK	1	9	2.7778	.36324	.12108	2.4986	3.0570	2.00	3.00
	2	3	2.6667	.57735	.33333	1.2324	4.1009	2.00	3.00
	Total	12	2.7500	.39886	.11514	2.4966	3.0034	2.00	3.00
TCK	1	9	2.9444	.30046	.10015	2.7135	3.1754	2.50	3.50
	2	3	3.1667	.28868	.16667	2.4496	3.8838	3.00	3.50
	Total	12	3.0000	.30151	.08704	2.8084	3.1916	2.50	3.50
TPCK	1	9	2.1111	.78174	.26058	1.5102	2.7120	1.00	4.00
	2	4	2.0000	.81650	.40825	.7008	3.2992	1.00	3.00
	Total	13	2.0769	.75955	.21066	1.6179	2.5359	1.00	4.00

Table 12
ANOVA of HE-TPACK Domains Results

Domain		Sum of Squares	df	Mean Square	*F*	Sig.
Technology Training	Between Groups	.599	1	.599	1.473	.250
	Within Groups	4.477	11	.407		
	Total	5.077	12			
PK	Between Groups	.034	1	.034	.213	.653
	Within Groups	1.764	11	.160		
	Total	1.798	12			
TK	Between Groups	.154	1	.154	.224	.645
	Within Groups	7.576	11	.689		
	Total	7.731	12			
CK	Between Groups	.308	1	.308	1.692	.220
	Within Groups	2.000	11	.182		
	Total	2.308	12			
PCK	Between Groups	.007	1	.007	.027	.872
	Within Groups	2.556	10	.256		
	Total	2.563	11			
TPK	Between Groups	.028	1	.028	.161	.696
	Within Groups	1.722	10	.172		
	Total	1.750	11			
TCK	Between Groups	.111	1	.111	1.250	.290
	Within Groups	.889	10	.089		
	Total	1.000	11			
TPCK	Between Groups	.034	1	.034	.055	.820
	Within Groups	6.889	11	.626		
	Total	6.923	12			

Research Question 2

The second research question was formulated as follows: “Are faculty members’ self-perceptions of their digital native or immigrant status in line with their generational cohort classification?” This question was measured by question 6 in the demographic section of the survey instrument, which asked participants to classify themselves as either a digital immigrant or a digital native based on the definitions provided in the question. In order to determine the difference, participants in the age group 30–39 were considered as digital natives, while all other age groups were digital immigrants. The age range the participants selected was compared to what they thought they aligned with in terms of being a digital immigrant or a digital native.

In total, 50% of the digital natives classified themselves as digital immigrants. Of the two participants who classified themselves as digital immigrants, one was female and the other male. The female participant had a tenure-track position and had attended four to six technology workshops; the male participant had already achieved tenure and had attended one to three technology training workshops. However, one (11%) digital immigrant classified herself as a digital native. This participant had earned tenure status and had attended four to six technology trainings in the last year. The results can be seen in Table 13.

Table 13
Age Group and Alignment of Digital Immigrant or Native Status

Gender	Academic Ranking	Tenure Status	With which of the following do you think you align with the most?	Which age group best describes you?	How many technology training sessions have you attended in the last year?
Female	Associate Professor	Tenured	Digital Immigrant	70+	1–3
Female	Professor	Tenured	Digital Immigrant	50–59	0
Female	Assistant Professor	Tenure-track	Digital Immigrant	50–59	1–3
Male	Associate Professor	Tenured	Digital Immigrant	40–49	1–3
Female	Associate Professor	Tenured	Digital Native	40–49	4–6
Female	Assistant Professor	Tenure-track	Digital Immigrant	30–39	4–6
Female	Assistant Professor	Tenure-track	Digital Immigrant	40–49	1–3
Female	Assistant Professor	Neither	Digital Immigrant	50–59	10
Female	Assistant Professor	Tenured	Digital Native	30–39	0
Male	Associate Professor	Tenured	Digital Immigrant	30–39	1–3
Female	Lecture	Neither	Digital Immigrant	40–49	0
Male	Assistant Professor	Tenure-track	Digital Native	30–39	1–3
Male	Assistant Professor	Tenure-track	Digital Immigrant	50–59	1–3

Summary

This chapter presented the results of conducting the HE-TPACK survey on a medium-sized regional campus. For research question one, to determine if any differences existed between digital immigrant and digital native faculty members, a frequency analysis and one-way ANOVA test was performed. In order to assess research question two, the data were examined to compare the age range that participants selected to the digital immigrant or digital native status they chose.

CHAPTER V

Results

The purpose of this study is to allow faculty at a mid-sized regional university to self-assess their own technological, pedagogical, and content knowledge, as well as the technology training proficiencies. This research also aims to determine if there is any difference between digital immigrant and digital native faculty members at the mid-sized regional university when compared to a larger flagship university. The second part of the study involves learning how faculty identify themselves in the terms of digital immigrants or digital natives and how they relate to the age group they selected.

Summary of Study

As the adoption of instructional technology in courses has become a growing trend in higher education, it is critical to understand how educators are adapting their technological, pedagogical, and content knowledge. Understanding what era different faculty members grew up in is also important in this respect, which is why ascertaining if they are digital immigrants or natives is essential as well. There is a paradigm shift in which educators who are considered digital natives are coming into faculty roles, whereas the environment was previously filled with digital immigrants. With this reversal, smaller universities have to attempt to grasp the identity of the general faculty population to better support them.

The guiding framework for this study is the TPACK model. To assess faculty members in a higher education environment, a modified version of the TPACK instrument known as the HE-TPACK instrument, which has eight domains and a demographic section. The demographic section also contains a question about faculty self-perception regarding if they are a digital

immigrants or digital natives. The rest of the instrument questions pertain to each of the TPACK domains and a section on technology training.

Research Question 1

RQ_0: Based on faculty members' HE-TPACK self-assessments, is there a difference between digital native faculty members and digital immigrant faculty members? According to the results of this study, both digital immigrant and digital native faculty at the mid-sized regional university had a positive response to the domains in the HE-TPACK instrument. Both groups strongly agreed or agreed with the items throughout the domains in the HE-TPACK survey. The fact that digital immigrants and digital natives provided so many positive responses suggests that the groups have overestimated their ability or acknowledged their ability instead of their actual capability (Lux et al., 2011; Evans, McKenna, & Oliver, 2005).

Technology Training

Digital immigrants and digital natives both responded "strongly agree" and "agree" to technology training items on the HE-TPACK instrument. These findings resemble those of Garrett (2014) and Johnson (2018), where faculty responded positively to technology training in their HE-TPACK survey. Garrett (2014) reported that faculty members utilized and valued the technology training and other support services that the university provided. Johnson (2018) suggested that faculty's positive responses could be because of the university having a faculty development center that focuses on supporting faculty using instructional technology. This study site has both support for instructional technology and a faculty development center that guides efforts in training and supporting faculty in their instructional technology endeavors. Faculty development centers have become a necessity for higher education institutions when training

faculty on instructional technology, as well as to adapt their pedagogy for online learning environments (Almpanis, 2015).

Results from this study showed that both the digital immigrants and digital natives believed that it is the responsibility of the university to provide the instructional technology training to their faculty, and both groups preferred the training to be done at the departmental level. Understanding that faculty members would prefer training in a smaller environment where they could receive more focused attention could promote the attendance of those who are reluctant to come (Williams, Foulger, & Wetzel, 2009; Niess, 2011). Based on the results of the HE-TPACK instrument, the digital immigrants were not utilizing the technology training available to them, and the digital native group members were taking advantage of more training opportunities. With digital immigrants not attending any or too few instructional training events, two major barriers for instructional technology and online classes have to be mentioned; one, faculty members are unwilling to change their teaching and pedagogy styles to utilize the tools provided, and second, some educators who used technology but ignored all the related pedagogical aspects (Elci, 2019). Another study has also indicated that there is a need to overcome the pedagogical and technical issues with adopting instructional technology and teaching online courses for faculty to be more efficient and successful (Bilgiç, Doğan, & Seferoğlu, 2011).

Pedagogy Knowledge (PK)

In the PK domain, both digital immigrants and digital natives agreed that they had a strong knowledge of pedagogy, assessment, and teaching methodologies. Similar to the studies of Johnson (2018), Garrett (2014), and Huffman (2016), digital immigrants and digital natives both strongly agreed or agreed on the HE-TPACK assessment regarding their knowledge ability

in PK; in other studies, this domain has often received the most significant results. The results from this study mirror those of the previous studies where faculty felt confident in their teaching and knowledge. The confidence and comfort that is reflected in the results of the survey from the digital immigrants and digital natives could be derived from their doctoral student experiences during which they received formal and informal training (Blouin & Moss, 2015; Lederer, Sherwood-Laughlin, Kearns, & O'Loughin, 2016). Faculty possessing this prior experience could suggest why the digital immigrants and digital natives felt so positively about being able to motivate students to learn.

Technology Knowledge (TK)

Digital immigrant and digital native faculty felt confident in the TK domain in their ability to know how and when they should use technology in their courses. The positive results in the technology domain match the findings of Johnson (2018), Garrett (2014), and Huffman (2016). They found that both digital immigrant and native faculty were confident in their ability to use technology in their teaching (Johnson, 2018; Garrett, 2014; Huffman, 2016). One possible reason for the positive responses regarding TK could be because of the university having a faculty development center that offers technology training even though the HE-TPACK indicated that the majority of faculty attended one to three technology training events in the last year (Johnson, 2018). Another possible explanation the positive response toward TK could be that their own personal TK that they gained through both their educational and personal endeavors causes them to learn more about technology (Hofer & Swan, 2008).

While the digital immigrant and digital native faculty may feel confident in their TK, they still need to increase their TK and training because of the need to be able to troubleshoot technical issues as they arise (Archambault & Crippen, 2009; Bilgiç et al., 2011). Technology

will continue to change in the academic environment, and it is critical for both digital immigrant and native faculty to stay abreast of related changes (Larsen, 2014). Another aspect of TK that needs to be taken into consideration is the lack of standardization in the classrooms that educators instruct in, which is why it crucial for faculty to stay informed about technology so that they can be familiar with whatever resource they have available (Hruska, 2018).

Content Knowledge

Both digital immigrants and digital natives indicated strong positive responses about their CK. Previous studies conducted by Garrett (2014), Huffman (2016), Johnson (2018), Hruska (2018) also indicated that both digital immigrant and native faculty strongly indicated that they were very knowledge in content and that this domain was often the one with the highest score. The CK domain having the highest score is actually not surprising, because educators in higher education are considered experts in their fields of study (Hruska, 2018). Shulman (1987) explained that faculty members have attained this expert status because of the abundance of knowledge obtained during their graduate studies in their specialized field. With both digital immigrant and native faculty possessing a vast CK, it could be expected that this domain in the HE-TPACK survey rendered the highest score in this study and others.

Pedagogy Content Knowledge (PCK)

In the PCK domain, both digital immigrant and digital native faculty were very positive about their ability to interweave their CK with their PK. The results from the study are consistent with those of Garrett (2014), Huffman (2016), Johnson (2018), and Hruska (2018), who also found that faculty members were able to integrate their CK into their teaching. The positive responses in this study and others are not surprising since all of these studies were conducted at

institutes of higher education, where educators are required to have terminal degrees to validate their expertise (Hruska, 2018; Johnson, 2018).

Both the digital immigrant and native faculty need to exercise multiple approaches to teaching topics because it critical in effective teaching (Shulman, 1987). Being able to cultivate both digital immigrant and native faculty who can provide multiple instructional approaches is essential for effective education. The ability to be able to interweave CK and PK can be traced back to some faculty coursework in doctoral programs, past teaching or student experiences, and the day-to-day practice of teaching (Johnson, 2018). This study's findings support those of other studies that have used the HE-TPACK instrument for assessments, and they all reflect the faculty's strength in the PCK domain.

Technology Pedagogy Knowledge (TPK)

In the TPK domain, both the digital immigrant and native faculty indicated positive responses regarding how they could utilize and integrate technology to enhance their teaching. These positive results mirror those of Garrett (2014), Huffman (2016), Johnson (2018), and Hruska (2018). One possibility is that the study site places a high importance on instructional technology or that the faculty is adopting instructional technology to try to relate to today's students (Johnson, 2018; Schrader, 2008). Another consideration is that the faculty is integrating technology into the classroom to help speed up the process of students learning concepts through the use of instructional technology (Celik & Keskin, 2009). The value of instructional technology to the faculty is another consideration regarding the faculty developing support and adoption of technology into their courses (Hruska, 2018). If faculty members value instructional technology, they are more willing to work at learning it and adjusting it to fit their needs of their courses (Hruska, 2018).

Technology Content Knowledge (TCK)

Both the digital immigrants and digital natives agreed that they understood the relationship between technology and content, as well as how they both could improve student learning in their courses. These findings align with what Garrett (2014), Huffman (2016), Johnson (2018), and Hruska (2018) found. These studies revealed that faculty valued technology and understood the need to integrate technology with their content and that faculty need to have the training and expertise to blend technology and content effectively. The one difference found in the results of this study is that digital immigrants responded that they were not sure that they understood how the choice of technology allows or limits the type of content ideas. This finding could be attributed to faculty not utilizing the training available to them since the majority of participants indicated that they had only gone to one to three technology trainings. Another consideration is that the faculty are not utilizing the faculty development center to help bridge the gap between content and technology selection (Garrett, 2017). Selecting the correct technology to match the content of a course requires a plan of action to effectively integrate technology; this way, the instructor is prepared for all the possible ways to harness the instructional technology, ensuring that they have a support system in place when issues arise (Hruska, 2018).

Technology Pedagogy and Content Knowledge (TPCK)

The results on the TPCK domain revealed very positive responses from both digital immigrants and digital natives, who agreed that the were able to blend technology with their content and pedagogy. These findings align with the other studies conducted by Garrett (2014), Huffman (2016), Johnson (2018), and Hruska (2018), who found that faculty members possessed the TPCK to provide excellent teaching. One of the considerations that explains the positive

responses from the digital immigrant faculty members is that they possess more years of experience, thus allowing them the time to cultivate a methodology for learning new technology and integrating it into their content and pedagogy (Hruska, 2018). Faculty members' responses in Johnson's (2018) study indicated that they were interested in good teaching practices.

Research Question 2

RQ_1: Are faculty members' self-perceptions of their digital native or immigrant status in line with their generational cohort classification?" The modified demographics section of the HE-TPACK instrument that participants responded to had a modified question asking the participants to select the category that they thought they aligned with the most, and they were provided the definition of both a digital immigrant and a digital native. The study resulted in one digital immigrant chose the digital native classification, and two digital natives classified themselves as digital immigrants. At least one suggests the possibility for digital immigrant faculty members have migrate over into a digital native status by abandoning their previously learned behaviors in regards to technology (Vodanovich, Sundaram, & Myers, 2010). Berk (2009) described the issue with digital immigrants transitioning over to digital natives, status because most are living with one foot in the past and the other in the present, and they are reluctant to change. Another consideration regarding why digital immigrants do not want to transition over to a digital native status is because their educational experience consisted of more traditional with lectures and hard copy assignments; whereas, digital native faculty have completed their educational experience in a digital world (Autry & Berge, 2011).

Digital natives can also fall prey to the same issues that digital immigrants do in terms of the reluctance to change or adapt to the technology. Zur and Zur (2011) described this reluctance as belonging two possible categories: avoiders and minimalists. Avoiders are digital natives who

do not feel an affinity for technology and are not enamored by all the new technology available (Zur & Zur, 2011). Minimalists realize and accept technology as part of today's world but only engage it if the need arises (Zur & Zur, 2011). Perhaps, the digital native faculty who reported feeling aligned with the digital immigrant status had more of a traditional educational experience, aligning with the avoider or minimalist groups of digital natives.

Conclusion

In conclusion, the study found that a medium-sized regional institution's digital immigrant and digital native faculty members responded positively to the HE-TPACK instrument. Both groups either strongly agreed or agreed with the eight domains on the HE-TPACK. The results from the survey were not surprising since the study focused on faculty members within the college of education and human services. Educators in this college must be experts in their field, and they have to have expertise in pedagogy, content, and technology. The participants all also had at least one year of teaching experience, and all except one attended a technology training session in the last year. This study found no significance in the results from the HE-TPACK in the eight domains encompassed in the instrument.

The study did reveal the self-alignment of digital immigrant or digital native status to have a significance. A digital immigrant chose the digital native classification, and there were two digital natives who selected digital immigrant as their classification. A consideration regarding these results is what educational experience they underwent, how they were continuing their education, and whether they were possibility they are avoiders or a minimalist with regards to technology.

Based on the findings of this study, it can be concluded that there is no significant difference between digital immigrants and digital natives. There are more determining factors—

such as educational background, continuing education, and willingness to change and learn—that impact a faculty members' use of instructional technology. The use of instructional technology comes down to that individual faculty member's desire and motivation to use instructional technology.

Limitations

One limitation that should be noted from this study is that the HE-TPACK survey was sent out electronically. If faculty are true digital immigrants they may have chosen not to participate in the survey because it involved technology, and if they were invited in person and a physical copy given to them they may have participated. The same could almost be said about the digital natives though where the invitation email was treated almost like a spam email and they disregarded the invitation in that sense. These factors could be part of the reason the study had low participation in the study.

Participation was another limitation in the study. Since it focused on the College of Education and Human Services faculty the pool was limited. In the future the study could be expanded out to include other academic colleges on campus to get a larger sample size. Another attribute to the low participation could also be the timing of sending out the invitation. The invitation was sent out in the last few weeks of the semester right before finals and that could part of the reason why faculty did not participate in the study. Those are the main limitations to the study.

Implications for P-20

Having a firm understanding between digital immigrants and digital natives is critical in the P-20 community because it is essential that faculty understands that the younger generations are more technology oriented. Understanding that students are being exposed to technology

from the beginning of their educational career and that they are developing experiences throughout that time that shapes how they learn and utilize technology is critical for faculty to understand and implement approaches that embrace that learning style. Faculty also need to be self-aware of technological, pedagogical, and content knowledge abilities to better adapt and utilize instructional technology in the classroom to help the digital native students flourish in their educational endeavors. Faculty having a grasp on their technological knowledge is crucial for the P-20 community because it allows for more opportunity for faculty to allow students to get more first-hand experience through technologies such as Zoom where they could video call into a project site or speak to a chief executive officer. Being able to utilize the technology between the classroom and the different organizations in the community will help build stronger relations and promote the growth of the student and promote the growth of the community.

Implications for Future Research

To continue on research on the HE-TPACK instrument and to investigate the idea of digital immigrants and digital natives more research needs to be occur in these areas. One suggested area that could enhance findings for both the HE-TPACK instrument and digital immigrants and digital natives is looking at their usage of faculty development centers. Adding another section to the HE-TPACK to ask the questions about usage and what services they use could help assess some of their responses on the HE-TPACK and it could suggest why some faculty migrate between digital immigrant and native status.

Another area of research that can be expanded upon is looking at the reliability of the instructional technology faculty is using in the course. Johnson (2018) looked at the instructional technology that was used in the classroom, however adding another section to the HE-TPACK to inquire what kind of issues faculty faces with instructional technology would

help expand on what issues if any occurs with use. Researching this area could suggest why faculty avoid technology or are late adopters of technology in the classroom. In conjunction research on how faculty handle technology failure in the classroom would also add depth at understanding the usage.

Considering that a major portion of the use of instructional technology is interweaving it with the course content and pedagogy. Another area of research to investigate would be to add more historic questions on the HE-TPACK to get a better understanding of the faculty's background to determine if they have had prior training in merging their content knowledge in with instructional technology. This research would help expand upon why some faculty are better at adopting technology and consideration for the differences in digital immigrants and natives.

Another interesting area that should be investigated is online classes. The HE-TPACK should be modified to investigate how many digital immigrants and natives are teaching online classes and what kind of methodology they are using to teach online. In this research they should look at how they are using the learning management system and how they are distributing the course content to students and how they are interacting with the students through the learning management system. Idea is to see if there is a difference between the ways that digital immigrants and digital natives interact online.

Summary

The purpose of this study was to assess how well faculty in the college of education and human at a medium-sized regional university did with the HE-TPACK assessment. The researcher also investigated if there was any difference between the generational cohorts of digital immigrants and digital natives. This study also sought to investigate how faculty from

different generational cohorts classified themselves in the terms of being digital immigrants or digital natives. Overall, the study found that both digital immigrants and digital natives strongly agreed with the domains of the HE-TPACK and wanted to foster the use of instructional technology in the classroom. However, it was discovered that some digital natives self-aligned with the definition of digital immigrant, and one digital immigrant identified with the digital immigrant definition. In the end, there was no statistical significance to prove any difference between digital immigrants' and digital natives' instructional technology usage.

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Appendices

Appendix A

Subject: Research Invitation to participate in doctoral student's dissertation study

Hello College of Education and Human Services faculty:

Randall Joyce, Principal Investigator from Murray State University, is conducting a research study called Assessing a Small University with HE-TPACK (IRB #). This study's goal is to assess your perceived knowledge, skill level, and beliefs about instructional technology and technology training. This study is part of Mr. Joyce's dissertation work and is being supervised by Dr. Teresa Clark in the College of Education and Human Services.

Taking part in this study is simple; the survey is being delivered via Google Forms and will take approximately 20 minutes to complete. The survey contains questions about demographics, instruction with technology, and technology training. If you choose to participate in the study the link can be seen below:

You can access the survey by using this link:
https://docs.google.com/forms/d/e/1FAIpQLScUQTFuefb9DUHbd7Zhcgi-dP3OQ4M_L5sSGNs7HiKq60BMhg/viewform?usp=sf_link

Participation in this study is completely voluntary. All participants will remain anonymous and you are free to decide not to participate or to withdraw at any time without consequence. All data collected during the conduct of this study will remain confidential. There are no known risks and/or discomforts associated with this study.

If you have any questions about this study, please contact Randall Joyce by email rjoyce@murraystate.edu or Dr. Teresa Clark at 270-809-6956 or tclark24@murraystate.edu.

Thank you for your consideration!

Appendix B

MURRAY STATE UNIVERSITY

Institutional Review Board

328 Wells Hall
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TO: Teresa Clark, Education

FROM: Jonathan Baskin, IRB Coordinator JB

DATE: 4/14/2019

RE: Human Subjects Protocol I.D. – IRB # 19-132

The IRB has completed its review of your student's Level 1 protocol entitled *Assessing a Small University with HE-TPACK*. After review and consideration, the IRB has determined that the research, as described in the protocol form, will be conducted in compliance with Murray State University guidelines for the protection of human participants.

The forms and materials that have been approved for use in this research study are attached to the email containing this letter. These are the forms and materials that must be presented to the subjects. Use of any process or forms other than those approved by the IRB will be considered misconduct in research as stated in the MSU IRB Procedures and Guidelines section 20.3.

Your stated data collection period is from 4/14/2019 to 10/31/2019.

If data collection extends beyond this period, please submit an Amendment to an Approved Protocol form detailing the new data collection period and the reason for the change.

This Level 1 approval is valid until 4/13/2020.

If data collection and analysis extends beyond this date, the research project must be reviewed as a continuation project by the IRB prior to the end of the approval period, 4/13/2020. You must reapply for IRB approval by submitting a Project Update and Closure form (available at murraystate.edu/irb). You must allow ample time for IRB processing and decision prior to your expiration date, or your research must stop until such time that IRB approval is received. If the research project is completed by the end of the approval period, then a Project Update and Closure form must be submitted for IRB review so that your protocol may be closed. It is your responsibility to submit the appropriate paperwork in a timely manner.

The protocol is approved. You may begin data collection now.

Appendix C

Assessing a Small University with HE-TPACK

ELECTRONIC CONSENT FORM

* Required

Assessing a Small University with HE-TPACK

Primary Investigator: Randall Joyce
Faculty Sponsor Contact: Dr. Teresa Clark, 270-809-6956, Tclark24@murraystate.edu

You are being invited to participate in a research study conducted by a Murray State University doctoral student. This form contains information about the study. Please read the form carefully and ask questions about anything that is not clear. You may print a copy of this form for your records.

1. Nature and Purpose of Project: You are invited to participate in a research study that is focusing on how faculty combine their technological, pedagogical, and content knowledge in their courses to gain a better understanding of how faculty utilize instructional technology in the classroom.

2. Participant Selection: You are being asked to participate because you're a faculty member at Murray State University in the College of Education and Human Services.

3. Explanation of Procedures: Truthfully fill out the survey. Study duration: Your participation will take approximately 20 minutes

4. Discomforts and Risks: There are no known risks associated with this study.

5. Benefits: Participants, on completion of the survey, will be able to enter a drawing for a $50 Amazon Gift Card.

6. Participant Compensation: You will receive no compensation for your participation.

7. Refusal/Withdrawal: Your participation is strictly voluntary and you are free to

withdraw/stop participating in the survey at any time with absolutely no penalty.

8. Contact Information: Any questions about the procedures or conduct of this

research should be brought to the attention of Dr. Teresa Clark at 270-809-6956 or

tclark24@murraystate.edu.

This project has been reviewed and approved by the Murray State University Institutional Review Board (IRB) for the Protection of Human Subjects. If you have any questions about your rights as a research participant, you should contact the MSU IRB Coordinator at (270) 809-2916 or msu.irb@murraystate.edu.

1. *

Mark only one oval.

- ◯ Agree
- ◯ Disagree *Stop filling out this form.*

Demographic Information

2. Gender

Mark only one oval.

- ◯ Female
- ◯ Male

3. Academic Ranking

Mark only one oval.

- Assistant Professor
- Associate Professor
- Professor
- Adjunct
- Lecturer

4. Tenure Status

Mark only one oval.

- Tenured
- Tenure-track
- Neither

5. Total number of years of full-time faculty (i.e. teaching experience)

Mark only one oval.

- 0
- 1-4
- 5-9
- 10-14
- 15-19
- 20+

6. How many technology training sessions have you attended in the last year?

Mark only one oval.

- 0
- 1-3
- 4-6
- 7-9
- 10 or more

7. Which of the following do you think that you align with the most: Digital Immigrant - a person that did not grow up with technology or Digital Native - a person that has grown up with technology his/her entire life?

Mark only one oval.

- Digital Native
- Digital Immigrant

8. Which age group best describes you?

Mark only one oval.

- 20-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70+

HE-TPACK Items

Technology Training

9. Technology training would enhance my teaching

Mark only one oval.

	1	2	3	4	5	
Strongly Agree						Strongly Disagree

10. It is the University's responsibility to train me to use technologies that will enhance my teaching.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree						Strongly Disagree

11. The University should not make technology training a requirement for faculty.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree						Strongly Disagree

12. Technology training should be offered in each academic department at my University.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree						Strongly Disagree

PK Domain

13. I have a clear understanding of pedagogy (e.g., designing instruction, assessingstudents' learning).

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

14. I am familiar with a wide range of practices, strategies, and methods that I can use in my teaching.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

15. I know how to assess student learning.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

16. I know how to motivate students to learn. *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

TK Domain

17. I am familiar with a variety of hardware, software and technology tools that I can use for teaching.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

18. I know how to troubleshoot technology problems when they arise. *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

19. I do not know how to use technology in my everyday life.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

20. I recognize that technology use can have positive and negative effects.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

21. I cannot decide when technology can be beneficial to achieving a learning objective.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

22. I can decide when technology may be detrimental to achieving a learning objective.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

CK Domain

23. I have a comprehensive understanding of the curriculum I teach.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

24. I understand how knowledge in my discipline is organized.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

26. I can explain to students the value of knowing concepts in my discipline.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

27. I can make connections between the different topics in my discipline.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

28. I stay abreast of new research related to my discipline in order to keep my ownunderstanding of my discipline updated.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

PCK Domain

29. I understand that there is a relationship between content and the teaching methodsused to teach that content.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

30. I can anticipate students' preconceptions and misconceptions

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

32. I understand what topics or concepts are easy or difficult to learn

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

33. I can provide multiple representations of content in the form of analogies, examples,demonstrations, and classroom activities

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

34. I can adapt material to students' abilities, prior knowledge, preconceptions, and misconceptions.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

TPK Domain

35. I understand how teaching and learning change when certain technologies are used.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

36. I do not understand how technology can be integrated into teaching and learning tohelp students achieve specific pedagogical goals and objectives.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

38. I know how to be flexible with my use of technology to support teaching and learning.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

39. I cannot reconfigure technology and apply it to meet instructional needs
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

40. I understand that in certain situations technology can be used to improve student learning.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

TCK Domain

41. I cannot select and integrate technological tools appropriate for use in specificdisciplines (or content).
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

42. I understand how the choice of technologies allows and limits the types of content ideas that can be taught
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

integrated into teaching and learning.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

44. I am aware of how different technologies can be used to provide multiple and varied representations of the same content.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

45. I cannot select specific technologies that are best suited for addressing learning objectives in my discipline.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

46. I understand that I need to be flexible when using technology for instructional purposes.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

TPACK Domain

47. I can effectively integrate educational technologies to increase student opportunities for interaction with ideas
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

48. I have different opportunities to teach specific curriculum content topics with technology.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

technology.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

50. I cannot determine when a technology resource may fit with one learning situation in my discipline, and not with another.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

51. I can flexibly incorporate new tools and resources into content and my teaching methods to enhance learning.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

52. I understand how digital technologies can be used to represent content in a variety of formats.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

53. I can use teaching methods that are technology-based to teach content and provide opportunities for learners to interact with ideas
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

54. I understand what makes certain concepts difficult to learn for students and how technology can be used to leverage that knowledge to improve student learning.
Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

curriculum content.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

56. I know how to operate classroom technologies and can incorporate them into my particular discipline to enhance student learning.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

57. I know how to operate classroom technologies and can incorporate them into my particular discipline to enhance student learning.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree

58. I know how to integrate the use of educational technologies effectively into curriculum-based learning.

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	◯	◯	◯	◯	◯	Strongly Disagree