Online Technology Integration Professional Development: Action Research Evaluating Impact on Faculty Perceptions and Practices

Anna Loftus

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ONLINE TECHNOLOGY INTEGRATION PROFESSIONAL DEVELOPMENT: ACTION RESEARCH EVALUATING IMPACT ON FACULTY PERCEPTIONS AND PRACTICES

by

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DEDICATION

To my husband, Spencer, you have been my strongest support system, as well as a constant source of love and motivation throughout this journey. You have kept me smiling every day, and I want to thank you for encouraging me to continue my education and never doubting that I would achieve this goal. To my mom, Lisa, thank you for always having faith in me and sharing your words of encouragement every step of the way. I value our friendship more than I could ever put into words. To my dad, Spero, thank you for instilling the definition of hard work in me and showing me I can do anything I put my mind to. You are truly such a role model to me, and I look up to you in so many ways. To Kathi, Dave, Libby, and Kenny, thank you for each playing a special role in helping shape me into the person I am today to make this goal possible. Lastly, I cannot forget my dog, Tuck, the world’s best writing partner; you spent countless nights by my side because you knew I loved having you close by while I worked. To all of you, thank you from the bottom of my heart.
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Lastly, I would like to acknowledge my cohort, X-Factor. I cannot imagine going through this experience without you. Our constant communication gave me comfort knowing we were all there for each other during the uncertainties, challenges, and best of all, successes. Since orientation several years ago, we have created a very special bond, and I am ecstatic to have crossed the finish line with you all by my side.
ABSTRACT

Many faculty teaching online lack the skills and knowledge in technology to effectively integrate technology into their course design. Faculty feel they are not provided enough professional development opportunities to improve their technology integration skills. Therefore, online professional development specifically designed for online faculty interested in integrating technology into their course design can assist in preparing faculty for the online classroom. The purpose of this action research was to implement and evaluate the impact of online technology integration professional development for faculty teaching at a distance at an institution of higher education. This study focused on three research questions. The first question asks how, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology? The second question asks how, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology? The third question asks how, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?

The intervention was a six-week online technology integration professional development including a combination of 16 full-time and part-time faculty participants teaching online at an institution of higher education. This research used a convergent mixed-methods design, collecting and analyzing both quantitative and qualitative data,
including the Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) pretest and posttest, discussion boards, and semi-structured interviews. The TIFPBQ pretest and posttest were analyzed using descriptive statistics, followed by inferential statistics utilizing the nonparametric Wilcoxon signed-rank test. Discussion boards and semi-structured interviews were analyzed using inductive analysis and coding.

Findings from this study indicated the professional development had a positive impact on faculty perceptions about readiness to integrate technology, but also revealed elements impacting readiness. Additionally, the professional development positively impacted perceptions about advantages and barriers of technology integration. Finally, the professional development had a positive impact on faculty plans to integrate technology into their course design. Implications for designers of online technology integration professional development and areas for future research in this field are offered.
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CHAPTER 1
INTRODUCTION

National Context

With the increasing amount of technology available in online courses, the question remains whether or not higher education faculty members are prepared to integrate this technology effectively. Learning within this digital age, students expect their faculty members to be knowledgeable in technology and implement it into their courses. This was supported by a survey of 35,760 students enrolled in 110 institutions across the United States that found when asked about technology tools, students responded that on average, they want more technology (“EDUCAUSE”, 2017a). Yet, even though it is clear that students want this technology, preparing faculty on how to integrate technology is not always occurring.

Faculty agree they were not necessarily trained on how to integrate technology. A study that surveyed over 11,000 faculty members from seven different countries found between one-third and two-thirds of all respondents stated they “could be more effective if they were better skilled” (“EDUCAUSE”, 2017b, p. 27) at integrating a variety of technologies into their classes. Specifically, faculty wished they were more proficient in using the technology, including multimedia production tools (e.g., video editing and creation software), learning management systems (LMS) (e.g., Blackboard, Instructure Canvas, and Desire2Learn Brightspace), online collaboration (e.g., web-conferencing), and free website content (“EDUCAUSE”, 2017b). A LMS “is the framework that handles
all aspects of the learning process” (Watson & Watson, 2007, p. 28) and an online software that offers a wide variety of tools to assist in multiple facets of education and instruction (Edmunds & Hartnett, 2014). Example of these tools can include assessments, gradebooks, content, resources, activities, and more. In this study, the LMS that was utilized was Desire2Learn Brightspace. Better skilled can be translated into being better prepared, which was the root of this research problem; faculty need technology integration professional development.

Professional development has commonly been used to educate faculty about various technology elements and integration (Alsofyani, Aris, & Eynon, 2013; Bese, 2016; Esterhuizen, Blignaut, & Ellis, 2013; Macdonald & Poniatowska, 2011; McQuiggan, 2012; Rienties, Brouwer, & Lygo-Baker, 2013). Yet, faculty who teach online are not always offered this opportunity. This was supported by a recent survey conducted by the Instructional Technology Council (2017) that found 25% of universities did not require new online faculty to go through any mandatory professional development before they taught online. In addition, when faculty members who have taught online were asked if recurring development was required after they begin teaching online, 70% answered that it was not (Instructional Technology Council, 2017). These statistics support the problem at hand. Technology is updated every day, and therefore both new and current faculty should be required to attend professional development. Furthermore, researchers found professional development can increase preparedness and engagement (Ganza, 2012) and confidence (Sheffield, McSweeney, & Panych, 2015).

Even in instances when technology professional development was offered, faculty admitted they did not always attend. Georgina and Hosford (2009) studied how
technology was integrated by faculty members into pedagogy based on technology training and technology knowledge. The results found that although 94.9% of faculty knew faculty technology professional development was offered, only 7.2% of the faculty actually attended professional development sessions “to a very great extent” (Georgina & Hosford, 2009). This indicated that even though the professional development opportunities may have been available, faculty did not have to attend, and very frequently decided not to attend.

**Current Faculty Technology Integration**

Even with more technology readily available for faculty, it is clear many faculty members are not choosing to integrate varied technology into their courses. In a survey conducted by The Higher Education Research Institute (2014) of 269 colleges/universities with 16,112 undergraduate faculty members, only 16.1% of faculty members frequently used online discussion boards, while only 23.1% used online homework or virtual labs. These are some of the most basic online technology tools. This number may have been low because only small portions of “faculty are rewarded for their efforts to use instructional technology” (The Higher Education Research Institute, 2014, p. 35). Additionally, faculty members may have felt the time and effort required to incorporate technology does not lead to enough positive recognition from educational leadership. This was also supported by Allen and Seaman (2013) who found 44% of faculty believed it took more time to teach online in comparison to teaching in a traditional face-to-face environment. Georgina and Hosford (2009) stated similar results, as they found 33.4% of faculty surveyed favored teaching in a traditional classroom, where there would not be any technology integration involved. Each of these factors may
have been contributing to the underlying reason of why faculty are not attending professional development regarding technology integration.

**Lack of Support**

Technology integration has never been an easy feat. Orr, Williams, and Pennington (2009) found online faculty felt as if they must become “technologists” (p. 263) when they taught online in order to keep up with the technology demands of an online course. Time and resources needed to be continually allocated to ensure faculty members had the proper technology skills and knowledge to deliver effective online learning. Even though technology may have been overwhelming, it still needed to be a top priority for institutional leadership to ensure faculty were encouraged to properly integrate technology into online learning (“EDUCAUSE”, 2017b).

Faculty members need support when they are preparing to integrate technology into online courses. The Higher Education Research Institute (2014) found only 58.2% *strongly agreed or somewhat agreed* when evaluating the statement “there is adequate support for faculty development” (p. 35). Therefore, the faculty felt they were not provided the professional development opportunities they needed. However, EDUCAUSE Center for Analysis and Research (2017a) found if faculty were willing to work with instructional designers and instructional technologists, both designers and technologists could be of valuable assistance in technology integration and technology engagement. With the help of trained professionals in the field of educational technology, the problem of lack of support could be controlled, and faculty could receive the professional development they needed. Faculty believe support is critical in technology
integration (Bailie, 2001; Esterhuizen et al., 2013; Gutman, 2012), but it is still lacking (Li, Worch, Zhou, & Aguiton, 2015).

Online classes continually rely on technology to exist. Technology needs to be present. Communication, learning, and interaction in an online course play critical parts in which technology is implemented (Jones, 2011). Faculty should feel supported when using course technology. Yet, only 58% of faculty expressed they were provided with the necessary technology support services to assist with the technology integration in online learning (“EDUCAUSE”, 2017b). Help and training of knowledgeable staff could increase the value of technology professional development for faculty.

**Local Context**

The setting for this study was Laken College (LC) (pseudonym), a private college that is located in the Eastern United States. LC enrolls approximately 3,119 students and offers bachelor, master, and doctoral level degrees (Laken College, 2020). Furthermore, LC employees 398 faculty members, including 194 full-time and 204 part-time faculty members (Laken College, 2020). In addition to the main campus, LC has seven regional campuses across the United States. This research study did not have a physical location, as it was conducted completely online within Brightspace, the LMS that LC utilizes. The advantage to an online professional development was that distance did not serve as a barrier for a successful study (Campbell, 2016; Carter, 2004; Cercone, 2008; Healy, Block, & Judge, 2014; Rizzuto, 2017; Sullivan, Neu, & Yang, 2018; Thomas, 2009). Offering online professional development was essential so it could serve both the local faculty, as well as those located at a regional campus.
Based on experiences and observations as an instructional designer at LC, the critical problem being explored was how online faculty at LC lacked skills and knowledge in technology integration for their online courses. With the ever-changing amount of technology available in online learning, online faculty could not be expected to know how to integrate this technology into their online courses without the proper professional development.

Unfortunately, LC does not mandate technology professional development, and therefore online faculty continually struggle with technology integration every day within their courses (K. Colangelo, B. Perkins, & A. Dumont, personal communication, September 17, 2018). Furthermore, in speaking with the associate director of technology services (K. Colangelo personal communication, September 17, 2018), she mentioned “even with the amount of professional development available to faculty regarding best practices of online technology integration, faculty ultimately have the choice of whether or not they want to participate.” With over 300 online faculty members in a variety of disciplines, this issue needed to be addressed to ensure faculty are prepared to teach online before it is time to launch their course.

It was essential to understand that in the past, the college has offered technology professional development that would be helpful for faculty looking to enhance technology integration in their online courses. All session formats were strictly face-to-face, typically 60 minutes in duration, and scheduled based on projected demand and academic calendar.

From 2017-2019, a total of 668 LC faculty participated in professional development offered (Laken College Center for Excellence in Teaching, Learning, and...
Professional development could be categorized into two categories: LMS and course technology integration. Within this total, if a faculty member attended five sessions, they would count five times in the total of number of attendees. Although 668 attendees may seem like a large number, LMS professional development accounted for the majority of attendance with 537 of the 668 attendees (80.5%) participating in sessions related strictly the LMS (Laken College Center for Excellence in Teaching, Learning, and Scholarship, 2019). When broken down more specifically, attendees were present at the following sessions related to the LMS: Overview of Brightspace (39.7%), Gradebook (25.5%), Activities/Assignments/Discussions/Quizzes (15.3%) (Laken College Center for Excellence in Teaching, Learning, and Scholarship, 2019). Yet, the professional development that related specifically to course technology integration, had very low turnouts, with less than 20% of the total attendees from 2017-2019 (Laken College Center for Excellence in Teaching, Learning, and Scholarship, 2019). These courses were titled Facilitating A Course and Design Lab, with 45% and 19.2%, respectively, of the total number of attendees (Laken College Center for Excellence in Teaching, Learning, and Scholarship, 2019). Additionally, there were 110 faculty who signed up for various sessions, but either canceled or did not show up to the actual session. From this, it was evident the LMS professional development had the largest participation.

In 2018, LC switched from Moodle to the current LMS Brightspace. This is a continual struggle for faculty as not only are they attempting to learn a new LMS, they are also attempting to integrate technology into their courses (K. Colangelo & B. Perkins, personal communication, September 17, 2018). I acknowledge professional development
in this topic is essential as the LMS is the baseline for an online, virtual learning environment; however, there is more to technology integration in online learning than the LMS itself.

Low turnout for course technology integration professional development may partially be because faculty were already overwhelmed and worried about simply building their courses in the Brightspace LMS and did not feel confident trying to integrate additional technology at that point (B. Perkins, personal communication, September 17, 2018). My hope is that with the proper professional development, faculty will not just understand the LMS aspect of technology integration, but instead, will be able to see how course technology integration professional development attendance can enhance the quality of their online courses moving forward.

Another critical barrier of the current LC professional development structure was that sessions are only offered face-to-face when many faculty at LC were teaching and working at a distance. With just over 200 part-time faculty (*Laken College*, 2020), it would be beneficial to have professional development online to be more accessible to the part-time faculty population. Using an online learning environment for professional development would offer all faculty an opportunity to complete the technology integration professional development completely online while using the LMS they are expected to teach with.

Faculty all have differing levels of technological knowledge and skills. When speaking about the topic, an instructional designer shared “faculty of all technological backgrounds are teaching online now, and even if a faculty member has a great understanding of technology, this does not mean they necessarily know how to integrate
technology in the online classroom.” (B. Perkins, personal communication, September 17, 2018). This personal view was supported by Georgina and Olson (2008) who found although faculty members that were proficient with email, laptops, and cell phones outside of class, it did not guarantee proficiency with technology in the classroom. Therefore, technology integration professional development could help faculty regardless of their technology skills and current technology usage.

**Statement of the Problem**

Many faculty teaching online lack the skills and knowledge in technology to effectively integrate technology into their course design. Faculty feel they are not provided enough professional development opportunities to improve their technology integration skills. Therefore, online professional development specifically designed for online faculty interested in integrating technology into their course design can assist in preparing faculty for the online classroom.

**Purpose Statement**

The purpose of this action research was to implement and evaluate the impact of online technology integration professional development for faculty teaching at a distance at LC.

**Research Questions**

Three research questions guided this research:

1. How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology?
2. How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology?

3. How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?

**Statement of Researcher Subjectivities and Positionality**

Working as an instructional designer at LC, I work with faculty on a daily basis to help design courses, integrate technology, and ensure alignment in their online course design course. Previously, I earned my Master of Art in Education in Instructional Technology, and I have been working in my current position since June 2018. I also teach online courses part time within the LMS at LC, so I have insight into the online course teaching perspective as well. Before working at LC, I worked as an instructional designer/instructional technology faculty support manager at another university in the southeastern United States for two-and-a-half years.

Within my current position, I am knowledgeable of emerging instructional technology, Quality Matters (peer review process to ensure alignment and quality course design), technology accessibility requirements, professional development, and multimedia design and development. I am passionate about educators understanding the positive impact technology can have on teaching and learning and feel technology integration has to go above and beyond simply using the LMS. I have seen first-hand when faculty members experience their *aha* moment regarding technology integration, and I enjoy being along for their journeys. I find the most effective way to teach faculty
about technology integration is through professional development by skilled educational technology professionals.

Ultimately, I believe there is a lack of participation in professional development because faculty members do not have time to attend the technology professional development sessions the college provides. Professional development takes time and I understand members have to prioritize the little amount of extra time they have to determine what may benefit their courses the most. Therefore, I kept this in mind when I created my online professional development to ensure it was feasible for a variety of faculty members. I also had to remember faculty members may not think my professional development will be beneficial and will opt out of participating. This was supported by conversations with instructional designer (B. Perkins, personal communication, January 14, 2019) when she revealed

It has become increasingly difficult to entice faculty to attend professional development opportunities, guest speaker presentations, and the necessary professional development needed to innovate and stay relevant within their role. Much of this is due to the exponential demands that faculty face in their day-to-day lives. This is particularly true at smaller institutions where faculty often take on a myriad of roles from serving on committees to participating in classroom-based research. Unfortunately, faculty are forced to prioritize their time, and these development opportunities are often perceived as more of a luxury than a requirement and thus fall to the bottom of that priority list.

Although it is unlikely course technology integration professional development will ever be mandatory at LC, I still believe it should be a priority for the instructional designers to
at least make the sessions as appealing, flexible, and convenient as possible. Therefore, designing and offering one cohesive, online professional development opportunity which addressed all the essentials of online technology integration was a potential answer to the current problem. Not only would professional development keep faculty focused and interested, but it would also allow faculty to complete a professional development which incorporated many elements of technology integration. Regardless of what specific faculty members decided to join my study, I continue to believe professional development is a powerful learning opportunity for any interested faculty member. Additionally, for any faculty members who decided not to join my study, I am still open and willing to help with their technology integration and instructional needs in the future.

Within my research paradigm I am an interpretivist. This paradigm allows for explanation and reflection on the part of participants. According to Creswell (2014) in this type of worldview, open-ended questions are generated so that the study participants are able to share their experiences and thoughts freely. As my study was focused on online professional development, I wanted faculty to feel they could express themselves without worrying about negative consequences or feedback. I believe learning is about asking questions to find a deeper meaning to apply to future experiences. Therefore, my belief directly links to the interpretivist paradigm.

It is common for action researchers to study their own environment while attempting to solve a problem through reflection and research (Herr & Anderson, 2005). As I implemented and evaluated an online professional development focused on technology integration in the online learning environment for online faculty at LC, it was clear my positionality was one of an insider. I worked within the environment and with
this population frequently. Working as an insider, the goal of my research was to contribute to the knowledge base, specifically of educational technology integration within online courses (Herr & Anderson, 2005). Advantages to taking an insider positionality includes a genuine understanding of the environment and simpler access to the population and the research site (Merriam et al., 2001). Yet, these could also work against me, as insiders feel so comfortable with their audience that they may cross unethical boundaries (Merriam et al., 2001).

When working with research in an online setting, there are not always clear cut ethical guidelines to follow when it comes to research (Kanuka & Anderson, 2007). With this, I ensured my subjectivities did not interfere negatively with this study. I believe that anyone, regardless of age or experience, could integrate technology into their courses to some degree. Yet, I also had to remember that some faculty members may not feel this way, and I could not let this mindset shape my study, my results, or my interpretations. I had to understand that others may not share the same pedagogical view as myself, and they may find the online professional development was not ideal for them. I did, however, take into consideration the experience I had working with faculty members with varying levels of technology experience. I facilitated knowledge growth in faculty with varied levels of technology experiences to demonstrate technology integration was possible for willing faculty members and not to become discouraged. I reminded faculty members that learning technology takes time, and it was normal to have some degree of struggle when learning new tools. Working within an environment in which I was comfortable and familiar with, I had to be sure that all data were reported accurately, even if it was not desirable (Herr & Anderson, 2005). If the results were not what I hoped
for, it was still my duty as an ethical researcher to allow the thoughts of my population to be voiced (Merriam et al., 2001).

I also used bracketing during my research. The process of bracketing was used to alleviate damaging preconceptions from researchers which could possibly decrease the overall dependability of research (Fischer, 2009; Tufford & Newman, 2012). Bracketing was also helpful for comprehensive researcher reflection (Ahern, 1999; Fischer, 2009). Bracketing was accomplished through journaling about various elements of the research including subjective issues in research, personal values, possible conflicts, and reframing of any potential barriers (Ahern, 1999). Therefore, in my study I achieved bracketing through my audit trail of journals and memos addressing the above topics consistently throughout my research process.

In terms of power, I work on the same level as faculty, and therefore I did not anticipate any feelings of imbalances of power. To ensure this, I allowed faculty members access to their interview transcripts to verify their information was transcribed accurately and was congruent with their desired meanings conveyed (York & Richardson, 2012). Through this, my positionality as an insider with an interpretivist worldview allowed for an ethical and accurate action research study.

**Definition of Terms**

**Adult Learning Theory/Andragogy:** Adult learners are at different points in their lives, and therefore, have different experiences and responsibilities compared to younger learners (Merriam & Bierema, 2013). Adult learning theory, created by Knowles (1974), highlights the different characteristics of an adult learner. These include the ability to be independent, a director of self-learning, frequently pulling
from various life experiences, and willing to learn and apply knowledge promptly (Knowles, 1974; Merriam, 2001; Zmeyov, 1998).

**Learning Management System (LMS):** Watson and Watson (2007) stated that the LMS “is the framework that handles all aspects of the learning process” (p. 28). Additionally, the LMS is an online software that offers a wide variety of tools to assist in multiple facets of education and instruction (Edmunds & Hartnett, 2014). Example of these tools can include assessments, gradebooks, content, resources, activities, and more. In this study, the LMS that was utilized was Desire2Learn Brightspace.

**Online Faculty:** Online faculty refers to all faculty members that are teaching courses within the online learning environment. Online faculty in this study were required to have taught at least one online course within the last year.

**Online Learning Tools:** Online learning tools refers to the actual technology that is integrated into courses such as multimedia elements and communication tools (Khan, 2005).

**Online Learning:** Singh and Thurman (2019) reviewed the literature over the past 30 years related to the definitions of online learning and proposed cohesive definitions of online learning, with one definition stating “Online learning is defined as learning experienced through internet in an asynchronous environment where students engage with instructors and fellow students at a time of their convenience and do not need to be co-present online or in a physical space” (p. 302). Online learning can also be referred to as e-learning or distance learning.
**Professional Development:** Professional development is education that changes and modifies how educators teach, which in turn produces increases in student outcomes and learning (Guskey, 1986; Odden, Archibald, Fermanich, & Gallagher, 2002).

**Technology Integration:** Technology integration does not mean using technology in class (Davies, 2011; Dockstader, 1999). Instead, successful technology integration means technology should be aligned to learning outcomes (Davies, 2011; Dockstader, 1999; Ertmer & Ottenbreit-Leftwich, 2010), enhance learning activities (Kebrichi, Lipschuetz, & Santiagueet, 2017), and motivated by the curriculum (Dockstader, 1999) and learning (Dinc, 2019).
CHAPTER 2
LITERATURE REVIEW

Introduction

The purpose of this action research was to implement and evaluate the impact of online technology integration professional development for faculty teaching at a distance at LC. The literature review focuses on three research questions. The first question asks how, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology? The second question asks how, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology? The third and final question asks how, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?

With the research questions, three main variables were explored to locate relevant resources: (a) technology integration, (b) online professional development, and (c) online course design. To locate diverse resources, the following databases were used: Education Source, ERIC, JSTOR, and ProQuest. The results included full-text, peer-reviewed articles from academic journals, or dissertations from doctoral students. Furthermore, Google Scholar was used to locate additional resources, as well as resources where the full text was not available through Education Source, ERIC, JSTOR, or ProQuest. The keywords for these searches included the following: online course design, online
professional development, online training, advantages of online professional
development, challenges of online professional development, technology integration,
faculty, technology, and adult learning theory. The final technique used to locate
resources was from mining references of previously located articles and dissertations.
This allowed for the location of many articles that typically did not show in previous
searches, but still had a clear link to the research question and variables.

This literature review is organized into five major sections. The first section takes
an in-depth look at technology integration and explores the definition of technology
integration, current models/frameworks, advantages, challenges and barriers, and how
technology integration is currently being measured. The second section focuses on the
concept of professional development, with a specific focus on definitions, different
formats, theoretical frameworks, and online models. The third section examines online
professional development, and highlights both the advantages and disadvantages, as well
as different data collection methods used to measure educator perceptions in past studies.
The fourth section explores course design considerations for effective online professional
development, with specific sections related to personalization, authentic content,
participant reflection, participant collaboration, incorporation of multimedia, ability to
track progress, and length. The fifth and final section highlights technology in
professional development and specifically discusses faculty perceptions of technology,
readiness to integrate technology, willingness to integrate technology, hands-on
application of technology, technology integration implementation and support, and the
impact of professional development on technology integration for educators of various
teaching levels.
Technology Integration

Technology integration will be studied closely in this action research study. As the main purpose of this professional development was to implement and evaluate the impact of technology integration, it was essential to understand the different components of technology integration and how they have been discussed in the literature. This section will discuss the following elements related to technology integration: (a) definition, (b) current models/frameworks, (c) advantages, (d) challenges/barriers, and (e) measurement of technology integration.

Definition of Technology Integration

The definition of technology integration has been explored over the years and multiple researchers have defined technology integration differently. Definitions of technology integration can be more basic, and simply mean having access to computers (Ertmer, 1999), or that technology should be incorporated into day-to-day educational activities (Keller & Bichelmeyer, 2004). Others focus technology integration on being more curriculum-focused and desire direct alignment to teaching and learning outcomes as a result of technology (Curwood, 2011; Ertmer, 1999). According to Dockstader (1999), “Technology integration is having the curriculum drive technology usage, not having technology drive the curriculum” (p. 73). Similarly, technology integration should be strategically integrated to further learning (Dinc, 2019) and prior to designing into a course, educators should “ask themselves what the technology will add to the learning activity” (Kebritchi et al., 2017, p. 13).

Furthermore, technology integration does not mean using technology in class (Davies, 2011; Dockstader, 1999). Instead, technology integration focuses on not only
knowing how to use a technology tool (An & Reigeluth, 2011), but also being able to effectively use that tool to facilitate learning to meet learning outcomes (Davies, 2011; Dockstader, 1999; Ertmer & Ottenbreit-Leftwich, 2010) and facilitate higher-order thinking (Potter & Rockinson-Szapkiw, 2012). Although, practicing integrating technology tools and being knowledgeable about the tools are critical for effective integration (Potter & Rockinson-Szapkiw, 2012), when technology integration is focused too much on tools, educators are not ready to ensure learning and technology is in alignment (An & Reigeluth, 2011).

Technology integration is effective when alignment of technology is visible to actual learning outcomes and to the curriculum (Dockstader, 1999), as well as to student learning (Dinc, 2019). Additionally, technology integration in teaching and learning should be viewed as fundamental instead of supplemental (Ertmer & Ottenbreit-Leftwich, 2010). In this current study, technology integration is a combination of definitions, which includes learning the technology, adopting/integrating of technology, and aligning the technology to course outcomes.

**Models of Technology Integration**

With the growth of online learning and technology usage, studying technology integration has been relevant in related research. There have been numerous models utilized to understand more about technology integration as a whole. The three that will be discussed in this section include: (a) framework for understanding and assessing technology literacy (Davies, 2011), (b) Technology Acceptance Model (Davis, 1985), and (c) Roger’s (2003) Diffusion of Innovations theory. Each model explores a different view of how technology integration can be demonstrated and explained.
A framework for understanding and assessing technology literacy. By providing a framework that can assist with integration, it could make expectations of educators much clearer. Understanding the framework of technological literacy (Davies, 2011) is essential for evaluating how technology is integrated into education. The framework of technological literacy focused on three different levels of literacy: awareness, praxis, and phronesis (Davies, 2011). In this framework, each level of technology literacy is essential for successful pedagogical technology integration. Awareness deals with how much the technology the user knows is available and usable, praxis focuses on engaging with the technology and functions, and phronesis highlights their readiness to explore technology to meet their learning outcomes (Davies, 2011). The framework of technological literacy involves both the student and the educator, with both parties being committed to understanding the desired purpose for the tool and how it connects to learning outcomes (Davies, 2011).

Technology Acceptance Model. The Technology Acceptance Model is another frequently used model in a multitude of fields because this model was designed to determine whether or not an individual is likely to adopt a technology based on its ease of use and usefulness to the individual (Davis, 1985; Legris, Ingham, & Collerette, 2003; Teo, 2011). Within this model, each user would have an individualized reaction to technology related to their own opinions of technology. The ease of use and usefulness, in turn, impacts the individual’s attitude and overall decision to use the technology or not (Davis, 1985; Legris et al., 2003). This model would be effective if the overall goal of technology integration were to see if an individual planned to use and accept the technology.
Additionally, the Technology Acceptance Model has been used to measure future technology usage in a variety of fields including education and business. Wright (2018) studied how faculty in higher education planned to implement mobile technology in academic settings using the Technology Acceptance Model. As mobile technologies could provide benefits in higher education, providing ways for successful technology integration was studied (Wright, 2018). Findings indicated that faculty based their future technology usage off of self-motivating factors and whether or not there would be support to help troubleshoot technology issues (Wright, 2018). Directly related to online education, Gabbard (2004) studied how the Technology Acceptance Model could help predict the likelihood of students in a community college setting to complete their online courses. This study viewed the technology as the online course itself and found a positive relationship between a high Technology Acceptance Model score and the student following through and completing the online course (Gabbard, 2004). Additionally, Willis (2008) investigated the Technology Acceptance Model to measure how individuals planned to use social networking technology in the future. Willis found the use of technology through social networking provided colleagues an opportunity to build relationships with whom they typically would not be able to connect with. Findings represented the Technology Acceptance Model as an appropriate way to measure how accepting people are of social network systems, but there was no evidence showing that subjective norm of pressure from others impacted their plan to use technology or their perceived ease of use (Willis, 2008).

The Technology Acceptance Model has also been explored in fields such as emergency response, technology, and security and had positive results. In a study relating
to the field of emergency response, the Technology Acceptance Model was used to identify ease of use and perceived usefulness for new chemical detection equipment (Seiter, 2012). This study focused on the importance of ensuring those first responders using the equipment found it useful, therefore impacting the safety of all those involved and indicated positive relationships involving ease of use, perceived usefulness, and behavioral intention with the equipment (Seiter, 2012). In an earlier study by Conca (1998), the Technology Acceptance Model was used in software trials to see if it impacted judgement and decision making. Although the model did not impact the attitudes towards using the software, it did have an influence on the perceived usefulness. Additionally, Jones (2009) used the Technology Acceptance Model to determine what impact it would have on the acceptance of information systems security measures, focusing on behavioral factors. Specifically, the study investigated employee perceptions and beliefs of other employees as behavioral factors to help assist other management leaders and professionals and found the perceived ease of use positively impacted perceived usefulness, while the subjective norm of management support was closely linked to intention to use (Jones, 2009). Through these studies, the Technology Acceptance Model has shown positive links between a variety of fields and perceived ease of use and usefulness.

Roger’s Diffusion of Innovations theory. Rogers (2003) Diffusion of Innovations theory related to technology integration has a similar goal of Technology Acceptance Model, as this theory also attempts to understand the likeliness of an individual using a given technology. The Diffusion of Innovations theory focuses on how immediately different populations will adopt specific technology based on innovation,
communication, time, and social systems while taking into consideration the uncertainty of the unknown (Rogers, 2003). By considering each of these factors, it puts into perspective why an individual chooses to use a given technology. Baltaci-Goktalay and Ocak (2006) found many faculty are hesitant to adopt new technology into their curriculum and classrooms. Therefore, the decision as to whether or not to ultimately integrate technology, as well as how quickly technology integration occurs, relies on many factors (Baltaci-Goktalay & Ocak, 2006). Additionally, faculty are facing pressure to take the next steps towards technology integration in coursework (Baltaci-Goktalay & Ocak, 2006).

Two other considerations in the Diffusion of Innovations theory are uncertainty and consequences (Rogers, 2003; Sahin, 2006). Both factors can greatly impact the likeliness of a user ultimately using a given technology. Therefore, if users are more knowledgeable of the challenges and barriers of the technology beforehand, they would be more informed about the consequences and likely feel more certain about the technology (Sahin, 2006). Within the Diffusion of Innovations theory, there are five stages in the innovation-decision process, which included knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2003). Each of these stages can impact the following stage and would help determine if the technology will ultimately be adopted or rejected.

The Diffusion of Innovations theory has been used in many studies to measure the likeliness of technology adoption in various subjects such as social media, online gaming, and nursing. In a study conducted by Chang (2010), the Diffusion of Innovations theory was used to measure hashtag usage on Twitter. Chang highlighted how the Diffusion of
Innovations theory helped determine innovation as it related to the adoption process of such a tool by influencing others to want to use the same hashtag. Additionally, Cheng, Kao, & Lin (2004) used the Diffusion of Innovations theory to measure online gaming potential in Taiwan. From this study the authors found they were able to describe the typical audience for early adopters using the theory (Cheng et al., 2004). Furthermore, using the elements of the Diffusion of Innovations theory, Fraser (2010) focused on nurses’ likelihood of using specific online technology and resources based on information they received from their college’s website. Fraser found although nurses were directed to the website to view the resources based on the perceived characteristics, more successful results may have been present if the theory was used more “holistically” (p. 60) in its entirety, instead of only pieces of the theory.

Other studies integrating the Diffusion of Innovations theory were linked to fields such as online education, health, and business. Specifically related to online education, Eineke (2004) focused on using this theory to measure acceptance and application of online professional development approaches. Findings indicated this theory would be an appropriate strategy to increase adoption rates for professional development related to specific educational strategies (Eineke, 2004). In addition, Byambaa, Janes, Takaro, and Corbett (2015) utilized the Diffusion of Innovations theory by reviewing literature to study the possible adoption of Health Impact Assessments in a variety of low and middle income countries. Findings from this review indicated this theory would be an effective approach to pinpoint possible barriers and issues related to successful adoption techniques (Byambaa et al., 2015). Furthermore, Lee, Hsieh, and Hsu (2011) combined both the Diffusion of Innovations theory and the Technology Acceptance Model to
explore what impacted employees’ intentions to use an e-learning system in a business environment. The results indicated stakeholders were able to prepare and assess their learning more efficiently by using an extended version of the Technology Acceptance Model (Lee et al., 2011). Through these examples, it is evident that Roger’s (2003) Diffusion of Innovations theory can be applicable to a variety of fields in hopes of measuring the adoption of technology use.

**Advantages of Technology Integration**

With the increase in technology integration over the years, advantages to integration have been explored. The first notable advantage of incorporating technology into teaching and learning was the perceived positive impact it had on student learning (Henderson, Selwyn, & Aston, 2015; McKnight et al., 2016; Shi, 2019). McKnight et al. (2016) studied the different ways that educators used technology to improve student learning and found that by integrating technology, students had more up-to-date, comprehensive learning resources easily available. Additionally, learning was enhanced as a result of technology integration because educators were able to personalize learning and provide students with new viewpoints and concepts (McKnight et al., 2016). Furthermore, Henderson et al. (2015) explored the reasons that digital technology was useful to university students and found that it allowed students to learn information in various ways and review resources at their convenience to improve their learning comprehension. In support of this, Shi (2019) and Smarkola (2008) found that instructional technology had a positive impact on student performance. Therefore, technology integration positively impacted student learning in a variety of ways.
Integrating technology into the curriculum also had a perceived positive impact on student engagement and has been studied in recent years (Chen, Lambert, & Guidry, 2010; Günlü & Kuzu, 2014; Rashid & Asghar, 2016; Smarkola, 2008). Chen et al. (2010) studied how college students’ engagement was impacted by technology in different learning formats. Findings indicated there was a positive impact on student engagement after incorporating technology (Chen et al., 2010). Furthermore, Günlü & Kuzu (2014) investigated the role of technology in student engagement in higher education and found successful technology integration can contribute to student engagement. In support of this, Rashid and Asghar (2016) studied the connections between technology, student engagement, and self-directed learning and found integrating technology positively impacted student engagement. Therefore, there was a clear link between technology integration and the positive influence it had on student engagement.

**Challenges of Technology Integration**

Although educators contemplate technology integration into their course design, there have been numerous challenges or barriers that prevent educators from doing so. One challenge is technology integration requires the educator to be comfortable with the functions of a technology tool before it can be used to teach and learn (Davies, 2011; Johnson, Jacovina, Russell, & Soto, 2016). Many educators did not grow up in the digital age and are not as comfortable with technology as their students (Johnson et al., 2016). Closely linked to comfort level, is the concept of learning curves. There are learning curves with all technology, and it takes time and practice to master a tool (Chen, 2008; Davies, 2011; Dinc, 2019; Frederick, Schweizer, & Lowe, 2006; Johnson et al., 2016;
Morehead & LaBeau, 2005). There is not enough time for educators to learn a tool and then implement it into their classroom teachings (Frederick et al., 2006), discover the potential possibilities a technology tool may have (Morehead & LaBeau, 2005), or practice teaching with technology (Georgina & Olson, 2008).

A related barrier with technology is it continually changes and evolves (Abbitt, 2011; Lawless & Pellegrino, 2007), and therefore trying to learn about technology is “equivalent to asking teachers to hit a moving target” (Ertmer & Ottenbreit-Leftwich, 2010, p. 260). To ease this challenge for educators, learning technology should be collaborative and meaningful, with continual access to support from various levels (Morehead & LaBeau, 2005). Martin et al. (2011) tracked seven consecutive years of findings from the Horizon Report, a report which highlights technologies that are expected to have a significant impact on education. The results from this study indicated how much technology changes over the years, with examples of major technology progression from vector graphics, to social networking, to mobile augmented reality (Martin et al., 2014). Furthermore, Schulte (2010) studied faculty perceptions of technology in online programs and found that because technology is changing so quickly, faculty had to continually update their courses to keep up with the technology. Depending on the technology being utilized, it may take the instructor a copious amount of time to understand both the simple and complex functions of the technology they choose to use.

Additionally, in some situations, availability and support are other significant challenges to technology integration. If there is a lack of technology tools available, technology integration may not be possible (Chen, 2008; Georgina & Olson, 2008; Johnson et al., 2016). For example, not having technology such as computers and
software readily available would cause a hindrance in the overall possible integration of technology (Chen, 2008). In the cases where faculty could locate technology, many still feel unsupported in terms of using the tools (Chen, 2008; Johnson et al., 2016; Morehead & LaBeau, 2005). Fear may be linked to the possibility of having problems with technology and knowing there is no technical support available to help troubleshoot the issue (Ertmer, Ottenbreif-Lefwich, Sadik, Sendurur, & Sendurur, 2012) because of how unpredictable technology can be (Keengwe & Ochwari, 2009). Furthermore, after learning about technology, support should still be readily available (Kopcha, 2012) to help maintain the technology integration (Avci, O’Dwyer, & Lawson, 2020; Keengwe & Ochwari, 2009; Smolin & Lawless, 2011), help with possible technical issues and overall integration (Avci et al., 2020; Keengwe & Ochwari, 2009), and provide pedagogical support (Ertmer, 2005). Therefore, ensuring that support is available from those who taught the technology integration is critical (DeSantis, 2012). Yet, without that support before, during, and after technology integration may leave those attempting to integrate technology unprepared.

It is common for the success of a technology to be measured in terms of metrics. Yet, it continues to be difficult to measure how effective technology is (Davies, 2011). This may be because selecting appropriate tools does not promote technology integration. Instead, it relies on successful and effective faculty technology implementation (Davies, 2011; Morehead & LaBeau, 2005). Therefore, attempting to measure the effectiveness of technology integration may be difficult and considered a barrier to integration.

Furthermore, trying to meet assessment requirements while integrating technology has been an obstacle. Hew and Bush (2007) conducted a review of past
empirical studies and found assessment was a common barrier for educators attempting to integrate technology. Furthermore, Hennessy, Ruthven, and Brindley (2005) studied the impact that technology integration had on core subjects in secondary schools and results showed educators found it difficult to find a balance between integrating the technology and adhering to traditional assessment requirements. Therefore, attempting to find time to not only integrate technology, but also meet the requirements for assessment continues to be a challenge.

A final barrier related to technology integration is ensuring there is higher-level support for technology initiatives. Avci et al. (2020) explored elements of effective professional development to assist in technology integration in schools. Similarly, Twinning, Raffaghelli, Albion, and Knezek (2013) studied how professional development could specifically prepare educators to use both information and communication technology to adapt to the shift of technology-enhanced learning. The findings of Twinning et al. indicated that many times administrators do not join in on professional development conversations. Yet, Avci et al. shared this support for technology integration from higher-level roles needs to be present because it can create a welcoming atmosphere (Avci et al., 2010) and be encouraging (Liu & Kleinsasser, 2015). Therefore, overcoming the barrier of lack of higher-level support can prove to be necessary for technology integration.

**Measuring Technology Integration**

Although it has been considered challenging to measure and assess technology integration, various studies in all levels of education have explained procedures and instruments being utilized (Bond, 2015; Davies, 2011; Georgina & Olson, 2008;
Researchers that measured technology integration used qualitative, quantitative, and mixed methods studies. In terms of qualitative data, educators’ comments and reflections were a dominant way to gather data. Sullivan et al. (2018) used qualitative text analysis to study posts and comments in the professional development discussion boards to measure the effectiveness of technology integration. While Bond (2015) implemented an action research study focused on technology professional development in hopes of increasing educator technology integration, the researcher utilized a mixed method design to collect data using a Technology Integration Matrix (i.e. quantitative) and educators’ reflections (i.e. qualitative).

Surveys or questionnaires were also common instruments for collecting data related to technology integration (Davies, 2011; Georgina & Olson, 2008; Rienties et al., 2013). These included both existing survey instruments, as well as instruments created by the researcher. In a study by Georgina and Olson (2008), surveys were sent out to faculty to see how technology training and literacy impacted self-perceptions using a quantitative study. Additionally, Davies (2011) used an observational study to develop a framework to evaluate technology integration which utilized surveys based on attitudes towards the integration of technology and technology in general. In terms of using preexisting surveys and adding additional questions from the literature and experts in the field., McKinley (2014) measured whether there was a relationship between various faculty demographics, their technology usage, and their attitude toward technology. Additionally, Rienties et al. (2013) used a pretest-posttest design, the TPACK model, and the educator’s beliefs and intentions questionnaires to measure the effect that online
professional development in higher education had on faculty views and plans as it related to technology teaching and implementation. These studies demonstrated that a combination of surveys and questionnaires were a common way to collect data to measure technology integration.

**Professional Development**

Professional development has numerous elements explored in the literature and reviewing those different facets was essential to understand the importance of professional development. This section will examine (a) the definition of professional development, (b) the different formats of professional development, (c) the various theoretical frameworks related professional development, and (d) models of online professional development.

**Defining Professional Development**

Professional development has been utilized in many different fields, but this study will explore its alignment to education. Professional development changes and modifies how educators teach, which in turn produces increases in student outcomes and learning (Guskey, 1986; Odden et al., 2002). Educators should participate in professional development from their own institutions, that align with their own beliefs, and that can provide support after the professional development is finished (Ertmer & Ottenbreit-Leftwich, 2010). Professional development, also known as professional growth, can be referred to “as an inevitable and continuing process of learning” (Clarke & Hollingsworth, 2002, p. 947). Thus, professional development not only requires learning during the development but also commitment after the professional development has ended to implement and enhance teaching practices (Odden et al., 2002). Additionally,
Guskey (2003) reviewed 13 different studies that outlined the characteristics of effective professional development and found “helping teachers to understand more deeply the content they teach and the ways students learn that content” (p. 749) was commonly mentioned. Therefore, the knowledge and information acquired through professional development should ideally be applied after with the hopes of improving the teaching and learning process for both students and educators.

**Formats of Professional Development**

Professional development have been designed in three different formats: (a) online, (b) face-to-face, and (c) blended. Each of these formats may be ideal for a specific target population to maximize participation and availability of possible participants. Each format can also be effective for professional development focusing on technology integration.

**Online professional development.** Online professional development occurs when the learner completes all or most of the learning activities using the Internet (Fishman et al., 2013; Thomas, 2009). Online professional development allows educators to participate in professional development when they otherwise may not have time nor access to online resources in a physical format (Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009). The online professional development format also helps with monetary, logistical, and scalability barriers (Dede et al., 2009). Online professional development has also been found to positively impact technology integration (Rienties et al., 2013; Treacy, Kleiman, & Peterson, 2002). Additionally, after completing an extended professional development on technology, participants positivity toward technology integration increased, with some participants even indicating technology
integration was a regular piece of their teaching (Brinkerhoff, 2006). Furthermore, after completing a technology integration course, preservice teachers were more likely to use technology (Cullen & Greene, 2011).

Online professional development also considers part-time faculty because professional development is available outside of the regular workday by nature of it being in an online format (Campbell, 2016; Schnitzer & Crosby, 2003). In a study by Campbell (2016), a fully online professional development was created so online adjunct faculty members who worked at home or away from the campus could attend. The findings revealed this format encouraged community building without having to be physically in the same location (Campbell, 2016). Additionally, Schnitzer and Crosby (2003) studied techniques for development and recruitment of online adjunct instructors at community colleges. Due to the distance from the campus, the adjunct faculty felt disconnected and therefore online professional development was preferable shortly after hiring (Schnitzer & Crosby, 2003). With this, online professional development is desirable for faculty, especially those who may be part-time or not located near a campus.

**Face-to-face professional development.** Alternatively, face-to-face professional development has more limitations in the sense of space and timing. Face-to-face professional development occurs in one central, physical location at one specific time (Fishman et al., 2013; Thomas, 2009). This format requires all participants to be physically present at one place, at one time, similar to a traditional classroom. This type of format typically occurs on campus in specific professional development locations and encourages personal interactions (McConnell, Parker, Eberhardt, Koehler, & Lundeberg, 2013). Face-to-face professional development occurs in a physical location where all
faculty must have the same availability to attend. Face-to-face professional development has also been effective in connection to technology, as it helped faculty learn about new technology tools to engage their students, become more comfortable designing online course content, and prepare to teach online (Johnson, Wisniewski, Kuhlemeyer, Isaacs, & Krzykowski, 2012).

**Blended professional development.** The final format of professional development which has been offered is referred to as blended or hybrid. Blended professional development includes both online and face-to-face components for the participants (Carter, 2004; Thomas, 2009). Brooks (2010) reviewed literature related to professional development formats and community of practice for faculty and suggested future use of a hybrid professional development so faculty have an opportunity to communicate with each other both online and face-to-face. In terms of blended professional development focusing on technology integration, faculty revealed after they finished a blended technology integration professional development, they planned to integrate technology into their courses (Murthy, Iyer, & Warriem, 2015).

**Theoretical Frameworks for Professional Development**

Two different theoretical frameworks are examined in relation to professional development. First, adult learning theory, or andragogy, will be explored. I will explain the relationship between professional development and adult learning and how studies have focused on this theory in the past. Next, cognitive apprenticeship will be defined and the relationship between this framework and professional development will be evident.
**Adult learning theory/andragogy.** Adult learning theory, created by Knowles (1974), highlights the different characteristics of an adult learner. These include the ability to be independent, a director of self-learning, frequently pulling from various life experiences, and willing to learn and apply knowledge promptly (Knowles, 1974; Merriam, 2001; Zmeyov, 1998). Adult learners are at different points in their lives, and therefore, have different experiences and responsibilities compared to younger learners (Merriam & Bierema, 2013). Additionally, in terms of developmental life cycles, adult learners are not at the same point in their lives as younger learners (Merriam & Bierema, 2013). Specifically, adult learners use their life experiences when learning, while younger learners do not have nearly as many experiences yet that they are able to connect to their learning (Merriam & Bierema, 2013). Merriam (2008) asserted “adult learning is a complex phenomenon that can never be reduced to a single, simple explanation. Rather, I think what we have is an ever-changing mosaic where old pieces are rearranged and new pieces are added” (p. 94). Therefore, adult learning theory is multifaceted and designed to meet the needs of the adult learners.

Furthermore, andragogy focuses on the adult learner at the center of his/her learning process and directly relates to elements impacting his/her life (Zmeyov, 1998). With the specific needs of adult learners, it is critical to apply andragogy in professional development. Andragogy is not the same as pedagogy, as adult learning principles need to be applied using andragogy to ensure success for learners (Knowles, 1974). Pedagogy is based on foundations that learners do not know what they need in order to learn and relied on extrinsic motivation (Ozuah, 2005). Alternatively, adult faculty members in a professional development context can be classified as adult students following adult
learning principles (Vaill & Testori, 2012). Adult learning theory should be a significant design consideration to ensure the content is catered to the adult population.

Additionally, adult learning theory has been applied to professional development. Trotter (2006) reviewed literature and discussed different adult learning theories and how they impacted and are implemented into professional development. The researcher revealed common trends in professional development that utilized adult learning principles, showing adults inherently used their life experiences, used reflection to develop individually, and shaped educational goals grounded in their interests (Trotter, 2006). Additionally, Easton (2008) discussed the need for educators to attend professional development to learn how to become active learners in their environment. In professional development, participants should learn how to apply adult learning principles to their teaching, including the addition of learning from others, encouraging reflection, and incorporating continual dialogue (Easton, 2008). Siko and Hess (2014) also researched the importance of considering adult learning principles in the creation of quality professional development opportunities for educators. The study focused on partnering with a community college to offer technology integration courses focusing on adult learning principles, which found favorable results from the faculty (Siko & Hess, 2014). Professional development is commonly grounded in adult learning principles while focusing on experiences and reflections.

**Cognitive apprenticeship.** Cognitive apprenticeship is another framework that has ties to professional development. Cognitive apprenticeship focuses on experts working with learners to solve problems and complete tasks in real-world situations to enhance their learning (Collins, Brown, & Newman, 1986). Additionally, it allows
learners to see and dissect complex conditions and tasks with the expert there to walk them through any issues (Collins et al., 1986). Within this model, it allows for higher-order thinking to occur in the learners. Lajoie (2009) found that utilizing cognitive apprenticeship was valuable because it takes into account the student, the educator, the instructional context, and the instructional assessments.

Studies in literature have shown that cognitive apprenticeship proved to be a suitable strategy for professional development related to a variety of topics including instructional design and science. Stefaniak (2018) studied how cognitive apprenticeship was used in a three-phase professional development focusing on instructional design and found this framework was appropriate to use in professional development working with faculty. Additionally, Parscal (2007) applied cognitive apprenticeship during an asynchronous professional development for future online faculty. Parscal found cognitive apprenticeship was a suitable method for adult learners in an accelerated setting to prepare them with the skills needed facilitate online learning. Lastly, Lajoie (2009) studied a model of implementing cognitive apprenticeship in professional development related to avionics equipment troubleshooting procedures. Lajoie explained the expert in this study was a computer simulator who worked with participants and asked critical thinking questions to help troubleshoot avionics issues. The results of this study found using cognitive apprenticeship was useful in this type of study due to the increase in troubleshooting proficiency by the participants (Lajoie, 2009).

Other studies have also used cognitive apprenticeship in a different way when relating to professional development. Instead of using the typical approach to cognitive apprenticeship by bringing in experts, this approach to cognitive apprenticeship in
professional development has other educators working as the experts or coaches by focusing on reciprocal interactions (Glazer & Hannfin, 2006; Glazer, Hannafin, & Song, 2005). Glazer and Hannafin (2006) proposed using this collaborative approach to help educators become leaders in the future, so they are able to maintain the skills and techniques learned in professional development. Additionally, Glazer et al. (2005) used this technique to allow educators to share their resources, provide on-demand support, and have experienced peers work with less experienced peers. As cognitive apprenticeship integrates experts into teaching and learning practices, it is logical to use this type of theoretical framework to measure mastery (Lajoie, 2009). Therefore, because the experts are really peers in this iteration of cognitive apprenticeship, numerous benefits are present.

**Online Models of Professional Development**

This section will explore four different online models of professional development, each of which has its unique features and foundations. These models vary from the technology integration models discussed earlier, because the focus of these models are professional development specifically for online faculty. First, (a) professional development framework for online teaching will be explained, followed by (b) the three-tiered approach. The section will conclude with examining (c) the Program for Online Teaching (POT) and (d) online in-service course model.

**Professional development framework for online teaching.** The professional development framework for online teaching was explicitly developed to address the needs for online educators and faculty. This framework focuses on three pillars: (a) organization (i.e. rewards, recognition, positive culture), (b) community (learning groups,
peer support, mentoring), and (c) teaching (technology, pedagogy, content) (Baran & Correia, 2014). According to this framework, each of these three pillars should be present in online professional development. Not only does this framework take into account rewarding and recognizing the educators, but it also highlights the importance of collaboration, which is essential to professional development online (Baran & Correia, 2014; Chitanana, 2012; Powell & Bodur, 2019; Teräs & Kartoğlu, 2018). This framework is appropriate for online faculty in higher education at a variety of teaching and technology levels and to ensure faculty are supported and ready to teach online (Baran & Correia, 2014).

**Three-tiered approach.** Vaill and Testori (2012) have proposed another model of professional development focused on online faculty. The goal of this framework was to help faculty transition to teach online by highlighting ongoing support, mentoring, and orientation to onboard faculty (Vaill & Testori, 2012). Additionally, this model taught faculty to revise an online course in case they felt new design considerations needed to be implemented (Vaill & Testori, 2012). By equipping faculty with these types of skills, it allows for a more practical implementation after the professional development. Also, it may help faculty to feel empowered to take what they learned and apply it soon after the professional development is over, which aligns with adult learning theory (Knowles, 1974; Merriam, 2001; Zmeyov, 1998). Vaill and Testori indicated this model has been successful as it creates a positive learning experience for faculty. When faculty complete professional development utilizing this framework, they not only have a solid foundation of teaching online, but also contributed to the development of a fully online course. The Three-tier approach differed from the Professional development framework for online
teaching because it has a large focus on orientation and mentoring integrated into the professional development.

**Program for Online Teaching.** The POT offers an online professional development solution for faculty by utilizing open source technologies, such as blogs and social media sites (Lane, 2013). This model provides faculty with an opportunity to use educational technology tools throughout their professional development they may consider useful in their actual online classrooms after the professional development (Lane, 2013). A facet of POT allows faculty to experiment with other technologies outside of the LMS for their professional development and have an opportunity to become emerged in creative ways to apply technology-infused pedagogy in their future online classrooms (Lane, 2013). While still having clear professional development objectives and goals, open source technologies highlight new and innovate ways to share information and broaden communication. After faculty completed professional development following POT, they found it was a positive learning experience, and felt their online teaching, technology skills, and pedagogy had improved (Lane, 2013). This model is different from the previous two models discussed because the foundation of this professional development was focused on open source technologies shaping the professional development.

**Online in-service course model.** The online in-service course model has provided an alternative approach to provide professional development for educators. Influenced by constructivist learning theory, this model of professional development has three main participants, which include the educator, the student, and other students (Signer, 2008). Each participant plays a crucial role in the process where the focus on
feedback is the foundation and guiding principle of this model. Continual feedback is provided by the professional development facilitators related to online resources, research, classroom implementation, assignments, and requirements (Signer, 2008). To achieve this, the main communication tool is asynchronous discussion boards in an online environment to allow educators to share their findings, accomplishments, and barriers to success (Signer, 2008). By encouraging all communication in the discussion board, it allows participants to get to know each other and the technology they are using. The online in-service course model by Signer was also mentioned in other studies that reviewed literature related to professional development models which mentioned this model could be applied in a variety of fields (Gill, 2011) and for discussions relying on real life experiences (Moore, Robinson, Sheffield, & Phillips, 2017). Results indicated the online in-service model provided educators with new ideas, resources, instructional techniques, and increased level of technology comfort to integrate into their future teaching and learning (Signer, 2008). The online in-service model differs from other models of professional development discussed because of the focus of online discussion boards and continual feedback to be effective.

**Online Professional Development**

With the growth of online learning, there is a continual need for well-designed online professional development. This section will examine (a) the advantages of professional development, (b) the disadvantages of online professional development, and (c) data collection methods utilized in studies measuring readiness, perception, and course design for online learning through professional development.
**Advantages of Online Professional Development**

When examining the literature, common themes have been revealed related to the benefits of online professional development, and they are outlined in the below sections. Advantages include: (a) flexibility, with a focus on time, travel, and content viewing, (b) creating a community of learners, with a focus on networking and exchange of knowledge, and (c) formal/informal communications between participants.

**Flexibility.** Providing a flexible timeline to complete professional development may be ideal for many participants. Online professional development highlights the importance of flexibility in time and travel without being tied to a specific time to complete work (Campbell, 2016; Carter, 2004; Cercone, 2008; Healy et al., 2014; Rizzuto, 2017; Sullivan et al., 2018; Thomas, 2009). For example, online faculty may work on an online professional development task in between grading or while their own children are at school. There is an added convenience by having an adaptable planning period and the ability to complete professional development at home in control of their individual environment (Powell & Bodur, 2019; Wyants & Dennis, 2018). Thus, flexibility is an advantage to online professional development in relation to time, convenience, and travel.

In many cases, online professional development has also allowed participants the opportunity to have more control of the course materials and content provided in the course to enhance learning. For example, there is continuous access to resources, such as documents and videos that can also be downloaded and reviewed without limit, providing a sense of control for participants (Cercone, 2008; Powell & Bodur, 2019; Wyants & Dennis, 2018). Compared to a face-to-face format where the materials may only be
available in class, in online professional development participants would have a repository of resources available throughout the course including resources such as presentations, videos, e-book readings, or journal articles. This would allow faculty to use these resources when course design and development is practical to their schedules.

**Community of learners.** Within a community of learners in an online environment, there is potential for a rich exchange of knowledge between participants. A community of learners allows participants to feel part of a group or community while they are learning, especially in a completely online environment (Mohr & Shelton, 2017). By providing networking for online professional development (one form of which is cohorts), it allows for communication with other colleagues and topic presenters to share ideas by connecting with each other (Carter, 2004; Healy et al., 2014; Macdonald, 2010; Powell & Bodur, 2019). Furthermore, findings from a long-term professional development for science teachers highlighted the importance of a community of learners by emphasizing the value of relationships, sharing resources, collaborating, and building networks (Dawkins & Dickerson, 2007). Therefore, it is evident there of the many advantages a community of learners contributes to effective online professional development.

Specifically, Liu and Kleinsasser (2014) studied benefits and barriers for online professional development of current and future English as a foreign language educators and found the emotional support and collaboration they received from other participants was very influential for future instructional practice. Liu and Kleinsasser found due to the collaborative native of online professional development, learning communities allowed educators an opportunity to “recapture their teaching enthusiasm and revisit their
teaching ideals” (p. 53). Baran and Correia (2014) also supported a community of learners known as communities of practice and indicated peer-to-peer faculty mentoring, group discussions, and sharing were all critical elements in online professional development.

A community of learners contributes to online professional development in a variety of ways. Lock (2006) studied the need for change in current professional development opportunities to make way for online learning communities. Lock emphasized that successful online learning communities include participants who are eager to be involved, who feel welcome and secure sharing with others online, and who feel inspired to participate. Additionally, Carter (2004) examined how effective online professional development was designed and found in terms of a community of learners, it required learners who were willing to communicate with each other and be collaborative. Furthermore, Healy et al. (2014) studied physical educators’ observations into online learning and found a community of learners allowed for exchange of ideas, strategies, and feedback. Additionally, Macdonald (2010) studied how to effectively design online professional development to engage university employees. Compared to the beginning of the study, participants found by the end of the study their distress related to feeling alone in online professional development diminished because of their ability to join an online community (Macdonald, 2010).

Furthermore, Sullivan et al. (2018) implemented a model of online technology integration professional development for faculty that encouraged collaboration between faculty participants, instructional design staff, and peers. The researchers found working with peers was very beneficial for faculty in this setting because faculty were able to
learn vicariously through the strategies of others and articulated the desire to continue to learn about technology integration once the professional development was over (Sullivan et al., 2018). Additionally, multiple participants noted within the professional development, working with others was “the most valuable part” (Sullivan et al., 2018, p. 352).

Finally, online professional development provides an opportunity to chat both formally in real-time environments (Carter, 2004) and informally in a more conversational manner (Campbell, 2016) so participants can get acquainted with each other. Allowing participants this time to communicate informally provides a way to have the same interactions and reflections they would have in a face-to-face format (Campbell, 2016). A community of learners in online professional development has many advantages including networking, collaboration, and emotional support.

**Disadvantages of Online Professional Development**

Although there are advantages to online professional development, it is also essential to identify the possible drawbacks. Barriers with technology are highlighted as an issue that can negatively impact an online professional development program (Carter, 2004; Healy et al., 2014). For example, possible issues may include trouble downloading or accessing a software, or lack of a stable internet connection. Second, participants expressed that online professional development lacked a strong connection to relatable content and issues (Healy et al., 2014; Liu & Kleinsasser, 2014). That is, online professional development could not replace the face-to-face alternative because participants were not able to get the hands-on experience they needed to make the content relatable to their jobs (Healy et al., 2014). Additionally, participants lacked the amount of
time needed to complete expectations for online professional development (Carter, 2004; Liu & Kleinsasser, 2014). Although participants learned about new techniques and content during the professional development, they did not have enough time to actually implement this new knowledge into their classrooms and then share the level of effectiveness (Liu & Kleinsasser, 2014). Although online professional development can usually be completed in a flexible format, it still requires a significant amount of time.

Closely related to time is motivation. Carter (2004) and Wyants and Dennis (2018) asserted participants lacked compensation or incentives for the work they put into their professional development. Without having face-to-face interaction, an additional disadvantage of online professional development was the lack of social interactions and connectedness to classmates (Healy et al., 2014; Wyants & Dennis, 2018). Examples would include not being able to share ideas in real time or receive immediate feedback from other participants (Healy et al., 2014).

The final barrier to online professional development was lack of privacy from other participants (Carter, 2004). Participants may be hesitant to share comments in an open online discussion board, as they do not know all of their online peers and worry about potential judgement (Carter, 2004). Even when professional development is completed within a secure LMS, it still may leave specific participants feeling vulnerable about sharing in this type of environment.

Data Collection Methods Utilized

As the main variables in the current study relate to faculty perceptions focusing on readiness, preparedness, and course design through online professional development, it was critical to identify the data collection methods in recent literature regarding these
components. From examining four main studies, it was evident surveys, questionnaires, and interviews were often used to measure the desired variables. Ganza (2012) conducted a mixed methods study that focused on questionnaires and content analysis (quantitative), and interviews (qualitative) to gather data related to the impact that online teaching had on faculty in higher education, with a focus on attitudes and behaviors. In a second study, Sheffield et al. (2015) used online pre-and-post surveys to measure “future educators’ awareness, competence, confidence, and attitudes regarding teaching online” (p. 1).

Using an action research method, in a third study, Lane (2013) self-created surveys to measure if an online and open professional development course would help prepare faculty to teach online. Surveys were created based on information communicated through blogs, discussions, and Facebook and were administered during the middle and end of the professional development course (Lane, 2013). Lastly, using a mixed-methods approach, Thomas (2009) measured the effectiveness of online professional development by distributing a survey created by the researcher.

**Course Design Considerations for Effective Online Professional Development**

Creating professional development for online delivery requires specific design considerations. This type of professional development must focus on online best practices of pedagogy, teaching, and learning. Numerous primary design considerations were evident and recommended in the literature. These design best practices included: (a) personalization, (b) authentic content, (c) participant reflection, (d) participant collaboration, (e) incorporation of multimedia/online learning tools, (f) ability to track participant progress, and (g) length of professional development.
**Personalization**

Personalization is a design consideration when creating online professional development. When faculty are enrolled in professional development, they are typically at different places in their careers in terms of experience and content expertise/area. It would be helpful to ensure the professional development content is catered to the needs of faculty, so there is alignment between the content and the courses faculty plan to teach (Baran & Correia, 2013; Powell & Bodur, 2019; Sullivan et al., 2018; Qian, Hambrusch, Yadav, & Gretter, 2018). For example, a faculty member teaching an introduction to nursing course will want to ensure the content being learned in the professional development is applicable to his or her entry level course, as well as to his or his skill level.

Baran and Correia (2013) indicated specialized content related to technology, design, development, and pedagogy should be available through professional development. This was supported by Sullivan et al.’s (2018) professional development study that indicated how the “hands-on, self-guided nature of the activities” (p. 343) promoted participants to focus on their personal needs. Additionally, Powell and Bodur (2019) studied the barriers to accessible effective professional development by creating an online professional development for educators. The professional development findings revealed there was a lack of personalization in the content, and by including individual needs of participants for future professional development, it would be much more beneficial (Powell & Bodur, 2019).

Furthermore, Qian et al. (2018) designed a two-year study on how to effectively create online professional development for K-12 computer science educators. Qian et al.
found the professional development should align with educators’ backgrounds, as well as course curriculum for impactful professional development. Therefore, when designing the professional development, the developers need to have a strong understanding of the background and preferences of participants so that activities planned are satisfying to each learner on a personal level (Macdonald, 2010; Powell & Bodur, 2019; Qian et al., 2018). Furthermore, to encourage participants to have successful and meaningful experiences from the course, it may require different materials for different participants (Macdonald, 2010; Qian et al., 2018). To link this specifically to technology professional development, professional development is more effective if it tailored to specific participants and their skill level (Liao, Ottenbreit-Leftwich, Karlin, Glazewski, & Brush, 2017), as well as their subject areas and disciplines (Howard, Chan, Mozejko, & Caputi, 2015; Hsu, 2010). Therefore, personalized professional development could be accomplished by providing specific content to participants that they can connect to in order to make their experiences more meaningful and relatable.

**Authentic Content**

Research shows designing authentic content for online professional development should be considered a priority so participants can have an opportunity to explore issues that actually impact them. Authentic content includes “course content and skills [that] should be made relevant to the profession and be understood within the framework of the educator’s prior knowledge” (Chitanana, 2012, p. 43). Chitanana studied an International Education and Resource Network Science Technology and Math online professional development course to align with the constructivist foundations and found authentic tasks that focused on real world experiences were critical for online professional development.
Additionally, Doherty (2011) studied faculty enrolled in a professional development focused on integration of Web 2.0 tools and found it was essential for faculty to connect their specific needs to the work they did in the professional development. By connecting their individual needs to what was being learned in the professional development, faculty were able to create authenticity into their learnings. Furthermore, Teräs and Kartoğlu (2018) studied an online professional development for vaccine management. Participants expressed authentic tasks distinguished this professional development from others and found these activities were “enjoyable, they promoted deep learning and they encouraged commitment to the learning process” (Teräs and Kartoğlu, 2018, p. 23). Designers of professional development should implement activities related to authentic content of the participants involved.

**Participant Collaboration**

One of the disadvantages of online professional development was the lack of social interactions (Healy et al., 2014; Wyants & Dennis, 2018). Ensuring participant collaboration helps resolve this issue. There are multiple ways to communicate in an online environment, and types of collaboration include discussion boards, as well as web-conferencing tools like Skype (Campbell, 2016; Chitanana, 2012; Dede et al., 2009; Teräs & Kartoğlu, 2018). Furthermore, Sullivan et al. (2018) found it was valuable to communicate with other faculty on discussion boards.

Working in groups is another way to encourage collaboration. Faculty members prefer to work in groups in online professional development, as faculty members find respecting and supporting other participants’ views and interactions can improve the overall course design (Chitanana, 2012; Powell & Bodur, 2019). Participants appreciated
the expertise other participants contributed; as it was helpful to learn from different cultural perspectives and environments (Powell & Bodur, 2019; Teräș & Kartoğlu, 2018). As one of the most valuable elements of an online professional development was the ability for participants to learn from one another, working together allowed participants to share knowledge, learn about resources, acquire skills, and create new knowledge from interactions (Chitanana, 2012; Teräș & Kartoğlu, 2018). Ideally, the working relationships formed between colleagues would continue to grow so the transfer of knowledge would continue to expand.

**Participant Reflection**

Providing participants an opportunity to reflect in an online professional development course can impact a course in numerous ways. Reflection in professional development was encouraged to help faculty members question and think critically about their own teaching strategies and techniques, compare teaching practices, and delve deeper into their own experiences (Chitanana, 2012). Additionally, reflection can be incorporated with feedback so faculty are able to have time to complete activities, receive feedback from facilitators, and then be given time to reflect and improve if needed (Powell & Bodur, 2019). Moreover, reflection often occurs in discussion boards regarding specific content and tips learned from the professional development (Campbell, 2016). Furthermore, reflection has been accomplished by incorporating activities directly into learning such as encouraging critical reflection through diaries outlining their experiences, problem solving methods, peer and mentor interactions, and task progress (Teräș & Kartoğlu, 2018). Therefore, allowing participants an opportunity to process and reflect on the variety of content presented may provide a deeper understanding of content.
Incorporation of Multimedia/Online Learning Tools

As online professional development occurs completely in an online environment, inclusion of multimedia should be considered when creating online professional development. Online learning tools refer to the actual technology that is integrated into the courses, such as multimedia elements and communication tools (Khan, 2005). The different types of multimedia/online learning components that can be incorporated into online professional development include interactive videos, audio, ePortfolios, simulation, badges, digital games, and video presentations (An, 2018; Chitanana, 2012; Kebritchi et al., 2017; Qian et al. 2018; Sullivan et al., 2018; Teräs & Kartoğlu, 2018).

When deciding to implement multimedia tools into online professional development, understanding their impact on faculty is critical. Faculty found that multimedia, such as interactive videos, can be encouraging and increase faculty motivation and collaboration to create authentic connections between learners and real-world tasks (Chitanana, 2012; Qian et al. 2018; Teräs & Kartoğlu, 2018;). An (2018) studied the use of digital games integration with faculty. At first, faculty were hesitant to incorporate digital games into courses because they viewed them as a waste of time and simply a fun activity. However, by the end of the professional development, faculty felt it would be useful for them to design educational games for their courses and saw the benefits of this type of learning activity (An, 2018). Therefore, faculty have had positive feedback and results from implementing a variety of multimedia, and therefore, would possibly use them in their courses.
**Ability to Track Participant Progress**

As work is completed online during this type of professional development, ensuring participants the opportunity to track progress is essential. There are different ways to track progress in online professional development and this tracking can be achieved through badges, activity checklists, or automatically generated certifications (Macdonald, 2010; Qian et al., 2018). Tracking progress provides faculty an opportunity to see their achievements and completions, which can be especially useful when a course is optional (Macdonald, 2010; Qian et al., 2018). Monitoring and marking progress in professional development is a technique to keep participants on track and show them their continual status.

**Length of Professional Development**

Although many design considerations for online professional development are comprehensive and detailed, the suggested length is not as concrete in the literature. There is no set time for how long professional development should be offered in the online environment. Studies have reported professional development lengths anywhere from three weeks (Macdonald, 2010), to eight weeks (Chitanana, 2012), to nine weeks (Teräs & Kartoğlu, 2018), to 12 weeks (Rienties et al., 2013). Additionally, other studies found that online professional development could be achieved all in one day (Campbell, 2016; Carter, 2004). Specifically, a study by Campbell (2016) included a one-day professional development that included both synchronous and asynchronous portions on a particular topic to make sure content was focused and relevant for the learners. Campbell focused on two-hour courses that covered a variety of topics and highlighted synchronous streaming videos where the faculty and the trainer needed to be online at the same time.
Additionally, Garet, Porter, Desimone, Birman, and Yoon (2001) surveyed over 1,000 math and science educators on the topic of effective professional development and asked questions specifically related to duration. Although this study was not specifically for online professional development, Garet et al. found “professional development is likely to be of higher quality if it is both sustained over time and involves a substantial number of hours” (p. 933). Therefore, this variety of lengths demonstrated the length could be determined by the course designer, as it depends specifically on the amount of time needed to successfully cover all the content.

**Technology in Professional Development**

Technology in professional development has many elements. This section will explore (a) faculty’s perceptions towards technology, (b) readiness to integrate technology, (c) willingness to integrate technology, (d) hands-on application of technology, (e) technology integration implementation and support, and (f) impact of technology professional development on educators.

**Faculty’s Perceptions Toward Technology**

Higher education faculty hold both negative and positive perceptions of technology in professional development. Georgina and Olson (2008) studied professional development focusing on technology and technology literacy and the effect it had on faculty pedagogy. Georgina and Olson found “…nearly 70% of faculty agreed (out of which 18% strongly agreed) that it was the universities' responsibility to train faculty. Only 35% agreed (6% strongly agreed) that it was faculty's sole responsibility to learn to use technology” (p. 6). Faculty preferred to teach in technology-enhanced classrooms, but cited barriers to technology integrated pedagogy including lack of support services,
technology not being viewed a priority by departments, and “too many old-school teachers that do not want to take the time to learn new approaches” (Georgina & Olson, 2008, p. 7). Furthermore, Ferguson (2004) examined faculty relationships between teaching styles and pedagogical beliefs, as well between teaching strategies and technology teaching techniques. Ferguson indicated faculty felt pressured by administration to use technology without technology even being readily available to adopt and implement. Contrastingly, faculty did still indicate they implemented technology to teach in alignment with their teaching philosophy (Ferguson, 2004).

Additionally, Osika, Johnson, and Buteau (2009) studied factors that influenced faculty members decisions of whether or not they used and integrated technology into their online courses. Osika et al. found numerous factors impacted the faculty usage decision including training, support, level of comfort, and pressure from students and peers. Faculty who did use technology reported that if they were comfortable using a given technology in the past at work and they were more likely to implement technology into their online courses (Osika et al., 2009). Moreover, Esterhuizen et al. (2013) reported e-learning managers perceptions of how faculty members integrated technology during professional development. Findings indicated technophobia, or the fear of being able to use technology, was a main concern of faculty (Esterhuizen et al., 2013). Faculty perceptions of technology continue to be both negative and positive.

**Readiness to Integrate Technology**

It is also critical to examine educator readiness to integrate technology. Marzilli et al. (2014) studied faculty attitudes concerning technology and innovation. The findings indicated that to successfully shift to a more technology-infused course, it relied largely
on the faculty members to be ready and willing to increase their current technology usage (Marzilli et al., 2014). Therefore, it is important that faculty were ready to integrate technology prior to the actual integration to make this happen. Additionally, Keengwe and Ochwari (2009) created a professional development for early childhood educators focusing on technology integration and technology tools. Keengwe and Ochwari found that in general, educators needed to be more comfortable and experienced with technology in order to make technology integration a central part of the curriculum. With this, educator readiness and comfort level of technology directly aligned to how technology was integrated into the curriculum as a whole. Furthermore, Brinkerhoff (2006) found that in a long-term technology professional development overall, the participants “were less fearful and more confident toward technology” and believed more confidently in their technology skills after completion of the professional development (p. 33). Therefore, professional development proved to be a valuable experience to increase confidence, and in turn readiness related to technology.

**Willingness to Integrate Technology**

When considering the numerous elements of technology integration, the willingness of participants to integrate technology also needs to be explored. Faculty showed positive feelings as it related to technology and were willing to continue to learn more about technology to further integration (Marzilli et al., 2014). Additionally, Wachira and Keengwe (2011) studied technology integration barriers as identified from the perspective of suburban school math educators. Wachira and Keengwe found that even if there were uncertainties related to technology, educators still had positive perspectives about technology and were willing to learn and apply technology into their
teaching. Furthermore, Bennett and Bennett (2003) conducted a professional development focused on characteristics of the Diffusion of Innovations to explore how specific instructional technology characteristics impacted faculty willingness to integrate technology. The findings from this study indicated willingness of faculty was increased when professional development covered a variety of technology elements such as tutorials, hands-on application, and technology participant experience (Bennett & Bennett, 2003). To build on this, when a professional development shares possible barriers to technology integration, participants are more likely to overcome those barriers (Potter & Rockinson-Szapkiw, 2012), which may in turn impact their willingness to integrate. Therefore, when incorporating technology into professional development, keeping the concept of participant willingness at the forefront is essential.

**Hands-on Application of Technology**

Allocating time in technology professional development for hands-on application and practice has been studied (Anyanwu, 2015; An & Reigeluth, 2011; Curwood, 2011; Keengwe & Onchwari; Sullivan et al., 2018). Anyanwu (2015) investigated teacher perceptions in a professional development focusing on Web 2.0 tools. Anyanwu’s findings indicated that participants needed additional hands-on time with tools in order to feel prepared to integrate them into future teaching even after the completing of the professional development. Furthermore, An and Reigeluth (2015) distributed a survey to gather information about various elements of technology (including perceptions, beliefs and barriers) to design more effective technology support and professional development for K-12 educators. The results from An and Reigeluth showed that that educators need
more hands-on time with technology unprofessional development so they can as effective possible with their students, aligning with Anyanwe’s study.

To further understand what effective technology professional development looked like, Liao et al. (2017) surveyed teachers at two different points, seven years apart. Results indicated that there was an increase from 2009 to 2016 regarding preference in include hands-on time to practice to technology. Curwood (2011) also explored elements that contributed to effective technology professional development and found that providing ample time for hands-on work with digital tools should be considered a fundamental piece of professional development. Therefore, the findings above highlighted the importance of incorporating hands-on time into the original design of the professional development to best prepare educators for technology integration.

**Technology Integration Implementation and Support**

Key elements of technology integration professional development include implementation and support. Gutman (2012) found, “recognition, collaboration, technical support, online sharing of pedagogical practices, and instructional design” (p. 55) should all be considered to increase the use of technology in higher education courses. Faculty need awareness of what types of technologies are available to them. For example, using a computer in a course does not count as technology integration, and it therefore falls on faculty to determine whether or not technology integration will be successful (Esterhuizen et al., 2013; Hsu, 2010; Li et al., 2015). Additionally, technology tools can be overwhelming, so it is important that faculty not only know the most effective tools, but they also know how to implement them into their courses (Sullivan et al., 2018).
Lack of support related to technology is considered a barrier to teaching online. Lackey (2011) studied effective strategies in professional development to prepare faculty to teach online and found numerous participants in the study did not receive enough preparation to teach online prior to the start of their first online semester. Specifically, most participants wanted additional support in online technology and technical elements related to online learning to better prepare for upcoming teaching (Lackey, 2011). Additionally, Esterhuizen et al. (2013) reported faculty professional development, institutional support, resources, and technology support all need to be available for faculty. For example, faculty need to feel supported in a variety of ways if they need assistance troubleshooting a technology problem. Furthermore, additional researchers continue to assert educators require support on various components of technology integration, such as troubleshooting technologies (Baran & Correia, 2012), clearly outlined support (Baran & Correia, 2014; Carter, 2004; Gutman, 2012), technology vocabulary (Carter, 2004), and access to specific types of technology (Li et al., 2015).

Professional development for educators is critical and can be applicable in many ways. Furthermore, the need for support does not end once the professional development concludes. Anyanwu (2015) found participants were never contacted after the competition of technology professional development to check-in about actual implementation. Additionally, DeSantis (2012) studied professional development for technology integration specifically focusing on interactive white boards and found that without providing follow-up support to see how teachers were doing, they had trouble actually implementing the technology. Furthermore, conducting a study on teacher pedagogical beliefs, Ertmer (2005) argued designers of technology professional
development should provide “ongoing technical and pedagogical support” (p. 35) to ensure teachers are prepared to integrate technology and can continue to build the confidence needed for successful integration. Through the research shown above, follow-up technology support is critical to successful and effective technology integration.

**Impact of Professional Development on Technology Integration**

After reviewing studies in various levels of education that focused on technology professional development, numerous themes emerged. In a study that focused on elementary and secondary educators, technology professional development increased the level of technology integration and “well-trained teachers successfully integrated technology” (Hsu, 2010, p. 320). For example, if educators were able to enroll in professional development that provided an opportunity to explore with technology, it was more likely they would use technology. Additionally, in technology professional development for elementary level educators, completion of the professional development indicated a positive increase in educators views towards the advantages of technology integration in the classroom (Bettis, 2015). Furthermore, after completing technology professional development, educators found more creative approaches to integrate technology and increase student achievement (Bettis, 2015). For example, professional development may help educators locate a new technology for group work and collaboration to integrate into the classroom.

Technology professional development positively impacted technology integration in the classroom. A study focused on higher education faculty in technology professional development found faculty planned to immediately integrate instructional technologies learned in the professional development (Sullivan et al., 2018). Many faculty were even
actively integrating technology into their courses while they were still enrolled in the professional development (Sullivan et al., 2018). For example, faculty may learn a new tool in the training, such as how to web-conference, and decided to hold a web-conference with students to try out the new tool.

Additionally, a 12-week online professional development studying higher education found faculty increased their confidence levels regarding technology integration in regards to both discipline and design (Rienties et al., 2013). For example, faculty were considering the information learned from the training and applying it to their course design to further integrate technology into their courses. Furthermore, technology professional development for elementary school educators positively impacted confidence levels related to technology usage in the classroom, but relied heavily on support after the professional development was completed (Zhao & Bryant, 2006). For example, although educators may learn valuable information regarding technology integration through the professional development, educators want to feel supported in the future if they have questions on concerns. So, these studies showed promising results to ensure technology professional development can be effective.

**Chapter Summary**

Technology integration cannot be defined as using technology in class, but instead focuses on the successful integration of technology to help drive the curriculum and instructional activities. Different models of technology integration include the Technology Acceptance Model, a framework for evaluating educational technology integration, and the Diffusion of Innovations theory. There are many advantages to integrating technology, such as perceived positive impact on student learning and student
engagement. Furthermore, there are numerous challenges to technology integration such as educator comfort levels with technology, learning curves, continually changing technology, fear of technology, lack of time, barriers with metrics and assessments, and lack of higher-level support. Lastly, technology integration is commonly measured through surveys, questionnaires, in quantitative, qualitative, and mixed-methods studies.

Professional development is a process that helps enhance the teaching skills and abilities of educators. Professional development is classified into three different formats, including online, face-to-face, and blended, each with its own definition and approach. When designing professional development for faculty, incorporating an adult learning theory, andragogy, or cognitive apprenticeship theoretical framework into course design is appropriate to ensure the learning is catered to the specific adult population. Additionally, different models of online professional development such as the professional framework for online teaching, the three-tiered approach, the Program for Online Teaching, and the online in-service course model may all be considered to see if an application can be implemented into online professional development.

The advantages of this online professional development include specific elements such as flexibility and community of learners. Possible disadvantages of online professional development include barriers with technology, lack of time and motivation. Furthermore, studies were identified that focused on the main variables in the current study; faculty perceptions focusing on readiness, preparedness, and course design through online professional development. From examining these studies, it was clear that surveys, questionnaires, and interviews were often used to measure the desired variables.
Course design considerations for effective online professional development include personalization, authentic content, participant reflection, and participant collaboration. Other factors to take into account include the incorporation of multimedia/online learning tools, the ability to track participant progress, and the overall length of the professional development.

Technology in professional development relates to perceptions towards technology, readiness to integrate technology, willingness to integrate technology, hands-on application of technology, technology integration implementation and support, and the impact of professional development on technology integration for educators of various teaching levels. In higher education, faculty have both positive and negative perceptions of technology. Positive perceptions include faculty continuing to use technology in their classrooms and aligning technology integration with their teaching philosophies. Contrastingly, negative perceptions include pressure from administration without having proper tools to integrate technology and lack of technology support. Overall, when properly trained in a professional development focusing on technology, participants feel more ready to integrate technology after their participation. As for willingness to integrate technology, willingness increases as participants are offered a variety of different learning opportunities throughout the technology professional development and are provided information about possible barriers to the technology prior to implementation. Technology integration is also closely related to implementation and support. In addition, faculty do not feel supported when integrating technology and need assistance in order to prepare for their online courses. Technology professional development positively impacts educators in a variety of levels. Additionally, technology
professional development increased views towards the advantages of technology integration in the classroom, increased creative approaches for integrating technology, increased confidence levels regarding technology integration, and had an immediate impact on teaching practices.
CHAPTER 3

METHOD

The purpose of this action research was to implement and evaluate the impact of online technology integration professional development for faculty teaching at a distance at LC. I conducted the study within my sphere of influence in an attempt to make an impact on this context. I had direct access to the participants and was familiar with the environment and the expectations of faculty at LC. Therefore, this aligned with action research, as action research is ideal when the researcher has a “specific educational problem to solve” (Creswell, 2012, p. 577). To support this, action researchers become involved in their study in hopes of leading the way for progress in their specific setting (Carr & Kemmis, 1986). My overall goal was to help online faculty participants effectively integrate technology into their online courses, and therefore action research was the best research design for my study because I could find a solution. This study addressed the following three research questions

1. How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology?

2. How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology?
3. How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?

**Research Design**

As I investigated why online faculty at LC lacked skills and knowledge in technology integration for their online courses, I decided to utilize action research. This section will explore why action research was appropriate for this study, share the definition of action research, and highlight how action research differed from other types of research. Additionally, it will discuss my specific chosen research design and why it fit my study.

The early findings of action research have been credited to Lewin in the 1940s (Bradbury-Huang, 2010; Rudestam & Newton, 2007). Action research is not limited to a single area, but instead can be applied to a variety of academic and non-academic subjects such as education, engineering, and social work (Greenwood & Levin, 2007). Action research is a type of research conducted by educators to find answers to issues in their local settings (Creswell, 2012). Conducting action research allows educators to continue to engage in the learning process (Mills & Butroyd, 2014). Action research is an opportunity for educators to learn, but more specifically to learn about the world in which they work.

Greenwood and Levin (2007) stated that successful action research requires the combination of “action, research, and participation” (p. 5). My study undoubtedly fit the action research model because it had the *action* during the professional development, the *research* during the literature review to support my professional development design, and
the active participation from both the faculty participants and myself. Additionally, action researchers support the notion “that action is the only sensible way to generate and test new knowledge” (Greenwood & Levin, 2007, p. 6). This aligned with my study because in order to gather new knowledge based on the problem of practice, an action needed to be taken. This action could then initiate change within my environment. Action research was appropriate for my study because I also supported the power of sparking action to investigate problems and search for new solutions. The ability to apply this to my own setting made the research feel more personal and therefore something into which I wanted to invest my time and energy.

Action research was found to assist in “empowering stakeholders” (Bradbury-Huang, 2010, p. 93). I found this aspect of action research essential, as the results from my study ultimately empowered me to help make changes in my local context. Action research holds true to the foundation “that all people affected by or having an effect on an issue should be involved in the processes of inquiry” (Stringer, 2014, p. xv). This set action research apart from other types of research because, in traditional studies, the researcher was solely the researcher, and was not affected by the outcome of the study. Yet, action research has allowed education practitioners a way to conduct research that has continually provided clear and personal links to their workplace in a way that other research designs cannot (Mertler, 2017). Therefore, in action research, the researcher is deeply invested in the results, as they are conducting the research to find answers and gather information for their own interests (Mertler, 2017). This distinguished action research because the outcomes of action research could be directly applied to the work life of the researcher; therefore, the results had a richer meaning. This linked back to my
positionality as an insider because I wanted to contribute to the knowledge base and solve a problem in my environment (Herr & Anderson, 2005).

Action research also differs specifically from purely qualitative research because the research is “with practitioners” (p. 94) instead of “about practice” (Bradbury-Huang, 2010, p. 94). This related directly to my study because I worked with faculty participants at LC in a personalized professional development in my local context instead of just studying about faculty and professional development in general. By working with faculty participants, it provided insight into directly how the professional development impacted these specific faculty members, instead of all faculty in general. Finally, another identifying factor of action research was that it directly aligned to a problem and a solution in a specific environment, opposed to theoretical research which focused exclusively on the academic perspective (Rudestam & Newton, 2007).

Although traditional research may be deemed complete when the results are made generalizable to a population, this is not the case for action research (Stringer, 2014). Action research varied from other types of research because I was focused on applying results to the specific population and solving issues that were faced in the given environment (Stringer, 2014). Generalizability was not of significance because I was more focused on how the results would impact the specific population so changes could be made in the local context. Once the results are collected, action research is not complete, as a unique characteristic about conducting action research it that it is essential to recognize that sharing results should be a priority (Creswell, 2012). Results can be shared at a variety of levels, including local contexts, national conferences, journals, and district conferences (Mertler, 2017).
In general, using action research has many advantages. Action research is conducted in a four-stage process, which includes planning, acting, developing, and reflecting (Mertler, 2017). In my study, I conducted action research for the first time, and subsequently, it was very helpful to have a proven four-step approach to guide my research. Specifically, in terms of the planning stage, I was able to take the experiences and insight I have learned at LC to plan a professional development that was catered to LC faculty. The four-stage process was also advantageous because it provided me time to use each stage to organize my study. The process allowed me time to plan the study and follow all the way through to the reflection stage to see how my study progressed based on what I planned. Another advantage of conducting action research is that it allowed collaboration between individuals who are interested in solving issues to which they can directly relate (Creswell, 2012; Stringer, 2014). As an action researcher at LC, I was able to involve others who had stakes in the outcome of the action research while I followed ethical and responsible guidelines.

Action research is not only confined to either qualitative or quantitative research, but it can also utilize both types of research in a mixed-methods approach (Creswell, 2012). Selecting a mixed-methods design allowed me to “capitalize on the strengths of both qualitative and quantitative data” (Mertler, 2017, p. 107). This was supported by Rudestam and Newton (2007) and Greenwood and Levin (2007) who also found action research can be utilized in both quantitative or qualitative research studies using a variety of data collection methods such as surveys and interviews. This aligned with my research, as I utilized both questionnaires and interviews to address my research questions.
Having collected both quantitative and qualitative data during the same time period, my study utilized a convergent mixed-methods design, also known as a concurrent design, a parallel design (Creswell & Plano Clark, 2018), or a triangulation design (Mertler, 2017). It is important to note that in this type of design, both qualitative and quantitative data are equally important and are used simultaneously to support the strengths of each other (Creswell & Plano Clark, 2018; Mertler, 2017). I chose this design because my research questions had a strong focus on both qualitative and quantitative data, and therefore needed to be considered at the same time. In addition, Mertler (2017) asserted triangulation mixed-methods design leads to substantially increased credibility when the two types of data are combined and have the same findings. Fielding (2012) found using a convergent design allowed the researcher the opportunity to determine if data from different methods corroborate one another. This is precisely what I did, as my questionnaire, interviews, and discussion boards explored the same topics to search for supporting findings from all sources.

Having used a mixed methods approach, it was critical to understand that merging two methods could be difficult because it relied on me being able to ensure the methods were implemented correctly both individually, as well as together (Morgan, 2014). What this meant to my research was that both types of data collected had to be carefully planned to ensure rigor and trustworthiness was present for the qualitative and the quantitative data. Additionally, in order to make the integration of two methods successful, I represented my findings such that both the qualitative and quantitative results were meaningful (Morgan, 2014).
Participants and Setting

The participants for this study were online faculty at LC. Faculty participants had different levels of experience with teaching online and integrating technology online. With this, an online faculty was considered eligible for this study if they had taught at least one online course within the last year at LC. Therefore, both full-time and part-time faculty were considered for this study. All online faculty participants were at a minimum familiar with the LMS, as this was the same virtual environment in which they teach their online courses in at LC. In addition, all faculty participants already had an existing LMS account, and therefore could use their already-existing log in credentials to access the professional development course. Working as an instructional designer, I was able to ensure all online faculty taking part in this study were enrolled in the online professional development course as learners.

At LC, faculty professional development was typically face-to-face, at a physical college location on the main campus. Sessions were facilitated by staff members at the university specializing in teaching and learning, as well as instructional design and development from different departments on campus. Sessions usually were located in different sites on campus, including specific labs and classrooms depending on the session topic. Sessions were either scheduled in rooms with computers (if needed) or faculty were directed to bring their own laptops. Scheduled sessions were emailed out to LC faculty where they were encouraged to sign up based on their schedule and interest in sessions offered. Examples of professional development sessions in the past have included Design Lab, which was open lab time for faculty to work with a staff member
on their course, and *Facilitating a Course*, which showed the basics of how to operate and teach a course in the LMS.

In terms of choosing the sample in the study, I utilized the technique known as purposeful sampling, which was when the participants are chosen because they “best help the researcher understand the problem and the research question” (Creswell, 2014, p. 239). Purposeful sampling was ideal for my study, as I worked with online faculty on a daily basis, and was familiar with faculty who may benefit from professional development on technology integration in their online pedagogy. Additionally, I reached out to other professionals on campus who worked with faculty who taught online courses. From here, I narrowed it down to possible candidates who would be a good fit for the study. With this, I invited 50 online faculty members to participate in the study.

Criteria for inclusion of to be invited as a faculty participant included (a) being a full or part-time LC faculty member, (b) had at least one year teaching online, as well as (c) planned to teach an online course within the next academic year. I extended the invite via an email to faculty members’ LC email address, and followed up with an additional email. The recruitment email can be seen in Appendix A. From the 50 faculty invited, 17 agreed to participate in the study, yielding a 34% response rate. During the end of the first week of the professional development, one faculty participant dropped out of the study, bringing the total number of faculty participants to 16. This sample size allowed me to analyze qualitative and quantitative data, as well as build relationships with faculty. An action research study with similar factors which focused on an online professional development for part-time faculty featured a sample size of 20 (Barbour-Conerty, 2016).
Permission to conduct this study at LC was provided by the Associate Director for Technology Services (see Appendix B).

The final population studied included diversity in terms of gender, age, ethnicity, years teaching online, years teaching, years at LC, faculty status, and school. Of the 16 faculty participants in the professional development, 12.5% had been teaching online for 0-1 years, 25% had been teaching online for 2-5 years, 37.5% had been teaching online for 6-9 years, and 25% had been teaching online for 10 or more years. Of the faculty participants, 31.25% were full-time faculty, while 68.75% were part-time faculty.

Complete demographics of all sixteen faculty participants can be seen below in Table 3.1.

Table 3.1. Demographics of Faculty Participants

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Descriptor</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>12 (75%)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4 (25%)</td>
</tr>
<tr>
<td>Age</td>
<td>30-40 years</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td></td>
<td>41-50 years</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td></td>
<td>51-60 years</td>
<td>4 (25%)</td>
</tr>
<tr>
<td></td>
<td>61-70 years</td>
<td>5 (18.75%)</td>
</tr>
<tr>
<td></td>
<td>71-80 years</td>
<td>4 (37.5%)</td>
</tr>
<tr>
<td></td>
<td>No answer</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>African American</td>
<td>5 (31.25%)</td>
</tr>
<tr>
<td></td>
<td>Caucasian</td>
<td>9 (56.25%)</td>
</tr>
<tr>
<td></td>
<td>Ethiopian/American</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td></td>
<td>Puerto Rican</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td>Years Teaching Online</td>
<td>0-1 year</td>
<td>2 (12.5%)</td>
</tr>
<tr>
<td></td>
<td>2-5 years</td>
<td>4 (25%)</td>
</tr>
<tr>
<td></td>
<td>6-9 years</td>
<td>6 (37.5%)</td>
</tr>
<tr>
<td></td>
<td>10 or more years</td>
<td>4 (25%)</td>
</tr>
<tr>
<td>Years Teaching</td>
<td>0-1 year</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td></td>
<td>6-9 years</td>
<td>3 (18.75%)</td>
</tr>
<tr>
<td></td>
<td>10 or more years</td>
<td>12 (75%)</td>
</tr>
</tbody>
</table>
In terms of data collection, faculty participants completed the Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) pretest and posttest, as well as the discussion boards (to be described below in detail). Additionally, I used purposeful sampling to choose five faculty participants to participate in semi-structured interviews (also described below in detail) based on diversity in terms of gender, age, ethnicity, years teaching online, years teaching, years at LC, faculty status, and school. Demographics for the five faculty participants selected for semi-structured can be seen below in Table 3.2.

**Table 3.2. Demographics of Semi-Structured Interview Faculty Participants**

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Descriptor</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>3 (60%)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2 (40%)</td>
</tr>
<tr>
<td>Age</td>
<td>41-50 years</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>61-70 years</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>71-80 years</td>
<td>3 (60%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>African American</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>Caucasian</td>
<td>4 (80%)</td>
</tr>
<tr>
<td>Demographic</td>
<td>Descriptor</td>
<td>Number of Participants</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Years Teaching Online</td>
<td>0-1 year</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>2-5 years</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>6-9 years</td>
<td>2 (40%)</td>
</tr>
<tr>
<td></td>
<td>10 or more</td>
<td>1 (20%)</td>
</tr>
<tr>
<td>Years Teaching</td>
<td>0-1 year</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>2-5 years</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>6-9 years</td>
<td>2 (40%)</td>
</tr>
<tr>
<td></td>
<td>10 or more</td>
<td>1 (20%)</td>
</tr>
<tr>
<td>Years at Laken College</td>
<td>6-9 years</td>
<td>3 (60%)</td>
</tr>
<tr>
<td></td>
<td>10 or more</td>
<td>2 (40%)</td>
</tr>
<tr>
<td>Faculty Status</td>
<td>Full-time</td>
<td>2 (40%)</td>
</tr>
<tr>
<td></td>
<td>Part-time</td>
<td>3 (60%)</td>
</tr>
<tr>
<td>School</td>
<td>Arts, Sciences, and Professional Studies</td>
<td>2 (40%)</td>
</tr>
<tr>
<td></td>
<td>Social Work and Behavioral Sciences</td>
<td>3 (60%)</td>
</tr>
</tbody>
</table>

**Intervention**

The intervention in this research came in the form of online technology integration professional development hosted completely within the LMS. This online technology integration professional development was specifically designed for the faculty at LC. Therefore, there were many design features that were catered to the needs of LC faculty to better help them in their online teaching within the LMS. This section will explore the intervention elements related to the professional development including (a) overview of the professional development, (b) alignment to research-based theories and course design considerations, and (c) module design.

**Overview of the Professional Development**

The professional development consisted of one Getting Started module, and six additional online modules that focused on technology integration topics. The six module
titles were (1) What is Technology Integration? (2) Exploring Technology Tools, (3) Barriers to Technology Integration, (4) Evaluating Your Technology Tools, (5) Student Engagement Using Technology, and (6) Technology Integration: Your Turn. The decision for the professional development to be conducted in the LMS was decided because faculty participants would be teaching online so they had an opportunity to learn in an online environment. Additionally, it attracted both full-time and part-time faculty who were both local, as well as located at regional campuses.

Each module allowed the faculty participants to work at their own pace in terms of daily work, with due dates for discussion board original posts on Thursday of each week, and responses by Sunday of each week. This ensured faculty participants had time to collaborate with one another in the discussion boards. Flexibility in online learning was supported by Rienties et al. (2013), as the researcher studied educators’ beliefs of technology using flexible online modules as well. The main communication in this professional development was through discussion boards, as many studies encouraged and highlighted the importance of participant collaboration through discussion boards (Campbell, 2016; Chitanana, 2012; Dede et al., 2009; Sullivan et al., 2018; Teräs & Kartoğlu, 2018).

There was also one assignment and one optional assignment in the course which allowed faculty participants to test their technology integration skills further. The assignment and optional assignment were due on Sunday of the given week. The faculty participants had six weeks to complete the course in total, with one module per week, for a total of six modules. Participants were told to allocate approximately 1-2 hours per week to complete the professional development.
As LC focused on asynchronous, online learning, I wanted to ensure faculty participants followed the same format during their online professional development. This professional development modeled a similar format to online courses they teach, including instructional resources, videos and other topic-related content to meet learning objectives. With this, faculty had a sense of control over the course materials, as they were able to go back and view them on their own time as needed (Cercone, 2008; Powell & Bodur, 2019; Wyants & Dennis, 2018).

Modules included both learner-to-learner and instructor-to-student interaction, as both are critical to success in online courses (Moore, 1997). This was demonstrated mainly through discussion boards, which allowed for both formal and informal conversations between participants (Campbell, 2016; Carter, 2004). Ideally through communication in the online course, faculty built a community of learners for feedback, reflection, and collaboration (Baran & Correia, 2013; Liu & Kleinsasser, 2014; Healy et al., 2014; Macdonald, 2010; Powell & Bodur, 2019; Sullivan et al., 2018).

Alignment to Research-Based Course Design Considerations

Specific course design considerations based on findings from the literature were threaded throughout the professional development and built the modules. After reading literature focusing on online professional development, several common design considerations emerged. Table 3.3. highlights the different course design findings, as well as how they were implemented into this professional development. Specifically, there was a focus on (a) flexibility, (b) personalized professional development, (c) authentic content, (d) participant collaboration through discussion, (e) participant reflection, (f)
sense of control over materials, (g) incorporation of multimedia/online learning tools, (h) ability to track participant progress, and (i) community of learners.

Table 3.3. Course Design Research Findings Alignment to Actual Course Design

<table>
<thead>
<tr>
<th>Course Design Research Findings</th>
<th>Course Design Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility</td>
<td>Modules allowed the faculty participants to work at their own pace in terms of daily work, with due dates only on Thursday and Sunday of each week. This ensured flexibility, as well as allowed faculty participants to interact on discussion boards with other learners.</td>
</tr>
<tr>
<td>Personalization</td>
<td>Throughout the professional development, faculty participants were able to choose tools they felt were right for them to implement into their online courses based on their experience and discipline, instead of being tied to one specific tool that may not relate to their specific background. Faculty participants were continually shown a Technology Tools Menu I created with various technology tools to choose from. This personalized professional development made it easier to motivate and engage faculty participants because they found it more useful.</td>
</tr>
<tr>
<td>Authentic content</td>
<td>Authentic content was encouraged in a variety of modules to ensure faculty participants were able to bring in their real world experiences into the professional development. By motivating faculty participants to do this, they were ideally able to see a link between what they were learning and how it impacted their current and future environments.</td>
</tr>
<tr>
<td>Participant collaboration</td>
<td>Faculty participants collaboration was achieved through multiple discussion boards, as faculty were able to collaborate on thoughts and ideas.</td>
</tr>
<tr>
<td>Course Design Research Findings</td>
<td>Course Design Implementation</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Participant reflection</td>
<td>With the layout of the course in terms of Thursday/Sunday deadlines, faculty participants had the time to reflect. They had a few days to reflect over other learners’ discussion posts and respond once they were able to process. Additionally, the resources were continually available to faculty participants once they began the module, so they could reflect and review the content as needed.</td>
</tr>
<tr>
<td>Sense of control over materials</td>
<td>Once faculty participants begin a module, they had the ability to view and review the content and resources as often as they would like. Resources stayed open the entire length of the professional development and were available for download.</td>
</tr>
<tr>
<td>Incorporation of multimedia/online learning tools</td>
<td>Throughout the professional development, there were various technology tools and technology tools categories were introduced in the Technology Tools Menu. Additionally, the Read/Watch and Activities submodules for the week included multimedia videos and other learning tools to learn about the content provided that week. Lastly, faculty participants were encouraged to try and explore new technology tools based on the discussion requirements for the week.</td>
</tr>
<tr>
<td>Ability to track participant progress</td>
<td>Within the Getting Started Module, directions were included specifically on how to track progress through each module and the course in general. This allowed faculty participants to get a better understanding of their progress. Additionally, I created and distributed badges after each module was completed to each faculty participant individually within Brightspace.</td>
</tr>
<tr>
<td>Course Design Research Findings</td>
<td>Course Design Implementation</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
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<tr>
<td>Community of learners (Baran &amp; Correia; Carter, 2004; Healy et al., 2014; Liu &amp; Kleinsasser, 2014; Macdonald, 2010; Powell &amp; Bodur, 2019; Sullivan et al., 2018)</td>
<td>The entire layout of the course was based on the idea of a community of learners. By using video introductions in the first module, faculty participants were able to put a face to a name, even if they were not located at the same campus. From here, they were able to build a network based on experiences and ideas.</td>
</tr>
</tbody>
</table>

**Module Design**

Each new module was introduced with a personal video with closed-captions to welcome faculty participants to the week. The video also directed faculty participants to the module for the week. Additionally, a weekly email was sent to all the faculty participants which directed them to watch the module video in Brightspace to get started for that particular week. Upon clicking each module in the LMS, faculty participants reviewed a module introduction screen which included an image, the name of the module, and the purpose statement (see Figure 3.1). This provided faculty participants with an overview of what to expect in the module. The consistent layout ensured ease of use in navigation for all faculty participants.

![Figure 3.1. Module 1 introduction screenshot.](image-url)
Starting with the first module, each module included two submodules, titled Read/Watch and Activities, as seen in Figure 3.2. The Read/Watch submodule included all the assigned materials or resources to read or watch for the week, such as instructional videos, eBooks, PowerPoints, articles, PDF’s, websites, or infographics. This section integrated a combination of already existing materials, as well as original materials created specifically for the professional development.

Figure 3.2. Module structure of the read/watch and activities submodules.
All resources were free of charge to ensure ease of use for the faculty participants. Additionally, all materials were linked so the faculty participants could click directly on the resource and open it either in a new browser window or by automatic download. Therefore, they did not have to worry about locating any resources outside of the classroom to finish the required work. The Activities submodule included all the discussions and assignments, along with directions, due for that week. Both the Read/Watch and Activities submodules for multiple weeks included the incorporation of multimedia and online learning tools (An, 2018; Chitanana, 2012; Qian et al. 2018; Sullivan et al., 2018; Teräs & Kartoğlu, 2018). Incorporating a variety of these types of multimedia and online learning tools provided an opportunity to engage with the tools throughout the professional development.

Faculty participants were encouraged to track their progress using progress bars, and were awarded badges within Brightspace when they completed a module, as providing participants the ability to track progress is significant in online professional development (Macdonald, 2010; Qian et al., 2018). Badges may have been an incentive to faculty participants to complete each module within the professional development. Once each faculty participant completed the work for any given module, they were awarded a badge. Six separate badges were created for the professional development, one for each module (see Figure 3.3 below). The badges provided faculty participants with reassurance and completion status by knowing they had successfully completed a module. They were notified they received a badge by the Brightspace notification feature.
Entering the Course & Welcome Video

When first entering the course, faculty participants were prompted to watch the course welcome video that was posted on the course homepage (see Figure 3.4). This was a two minute closed-caption video that was created to welcome faculty participants to the class and gave a brief introduction to the overview and outline of the course. It also included introductory information about the study and thanked faculty participants for their participation. The end of the video directed faculty participants to the Getting Started module to begin the course and get started. Below the video was a graphic with the title for the first module. It was essential to include a video note announcement, as it was a way to familiarize faculty participants with a video tool they used for their own introductions. It also added a personal feel to the online professional development.
Module Descriptions and Overviews

This intervention included a Getting Started module along with six additional modules to further explore technology integration for online faculty participants at LC. Specific details are included in each section below related to topics that were covered, resources that were explored, and activities that were completed. This section also describes in detail the following modules: (1) What Is Technology Integration? (2) Exploring Technology Tools, (3) Barriers to Technology Integration, (4) Evaluating Your Technology Tools, (5), Student Engagement Using Technology, and (6) Technology Integration: Your Turn.

Getting started module. After watching the welcome video, faculty participants were directed to the Getting Started module. This was accomplished by placing a video announcement on the course home page as seen above in Figure 3.4. The Getting Started
module included numerous elements that assisted the learner in getting acquainted with the class (Quality Matters, 2014). This module was visible and easy for the faculty participants to locate. Specifically, the Getting Started module included the following information: (a) course overview and objectives, (b) instructor information, (c) study details, (d) how to track your progress (e) weekly module schedule, and (f) how to check your progress. By providing this information up front, faculty participants were able to understand the layout of the course and what they could expect over the upcoming weeks. See Figure 3.5 below for an example of the Getting Started module introduction.

![Figure 3.5. Getting started module content.](image)

Additionally, in the Getting Started module faculty participants learned more about where to get different types of technology support at LC. This included who to call and how to seek appropriate support from areas such as the instructional design team, the academic technologist, technology services, Brightspace support, and the Center for
Excellence in Teaching, Learning, and Scholarship. This was essential because each support was designated to help in very specific areas so faculty participants could be ready for any troubleshooting they may face in the future. Additionally, in the future faculty participants would be able to share this information with their students.

**Module 1: Choosing educational technology.** In this first module, faculty participants were introduced to the concept of educational technology in a general sense. In the Read/Watch section there was an introductory video that explained what technology was, how to integrate technology, and why it was important (see Figure 3.6 below). The video explored a critical piece of technology integration in the sense that simply using technology in a class does not mean you are integrating it, but instead technology integration relied on showing how technology meets learning objectives (Davies, 2011; Dockstader, 1999). This was included in the opening module as a foundation piece and was threaded throughout the entire professional development. Additional resources in the first module explored steps in the technology integration process, an infographic on how education can be improved through technology integration, and a video on the Diffusion of Innovations the and the adoption curve.

![Technology Integration video.](image)
In terms of activities for this module, there were two discussion board topics due this week. Both discussion topics were designed to be introductory, so faculty participants could be eased into the first week of the professional development. The first topic was an introduction discussion (see Figure 3.7 below) which allowed faculty participants to introduce themselves to each other and explain their experience in teaching online, as well as why they decided to participate in this professional development. The second discussion topic focused on the Diffusion of Innovations theory (Rogers, 2003), exploring specifically the adoption curve and where faculty participants felt they fell on the curve. This allowed faculty participants to open up about their readiness to integrate technology, as well as express their current feelings related to technology integration.

![Introduce Yourself Discussion](image)

**Figure 3.7. Introduce yourself discussion located in module 1.**

**Module 2: Exploring technology tools.** As the first module was primarily about learning the basics of technology integration, the second module provided faculty participants an opportunity to start to explore and learn about a variety of technology
tools. Various tools were introduced in this module so faculty participants had an opportunity to experiment and explore tools they felt would personally benefit them in the online classroom specific to their current discipline and classroom needs (Baran & Correia, 2013; Macdonald, 2014; Powell & Bodur, 2019; Qian et al., 2018; Sullivan et al., 2018). This was achieved through the Technology Tools Menu (see Figure 3.8 below). These tools fell into different categories and focused on all levels of technology use. The Technology Tools Menu was split up into five different sections including (a) presentation, infographics, & videos, (b) websites & blogs, (c) web conferencing, (d) collaboration & group work, and (e) quizzes & formative assessments. Each section provided multiple tools and direct links to websites for these tools. All tools explored in this professional development had a free/basic version, so there were no costs to the faculty participants.

![Technology Tools Menu](image)

Figure 3.8. Preview of technology tools menu.
Other resources in this module included articles about how to make smart choices about technology, how to choose the right technology tools for courses, and how educational technology was impacting education. It critical to include information about how to choose technology tools, as faculty participants should be introduced to meaningful technology integration from the start.

There was one discussion topic due in the second module. This discussion focused on each faculty participant choosing one technology tool to explore further. After reviewing the Read/Watch section for this module, this discussion topic was the first opportunity where faculty participants really got to dive deeper into a tool of their interest. The goal of this discussion was to help faculty participants determine if the tool they chose was actually the right fit for their course and to see if it aligned with their goals and objectives. Regardless of whether or not the faculty participants ended up using the tool in the future, it was helpful for other faculty to see their thoughts and honest reviews on selected tools. To determine the feasibility of possible tools, faculty participants discussed why they chose the tools, foreseeable benefits, and possible challenges to integration. Based on the answers to those questions, faculty participants shared whether or not they thought they could see themselves integrating the tool into future courses.

**Module 3: Barriers to technology integration.** The focus of the third module was barriers to technology integration. It was important to highlight possible barriers to technology integration, as many faculty participants in the past mentioned that they wished they knew more about possible barriers before diving head-first into a new technology tool. Additionally, the literature revealed there were many different barriers to
technology integration which was shared with faculty participants. Therefore, this module gave faculty participants that exposure to potential barriers ahead of time. In the Read/Watch section an infographic was created which highlighted common barriers that were discussed in the literature review (see Figure 3.9 below). Other resources in this module included articles related to challenges for educators when adopting technology in higher education, why educators do and do not integrate technology, how to address barriers to universal design for learning, and how to adopt technology without spending extra money.

![Figure 3.9. Common barriers to technology integration.](image-url)
There was one discussion topic due in this module which focused on the barriers to technology integration. This discussion not only had faculty participants share past and potential challenges to technology integration, but it also required faculty participants to share the type of support they would like to receive in order to overcome challenges. This was important to include so faculty participants could see that barriers could be overcome with the right support. By bringing in real world experiences related to challenges, it highlighted the importance of incorporating authentic content into the professional development (Chitanana, 2012; Doherty, 2011; Terävä & Kartoğlu, 2018). Therefore, making the content relatable to the faculty participants.

Module 4: Evaluating your technology tools. The fourth module focused on evaluating technology tools. The first three modules began to prepare faculty participants for this module, as faculty participants explored technology tools and what they had to offer, as well as potential barriers. This module then provided faculty participants with an opportunity to definitively evaluate whether or not a technology tool was a good fit for their needs. The resources in the Read/Watch section for this week included articles related to how to evaluate technology tools to assist in supporting teaching and learning, and where to start in this process. This module also included an adapted technology tool evaluation template.

The one discussion topic for this module had faculty participants not only choose and evaluate a tool, but also reflected on the tool and whether or not they would recommend it to a colleague. Collaboration in online professional development was encouraged by existing research (Campbell, 2016; Chitanana, 2012; Dede et al., 2009; Powell & Bodur, 2019; Sullivan et al., 2018; Terävä & Kartoğlu, 2018). Therefore, the
collaboration in this discussion was two-fold, as faculty participants communicated with one another via the discussion board, but they also advocated for or against a tool.

The discussion topic prompt can be seen below in Figure 3.10. This provided faculty participants with an opportunity to complete a full-tool evaluation which asked questions related to alignment of course objectives, customization, literacy skills, navigation, engagement, cost, and more. The process of completing this evaluation showed faculty participants that there was much more to choosing a tool than the bells and whistles promotion of the technology tool.

![Evaluating A Technology Tool of Your Choice](image)

Figure 3.10. Module 4 discussion topic on tool evaluation.

**Module 5: Student engagement using technology.** Keeping learners engaged in an online professional development course is not always easy. Therefore, this module
investigated different strategies to engage participants using technology integration. Resources in the Read/Watch section of this module focused on getting faculty participants engaged, keeping faculty engaged, and engaging uses of technology integration in education. Additionally, there was a video focused on an introduction to using Google Forms from LC email accounts. This was included as it directly related to the assignment for this week (see Figure 3.11 below).

![Module four introduction to Google Forms video.](image)

For this assignment this week, faculty participants created their own scavenger hunt for their students using Google Forms. This tool was chosen because everyone who has a LC email account has the ability to create Google Forms without any additional sign-up or registration. A scavenger hunt was chosen because it provided faculty participants an opportunity to create an assignment that engaged students. Additionally, assignments such as scavenger hunts have recently been used as an interactive way which allows students to explore and find resources and information on their own based on
directions the instructor provides (Jones, Smith, & Royster, 2017), therefore going beyond the resources provided and outlined for them in the course. Furthermore, faculty participants could use their newly-created scavenger hunt after the professional development ended for integration within their own courses.

Faculty participants were provided an example of a scavenger hunt created for a web design course at LC (see Figure 3.12 below) as a reference. It offered faculty participants an opportunity to look at the types of questions and to think about how they could model questions related to their specific courses. This activity was very hands-on and allowed faculty participants to produce a technology deliverable.

Figure 3.12. Scavenger hunt example.
Module 6: Technology integration: Your turn. The final module in the professional development focused on technology integration and the possible impact on faculty participants course design and development moving forward. No new resources were explored this week in the Read/Watch section, as it instead served as a recap and review for the Technology Tools Menu and other valuable resources embedded in the course. The goal of this module was to see if the professional development prepared faculty participants to integrate technology, and whether or not they planned to integrate the technology into their upcoming course design.

The Activities for this section included one discussion, one optional assignment, and the link to this research TIFPBQ posttest. The final course discussion topic served as a wrap-up and provided faculty participants with an opportunity to reflect on their experiences, as reflection incorporated into professional development can help participants think critically (Chitanana, 2012; Teräs & Kartoğlu, 2018). It asked questions related to their readiness to integrate technology, as well as if they planned to integrate technology moving forward. It also explored rationale for their decision in either direction. There was also an optional assignment this week which allowed faculty participants to have more hands-on experience with a tool of their choosing. In this assignment, faculty participants were encouraged to think about a course they taught, specifically honing in on a need in that course related to the professional development objectives and content. They were then asked to explore a tool that could help meet that need and how they could implement it into their course. The hope was faculty participants would choose a tool to support and enhance a specific element of their
course. Finally, to complete the course, faculty participants were provided the link to complete the TIFPBQ posttest.

Data Collection Methods/Data Sources

In this study, I collected both qualitative and quantitative data using a variety of methods and instruments. To ensure there was both high validity in the data and low probability of misunderstanding the data, triangulation was utilized (Bloomberg & Volpe, 2015). Triangulation of data was also helpful to ensure consistency between data methods and participants (Mertler, 2017). As faculty participants at LC were the primary participants of this study, all data was collected solely from the 16 faculty participating in the study.

From this, the primary data collection methods were the TIFPBQ pretest and posttest, discussion boards, and semi-structured interviews. Data collection did not begin until each faculty participant signed the University of South Carolina Consent to be A Research Subject Consent Form explaining the purpose of the study, which can be found in Appendix C. Direct alignment between research questions, information required to answer each research question, and data sources is outlined in Table 3.4. Additionally, each method will be described in detail, with specific rationale, in the sections below.

Technology Integration Faculty Perceptions and Beliefs Questionnaire Pretest & Posttest

To gather quantitative data, the TIFPBQ pretest and posttest used closed-response Likert scale items. Questionnaires are common for collecting data in mixed methods studies (Buss & Zambo, 2014). As distance was not a barrier in the online faculty technology integration professional development, the professional development was
offered to both local and non-local faculty. Therefore, all the TIFPBQ pretest and posttest were provided in an electronic format.

Table 3.4. Research Question and Data Sources Alignment

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Information Required</th>
<th>Data Sources</th>
</tr>
</thead>
</table>
| RQ1: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology? | Faculty participants input from discussions and semi-interviews, as well as the Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) pretest and posttest regarding how prepared they feel about integrating technology. The TIFPBQ also provided demographic data. | -TIFPBQ pretest & posttest  
-Semi-structured interviews  
-Discussion boards |
| RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology? | Data about advantages that encouraged faculty participants and challenges that hindered them from integrating technology into their courses from instructor-to-faculty (semi-structured interviews, TIFPBQ pretest and posttest) and faculty-to-faculty interaction (discussion boards). | -TIFPBQ pretest & posttest  
-Semi-structured interviews  
-Discussion boards |
| RQ3: How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design? | Descriptions from faculty participants about how the information learned in this professional development impacted how they planned to design courses in the future. Additionally, data from the TIFPBQ pretest and posttest. | -TIFPBQ pretest & posttest  
-Semi-structured interviews  
-Discussion boards |
The purpose of including the TIFPBQ pretest and posttest was not only to provide quantitative data, but was also to provide a way to compare pretest and posttest professional development data related to faculty participants perceptions and impact on plans for future course design. Online questionnaires are also beneficial because they are typically cost-friendly and are available to access from any location (Fink, 2013). Because online questionnaires can be misidentified as junk or spam e-mail, I emailed the TIFPBQ pretest from my LC email account so it could be completed prior to enrollment in the professional development, and embedded the posttest directly in the LMS so this was not an issue (Fink, 2013). By integrating the TIFPBQ posttest in the LMS, it was easy to locate and access.

This study combined two previously existing and tested instruments for the creation of the TIFPBQ pretest and posttest. The first instrument was called the Technology Skills, Beliefs, and Barriers scale, which was designed to help measure the readiness of preservice educator’s technology integration and preparation (Brush, Glazewski, & Hew, 2008). The second instrument was called The Technology Beliefs and Competencies Survey, which was used in a study focusing on the long-term impact of technology professional development on a variety of faculty skills when tested at three different times (Brinkerhoff, 2006).

In total, TIFPBQ pretest and posttest for this study included 10 demographic items and an additional 33 Likert scale items. A complete copy of the TIFPBQ pretest and posttest is located in Appendix D. The TIFPBQ pretest and posttest was composed of four sections. The first section was a demographic section with items that I created specific to my sample. The additional three sections - which were adapted from the two
instruments noted above - were Technology Beliefs, Perceived Technology Barriers, and Technology Integration. There was a total of 10 items in section one focusing on demographic information, 12 items in the Technology Beliefs section, 10 items in the Perceived Technology Barriers section, and 11 items in the Technology Integration section, for a total of 43 items. Alignment between research questions and TIFPBQ pretest and posttest items can be seen in Table 3.5. below.

Table 3.5. Alignment between Research Questions and Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) Pretest and Posttest Items

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>TIFPBQ Pretest &amp; Posttest Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology?</td>
<td>11. I support the use of technology in the classroom.</td>
</tr>
<tr>
<td></td>
<td>14. Content knowledge should take priority over technology skills.</td>
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<td></td>
<td>15. Most students have so many other needs that technology use is a low priority.</td>
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<td></td>
<td>17. Teaching students how to use technology isn’t my job.</td>
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<td></td>
<td>19. Technology helps teachers do things with their classes that they would not be able to do without it.</td>
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<td></td>
<td>20. Knowledge about technology will improve my teaching.</td>
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<td></td>
<td>21. Technology might interfere with “human” interactions between teachers and students.</td>
</tr>
<tr>
<td>RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology?</td>
<td>12. A variety of technologies are important for student learning.</td>
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<td></td>
<td>13. Incorporating technology into instruction helps students learn.</td>
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<tr>
<td></td>
<td>16. Student motivation increases when technology is integrated into the curriculum.</td>
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<td></td>
<td>18. There isn’t enough time to incorporate technology into the curriculum.</td>
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<td></td>
<td>22. Technology facilitates the use of a wide variety of instructional strategies designed to maximize learning.</td>
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<td>23. Lack of or limited access to computers in schools.</td>
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<td>25. Lack of knowledge about technology.</td>
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<td></td>
<td>26. Lack of knowledge about ways to integrate technology into the curriculum.</td>
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<tr>
<td>Research Questions</td>
<td>TIFPBQ Pretest &amp; Posttest Items</td>
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<td>27. My university assignment doesn’t require technology use.</td>
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<td>28. Lack of technology accessibility in my university classes.</td>
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<td>29. There is too much material to cover.</td>
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<td>30. Lack of mentoring to help me increase my knowledge about technology.</td>
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<td>31. Technology-integrated curriculum projects require too much preparation time.</td>
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<tr>
<td>32. There isn’t enough time in class to implement technology-based lessons.</td>
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<tr>
<td>RQ3: How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?</td>
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<tr>
<td>33. I (plan to) integrate computer activities into the curriculum.</td>
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<td>34. Technology (will) play(s) an integral role in supporting content learning in my class.</td>
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<tr>
<td>35. I (will) encourage students to work collaboratively on technology-based activities.</td>
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<tr>
<td>36. I (plan to) locate and evaluate educational technologies, including software, hardware, and online resources for use with my students.</td>
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</tr>
<tr>
<td>37. I (will) require students to use a variety of software tools and electronic resources to support learning.</td>
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</tr>
<tr>
<td>38. I (will) use technology to support project- and problem-based learning activities in my classroom.</td>
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<tr>
<td>39. I (will) use technology in my classroom to help support the state curricular standards.</td>
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<tr>
<td>40. I (will) use technology to assist me with classroom management and recordkeeping activities (e.g., grading, attendance).</td>
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<tr>
<td>41. Technology (will) help(s) me meet the individual needs of a variety of students in my classroom.</td>
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<tr>
<td>42. I (will) encourage my students to use technology to demonstrate their knowledge of content in non-traditional ways (e.g. Web sites, multimedia products).</td>
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<tr>
<td>43. I (will) use technology to design new learning experiences for students incorporating the unique capabilities of technology.</td>
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</table>

**Technology Skills, Beliefs, and Barriers scale.** The first instrument that was adapted for use within the TIFPBQ was the Technology Skills, Beliefs, and Barriers scale (Brush et al., 2008). The current study utilized both the Technology Beliefs and the
Technology Barriers sections of the Technology Skills, Beliefs, and Barriers scale. To ensure the validity of these sections utilized, a comprehensive literature review was completed to confirm scale sections were directly related to existing and leading concepts in the field (Brush et al., 2008). The Technology Skills, Beliefs, and Barriers scale was provided to a variety of teachers and educators who encompassed skills and knowledge in the field of educational technology (Brush et al., 2008). The Technology Belief section included 12 Likert scale items which utilized a 4-point Likert scale with the following options: (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree. The Cronbach’s alpha coefficient for the Technology Beliefs section was reported at .85 (Brush et al., 2008).

The Technology Barriers section included items focusing on perceived technology barriers that were involved with teaching (Brush et al., 2008). The Technology Barriers section included 10 Likert scale items which utilized a 3-point Likert scale with the following options: (1) not a barrier, (2) minor barrier, and (3) major barrier. This section reported a Cronbach’s alpha reliability of .81 (Brush et al., 2008).

The Technology Beliefs and Competencies Survey. To establish content validity for The Technology Beliefs and Competencies Survey, several existing surveys were explored and faculty who specialized in educational technology assessed the final survey to check for clarity and consistency (Brinkerhoff, 2006). A total of 11 items were included in the TIFPBQ pretest and posttest which originated from The Technology Beliefs and Competencies Survey section on Technology Integration (Brinkerhoff, 2006). These items utilized a 4-point Likert scale with the following options: (1) strongly
disagree, (2) disagree, (3) agree, and (4) strongly agree. The Cronbach’s alpha coefficient of this section was reported at .96 (Brinkerhoff, 2006). The adapted section of The Technology Beliefs and Competencies Survey used for this research included a change in word tense for the posttest so the items were framed in terms of how the professional development would impact plans for future course design.

**Adapted TIFPBQ pretest and posttest instrument sections and research questions.** Due to the nature of this research and the vast word choices utilized in the field of education technology, it was essential to understand the alignment between the TIFPBQ pretest and posttest sections created from the Technology Skills, Beliefs, and Barriers scale (Brush et al., 2008) and The Technology Beliefs and Competencies Survey (Brinkerhoff, 2006) to the research questions used for this current study. Alignment between the TIFPBQ pretest and posttest instrument sections, the research questions, and the rationale can be seen below in Table 3.6.

<table>
<thead>
<tr>
<th>Section Name</th>
<th>Research Question</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Beliefs</td>
<td>RQ1: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the readiness to integrate technology?</td>
<td>Items in this section aligned to RQ1 because were based on perceptions about technology and faculty participants’ level of readiness to integrate technology. Some items also aligned to RQ2 because they focused on the advantages of technology integration.</td>
</tr>
<tr>
<td></td>
<td>RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.6. Alignment Between Section Name in Technology Integration Faculty Perceptions and Beliefs Questionnaire Pretest and Posttest, Research Questions, and Rationale
<table>
<thead>
<tr>
<th>Section Name</th>
<th>Research Question</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Technology Barriers</td>
<td>RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology?</td>
<td>Items in this section align to RQ2 because they were solely based on the barriers or challenges of technology integration.</td>
</tr>
<tr>
<td>Technology Integration</td>
<td>RQ3: How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?</td>
<td>Items in this section aligned to RQ3 because they focused on how technology was integrated before the professional development in the pretest, and how technology was planned to be integrated after the professional development in the posttest, therefore impacting plans for course design.</td>
</tr>
</tbody>
</table>

**Discussion Boards**

To focus on gathering qualitative data, discussion boards were utilized. Discussion boards were built into the professional development, and therefore appeared throughout the professional development in the LMS. Faculty participants were informed ahead of time that their responses would be used for qualitative data collection. The purpose of discussion boards was that faculty participants would be able to interact freely in the discussion boards to exchange thoughts and opinions with each other. Discussion board interaction promotes learner-learner interaction, while the interaction between the instructor and the faculty highlight instructor-learner interaction (Quality Matters, 2014). Learner-learner interaction is ideal in an online format, as faculty may not have the chance otherwise to meet each other. Faculty may also have the opportunity to learn from
others with different cultural perspectives and backgrounds (Powell & Bodur, 2019; Teräs & Kartoglu, 2018).

There was one introduction discussion board topic which data was not collected from, as well as five additional discussion board topics that data was collected from, all located within the LMS. The five discussion boards that data was collected from were integrated into the professional development with topics aligning to the specific module. The five discussion boards topics were assigned during different modules, so faculty were not overwhelmed and instead felt they had enough time to commit to each discussion board. This also provided the faculty participants an opportunity to discover ideas from one another and interact asynchronously on their own time (Rienties et al., 2013). To ensure interaction, faculty participants were required to make one original post by Thursday of the module week, and respond to at least two of their classmates’ posts by Sunday of the module week. The entire discussion board protocol is located in Appendix E. Alignment between the modules, discussion board questions, and research questions can be seen in Table 3.7.

Table 3.7. Discussion Board Topic, Research Question, and Module Alignment

<table>
<thead>
<tr>
<th>Module</th>
<th>Discussion Board Topics</th>
<th>Research Questions(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1: What is Technology Integration?</td>
<td>Now that we have learned more about technology integration this week, take some time to reflect on the resources and how they relate to your current courses.</td>
<td>RQ1: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology?</td>
</tr>
<tr>
<td></td>
<td>• How ready do you think you are to integrate technology? Rate yourself between 1-10 with 1 being least ready and 10 being most ready. Provide an example for your rationale.</td>
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</tr>
<tr>
<td></td>
<td>• After watching the video about Roger’s (2003) Diffusion of Innovations theory and the adoption</td>
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</tr>
</tbody>
</table>
curve, where do you think you currently fall on this curve based on your feelings and experience related to technology?

- After this professional development, where would you like to fall on this curve? If you would like to fall on the curve in the same place as before the professional development, please note that as well.

Module 2: Exploring Technology Tools

This module introduced us to various technology tools we can use for presentations, infographics, videos, blogs/websites, word processing, web-conferencing, collaboration/group work, and quizzes/formative assessment tools. To review the list, visit the Technology Tools Menu resource in the Read/Watch section of this week. There are also additional resources provided to assist you in choosing technology tools that might interest you. Out of the tools you explored this week, choose one tool that you would like to focus on. This discussion can help you determine if the tool is actually the right fit for your course and whether or not it aligns with your goals and objectives. Regardless of whether or not you'll end up using the tool, your discussion will be helpful for other participants to see your thoughts and review on your selected tool. To determine the feasibility of using the tool in your course, answer the following questions:

- Why did you ultimately choose this tool?
- Discuss two foreseeable benefits of integrating this technology into your future online courses. Explain how these would be advantageous for both you and your students?
- Discuss two possible challenges of integrating this technology into your future online course. Explain how these would be disadvantageous for

RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology?

RQ3: How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?
<table>
<thead>
<tr>
<th>Module</th>
<th>Discussion Board Topics</th>
<th>Research Questions(s)</th>
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<tbody>
<tr>
<td></td>
<td>both you as the faculty member, as well as for your students.</td>
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<tr>
<td></td>
<td>• Overall, can you see yourself integrating this tool into your classroom in the future?</td>
<td></td>
</tr>
<tr>
<td>Module 3: Barriers to Technology Integration</td>
<td>It is no secret during a technology integration, you'll discover unique advantages and barriers. Using specific examples, explain the two biggest potential challenges you foresee may impact whether or not you decide to integrate technology after this professional development is over. Discuss the type of support that you would like to receive in order to overcome these challenges.</td>
<td>RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology? RQ3: How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?</td>
</tr>
<tr>
<td>Module 4: Evaluating Your Technology Tools</td>
<td>Review the Technology Tool Menu. Choose a tool (that is different from the one you chose in Module 2) that you would like to evaluate for future use. Feel free to use another tool even if it is not on this list and you find one that interests you! Regardless of what role you play in a course, choose a tool that genuinely interests you, that you think your students would enjoy, and that has the ability to link to your course objectives. Once you've selected a tool to evaluate, download and complete the Technology Tool Evaluation Template. Then, come back here and attach your completed evaluation. Additionally, answer the following questions.</td>
<td>RQ3: How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?</td>
</tr>
</tbody>
</table>
### Module 6: Technology Integration: Your Turn

Throughout this professional development you've learned that integrating technology into online courses takes time and has many intricacies. Please answer the following questions regarding your experience in this professional development:

- **Now that you have almost completed this last module, do you feel that you're more prepared to integrate technology into your future courses than you were at the beginning of this course.**

- **Do you plan to integrate technology into any of your courses moving forward? If so, how? If not, why?**

*Keep in mind this integration may look different for an Course Developer than it will for a Facilitator.*

<table>
<thead>
<tr>
<th>Research Questions(s)</th>
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<tbody>
<tr>
<td>RQ1: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology?</td>
</tr>
<tr>
<td>RQ3: How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?</td>
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**Semi-Structured Interviews**

The final form of qualitative data originated from one-on-one synchronous semi-structured interviews. The purpose of using qualitative interviews in this research was to give the interviewer an opportunity to see the viewpoint of the interviewee (Patton,
2002). Specifically, I wanted to see how faculty participants responded to questions that aligned to each research question in the study. I chose to use interviews because it provided an additional faculty participant perspective that was not able to be expressed in the TIFPBQ pretest and posttest because it allowed for real-time interaction.

Based on the selection criteria explained in the participants and setting section above, five faculty participants from the study participated in individual interviews. Each interview took between 30 and 60 minutes. These semi-structured interviews occurred 1-2 weeks following the final week of the professional development. This type of semi-structured interview allowed the researcher more flexibility, as there was more of a focus on interaction instead of following a specific set of questions, in a specific order (Edwards & Holland, 2013). Therefore, in this study, minor modifications to interview questions were made to follow the answers provided by the faculty participants to keep the interview flow consistent.

To align with the online structure of the professional development, all interviews were conducted via Zoom. All interviews were recorded using the built in recording feature in Zoom, as the recording provided benefits to the researcher while the interview was in progress, as well as once the interview was concluded (Edwards & Holland, 2013). I ensured each interview took place in a private location with minimal noise (Edwards & Holland, 2013). All interview recordings produced a .mp4, which was a standard and recognizable video file. In addition, recording ensured that I was able to focus directly on the emotions and reactions of the participants, as well as keep a direct line of vision with the participant during the interview (Edwards & Holland, 2013). After the completion of all interviews, each interview was transcribed.
For the interview to be successful and produce valuable information, the interviewer must ensure proper interview design (Patton, 2002). To support this, interviews take time to design and require ample preparation and development time (Mason, 2002). Therefore, the interview for this study was designed so that questions specifically aligned with RQ1, RQ2, and RQ3. In relation to RQ1, faculty participants were asked to specifically discuss how the professional development on technology integration impacted their faculty perceptions relating to their readiness to integrate technology into their online courses. To gather data for RQ2, faculty participants shared their honest opinions about the advantages and challenges of technology integration both before and after the professional development. Lastly, information gathered from RQ3 was especially important because faculty participants were asked about if (at all) the content they learned during in the professional development impacted their plans for course design. Questions aligning to RQ3 also allowed faculty participants an opportunity to share what, if any, specific online learning components/tools they planned to implement in their course design. Specific alignment between research questions and interview questions can be seen in Table 3.8. below. The entire interview protocol can be viewed in Appendix F.

Table 3.8. Research Question and Interview Questions Alignment

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Interview Questions</th>
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</table>
| RQ1: How, and to what extent, does participating in online technology integration professional development | 1. Based on the information you shared in the demographics section of the TIFPBQ, I understand you have been teaching online for X years. Is this correct?  
   a. If yes: Great. What initially made you want to begin to teach online?  
   b. If no: I understand. How long have you been teaching online?  
   2. How comfortable do you feel teaching online? |
<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Interview Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>impact faculty perceptions about readiness to integrate technology?</td>
<td>3. Thinking back to before this professional development, can you tell me your overall perception of technology integration for online learning? For example, does it excite you? Scare you? Why?</td>
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<td></td>
<td>4. Can you think of a time where you ran into an issue teaching online such as issues with students or problems with technology?</td>
</tr>
<tr>
<td></td>
<td>5. Prior to this professional development, can you provide an example of a time when you integrated technology in your online course? (If they cannot provide an example): I understand. Instead, can you think of a time in your online course that technology integration would have been helpful?</td>
</tr>
<tr>
<td></td>
<td>6. Are your perceptions the same now that the professional development has ended? Why or why not?</td>
</tr>
<tr>
<td></td>
<td>a. Can you provide an example of this?</td>
</tr>
<tr>
<td>RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology?</td>
<td>7. I know that technology integration is no easy feat. Prior to this professional development, what were some of the most significant barriers to success you encountered related to technology integration for your online courses?</td>
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<tr>
<td></td>
<td>8. Now that you have completed this professional development, do you still view these as barriers?</td>
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<td></td>
<td>9. I know a lot of new information was presented in this professional development. So, do you anticipate any new challenges related to technology integration in your online courses?</td>
</tr>
<tr>
<td></td>
<td>10. Now that you have completed this professional development, what do you think will be most challenging about integrating technology into your courses?</td>
</tr>
<tr>
<td></td>
<td>11. Is there anything specific you think your students will find challenging about your new ideas on technology integration?</td>
</tr>
<tr>
<td></td>
<td>12. If you are trying to integrate technology into your course and you run into trouble, do you think you would feel supported by the assistance available to you?</td>
</tr>
<tr>
<td></td>
<td>13. I appreciate you being so open about your challenges. On the opposite side of the spectrum, before you enrolled in this professional development what, if anything, did you view as positive aspects of integrating technology into online learning?</td>
</tr>
</tbody>
</table>
Research Questions | Interview Questions
--- | ---
14. Did you learn anything new in this professional development that revealed new advantages to technology integration? | 16. The professional development explored a lot of new tools for online learning. Are there any tools, in particular, you are most optimistic about integrating?
15. Is there anything specific you learned in this professional development that you think your students will be excited to see integrated into your online class? | 17. How do you plan to use these tools?
16. The professional development explored a lot of new tools for online learning. Are there any tools, in particular, you are most optimistic about integrating? | 18. Typically, how often do you revise and review your online courses? If you are new to online learning, how often do you think it is appropriate to review and revise your online courses?
17. How do you plan to use these tools? | 19. Now that you have completed this professional development, do you plan to make any updates to your course in terms of technology integration?
18. Typically, how often do you revise and review your online courses? If you are new to online learning, how often do you think it is appropriate to review and revise your online courses? | a. (If yes): How soon do you plan to make these changes? Next week, next semester, next year?
19. Now that you have completed this professional development, do you plan to make any updates to your course in terms of technology integration? | b. (If yes): What is your plan to begin making these changes?
18. Typically, how often do you revise and review your online courses? If you are new to online learning, how often do you think it is appropriate to review and revise your online courses? | c. (If yes): What updates are you most excited about
d. (If yes): What updates intimidate you the most?
e. (If yes): Why is that?
f. (If no): Do you feel more support should be offered?
20. Is there anything else you wish was included in this professional development that would have prepared you better to integrate technology into your future course design? | 20. Is there anything else you wish was included in this professional development that would have prepared you better to integrate technology into your future course design?
21. Do you have anything else you want to share about your overall perceptions of this professional development and readiness to integrate technology in your online courses in the future? | 21. Do you have anything else you want to share about your overall perceptions of this professional development and readiness to integrate technology in your online courses in the future?

**Data Analysis**

To analyze quantitative data, I used descriptive statistics and inferential statistics and to analyze qualitative data, I used inductive analysis to assist in drawing final conclusions. In this step, the overall objective was to condense all the information gathered into smaller, workable groups of data (Mertler, 2017). Quantitative and
qualitative data analysis provided insight and helped answer the research questions that were proposed at the beginning of the study (Mertler, 2017). In order to do this effectively, I analyzed the qualitative data and the quantitative data separately as outlined below (Guest, MacQueen, & Namey, 2012). Direct alignment between research questions, data collection methods, and data analysis can be critical and can be seen below in Table 3.9.

Table 3.9. Research Question, Data Sources, and Data Analysis Alignment

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Data Sources</th>
<th>Data Analysis</th>
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<tbody>
<tr>
<td>RQ1: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology?</td>
<td>- Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) pretest &amp; posttest</td>
<td>-Inferential Statistics: Wilcoxon signed-rank test -Descriptive Statistics: mean and standard deviation -Inductive analysis</td>
</tr>
<tr>
<td></td>
<td>-Semi-structured interviews</td>
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<td></td>
<td>-Discussion boards</td>
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<tr>
<td>RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology?</td>
<td>- TIFPBQ pretest &amp; posttest</td>
<td>-Inferential Statistics: Wilcoxon signed-rank test -Descriptive Statistics: mean and standard deviation -Inductive analysis</td>
</tr>
<tr>
<td></td>
<td>-Semi-structured interviews</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Discussion boards</td>
<td></td>
</tr>
<tr>
<td>RQ3: How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?</td>
<td>- TIFPBQ pretest &amp; posttest</td>
<td>-Inferential Statistics: Wilcoxon signed-rank test -Descriptive Statistics: mean and standard deviation -Inductive analysis</td>
</tr>
<tr>
<td></td>
<td>-Semi-structured interviews</td>
<td></td>
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<td></td>
<td>-Discussion boards</td>
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</table>
Quantitative Data Analysis

The quantitative data originated from the TIFPBQ pretest and posttest. I used both descriptive statistics and inferential statistics in quantitative data analysis. Specifically, in the TIFPBQ pretest and posttest, I compared Likert scale items, which some items had a 4 point Likert scale range and others have a 3 point Likert scale range.

Descriptive statistics and analysis typically include the calculation of the mean and standard deviation (Creswell, 2014). Therefore, in this study, I calculated the mean and standard deviation for each section of the TIFPBQ pretest and posttest, for both the pretest and posttest using JASP (Version 0.11.1, 2020). There were five items in the Technology Beliefs section of the TIFPBQ pretest and posttest that were reverse coded in terms of the mean because they are worded negatively (Brush et al., 2008). In terms of presenting the findings of my descriptive statistics, I displayed this data in a table, with pretest and posttest mean and standard deviation side-by-side so it clearly showed the impact, if any, that the professional development had on the different sections. I then created a narrative description that expanded on specific details regarding the data. Once I calculated the mean for each TIFPBQ pretest and posttest section, I compared the means of each TIFPBQ section using inferential statistics. In particular, I used the Wilcoxon signed-rank test to test the same group on two different occasions (“Wilcoxon”, 2018). In this situation, I tested the entire sample of online faculty participants at LC, with the two different occasions being the TIFPBQ pretest (administered prior to the first week of the professional development), and the TIFPBQ posttest (administered in the final week of the professional development). This t-test was a stronger way to determine if there was a significant difference between the means of the
pretest and posttest data ultimately determining what impact (if any) the professional
development had. The $p$ value for each section was calculated and compared against an
alpha level of .05, which was common in educational research studies (Mertler, 2017) in
order to show if there was a significant difference between the TIFPBQ pretest and
posttest. As multiple TIFPBQ sections answered one RQ, the Bonferroni correction was
conducted and the alpha was adjusted accordingly to determine significance. Results of
inferential statistics were examined thoroughly by discussing in text the significance (if
any) that the professional development had on each section of the TIFPBQ pretest and
posttest.

**Qualitative Data Analysis**

During qualitative data analysis, it is typical to collect and analyze data from
multiple sources (Creswell, 2014). Therefore, as explained in the data collection section, I
collected two types of qualitative data, including semi-structured interviews and
discussion boards. Both types of qualitative data analysis were conducted using inductive
analysis, meaning that the common themes of the data were extracted from the “bottom-
up” (Lodico, Spalding, & Voegtle, 2006, p. 5). Specifically, inductive reasoning follows
an approach where the researcher makes observations and collects data, investigates the
data to find themes, and then provides an overview of the themes and patterns in the data
(Lodico et al., 2006; Thomas, 2006). It is also important to note that in qualitative data
analysis, this does not happen in a linear motion, but instead a spiral for continuous
improvement and change (Creswell, 2017).

I used the same coding methods for both the discussion boards and semi-
structured interviews. Analysis of all data sources was ongoing, as data from multiple
sources needed to be studied before answering each research question. In an effort to keep participant scores and identities confidential (Lodico, Spaulding, & Voegtle, 2006), I assigned each faculty participant a pseudonym.

Responses from the discussion boards and from the semi-structured interviews were transcribed and exported into respective Microsoft Word documents and then combined into one document for purpose of analysis. From here, I read through all the data thoroughly to ensure a clear understanding of faculty participants’ responses to prepare for coding. Simply put, coding data is categorizing data into a uniform set of groups that make the data easier to analyze and interpret (Mason, 2002, p. 150).

All coding was conducted using a computer-aided qualitative data analysis (CAQDAS) through Delve (delvetool.com). This type of analysis was be chosen because it utilized technology, which made it quicker to retrieve codes given to the data (Mason, 2002). I examined these data sources using the sentence-by-sentence unit of analysis and assigned specific codes to the corresponding data. When coding my qualitative data, I specifically used the technique of looking for repetition in semi-structured interview and discussion board data while looking for looking themes (Bernard, Wutich, & Ryan, 2017). This allowed me a better insight into topics or content that faculty participants found very essential, and therefore, continually repeated that specific information.

As I was the only coder in this process, after the initial first round of coding was completed for each data source, I conducted a second round of coding to ensure reliability and consistency in the codes (Fink, 2017). It is important to note that although CAQDAS was very helpful when it came to assigning codes and extracting the data into
categories, I still took the time to understand, analyze, and code the data. Technology software helped, but it did not do the work.

Once the analysis was completed for both sources of qualitative data, I reported my findings. I studied the findings to locate overarching themes that applied to more than one data source (Creswell, 2014). Throughout this analysis, I continually quoted faculty participants from the discussion boards and semi-structured interviews to support my findings and shared the stories of my study participants, as well as to see the big picture (Creswell, 2017). From here, I displayed the data in multiple screenshots for readers to view and follow my coding process. In addition, visuals were created to present the final themes. Through the visuals and screenshots, not only did they display a summary of findings, but also provided insight into justification and outcomes from this study (Creswell, 2017). Because these were electronic, it will also be easier for me to share these findings with any interested stakeholders or parties in the future.

**Integration of My Findings**

Outlined above are the ways in which I reported both my quantitative and qualitative findings separately to ensure data were clearly understood. After the data were reported separately, I combined the results and findings to align with each, research question (Creswell & Plano Clark, 2018). To accomplish this, I utilized a common approach for integrating quantitative and qualitative data known as a convergent design for the primary data analysis integration procedures (Creswell & Plano Clark, 2018). This allowed me to show the big picture results and ensure triangulation. The primary purpose of the integration of data was that it allowed me to compare the quantitative and qualitative data collected and answer my research questions in an extensive and thorough
process (Creswell & Plano Clark, 2018). For example, all data findings related to RQ1 were written cohesively, so the results for RQ1 were clear and purposeful. This encompassed findings from all three data sources, including the TIFPBQ pretest and posttest, semi-structured interviews, and discussion boards. The same process was followed for RQ2 and RQ3, so each research question narrative was present. From here, I was able to explain how the converged data findings answered whether or not the online professional development on technology integration impacted faculty perceptions and plans for course design.

**Procedures and Timeline**

This action research utilized a timeline which included three different phases. Each phase was a specific length and included specific tasks for both the researcher and the faculty participants. Phase 1 was the action research preparation phase, Phase 2 was the actual implementation of the faculty participants technology integration professional development and data collection phase, and Phase 3 was the data analysis phase. The breakdown for each phase can be seen in Table 3.10. and is explained in the text below.

**Phase 1: Planning**

Phase 1 began in January of 2020 and lasted a total of three weeks in length. Prior to the start of Phase 1, in preparation for the study, approval from both the University of South Carolina and LC Institutional Review Board (IRB) was obtained (see Appendix G). As the researcher, I began this phase by sending out emails to invite potential faculty to participate in the study. This phase was important because this is when I designed and built the professional development in the LMS. I also ensured that the final designed professional development was fully functional and ready to launch.
Simultaneously, I invited the possible faculty participants to join the study. Once a faculty member agreed to participate in the study, they were sent the overview and consent form via their LC email address. Once the consent form was signed by the faculty participant, I signed my section of the form and emailed a copy back to the faculty for their records. Additionally, after completion of the consent form, I emailed each faculty participant a link to the TIFPBQ pretest. Faculty were instructed to complete the TIFPBQ prior to the start date of the study, as the pretest needed to be completed before they could be enrolled in the professional development. During this phase, the faculty participants reviewed the study overview, signed/submitted the consent form, and completed the TIFPBQ pretest. Once all faculty completed the TIFPBQ pretest, I enrolled each faculty participant in the professional development shell in the LMS. Finally, I also began my audit trail of journals and memos during Phase 1.

Table 3.10. Breakdown of Phases for Timeline

<table>
<thead>
<tr>
<th>Phase/Length</th>
<th>Date</th>
<th>Researcher’s Role</th>
<th>Faculty Role</th>
</tr>
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<tbody>
<tr>
<td>Phase 1: 3 Weeks</td>
<td>January 2020</td>
<td>• Received Institutional Review Board approval from the University of South Carolina and Laken College&lt;br&gt;• Emailed possible faculty participants&lt;br&gt;• Designed/built professional development in our Learning Management System (LMS)&lt;br&gt;• Tested out final professional development&lt;br&gt;• Identified faculty participants&lt;br&gt;• Provided an overview of the study to faculty participants and administered consent forms</td>
<td>• Reviewed the study overview&lt;br&gt;• Signed and submitted consent forms&lt;br&gt;• Completed Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) pretest</td>
</tr>
<tr>
<td>Phase/Length</td>
<td>Date</td>
<td>Researcher’s Role</td>
<td>Faculty Role</td>
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<tr>
<td>Phase 2:</td>
<td>February – March 2020</td>
<td>• Enrolled faculty participants in LMS shell</td>
<td>• Completed professional development</td>
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<tr>
<td>6 Weeks</td>
<td></td>
<td>• Started audit trail</td>
<td>• Completed TIFPBQ posttest</td>
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<td></td>
<td>• Implemented faculty participants technology professional development in the LMS</td>
<td>• If selected, participated in semi-structured interviews</td>
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<td>• Monitored professional development</td>
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<td></td>
<td></td>
<td>• Provided feedback and interacted on submitted assignments and discussion boards</td>
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<tr>
<td></td>
<td></td>
<td>• Selected faculty participants for, and conducted semi-structured interviews</td>
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<tr>
<td></td>
<td></td>
<td>• Began peer debriefing</td>
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<td></td>
<td></td>
<td>• Continued working on my audit trail</td>
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<tr>
<td>Phase 3:</td>
<td>April – July 2020</td>
<td>• Analyzed TIFPBQ pretest and posttest using descriptive and inferential statistics</td>
<td>• Reviewed individual transcript for accuracy (if applicable)</td>
</tr>
<tr>
<td>16 Weeks</td>
<td></td>
<td>• Analyzed discussion boards and interviews using inductive analysis</td>
<td>• Reviewed major findings or themes sent by the researcher to check for accuracy (member checking)</td>
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<tr>
<td></td>
<td></td>
<td>• Continued peer debriefing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Continued working on audit trail</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Completed member checking by emailing individual transcripts to each interviewee and shared themes with all faculty participants to review for accuracy</td>
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<tr>
<td></td>
<td></td>
<td>• Wrote quantitative results and qualitative findings separately, then integrated them together to answer each research question</td>
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</table>
Phase 2: Implementation & Data Collection

After Phase 1 was completed, Phase 2 began. It was six weeks in length and took place during February and March of 2020. This start date was chosen to allow faculty participants time to get settled into the Spring 2020 classes they were teaching before they began the professional development. Additionally, and intentionally, it ended the day that spring break began. As the researcher, I was in charge of implementing the faculty technology professional development and monitoring the professional development in the LMS. This required me to log into the LMS four to five times per week to ensure everything was on track. I also checked my email every day in case there was any unforeseen technical difficulties, as it allowed me a quick response time to troubleshoot with faculty participants. Additionally, I interacted with faculty participants in the professional development and provided timely feedback to faculty on submitted work. In this phase, I also focused continued working on my audit trail.

The faculty participants in this study also had many tasks they needed to accomplish during this phase. During the first week of this phase, faculty participants began the professional development. Throughout this phase they continued to progress through the professional development and completed the Getting Started module, as well as modules 1-6. This entailed completing discussion boards and assignments. In the final week of the professional development, faculty participants completed the TIFPBQ posttest. Finally, for those five faculty participants that were selected, they took part in the semi-structured interviews.
**Phase 3: Data Analysis**

Upon completion of Phase 2, Phase 3 commenced. Due to the amount of data collected during the previous phase, this phase lasted approximately sixteen weeks, beginning in April 2020 and ending in July 2020. This phase included analyzing and triangulating of data from the TIFPTQ pretest and posttest discussion boards, and semi-structured interviews. The TIFPBQ pretest and posttest was analyzed using descriptive and inferential statistics. The discussion boards and semi-structured interviews were analyzed using inductive analysis, specifically coding, to find emerging themes. Throughout the analysis of qualitative data, I participated in peer debriefing with my dissertation chair.

During this stage, I also conducted member checking in two ways. First, once all interviews were transcribed, I shared individual interview transcripts with faculty participants to review for accuracy and request feedback. Secondly, I emailed all faculty participants the themes that emerged from my qualitative data to ensure they aligned with their experiences from the study. During this phase, the faculty participants also had an active role, as they were asked to review the major themes and semi-structured interview transcripts (if applicable) for accuracy.

After all data was analyzed, I documented my findings. I first wrote about my quantitative results and qualitative findings separately. Then, I integrated both my qualitative and quantitative data together to answer each research question. Furthermore, my audit trail also continued throughout the conclusion of phase 3.
Rigor and Trustworthiness

Reliability and validity for the quantitative instrument were described in the data collection section above. For qualitative data, rigor and trustworthiness methods ensured that the results of the study were accurate, believable, and consistent with the collected data (Merriam, 2009; Shenton, 2004). Therefore, it was essential to implement methods of rigor and trustworthiness throughout this study. The types of rigor and trustworthiness measures that were used in my study included (a) rich, thick description, (b) methodological triangulation, (c) member checking, (d) peer debriefing, and (e) an audit trail.

Rich, Thick Description

As I wrote descriptions of the setting, activities, and faculty participants, I went to great lengths to provide numerous and precise details. Creswell (2014) referred to this process as “rich, thick descriptions” (p. 202) and asserted that it allowed the reader to share the experience. In addition, rich, thick descriptions contextualized the study allowing the reader to connect their own situations to those of the study (Merriam, 2009). If the study lacked this type of description, it may be challenging at the conclusion of the study for the population to understand how the results “ring true” (Shenton, 2004, p. 69).

Therefore, this detailed description played a vital role in this study to help the audience visualize the essential elements of the study. As the setting of this study was online within the LMS environment, I described various environment features, including the layout, content, format, and overall navigation. This allowed the audience to visualize themselves in the LMS to fully understand the study setting. Narratives and statements from the faculty interviews were also utilized to allow a glimpse into their thoughts,
attitudes, and experiences during the study. Also, discussion board comments were examined and shared to learn more about faculty participants’ views toward technology integration and see how they may have shifted over time. Lastly, I shared in great detail the faculty participants in the study, including demographics such as their discipline and experience with teaching online.

**Methodological Triangulation**

Methodological triangulation is a method utilizing both qualitative and quantitative data to justify emerging themes (Creswell, 2014; Guba, 1981; Shenton, 2004). Triangulation allows qualitative methods to compensate for the limitations of and supports the findings of quantitative methods, and vice versa (Mertler, 2017; Shenton, 2004). In addition, triangulation can be considered as an approach to combine qualitative and quantitative methods to seek answers to the same problem (Morse, 1991). First, I utilized triangulation of data by comparing the information gathered on the TIFPBQ pretest and posttest against the data collected from the semi-structured interviews. This ultimately consisted of comparing data that was compiled from that faculty participants filling out in TIFPBQ pretest and posttest on their own, versus what they expressed to me in a one-on-one interview setting. I then examined the data collected in the discussion boards, as this provided insight into what faculty participants were discussing amongst each other. Triangulation of these three data sources ensured that the information in all three methods was consistent with the emerging themes of the data.

**Member Checking**

Member checking is discussing the accuracy of data and findings collected via interviews and observations with the participants of the study (Lodico et al., 2017).
Member checking can be the most important way of ruling out my misinterpretations or misunderstandings, as well as recognizing my biases that emerge in my interpretations (Guba, 1981; Maxwell, 2005). To support this, Guba (1981) stated that member checking “is the single most important action inquirers can take” (p. 85). Before I shared my final product with the faculty participants, I shared the major themes with the faculty participants involved in my study to review them for accuracy (Creswell, 2014; Mertler, 2017; Shenton, 2014). I provided the major themes and summaries of each theme to faculty participants in the study via LC email. I also emailed the five faculty interviewees their transcripts. From here, I asked the faculty participants to read my interpretations in order to determine if my findings matched up with what intended (Shenton, 2014). The goal of member checking was to ensure their experiences matched my qualitative themes.

**Peer Debriefing**

According to Mertler (2017), “peer debriefing is the act of using other professionals ... who can help you reflect on the research by reviewing and critiquing your processes of data collection, analysis, and interpretation” (p. 143). The questions and input that I received during peer debriefing sessions allowed me to ensure outsiders understood my research, as well as allowed me to separate from my own biases (Guba, 1981; Mertler, 2017; Shenton, 2004). Peer debriefing occurred with my dissertation chair to ensure all data analysis had been exhausted. These debriefings with my dissertation chair helped me to correct any flaws and answer critical questions (Shenton, 2004). Peer debriefing with my dissertation chair was a very helpful way to talk through my thoughts and allowed my chair to interrogate my qualitative findings.
I also requested my colleagues’ feedback, since they were detached from the project, but still very knowledgeable of the content (Shenton, 2004). This technique of incorporating colleagues’ feedback to improve learning was referred to as critical friends’ groups (Dunne & Honts, 1998). Working with a very talented team at LC, my colleagues’ opinions greatly enhanced my study in this peer debriefing phase. Specifically, I asked my colleagues to review data and determine the plausibility of my findings and emerging themes. They also reviewed the actual professional development course in the LMS prior to implementation. The colleagues in my department work daily in the LMS, so all team members were very well trained in its capabilities and functions.

Audit Trail

An audit trail is a type of documentation a researcher uses to create a path of evidence detailing how the research was conducted and how data were analyzed and interpreted (Guba, 1981; Mertler, 2017; Shenton, 2004). This method helped to add trustworthiness to my study because anyone could retrace the steps I made throughout the study process (Shenton, 2004). I accomplished the audit trail by writing memos. In my memo writing, I wrote comprehensive notes which helped “catch your thoughts, capture the comparisons and connections you make, and crystallize questions and directions for you to pursue” (Charmaz, 2006, p. 72). In addition, in my memos, I had a chance to interact with my data and document my thoughts at that exact moment, which assisted me later in the research process (Charmaz, 2006). Memo writing was especially important in this study when I was analyzing my qualitative data and transitioning from my codes all the way through to the emerging themes. It was very functional and helpful to have a
documented path of how I progressed through my analysis, as it supported the decisions I made with evidence of how they were formed.

**Plan for Sharing and Communicating Findings**

Without sharing the findings of action research projects, a gap will continue to exist between “research and application” (Mertler, 2017, p. 259). Therefore, as action research has a direct link to the researchers’ workplace, it is essential to share a plan for communicating findings at a local level and in this case, to online faculty at LC. As faculty would be interested to know whether or not taking part in an online technology integration professional development would impact their online courses, regardless of the outcome of the action research, a report will be created to distribute to all faculty. In my local context, first I will share the results with the faculty participants involved in the study by creating a presentation and sharing it on a web-conference meeting. This will allow both local and regional online faculty members involved in the study to review the findings. Next, I will plan an informal presentation session where faculty could learn more about the study, ask questions, suggest new content, and showcase optional faculty participant testimonials. As university administrators have the final say in course design mandates and technology decisions, I will invite administrators to a presentation in the college’s learning commons to specifically explain the study to the audience and seek their feedback through evaluation forms. To reach more local universities, I will look for local higher education conferences which are held yearly in Boston, MA such as LearnLaunch Across Boundaries Conference. This would be an ideal avenue to share the results of this study, as it will provide an opportunity to present a project that could also impact other local universities.
With the growth of online learning, it will also be useful to share the results of this study at a national level, ideally the annual United States Distance Learning Association conference, as a session within the higher education track. Additionally, I will consider sharing it at the Association for Educational Communications and Technology annual conference. At both the local and regional conference, this presentation will focus on sharing the findings of my study and how others could implement a similar study at their institution. I will provide evaluation forms for the audience to provide feedback that could be used to enhance the professional development in the future.

As all data will be electronic, the faculties’ identities and confidentiality were of the utmost importance, as all electronic files were password protected and stored on a protected server, in a locked area, which ensured the highest security to protect information and identities (Albee, 2015). In addition, in order to build a relationship of respect in educational research between the researcher and the participants, it will be essential to ensure participants identities will be kept confidential (Kanuka & Anderson, 2007). Therefore, before sharing the findings, each participant will be identified by a pseudonym, so their personal information is never shared. I will remove any personally identifying information such as schools or disciplines when sharing my results so certain faculty participants names are confidential and do my best to ensure they will not be identified by administration or colleagues.
CHAPTER 4
ANALYSIS AND FINDINGS

The purpose of this action research was to implement and evaluate the impact of online technology integration professional development for faculty teaching at a distance at LC. Both quantitative (TIFPBQ pretest and posttest) and qualitative data (discussion boards and semi-structured interviews) were collected and analyzed. Data collection was based on the following three research questions:

1. How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology?

2. How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology?

3. How, and to what extent, does participating in online technology integration professional development impact faculty plans to integrate technology into their course design?

Quantitative Findings

The quantitative data source in this study was the TIFPBQ pretest and posttest. This section will discuss the TIFPBQ pretest and posttest sections, as well as report reliability. Additionally, this section will explore methods of analysis used on the
TIFPBQ pretest and posttest sections of data, focusing on descriptive statistics, inferential statistics and levels of significance. All analyses of the data were conducted using JASP.

**Technology Integration Faculty Perceptions and Beliefs Questionnaire**

The TIFPBQ pretest and posttest (see Appendix D) measured faculty perceptions and beliefs as they related to various elements of technology integration. The TIFPBQ pretest was completed prior to the first week of the professional development, and the TIFPBQ posttest was completed in the final week of the professional development.

The TIFPBQ pretest and posttest instrument was the combination of two existing technology integration instruments, The Technology Beliefs and Competencies Survey. (Brinkerhoff, 2006) and the Technology Skills, Beliefs, and Barriers scale (Brush et al., 2008). The TIFPBQ pretest and posttest used in this research was comprised of 43 total items, including 10 demographic items and three sections totaling 33 Likert scale items. The three sections of the TIFPBQ pretest and posttest were identified as: Technology Beliefs, Perceived Technology Barriers, and Technology Integration. Although there were 16 faculty participants in this research study, only data from 15 faculty participants were analyzed in the TIFPBQ pretest and posttest secondary to one faculty participant not completing the posttest. There were five items in the Technology Beliefs section of the TIFPBQ pretest and posttest that were reverse coded in terms of the mean because they were worded negatively (Brush et al., 2008).

The Cronbach’s alpha was calculated to measure the TIFPBQ pretest and posttest for reliability, also referred to as internal consistency. Conducting a test of internal consistency is a common way to test reliability of a questionnaire (Tavakol & Dennick, 2011). Taking under advisement the Technology Skills, Beliefs, and Barriers survey's
authors recommendation to remove one question within the Technology Beliefs section (Brush et al., 2008) because it consistently revealed a below .30 correlation score when standardizing outcomes of the survey, I also removed that one question from this research test of internal consistency. The Cronbach’s alpha score for the Technology Beliefs section pretest was $\alpha = .51$ (poor) and the Cronbach’s alpha posttest score was $\alpha = .71$ (acceptable). See Table 4.1. for the Cronbach’s alpha scores for each pretest and posttest section analyzed, which revealed the Technology Integration section pretest having an excellent outcome ($\alpha = .90$) and the Technology Integration section posttest near excellent ($\alpha = .85$).

Table 4.1. Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) Pretest and Posttest Section’s Cronbach’s Alpha Scores

<table>
<thead>
<tr>
<th>TIFPBQ Section</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Beliefs</td>
<td>.51</td>
<td>.71</td>
</tr>
<tr>
<td>Perceived Technology Barriers</td>
<td>.78</td>
<td>.83</td>
</tr>
<tr>
<td>Technology Integration pretest</td>
<td>.90</td>
<td>.85</td>
</tr>
</tbody>
</table>

**Descriptive statistics.** Descriptive statistics were used first to summarize data and describe various elements of the participants studied (Bakeman & Robinson, 2005) and included calculation of the mean and standard deviation (Creswell, 2014). To determine if the participation in professional development impacted faculty perceptions and plans to integrate technology into course design, the mean and standard deviation were calculated for the three pretest and posttest sections.

**Technology Integration Faculty Perceptions And Beliefs Questionnaire Pretest And Posttest by section.** Table 4.2. displays the descriptive statistics for the TIFPBQ pretest and posttest by section. The Technology Beliefs section included 12 items which
utilized a 4-point Likert scale with the following options: (1) *strongly disagree*, (2) *disagree*, (3) *agree*, and (4) *strongly agree*. Using descriptive statistical analysis, the mean score of faculty participants’ responses for the Technology Beliefs section of the TIFPBQ pretest prior to participating in the professional development was 3.24 (SD = 0.84). The mean score of faculty participants’ responses for the Technology Beliefs section of the TIFPBQ posttest after participating in the professional development was 3.34 (SD = 0.86).

Table 4.2. *Descriptive Statistics for Each Section of the Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) Pretest and Posttest*

<table>
<thead>
<tr>
<th>TIFPBQ Section</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Technology Beliefs</td>
<td>3.24</td>
<td>0.84</td>
</tr>
<tr>
<td>Perceived Technology Barriers</td>
<td>1.92</td>
<td>0.79</td>
</tr>
<tr>
<td>Technology Integration</td>
<td>3.20</td>
<td>0.84</td>
</tr>
</tbody>
</table>

*Note. N = 15.*

The Perceived Technology Barriers section included 10 items which utilized a 3-point Likert scale with the following options: (1) *not a barrier*, (2) *minor barrier*, and (3) *major barrier*. Using descriptive statistical analysis, the mean score of faculty participants’ responses for the Perceived Technology Barriers section of the TIFPBQ pretest prior to participating in the professional development was 1.92 (SD = 0.79). The mean score of faculty participants’ responses for the Perceived Technology Barriers section of the TIFPBQ posttest after participating in the professional development was 1.70 (SD = 0.75). It is important to mention that, as noted in the options above, selecting a 1 would indicate *not a barrier* towards technology integration, while selecting a 3 would indicate a *major barrier*. In this professional development, there was a module that
focused on recognizing and overcoming technology barriers. Therefore, a decreasing mean score in this section was a positive result, as it indicated faculty participants were viewing elements of technology as less of a barrier after they completed the professional development compared to before they completed the professional development.

The Technology Integration section included 11 items which utilized a 4-point Likert scale with the following options: (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree. Using descriptive statistical analysis, the mean score of faculty participants’ responses for the Technology Integration section of the TIFPBQ pretest prior to participating in the professional development was 3.20 ($SD = 0.84$). The mean score of faculty participants’ responses for the Technology Integration section of the TIFPBQ posttest after participating in the professional development was 3.62 ($SD = 0.50$).

**Inferential statistics.** Inferential statistics were used to test the hypotheses and draw conclusions (Lee, Dinis, Lowe, & Anders, 2016). Specifically, inferential statistics were used to test the hypotheses that the technology integration professional development would impact faculty perceptions and plans to integrate technology into their course design. Inferential statistical analysis began with conducting the Shapiro-Wilk test, as this test was a common procedure to check for normality within a set of data (Razali & Wah, 2011). The Shapiro-Wilk normality test (Razali & Wah, 2011; Shapiro & Wilk, 1965) identified significant results suggest a deviation from normality. A $p$ value less than .05 was used to determine if a significant deviation from the normal curve occurred. Based on this assumption, I determined that all data sets from the TIFPBQ pretest and posttest sections to be data that digressed from the normal curve because the Technology
Integration section deviated from normality. Therefore, the nonparametric Wilcoxon signed-rank test was conducted.

The Wilcoxon signed-rank test was used for each TIFPBQ pretest and posttest section to compare two sets of scores that come from the same participants and to investigate any change in scores from one time point to another (“Wilcoxon”, 2018). Because multiple tests were run under the same hypothesis, the Bonferroni type adjustment was applied to reduce a type I error rate to both of these tests. When multiple comparisons are being made, the type I error rate will rise. Using the Bonferroni correction helps to avoid reporting false positives (Streiner & Norman, 2011). Since this study used two similar tests that measured the impact of participating in online technology integration professional development on faculty participants’ advantages and challenges of integrating technology (RQ2), multiple comparison corrections needed to be applied in order to control for a type I error. To reduce the likelihood of discovering a false positive, the alpha level needed to be lowered to account for the number of comparisons being made (Streiner & Norman, 2011). For this study, an alpha level of .025 was used as the threshold for determining if the results of a test were statistically significant for both the Technology Beliefs section and the Perceived Technology Barriers section (see Table 4.3.). The Technology Integration section used the common educational research alpha threshold of .05 to determine significance (Mertler, 2017).

First, the data analysis of the Technology Beliefs section indicated faculty participants responded higher on the TIFPBQ posttest ($M = 3.34$, $SD = 0.86$) than on the pretest ($M = 3.24$, $SD = 0.84$); however, there was not a statistical significance of the
differences, $W = 29.00, p = .26$. Second, the data analysis of the Perceived Technology Barriers section indicated faculty participants responded lower on the TIFPBQ posttest ($M = 1.70, SD = 0.75$) than on the pretest ($M = 1.92, SD = 0.79$); however, the difference was not statistically significant, $W = 94.00, p = .06$. As discussed above, a decreasing mean in this section was a positive finding. Third, the data analysis of the Technology Integration section indicated faculty participants responded significantly higher on the TIFPBQ posttest ($M = 3.62, SD = 0.50$) than on the pretest ($M = 3.20, SD = 0.84$), $W = 5.00, p = .005$.

Table 4.3. Rationale for Bonferroni Type Adjustment to the Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) Pretest and Posttest Sections

<table>
<thead>
<tr>
<th>TIFPBQ Pretest &amp; Posttest Section</th>
<th>Research Question</th>
<th>Bonferroni Adjustment Rationale</th>
</tr>
</thead>
</table>
| Technology Beliefs                | • RQ1: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about readiness to integrate technology?  
• RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology? | The Bonferroni adjustment of .025 was applied because both the Technology Beliefs section and the Perceived Technology Barriers section test RQ2. |
| Perceived Technology Barriers     | • RQ2: How, and to what extent, does participating in online technology integration professional development impact faculty perceptions about the advantages and challenges of integrating technology? | The Bonferroni adjustment of .025 was applied because both the Technology Beliefs section and the Perceived Technology Barriers section test RQ2. |
Qualitative Findings & Interpretations

This section will describe the analysis of two qualitative data sources used in this research; discussion boards and semi-structured transcribed interviews. Although the names of the faculty participants of the study were visible to each other within the online professional development, in an effort to keep the analysis and findings confidential, each faculty participant in the study was assigned a pseudonym. There were a total of 345 discussion boards (including original posts and replies collectively) and five semi-structured interviews used for data analysis. Table 4.4. below describes the type of qualitative data sources, and the total number of codes applied to each source. Although Table 4.4. shows a total of 284 codes, first round coding generated 214 unique codes, with some codes being utilized in both qualitative data sources. Following the analysis of qualitative data, this section provides a presentation of key themes and findings.

Table 4.4. Summary of Qualitative Data Sources

<table>
<thead>
<tr>
<th>Types of Qualitative Data Sources</th>
<th>Number</th>
<th>Total Number of Codes Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion boards (collectively)</td>
<td>345</td>
<td>139</td>
</tr>
<tr>
<td>Semi-structured interviews</td>
<td>5</td>
<td>145</td>
</tr>
<tr>
<td>Total</td>
<td>350</td>
<td>284</td>
</tr>
</tbody>
</table>

No Bonferroni adjustment was applied because only the Technology Integration section tests RQ3. Therefore, the alpha level of .05 was used.
Analysis of Qualitative Data

The qualitative data were analyzed using a CAQDAS program, Delve. First, the 345 discussion board posts (original posts and replies) were combined into a Microsoft Word document and pasted into Delve with the file name Discussion Posts. Next, the five transcripts from the semi-structured interviews were combined into a second Microsoft Word document and pasted into Delve with the file name Combined Transcripts. All coding described below was conducted using a sentence-by-sentence unit of analysis.

First cycle coding. To begin the analysis process, the data from both files were coded using four separate first cycle coding lenses. First, I conducted Structural Coding by applying specific codes to align to each research question (Namey, Guest, Thairu, & Johnson, 2008; Saldaña, 2016). This type of coding was also was used first to familiarize myself with the transcribed data with a secondary purpose of gaining a better understanding of how data aligned to my research questions. For this lens, I applied the codes RQ1 for research question 1, RQ2 for research question 2, and/or RQ3 for research question 3. There were some data that aligned to more than one research question; therefore, it was not uncommon for more than one structural code to be applied to a sentence of data. Figure 4.1 below shows an example of Structural Coding in Delve.

![Figure 4.1. Structural coding in Delve.](image)
Second, I used *Descriptive Coding* to look for phrases or words, mostly nouns, to highlight specific topics discussed (Saldaña, 2016). Examples of codes with this lens included *convenient, excitement, and infographics*. For example, Karen stated in the discussion boards, “It has great value in connecting with guest speakers who cannot make it to campus or meeting with the student.” I coded this as *convenient* because the faculty participant was discussing the convenience of using a specific web-conference tool for technology integration in an upcoming online courses. Additionally, Steph stated in the discussion board, “After being involved with this research study professional development opportunity, I am eager to integrate technologies that have been introduced within this journey.” I coded this as *excitement* because the faculty participant was excited to use the content learned in this professional development to take the next step towards technology integration. As an example of applying the code of *infographics*, Lauren stated in the discussion board, “I like the concept of infographics, I hope to use this tool in the future.” This was coded as *infographics* because the faculty participant mentioned specifically about possible plans to use this tool in the future.

Third, I applied *Process Coding* to emphasize actions (Saldaña, 2016) using words or phrases that ended in “ing” (Charmaz, 2006). Examples of process codes included *lacking comfort* and *meeting my tech expectations*. I applied the code of *lacking comfort* when faculty participants explained in the semi-structured interviews and discussion boards how, if, when, or why they lacked comfort in terms of technology integration or technology use. For example, “Understanding how to use technology to help share that material beyond those safe tools I am already comfortable with does make
me uncomfortable so I am slow to move in that direction” was coded as lacking comfort.

Additionally, Dan stated,

I chose PowerPoint Video Recording tool for integrating into my future online courses. At this point, this tool seems to meet my online course tech. requirements. Since by definition online courses do not meet in the classroom, a Microsoft PowerPoint presentation with a software tool to create narrated presentation that can be posted will do the trick.

I coded this as meeting my tech expectations because the tool described seemed to be a good match for the expectations of the faculty participants.

Fourth, I used In Vivo Coding to capture the faculties’ specific words and thoughts (Saldaña, 2016). Figure 4.2 below shows an example of a discussion board post using Descriptive Coding, Process Coding, and In Vivo Coding within Delve.

![Figure 4.2. Discussion post using Descriptive, Process, and In Vivo Coding in Delve.](image-url)
For example, Karen stated in the discussion board, “It was a "wow" moment for me when I saw the list of tools that are available.” I coded this as *wow moment* because it showed how the content was a turning point for a faculty participant who was engaged in the professional development. Another was when Katie stated in the semi-structured interview, “… my approach now is like, all right, um, is there some way I can add supplement change it, liven it up, make it more interesting.” I coded this as *liven it up* because the quote highlights how the professional development provided the faculty participant insight into bringing more engagement into their courses using their newly gained technology experience.

**Code mapping.** After *first cycle coding* was completed, I used Excel for *Code Mapping* to organize my codes into categories (Saldaña, 2016). I exported all of my codes from Delve into one Excel list, so I could view every code in one place. Here, I read through all my first cycle codes to search for both similarities and differences in the codes I had generated. Figure 4.3 below shows the beginning stages of *Code Mapping* and forming of categories.

<table>
<thead>
<tr>
<th>student considerations</th>
<th>technology tools</th>
<th>faculty plans for integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>frequency</td>
<td>code</td>
<td>frequency</td>
</tr>
<tr>
<td>24</td>
<td>lack of student readiness</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>lack of student time</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>students thriving with technology</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>“they’re afraid of failing”</td>
<td>20</td>
</tr>
<tr>
<td>1</td>
<td>“I don’t think I’ve met their needs”</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>“ready to be a bridge for my students”</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>“students feel isolated”</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>“students feeling alienated”</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>“students panic with new things”</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>“more fully engage the student”</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>use real-world examples for students</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>young students not having problems</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>student accessibility</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>student confusion</td>
<td>19</td>
</tr>
<tr>
<td>8</td>
<td>student distraction</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>excelling students</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 4.3. Code mapping and initial forming of categories.
Code mapping was very helpful because it allowed me see how the pieces could be connected or related, and assisted me in beginning to organize my codes into categories. This was the first time I could begin to actually see the data and organize it together based on my findings.

**Second cycle coding.** After I completed Code Mapping, I used the second cycle method of Pattern Coding to discover patterns, categories, and emerging themes (Saldaña, 2016). This process was helpful to take data collected from first cycle coding and understand the meaning behind it (Saldaña, 2016). I tracked my thinking process by writing analytic memos to support and document my decisions (Charmaz, 2006; Creswell, 2014; Saldaña, 2016). The process helped confirm and form the following 13 categories: (1) community of learners (2) faculty plans for integration, (3) perceived faculty expectations, (4) enhancement of course, (5) reasons to integrate, (6) readiness after professional development completion, (7) positive faculty emotions, (8) negative faculty emotions, (9) lack of faculty readiness, (10) faculty apprehension, (11) student considerations, (12) technology tools, and (13) choosing technology tools.

Forming each of the categories required me to continually review and shift my codes to see how the pieces fit together. Table 4.5. below shows each final category name and how many unique codes were included in the formation of each category. Although there were a total of 214 first cycle codes, there were four that were not put into any categories, as they included the three structural codes, and one additional code of *off topic*. Therefore, the total number of unique codes was 210, as found below in Table 4.5.
Table 4.5. *Category Names and Number of Unique Codes in Each Category*

<table>
<thead>
<tr>
<th>Category Name</th>
<th>Number of Unique Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community of learners</td>
<td>4</td>
</tr>
<tr>
<td>Faculty plans for integration</td>
<td>22</td>
</tr>
<tr>
<td>Perceived faculty expectations</td>
<td>13</td>
</tr>
<tr>
<td>Enhancement of course</td>
<td>7</td>
</tr>
<tr>
<td>Reasons to integrate</td>
<td>24</td>
</tr>
<tr>
<td>Readiness after PD completion</td>
<td>29</td>
</tr>
<tr>
<td>Positive faculty emotions</td>
<td>18</td>
</tr>
<tr>
<td>Negative faculty emotions</td>
<td>18</td>
</tr>
<tr>
<td>Lack of Faculty readiness</td>
<td>8</td>
</tr>
<tr>
<td>Faculty apprehension</td>
<td>11</td>
</tr>
<tr>
<td>Student considerations</td>
<td>20</td>
</tr>
<tr>
<td>Technology tools</td>
<td>23</td>
</tr>
<tr>
<td>Choosing technology tools</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>210</strong></td>
</tr>
</tbody>
</table>

**Member checking.** Member checking occurred upon completion of qualitative data analysis. The function of member checking was to provide participants in the study an opportunity to review the accuracy of the research (Lodico et al., 2017; Mertler, 2017). To conduct member checking in my study, the major themes and summaries of each theme were emailed to all the faculty participants in the study. Additionally, the five faculty participants who participated in the semi-structured interviews were sent their transcripts. The faculty participants were asked to review the findings (and their transcript when appropriate) to ensure that I accurately captured their experiences and recollections from the study. By including the faculty participants in this process, they were able to reaffirm the accuracy, as well as express concerns about the research. Of the 16 faculty participants, 11 responded to the email; each offering validation that the themes represented their experiences. I felt member checking was very beneficial, as it demonstrated faculty participants’ opinions and participation were valued throughout the entire study.
**Peer debriefing.** The process of peer debriefing with my dissertation chair was both informative and reflective in nature. During my weekly peer debriefing sessions, I was able to discuss my rationale for the generation of codes, categories, and themes. Additionally, my dissertation chair helped me to visualize how my categories emerged into themes, through interrogating my choices and proposing questions to ensure my thinking was clear. For example, I did not realize I had so many codes that were focused on enhancement. However, during peer debriefing with my chair, I was questioned about this, which ultimately led me to creating a category which focused on how technology integration enhanced courses. Furthermore, the discussions that occurred during peer debriefing were extremely beneficial and provided an opportunity to actually talk about my developing ideas out loud. Specifically, this process helped me make sense and finalize theme one. Prior to this peer debriefing, I knew I wanted to have a theme regarding faculty readiness to integrate technology. However, it was not until peer debriefing that I was able to recognize that my categories revealed factors that were both in the faculty participants’ control, as well as out of their control.

**Themes and Findings**

Generating themes comes as a result of coding and categorizing qualitative data and is a rigorous process which “requires comparable reflection on participant meanings and outcomes” (Saldaña, 2016, p. 200). To visualize the process of creating themes, I made a copy of my final categories and moved them around on an Excel sheet to try to see how the categories fit together into themes. From this process, three themes emerged from the data: (1) Faculty awareness about factors they can and cannot control contributed to their readiness to integrate technology, (2) Faculty expectations about their
future use of technology included what, how, and why to integrate technology, and (3) Within a community of learners, faculty found a strong support system. A description of each of these themes with supportive rich, thick descriptions is discussed in the following sections. Additionally, rationale for how each category related to the given theme is discussed. Some categories were subsumed into more than one theme; however, each will only be discussed in detail under one theme. Finally, this section will also discuss unexpected findings from my qualitative analysis.

Theme one: Faculty awareness about factors they can and cannot control contributed to their readiness to integrate technology. Faculty readiness to integrate technology depends on many factors. Current research regarding faculty readiness to use technology revealed the need for instructors to be mindful of what technology was accessible to them and how to utilize the basic functions of that technology (Davies, 2011). Technology integration readiness was also linked to the amount of support received (Esterhuizen et al., 2013; “EDUCAUSE”, 2017b; Gutman, 2012; The Higher Education Research Institute, 2014).

In this study, faculty readiness took into account being aware of what factors the faculty could and could not control. Even when considering the factors that may be out of the faculty participants’ control, by the end of this study, faculty overwhelming indicated they felt ready to integrate technology in their future course design. For example, Dan stated in the discussion board, “I am in a better position to integrate technology into all my courses than I was before my participation in this workshop. I feel I am ready to take risks and attempt to incorporate some of the technologies into my classes.” Additionally, Karen stated in the discussion board,
This course has given me the opportunity to explore opportunities for including technology into my courses. It has been a fascinating journey and several of the tools offered interesting possibilities worth considering for inclusion. Yes, as far as understanding my options go, I do feel more prepared… I am willing to try with more confidence than before I began this class.

Through these statements, the faculty participants have demonstrated they are ready to integrate technology and understand different factors to consider. This theme subsumed the categories (1) readiness after professional development completion, (2) lack of faculty readiness, (3) positive faculty emotions, (4) negative faculty emotions, and (5) faculty apprehension. Figure 4.4 below provides a visualization of the categories subsumed within this theme.

![Figure 4.4. Categories subsumed within theme one.](image)

**Readiness after professional development completion.** This category linked very closely to RQ1, as it spoke to the impact that the online professional development had on
faculty readiness to integrate technology. Online professional development was found to increase confidence related to technology integration (Rienties et al., 2013). Specifically, this category focused on reasons for being ready to integrate technology and the level of readiness. A descriptive code utilized in this category was ready. This category also included many in vivo codes such as opened up a door for me, comfortable trying new stuff, and given us all the motivation. Figure 4.5 below shows each code that was assigned to this category.

| 33 ready                                                                             |
| 1. feeling prepared                                                                 |
| 2. feeling supported                                                                |
| 3. new knowledge                                                                    |
| 1. "I absolutely feel more prepared than I did before this study"                   |
| 1. "I am a better person to integrate technology into all of my courses than I was before my participation in this workshop" |
| 1. "I am considerably more prepared to integrate technology into my future courses than I was a mere six weeks ago" |
| 1. "certainly plan on integrating technology"                                       |
| 1. "what a difference six weeks makes"                                              |
| 1. "transformative"                                                                  |
| 1. "given us all the motivation"                                                    |
| 1. "I feel better prepared to integrate technology into future courses"            |
| 1. "I feel prepared"                                                                |
| 1. "I have come a long way"                                                         |
| 1. "I'm so glad I said yes to this whole thing. I am so grateful"                   |
| 1. "is it helping"                                                                  |
| 1. "much more confident"                                                            |
| 1. "my approach is different now"                                                   |
| 1. "Now I feel great"                                                               |
| 1. "opened up a door for me"                                                        |
| 1. "opening of a door"                                                              |
| 1. "I'll do so much more"                                                            |
| 1. "I'm ready"                                                                      |
| 1. "This course has really helped me feel more confident about using technology"   |
| 1. "I am willing to try with more confidence than before I began this class"       |
| 1. "wow" moment                                                                     |
| 1. "comfortable trying new stuff"                                                   |
| 1. asking for help                                                                  |
| 0. availability of resources                                                        |

Figure 4.5. Codes in the readiness after professional development completion category.
Through each of these codes, the faculty participants’ readiness to integrate technology was evident. This category fit within theme one because a critical element of theme one was the actual readiness of faculty participants to integrate technology, which was shown through the participant quotes. When explaining how prepared faculty participants were to integrate technology, Alexa stated, “I definitely feel more prepared and very optimistic about my future using and integrating technology into my future courses.” This was supported by Claire who stated, “I definitely feel more prepared to integrate more technology into my classes.” These statements from Alexa and Claire clearly demonstrated that both were more prepared and ready to integrate technology because of participation in the professional development. Furthermore, when discussing the impact from participation in a six-week professional development, Chris stated, “I am considerably more prepared to integrate technology into my future courses than I was a mere six weeks ago.” This was echoed by Maria who stated, “What a difference six weeks makes! I feel much more prepared to integrate technology tools into my courses.” These quotes from Chris and Maria demonstrated that the six week professional development was enough time to prepare both participants to make an impact on their technology integration readiness.

*Lack of faculty readiness.* When analyzing the qualitative data, it was clear that although faculty participants were ready to integrate technology in the future, there was still some areas they were lacking readiness. In this study, lack of readiness did not mean faculty participants were not ready to integrate technology as a whole. With this, it was important to note that in the final discussion board question and final interview question when asked about readiness to integrate technology, all faculty participants stated they
were ready or more ready than they were previously. However, they also stated they were aware of potential issues, which was seen in this emerging category. Figure 4.6 below shows each code that was assigned to this category.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&quot;need time to &quot;sit&quot; with some these tools&quot;</td>
</tr>
<tr>
<td>2</td>
<td>lack of opportunity</td>
</tr>
<tr>
<td>7</td>
<td>lack of readiness</td>
</tr>
<tr>
<td>8</td>
<td>lack of compensation/incentives</td>
</tr>
<tr>
<td>10</td>
<td>lack of support</td>
</tr>
<tr>
<td>18</td>
<td>training</td>
</tr>
<tr>
<td>30</td>
<td>technical problems</td>
</tr>
<tr>
<td>26</td>
<td>lack of knowledge about tools</td>
</tr>
<tr>
<td></td>
<td><strong>lack of faculty readiness (8)</strong></td>
</tr>
</tbody>
</table>

Figure 4.6. Codes in the lack of faculty readiness category.

This category specifically linked to theme one, because these were the factors that contributed to the faculty participants' lack of readiness; specifically, those out of their control, including such codes as training and technical problems. Areas such as technical support for possible issues need to be available (Gutman, 2012; Lackey, 2011) and training to prepare participants needed to be considered (Osika et al., 2009). In this study, technical problems was one of the factors of technology integration that faculty felt were out of their control and contributed to their lack of readiness. When explaining technical support, Molly and Claire expanded on the lack of technical support available. Molly stated, “[Barriers to technology integration include] ensuring that there is adequate educational instruction for effective use of the proposed technology and ongoing training to measure comprehension.” Similar thoughts were shared by Claire when she said, “There have been several times I have tried new things in the classroom, the technology doesn't work, and it's so stressful and frustrating.” These statements from Molly and
Claire clearly demonstrated that they did not feel they had technical support for technical problems when they were trying new technology.

Lack of technical support was closely linked to lack of training, which was another factor that faculty participants Steph and Chris felt were out of their control that contributed to their lack of readiness to integrate technology. Steph stated, “The times that I have wanted to embrace new technology that has been introduced, the professional development opportunities are just not available.” This was supported by Chris who stated,

Most of the time, I mean, even with, great training or, you know, with a program that has a really nice, set of videos that support how to use the program, there's still things that show up that you didn't anticipate, at least that I didn't anticipate. Through these quotes from Steph and Chris, it was evident faculty participants felt they would be more ready to integrate technology if they were offered more training in the form of professional development to prepare them for future implementation and possible issues.

**Positive faculty emotions.** During first cycle coding and Code Mapping, I realized how often faculty participants described how they felt about technology, both positively and negatively. At first, I planned to have all emotions in one category titled faculty emotions. However, during Code Mapping I realized I should make one category that focused on positive faculty emotions and another that focused on negative faculty emotions. Within this positive faculty emotions category, there were 18 total codes that described positive elements from the faculty participants about integrated technology. For example, codes in this category included in vivo codes of eager to explore, not afraid of
and ready to take risks. Each of these codes aligned with the positive emotions that were present as a result of the content learned and skills practiced during the professional development. Figure 4.7 below shows each code that was assigned to this category.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;cannot see a downside to implementing&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;compell me to be more innovative with my course design&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;challenge worth pursuing&quot;</td>
<td></td>
</tr>
<tr>
<td>16 excitement</td>
<td></td>
</tr>
<tr>
<td>&quot;I trust myself&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;I'm excited about it&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;I'm excited&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;I'm not afraid&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;not afraid of it anymore&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;ready to take risks&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;eager to explore&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;eager to integrate technologies&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;embrace change at every corner&quot;</td>
<td></td>
</tr>
<tr>
<td>24 willingness to try</td>
<td></td>
</tr>
<tr>
<td>1 skills</td>
<td></td>
</tr>
<tr>
<td>1 wanting to use technology</td>
<td></td>
</tr>
<tr>
<td>&quot;open try trying new things&quot;</td>
<td></td>
</tr>
<tr>
<td>1 becoming more comfortable</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.7 Codes in the positive faculty emotions category.

Positive faculty emotions closely related to theme one, as emotions could be considered a factor that faculty participants can control. When expressing positive faculty emotions, Lauren and Katie explained how integrating technology brought them excitement. Lauren stated, “I am excited by the opportunity to integrate technology into the classroom to improve students' learning and engagement.” To further expand on excitement, Katie stated,

What I learned from the reading for Module 2 has opened my mind to asking questions about what is challenging/problematic about my courses, reconsider my
approach to teaching, and made me feel a little excited about exploring new sites and tools.

These quotes from Katie and Lauren demonstrate that their thoughts about integrating technology into their courses excited them. While continuing to explore positive faculty emotions, Maria and Alexa explained how participating in this professional development increased their *willingness to try* to integrate technology more. Maria shared, “So, but starting off as kind of someone who's just taken this professional development and I'm not afraid of the technology anymore and I trust myself…” In relation to willingness to try, Alexa said, “I am adventurous and willing to take the kind of risk that would hopefully improve my teaching.” These statements from Maria and Alexa showed that participation in the professional development allowed both participants to increase their willingness to integrate technology and not be intimidated by the idea of integrating technology.

**Negative faculty emotions.** Based on the same idea as the previous category, in this study, this category highlighted the negative feelings about integrating technology felt by faculty participants. In the professional development, I created a specific module to align with RQ2 on barriers of technology integration, which is where many negative emotions related to technology integration emerged. I felt this was important to include because regardless of how beneficial technology integration may be, it was important that faculty participants were exposed to and prepared for possible barriers. Therefore, this category included descriptive codes such as *fear* and *frustration*, and in vivo codes such as *can’t predict it* and *intimidation factor*. This category included 18 codes, each of
which aligned to negative faculty emotions related to technology integration. Figure 4.8 below shows each code that was assigned to this category.

Figure 4.8. Codes in the negative faculty emotions category.

Similar to positive faculty emotions, negative faculty emotions were also a factor that was within the faculties’ control; therefore, integrating well within theme one. Having negative emotions of fear towards technology, which could be seen as technophobia, is not uncommon (Esterhuizen et al., 2013). In this study, when discussing technology integration, Claire stated, “The other piece is that I am anxious about trying new technology.” This demonstrated how Claire was concerned about integrating technology due to the anxiety it caused her. To share other negative faculty emotions linked to technology integration, James and Matt expressed fear. James commented, “But I think it’s the fear of breaking it, the fear of something,” while Matt had similar thoughts and stated “I see two major challenges for the integration of new technologies for me
personally. One challenge is the fear of failure.” These statements from James and Matt demonstrate that technology integration was not without its barriers, and therefore it was natural for faculty participants to have negative emotions, from this study fear was one of those negative emotions expressed. This study provided faculty participants an opportunity to share their frustrations and explore how they are within their realm of control. With this, faculty participants’ perspectives and attitudes could change over time.

**Faculty apprehension.** Originally, I had this category combined with negative faculty emotions because it appeared both were describing areas of concerns. Yet, upon further examination of the codes, the negative faculty emotions category appeared to focus more on the fact faculty participants were nervous and explored specifically how they felt. Whereas this faculty apprehension category focused on what actually made them nervous or apprehensive. Directly aligning to RQ2, this category was formed based on barriers of technology integration. Two codes in this category were *lack of time* and *access to technology*. Figure 4.9 below shows each code that was assigned to this category.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>lack of time</td>
</tr>
<tr>
<td>7</td>
<td>lacking comfort</td>
</tr>
<tr>
<td>2</td>
<td>lacking experience</td>
</tr>
<tr>
<td>1</td>
<td>&quot;don't know where I exactly find the time&quot;</td>
</tr>
<tr>
<td>1</td>
<td>&quot;decide where to invest the little time we have left&quot;</td>
</tr>
<tr>
<td>1</td>
<td>&quot;get stuck in the same rut&quot;</td>
</tr>
<tr>
<td>9</td>
<td>access to technology</td>
</tr>
<tr>
<td>1</td>
<td>being cautious</td>
</tr>
<tr>
<td>1</td>
<td>&quot;things I hesitate about&quot;</td>
</tr>
<tr>
<td>1</td>
<td>&quot;still things that show up that you didn't anticipate&quot;</td>
</tr>
<tr>
<td>1</td>
<td>&quot;some technologies are easier to integrate&quot;</td>
</tr>
</tbody>
</table>

Figure 4.9. Codes in the faculty apprehension category.
In relation to its location within theme one, faculty participants’ apprehension focused on factors that were within the faculties’ control. Lack of time as it relates to technology (Chen, 2008; Davies, 2011; Frederick et al., 2006; Johnson et al., 2016; Morehead & LaBeau, 2005) was a factor that was considered previously. When exploring barriers to technology integration in this study, Steph and Jess focused on the lack of time. Steph stated, “As an adjunct, I have very little time or energy left to explore new technology, no matter how mind-blowing or innovative it may be.” To further expand on lack of time, Jess said,

If I were to integrate more technology in my courses, I would need to spend a lot of time learning the technology. Time is not on my side at this point in my life with young children and multiple jobs.

Through Sarah and Jess’s statements above, finding time to integrate technology was a challenge. There were time constraining obligations that these faculty participants had, but what became clear was their time is very valuable. Aside from time, lack of access to technology tools or technology itself (Chen, 2008; Georgina & Olson, 2008; Johnson et al., 2016) has also been explored. This aligned to the thoughts of participants in this study, as Alexa and Dan shared how access to technology contributed to their apprehension about integrating technology. Dan stated, “In short, without adequate resources (hardware, software, time), there is little opportunity, as I see it, for me to integrate technology into my courses….” Similar concerns were shared by Alexa when she stated, “…the issue of resources is hugely based on the fact that I am on one of the regional campuses and we often don't have access to the same resources that might be readily available on the main campus.” Through Alexa and Dan’s statements, it showed
how both faculty participants were cognizant of the issues relating to accessing technology. Both faculty participants felt that in the current environment, neither was offered sufficient technology they felt was needed to actually integrate technology, which in turn concerned them and left them apprehensive about technology integration.

**Summary of theme one.** Being ready to integrate technology into future online course design required the consideration of many factors. This theme explored the importance of being aware of what factors could and could not be controlled by the faculty participants. Factors that could be controlled included positive and negative emotions, as well as elements linked to faculty apprehension, such as time. Factors that could not be controlled contributed to lack of faculty readiness, including technical problems and availability of technical support. Additionally, this theme captured the faculty participants’ overwhelming level of readiness to integrate technology. Even when considering factors out of one’s control, by the final week of the professional development (as evidenced by responses to the final discussion board and interview question), faculty participants stated they were more ready to integrate technology then when they started the study. For example, Sarah stated in the discussion board, “After completing this last module I feel better prepared to integrate technology into future courses.” Lauren also had similar thoughts in the discussion board when she stated, “I feel more prepared to use and integrate technology into my teaching.” Through these statements, the faculty participants expressed their increase in readiness to integrate technology now that the professional development has ended.

**Theme two: Faculty expectations about their future use of technology**

included what, how, and why to integrate technology. Regardless of the takeaways
from the professional development, the actual integration of technology into course design relied heavily on faculty participants’ expectations. Technology choices should be relevant and applicable to content areas and disciplines of those integrating technology (Hsu, 2010). It was the responsibility of the faculty to ensure technology integration would be successful (Esterhuizen et al., 2013; Hsu, 2010; Li et al., 2015) and to also understand the effectiveness of the tool and to actually achieve integration (Sullivan et al., 2018). In this study, faculty participants’ expectations were defined as expectations that faculty members feel they need to be accountable for as it related to technology integration. This included what technology they wanted to use, how they wanted to use it, and why they wanted to use it. Figure 4.10 below provides a visualization of the categories subsumed within this theme.

![Figure 4.10. Categories subsumed within theme two.](image)
This theme subsumed the categories (1) perceived faculty expectations, (2) faculty plans for integration, (3) reasons to integrate, (4) enhancement of course, (5) technology tools, (6) choosing technology tools, (7) positive faculty emotions, and (8) negative faculty emotions.

**Perceived faculty expectations.** This category was interesting to form because when reviewing codes, I noticed faculty participants felt a sense of responsibility to uphold their own technology expectations. The category fit within theme two because in this study, perceived faculty expectations focused on understanding faculties’ own expectations of their accountabilities as it related to technology integration. It correlated directly to why faculty participants should integrate technology, a pillar of this theme. Figure 4.11 below shows each code that was assigned to this category.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. strengthening skills</td>
<td></td>
</tr>
<tr>
<td>1. &quot;I need to get better&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;I want to start using it myself rather than just requiring the students to use it&quot;</td>
<td></td>
</tr>
<tr>
<td>1. &quot;it's my responsibility&quot;</td>
<td></td>
</tr>
<tr>
<td>4. my responsibility</td>
<td></td>
</tr>
<tr>
<td>3. meeting my tech expectations</td>
<td></td>
</tr>
<tr>
<td>1. &quot;change for the better&quot;</td>
<td>perceived faculty expectations (13)</td>
</tr>
<tr>
<td>1. &quot;expected to integrate technology&quot;</td>
<td></td>
</tr>
<tr>
<td>1. &quot;expands the scope of one's comfort zone&quot;</td>
<td></td>
</tr>
<tr>
<td>1. &quot;exposure&quot;</td>
<td></td>
</tr>
<tr>
<td>1. &quot;I have to change my attitude to embrace this new technology&quot;</td>
<td></td>
</tr>
<tr>
<td>3. finding new ways to use technology</td>
<td></td>
</tr>
<tr>
<td>2. making tech a priority</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.11. Codes in the perceived faculty expectations category.

In online courses, faculty are responsible for using technology to facilitate a course in terms of learning activities and pedagogy (Jones, 2011). Codes in this category included making *tech a priority, my responsibility, and strengthening skills*. In order for a
code to be included in this category, it had to relate to expectations that faculty participants gave themselves or other faculty members. In this study, as shown through the statements below from the semi-structured interviews and discussion boards, faculty participants felt various expectations in relation to technology integration. When explaining expectations, Liz said, “I feel that instructors should be required to strengthen their own skills in order to help ensure students’ progress.” A similar thought was expressed by Steph when she said, “It is my thought that all professors should be implementing technology into their course rooms.” These quotes demonstrated that both Liz and Steph believe the faculty should be responsible for integrating technology and staying up to date with their skills. Furthermore, when discussing personal expectations of using technology Maria stated, “The more I recognize the value of technology, personally and professionally, the more I want to prioritize its implementation” and Chris stated, “I need to get better…. I want to start using it myself rather than just requiring the students to use it.” These quotes identified how both Maria and Chris set personal expectations for themselves to follow through and actually integrate technology. Therefore, faculty participants appeared to hold themselves (as well as others in the same role) accountable in terms of technology integration expectations.

*Faculty plans for integration.* When reviewing codes, I noticed many codes were related to the actual faculty plan for integration after the professional development had ended. This aligned to theme two, as this category focused on the future use of technology in terms of how faculty plan to integrate technology into their pedagogy. For example, in vivo codes such as *taking it step by step* and *add more video* were two codes nested in this category. *Taking it step by step* focused on how the faculty participants
were going to integrate technology in terms of process, and *add more video* highlighted how the faculty participants were going to integrate technology in terms of specific technology tools and functions. Figure 4.12 below shows each code that was assigned to this category.

![Figure 4.12. Codes in the faculty plans for integration category.](image)

Sullivan et al. (2018) found faculty and staff wanted to immediately integrate technology during/after an online professional development that focused on technology integration, as well as continue to investigate technology after they were presented with it in the professional development. This aligned with my current study, as other codes subsumed in this category were *immediate integration* and *experimenting/exploring tools further*. First off, when explaining plans to integrate technology, Chris, Claire, and Maria expressed their timeframe for integrating technology. Chris stated, “There is no doubt
whatsoever that I will be incorporating new technologies into upcoming courses, actually starting almost immediately.” This plan was echoed by Maria who stated, “I will definitely integrate this tool into my courses and will consider how to encourage students to do so as a part of their Week 15 presentations for this [current] term…” Furthermore, Claire also planned to make changes to her course design soon, as she stated, “Implementing that [infographics] this semester, implementing today I'm talking to my class, um, over Zoom.” These statements from Chris, Maria, and Claire demonstrate that faculty participants planned to integrate technology immediately, specifically into their current courses so they are able to use it right away. In terms of looking ahead, Sarah explained, “I will do more research about a few different tools presented in this course, play with them, and then think about creative ways to integrate the technology that will address some of the course objectives.” This quote demonstrated that Sarah planned to take additional time to explore which tools will be a good fit for her courses moving forward.

**Reasons to integrate.** Ultimately, it was up to the faculty participants in this study to determine why they were going to integrate technology. Regardless of the chosen rationale, incorporating technology into teaching and learning should not be optional, but instead should be a central piece (Ertmer & Ottenbreit-Leftwich, 2010). To be included in this reasons to integrate category, the code had to include the reason as to why a faculty participant wanted to integrate technology. This could be related to a specific tool, or just technology integration in general. Figure 4.13 below shows each code that was assigned to this category.
When discussing reasons to integrate, Karen and Sarah’s reasoning aligned with the code of *ease of use*. Karen stated, “My overall impression of the tool is that it appears reasonably easy and offers interesting features.” As for why Sarah planned to integrate a technology tool she stated,

I would recommend this tool to a colleague for his or her course because it is user friendly, helps students to develop their technology skills, and it is easier for the professor to review and grade the assignment that require a presentation.

Through these statements, Karen and Sarah found the tools easy to use which overall would be a reason they chose to integrate the tools in the future. Another reason for integrating technology was expressed by Lauren and Alexa and aligned with the code of *getting student attention*. Lauren explained, “I foresee that using Vizia could increase students' attention to and reflection of assigned TedTalks and YouTube Videos. Having
integrated questions will also guarantee students actually watch the complete TedTalk and Video.” Alexa also stated she thought technology could be useful when she stated,

It’s [Powtoons] an attention grabber. The advantage for me would be that it would allow me to make the material come alive in a meaningful way. It takes the boredom out of material that might be difficult to grasp. And for the students, they would get the opportunity to interact in a playful way, while learning at the same time.

The quotes from Alexa and Lauren explained that a compelling reason for integrating technology was that it had the ability to help capture and retain student attention and engagement.

Enhancement of course. Although I did not realize while coding, once the coding cycles were completed, I had six different codes that began with enhance or enhances. At first, I did not have a separate enhancement of course category, but instead all six codes fell under the category of reasons to integrate. After peer debriefing with my chair and seeing things visually, it was clear that integrating technology enhanced many features of online course design. These codes focused on faculty expectations, specifically how technology enhanced courses, and why it would be integrated, therefore, aligning to theme two. Figure 4.14 below shows each code that was assigned this category.

| 17 enhance communication |  |
| 30 enhances engagement | enhancement of course (7) |
| 11 enhances interactivity |  |
| 26 enhances learning |  |
| "enhanced interactivity for all involved" |  |
| 3 enhances creativity |  |
| 20 meaningful integration |  |

Figure 4.14. Codes in the enhancement of course category.
Specifically, this category included the following codes: *enhance communication, enhances engagement, enhances interactivity, enhances learning, enhances creativity* and *enhanced interactivity for all involved*. With this, it made sense to include these codes in their own category focusing on enhancement. In support of this, technology could allow for communication in a variety of ways in an online classroom, as well as facilitates learning in terms of communication between the student and the content, the instructor, and other students (Jones, 2011). This was mirrored in this study, as Maria, Karen, and Sarah all used different tools to enhance communication. When discussing communication enhancement, Maria stated,

> I chose Venngage, an infographics online editor tool with a variety of templates from which to design and create….After my evaluation this week, however, I definitely see how using this tool can meet my goal of enhancing communication via Announcements.

Through the quote above, Maria shared how Venngage could help achieve her communication goals by creating infographics to keep a clear line of communication with students. Additionally, Karen explained her vision for enhancing communication using video conferencing.

> I think it [video conferencing] has great value in connecting with guest speakers…. I can also see that it could have great value in a fully online course, particularly if you would like a discussion to be more of a full-class-debate type experience. I think the experience of the interclass exchange is important to shared learning…
Karen’s comment demonstrated that video conferencing could enhance communications and provide learning experiences that otherwise would not be available to students.

Furthermore, Sarah explained how communication could be enhanced using PowerPoint.

I have chosen PowerPoint Video Recording as a tool for a future online course because it provides students an opportunity to review the information at their convenience and as many times needed. It also provides students the professor’s voice, important for fully online courses.

Through the quote above, Sarah confirmed how adding audio recording over PowerPoint slides can personalize communication that currently was not available to students.

The only code included in this category that did not begin with enhance, was coded as meaningful integration, as this code included specific rationale for integration of technology that would enhance the course design. Technology integration should focus on using technology to meet learning outcomes (Davies, 2011; Dockstader, 1999; Ertmer & Ottenbreit-Leftwich, 2010) and needs to be aligned to discipline and specific content areas (Hsu, 2010). Simply put, any technology integrated should be chosen for a specific reason to achieve a goal that is unique to that particular class. Jess, Alexa, and Dan shared specific uses for technology and technology tools based on their unique class needs to enhance their courses. For her plans to meaningfully integrate technology tools, Jess stated,

I could use Quizlet to reinforce what students learning in the course and assess the knowledge that isn't specifically addressed in their video reflection assignments. They could define the different Yamas and Niyamas, distinguish between
different types of meditation, and identify yoga poses with flashcards. It could be fun and interesting for the students.

Through this quote, Jess explained her vision of how Quizlet could be meaningfully integrated into her Yoga class to enhance to presentation of course content. Additionally, Alexa found a way to incorporate Powtoons and Canva into the needs for her specific class.

Though I chose Powtoons, due to the fact that I see it as beneficial for demonstrating a particular counseling model, I can see myself using Canva as well to help with certain courses that require a more in-depth analysis, such as a theories class.

From Alexa’s quote, she was able to conceptualize how Powtoons could help explain a counseling model in an interactive way and how Canva could help create infographics for information that dives deeper. Furthermore, Dan shared his vision of how technology could be meaningfully integrated into his courses.

The relative advantage of using it exists. That means, by using this technology, I can address and meet the particular need for the course. Once I determine the need, I need to know what students think and do with it. Was this valuable enough to help them comprehend and learn the subject better?

Through this quote, Dan explained how he would attempt to meaningfully integrate technology by considering the factors of class needs, student goals, and content comprehension.

**Technology tools.** This category was very straightforward and included the different technology mentioned by faculty participants that they would consider using in
the future, therefore, aligning to theme two. Being knowledgeable in various technology tools is essential, as faculty want to be more proficient in technology tools such as multimedia tools, online collaboration tools, LMS’s, and websites (“EDUCAUSE”, 2017b). In this study, to be included in this category, the tool either needed to be described by the specific name or by the specific type of technology. For example, codes related to specific tool names included Canva, Google, PowerPoint, Venngage, and Zoom, as the name of the actual tool was mentioned and therefore coded. In some cases, faculty participants did not mention the tool, but instead mentioned the type of technology. Examples of these codes were blogs, scavenger hunts, infographics, or surveys. Figure 4.15 below shows each code that was assigned to this category.

![Figure 4.15. Codes in the technology tools category.](image)

Although the purpose of this category was to highlight the tool or technology, it was helpful to also include the full quotes from the semi-structured interviews and
discussion boards to see the context of how the technology was discussed. Faculty participants chose various different tools they planned to integrate. First off, Claire explained how she was already using Scavenger Hunts.

I tried a Scavenger Hunt in my class today! The students have been anxious to start spring break, so I thought I’d try something new to get them engaged. I used similar questions as last week’s scavenger hunt, but instead of human trafficking, the subject was cybercrime. It went really well--it was very user friendly for the students, I was able to read their responses, and it generated some great discussion!

Through this quote, Claire shared her experiences using Scavenger Hunts by using the template provided in the professional development and making modifications for her criminal justice course. Her experiences from students were overall very positive.

Additionally, Katie shared how she planned to use Venngage and Google forms.

I have found --believe it or not :) -- there are "techno tools" that are interesting, understandable, and that I am capable of implementing. I have found two tools that I enjoyed and plan to include in future courses: offer Venngage as an option to enhance presentations, especially final ones and Google Forms that will help students learn to do basic surveys….A good assignment will be to develop five questions for a sample survey for their research questions and using Google Forms distribute their surveys to their classmates.

Katie demonstrated how Venngage could be a new and creative alternative for students to utilize with their final presentations. Katie also explained how she planned to use Google
Forms as an interactive way to collect data in her research class. Furthermore, Maria expressed her ideas about using Blogs and PowerPoint moving forward in her courses.

The first is using the Blog tool so students have more opportunities to interact with me and their peers without time constraints…. The second tool is the PowerPoint with audio narration. I'm thinking I can include snippets of significant resources in the PowerPoint slides and add narrative, similar to what I might have done in the f2f classroom… Maybe they [students] will find these tools more useful and interactive, adding clarity to the process.

Through this quote, Maria demonstrated how Blogs would be a new learner-to-learner interaction strategy implemented in a new format. Additionally, by recording her voice over her PowerPoints, Maria felt it could help clarify content to ensure student comprehension. Lastly, Matt explained how Visme could be integrated in his course design.

Visme really caught my eye. I believe I will dig into this tool and upgrade my presentations. I have a few benefits I can attain. One is the look and feel of this tool seems to be more modern and fluid that a PowerPoint presentation. These presentations catch the eye a bit more. Another benefits (in my estimation) is the ease at which the presentations can become movie clips.

Matt’s quote explained how he planned to utilize Visme to encourage students to take their presentations to the next level by including better visuals and the possible incorporation of videos. From the professional development, faculty participants learned and remembered specific tool names and technology names. Additionally, they were also
able to articulate why they focused on those tools. Therefore, this related back to theme two in terms of faculty expectations about specifically what they planned to integrate.

**Choosing technology tools.** Originally, this category was merged with technology tools. But, during *second cycle coding* it made more sense to keep the technology tools separate, and instead create another category for choosing technology tools. Instead of focusing on the technology tool or type, this new category focused more on faculty participants expectations in terms of why and how faculty would choose a tool to integrate into their courses in the future, therefore, aligning to theme two. Figure 4.16 below shows each code that was assigned to this category.

![Figure 4.16. Codes in the choosing technology tools category.](image)

Technology is continually progressing and changing and therefore educators cannot learn everything there is to know about a tool (Abbitt, 2011; Ertmer & Ottenbreit-Leftwich, 2010). In this current study, in order to be realistic about expectations, it was essential that faculty participants considered these factors before they chose a tool. To encourage this in my current study, there was one module that specifically addressed
choosing a technology tool and conducting an evaluation on its potential use. This provided faculty participants a chance to evaluate a tool before implementing it to weigh the pros and cons and see how it fit into their desired curriculum.

From the evaluation experience in this module, one code in this category was *tool evaluation*. It became clear when I was coding the data, that faculty participants found this tool evaluation exercise useful and planned to use this technique in the future to help choose technology tools for their pedagogy. Dan and Jen both explained how tool evaluation impacted their choice of technology tools. Dan stated, “My first impression was that this is difficult and time-consuming. Once I evaluated it, however, I found it easy and ready-made, and with some modifications, I can easily integrate it into my courses.” Through Dan’s quote, he demonstrated how a tool evaluation actually changed his opinion of tool and overall impacted his plans to integrate it. In relation to why a tool would be used, Jen stated, “I can relate to your comment "depending on how useful" technology is. I too evaluate the use of technology as to whether it makes sense or not, before I will apply it.” Jen’s quote identified how she uses a tool evaluation prior to implementing a tool to make sure its functional for her choice.

Next, the multiple tools presented in the professional development played a critical role in the faculty participants’ actual choosing of technology tools for future integration in their own courses. This was shown through the code of *variety of tools available*. Claire and Alexa expressed their positive thoughts towards the variety of tools. Claire stated, “Oh, the technology tools menu. That was, I thought that was really helpful again because I didn't know that all of that stuff was out there.” This was supported by Alexa who stated,
I learned about tools I didn't even know existed and I am happy that I have a list to choose from. I hope that I will have the opportunity to come back to this course and review the tools list.

These comments from Claire and Alexa highlighted how much they appreciated the variety of tools presented in the professional development, and how many of which were new to them.

Finally, as it relates to choosing technology tools, another code in this category was continuous technology changes. This code highlighted the importance of understanding that technology tools were continually evolving and it is essential to consider this fact when choosing a specific tool. Chris and Steph commented on how evolving technology may impact their plans for integration moving forward. Chris stated, “I have seen so many tech changes adopted, ‘guaranteed to change education (or recreation, or motivation, or life-as-we-know-it),’ only to be jettisoned shortly thereafter because a new ‘shiny object’ has come on the scene.” Steph had similar sentiments about changing technology when she stated,

Daily, scientists are coming up with new discoveries and challenges that keep technology spinning every second. Software’s keep upgrading and if educators do not possess technical skills, it does become difficult for us as educators to execute it in the right direction. By the time we as educators are skilled in a chosen technology, updates and changes have already been applied.

The quotes from Chris and Steph demonstrated the uncertainty that was tied to how quickly tools may develop and progress. Each faculty expressed how this factor caused possible hesitation before fully committing to incorporating a tool. With the wide variety
of tools available, faculty participants must consider why they want to choose a tool before implementation. As discussed above, this depends on the evaluation of the technology tool, as well as the possibility of the tool evolving or changing.

The two categories of positive faculty emotions and negative faculty emotions also contributed to the creation of theme two and were elaborated above under theme one. Both positive and negative faculty emotions could relate to faculty expectations about future use of technology, as it aligns to the why element of this theme. Both positive and negative emotions may factor into the ultimate rationale when a faculty member decides to integrate technology into their pedagogy in the future.

**Summary of theme two.** This professional development taught many elements of technology integration, but the actual implementation of technology in the future relied on the expectations of the faculty participants. Specifically, this theme focused on what technology faculty participants wanted to integrate, how they wanted to integrate it, and why they wanted to integrate it. The rationale for this theme was explored through perceived faculty expectations, faculty plans to integrate, reasons to integrate, how technology enhanced a course, positive faculty emotions, and negative faculty emotions. Additionally, this theme discussed specific technology and technology tools that faculty considered using in their future courses, as well as their rationale for choosing these tools.

**Theme three: Within a community of learners, faculty found a strong support system.** A community of learners is especially relevant in an online professional development environment. A community of learners in an online professional development highlights the ability of participants to connect interactively (Carter, 2004) in an effort to provide feedback and be exposed to new colleagues and experiences.
Through online professional development and networking with each other, communication within a community is possible and allows for sharing of ideas (Carter, 2004; Healy et al., 2014; Macdonald, 2010; Powell & Bodur, 2019). In this study, a community of learners was defined as faculty in the online professional development who worked collaboratively to show encouragement, exchange rich ideas, create professional relationships, and learn from each other. It was not until the faculty participants were in the role of a student that they really comprehended the need for community and the positive impact it had, both individually, as well as a group. This rich interaction was possible due to the design and implementation of discussion boards within this professional development. This theme subsumed the categories (1) community of learners, (2) reasons to integrate, and (3) choosing technology tools. Figure 4.17 below provides a visualization of the categories subsumed within this theme.

![Figure 4.17. Categories subsumed within theme three.](image)

**Community of learners.** This category for theme three started to emerge as I noticed the idea of having support from other faculty participants throughout the qualitative data. Faculty participants were continually mentioning how working and
exchanging ideas with other faculty who had similar goals was very positive and encouraging. As a researcher prior to the start of this study, I assumed that all faculty participants enrolled in this professional development knew each other. However, it was clear from the qualitative data that many did not know each other, and they found the professional development very helpful in building professional relationships. The main descriptive code used in this category was *community*. Through *In Vivo Coding*, codes such as *collaborating with the group* and *I have friends that help me* were also added to this section. Figure 4.18 below shows each code that was assigned to this category.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>community</td>
<td>The main descriptive code used in this category.</td>
</tr>
<tr>
<td>connecting with other faculty</td>
<td>Connected with other faculty</td>
</tr>
<tr>
<td>&quot;collaborating with the group&quot;</td>
<td>Collaborating with the group</td>
</tr>
<tr>
<td>&quot;I have friends to help me&quot;</td>
<td>I have friends to help me</td>
</tr>
</tbody>
</table>

Figure 4.18. Codes in the community of learners category.

Often times, online faculty members are not provided opportunities to connect with each other to share their experiences, hardships, or successes; therefore, creating spaces to collaborate professionally with each other should be encouraged (Baran & Correia, 2014). Communities within online professional development also provide participants a way to reduce the feeling of isolation and ease their trepidations (Macdonald, 2010), as well as provide emotional support to one another (Liu & Kleinsasser, 2014).

It was evident in the statements from the semi-structured interviews and discussion boards that faculty participants relied on their peers for strong support in many areas. First off, Claire shared why she valued the community of learners when she stated,
“I really enjoyed collaborating with the group because it was also nice to know that they were having the same challenges and barriers and most of those folks have used technology in the past.” Through Claire’s quote, she was encouraged to work with other faculty because she felt each were facing similar situations that they could all relate to together. It was clear it made the exchange between faculty more relatable. Next, Maria explained what the online community meant to her when she stated, “All of your posts are so thoughtful and candid. This is a great online community we are in.” From Maria’s quote, this demonstrated that she felt her peers were being authentic and were really taking the time to participate in the community of learners.

Furthermore, Dan and Matt expressed why they enjoyed working with their faculty peers. Dan stated, “I never thought of it that way! Thanks. Such an exchange of ideas is an excellent example of the diffusion of knowledge!” and Matt stated, “Everyone had such great ideas, and I'm inspired by a lot of these ideas and tools.” The quotes from Dan and Matt revealed how the community of learners helped both faculty participants to gain new viewpoints, which made him more enthusiastic moving forward. Lastly, Karen shared how the community of learners shaped her experience when she stated, “I agree that being part of a learning environment that continually supported the learning process so that the fear of ‘messing-up’ did not freeze out the willingness to try.” Karen expressed that having positive support from her peers encouraged her to try when she otherwise may have been too intimidated to do so. Through these quotes, the faculty participants identified enjoyment from being part of a community of learners that supported each other and provided new insight into their current way of teaching and learning.
Additionally, faculty participants showed the strong desire to meet each other and stay connected with their peers, even after the professional development ended. As Maria stated in the discussion board, “I think it would be really helpful for all of us to keep in touch for encouragement and sharing some of the tools we integrate moving forward,” while Matt stated, “I will miss this gang.” The support and professional relationships built through this strong community of learners over a six-week period highlighted the importance of working collaboratively in an online setting.

Although not discussed in detail within theme three, the two categories of reasons to integrate and choosing technology tools also contributed to the creation of this theme. The exchange within the discussion boards was so synergic that faculty participants trusted each other. Therefore, faculty participants formed opinions on their reasons to integrate technology based on the discussion with their peers and the feedback received. It was the strong support within a community of learners that made this possible.

In relation to the category of choosing technology tools, as mentioned within theme two, the evaluation of tools was critical to whether or not a tool would ultimately be chosen by faculty participants to integrate into their pedagogy. From this, faculty participants relied heavily on feedback and recommendations from their peers as to why or why not they may choose specific technology tools. Therefore, this collaboration and knowledge exchange aligned within theme three, showing the strong support within a community of learners.

**Summary of theme three.** Theme three described the importance of a strong support system within a community of learners throughout this professional development. During week one, many faculty participants did not even know each other. But, by week
six they had formed professional relationships that allowed for collaboration, knowledge exchange, and encouragement. With the frequent use of discussion boards, faculty participants shared their thoughts freely. Faculty participants were able to be inspired by each other, as well as share in successes and hardships with each other as it related to technology integration. Furthermore, faculty participants valued the opinions of their peers and appreciated the honest feedback that was communicated in regards to technology integration and technology tools.

**Unexpected Findings.** Through qualitative data analysis, this current study also brought forward unexpected findings related to student considerations. In this study, the category of student considerations was defined as student-related factors to consider regarding technology integration. Within the qualitative data, faculty participants described the element of student readiness, specifically the lack of student readiness to integrate technology. Although this category did reveal some students may excel when integrating technology, the faculty participants were still very concerned about student readiness for using technology, for both younger students, as well as older adult learners. It is a misconception to assume that because younger college students know how to use social media, they will automatically know how to use course technologies effectively as well (Switzer & Switzer, 2016). Additionally, many non-traditional adult learners have poor or outdated technology skills as it relates to college performance (Hsu, Wang, & Hamilton, 2011). Therefore, students may need additional support to be able to successfully integrate technology into their courses in the future. In this category faculty participants also described other student considerations related to technology integration including confusion, distraction, and fear.
The forming of this category was unexpected because this study was focused on how to prepare faculty to integrate technology, and therefore my focus was not on student preparation or other student considerations. The research of Willging and Johnson (2009) found technology-based issues such as lack of support, being overwhelmed by technology-rich content, and lack of technology preparation were all considered factors that influenced students dropping out of an online program. Additionally, not having sufficient access to technology (Moore, Bartkovich, Fetzner, Ison, 2002) and lack of technology infrastructure (Sorenson & Donovan, 2017) contributed to a loss of student retention in online programs. Therefore, technology-related considerations of the students emerged as an important element of technology integration to the faculty participants of this study.

**Chapter Summary**

As this was a mixed-methods action research study, both quantitative and qualitative data were collected and analyzed. Quantitative data was collected using the TIFPBQ pretest and posttest. Qualitative data was collected from discussion boards and semi-structured interviews. Three themes emerged from the qualitative data: (1) Faculty awareness about factors they can and cannot control contributed to their readiness to integrate technology, (2) Faculty expectations about their future use of technology included what, how, and why to integrate technology, and (3) Within a community of learners, faculty found a strong support system. Theme one from the qualitative data, which focused on faculty readiness, was supported by quantitative data through the Technology Beliefs section of the TIFPBQ, showed there was an increase in means between the pretest and posttest scores as it related to topics such as faculty emotions and
readiness. Theme one was also supported by quantitative data through the Perceived Technology Barriers section of the TIFPBQ, which showed there was a decrease in means between the pretest and posttest scores as it related to topics such as faculty barriers and apprehensions. Theme two from the qualitative data, which focused on faculty expectations about future use of technology, was supported by the Technology Integration section of the TIFPBQ which indicated there was a significance increase between the pretest and posttest means as it related to topics such as plans to integrate technology and the role that technology will play in future content. Through this, analyzing the data and creating themes provided a better understanding of the qualitative and quantitative data and findings.
CHAPTER 5

DISCUSSION, IMPLICATIONS, AND LIMITATIONS

This chapter situates the findings within the existing literature as it relates to the impact of online technology integration professional development on faculty perceptions about readiness to integrate technology, faculty perceptions about the advantages and challenges of integrating technology, and faculty plans to integrate technology into course design. The purpose of this action research was to implement and evaluate the impact of online technology integration professional development for faculty teaching at a distance at LC. Both quantitative (TIFPBQ pretest and posttest) and qualitative data (discussion boards and semi-structured interviews) were collected and analyzed. This chapter will present (a) a discussion, (b) implications, (c) limitations, and (d) closing thoughts.

Discussion

It is critical to position the findings of this study within the larger context of research related to technology integration and professional development. To answer the research questions, the data were combined and considered through a lens of faculty perceptions about readiness of integrating technology, faculty perceptions about the advantages and challenges of integrating technology, and faculty plans to integrate technology into their course design. The discussion is organized by RQ1, RQ2, and RQ3.
Research Question 1: How, and to What Extent, Does Participating in Online Technology Integration Professional Development Impact Faculty Perceptions About Readiness to Integrate Technology?

For faculty to integrate more technology in their courses, it depends heavily on the readiness and eagerness of those faculty members to expand their current technology usage (Marzilli et al., 2014). Therefore, ensuring faculty are ready to integrate technology prior to implementation is critical. Additionally, including technology integration into curriculum may only become more fundamental if educators become more comfortable and proficient with the use of technology (Keengwe & Ochwari, 2009). Therefore, the rationale for inclusion of this research question was to determine if faculty participants were more ready to integrate technology as a result of this professional development. In a study that measured the effects of a long-term technology professional development measuring technology beliefs and practice, Brinkerhoff (2006) found participants were more prepared to use technology after completing the professional development. The findings from this current study indicate that LC faculty perceptions align with Brinkerhoff’s findings, demonstrating that overall, the professional development had a positive impact on faculty participants’ perceptions about readiness to integrate technology. This section will discuss how the faculty participants’ perceptions for integrating technology was positively impacted by (a) increased faculty readiness and (b) community of learners. This section will also discuss faculty participants’ perceptions related to the impact of readiness due to (c) lack of technology and technological support.

Increased faculty readiness. In the final week of the professional development intervention of this study, faculty participants had an opportunity to interact through a
discussion board topic whether or not they felt more prepared to integrate technology into course design now that the professional development was ending. Overwhelming, all faculty participants stated they were more ready than prior to the professional development. For example, Maria stated,

I remember in the 1st week of the course I rated myself a 10 on being ready to integrate technology. Well, in my heart I was a 10, ready and willing to try; but now I am more prepared and have confidence to actually do it. Even with only baby steps, I can see the value for me, as well as the students, so I'm encouraged.

Karen supported this by stating, “I was the pokey puppy in the group more not ready than ready. These six weeks have greatly increased my confidence to try.” These statements answered RQ1 by demonstrating the positive impact the professional development had on faculty perceptions about readiness to integrate technology.

The first section of the quantitative TIFPBQ pretest and posttest, called Technology Beliefs, also corroborated the qualitative findings to answer RQ1. This section explored technology beliefs related to technology integration and asked questions relating to the beliefs of the participants regarding supporting the use of technology in the classroom and how technology knowledge improves teaching.

The impact of professional development is reflected in the increase of mean scores on the TIFPBQ Technology Beliefs section pretest to posttest. The mean score of the responses increased from 3.24 on the pretest to 3.34 on the posttest. Through the integration of the findings from qualitative responses in the discussion boards and the semi-structured interviews, as well as the results from the quantitative TIFPBQ pretest
and posttest Technology Beliefs section, this indicates the professional development had a positive impact on faculty perceptions about readiness to integrate technology.

**Community of learners.** While the professional development positively impacted faculty perceptions about readiness to integrate technology, the encouragement between and the community formed of faculty participants also played a critical part in this readiness. When online faculty are located in various locations, online professional development can help build a faculty community and develop skills (Mohr & Shelton, 2017). Professional development can also highlight the importance of a community of learners by emphasizing the value of relationships, sharing resources, collaborating, and building networks (Dawkins & Dickerson, 2007). Building strong connections within an online professional development also encourages networking, communication, and idea exchanges (Carter, 2004; Healy et al., 2014; Macdonald, 2010; Powell & Bodur, 2019). In order to be successful in this environment, the community participants have to be willing to participate in rich online discussions, feel secure and welcome, and be devoted and excited about inclusion in the community (Lock, 2006). Aligning with the research above, the connection and relationships formed between this study’s participants in professional development helped to positively impact faculty perceptions about readiness to integrate technology.

The qualitative findings related to the importance for a community of learners helped answer RQ1 by showing the impact that faculty participants can have on each other to increase perceptions about readiness. For example, Matt stated in the discussion board, “I got some great ideas from this endeavor. My colleagues are all so bright and creative. I was excited to see their work. Once again, I am humbled by being with such a
talented and collaborative group of colleagues.” Maria agreed with the importance of community by sharing in the semi-structured interview, “I'm not afraid of the technology anymore and I trust myself and I have friends to help me.” Through the qualitative findings presented above, it was clear the community of learners within the online professional development increased faculty perceptions about readiness to integrate technology.

**Lack of technology and technological support.** When considering how often technology changes and how much it has progressed over the years, it is logical to consider the availability of college technology and technical support personnel when integrating technology, as both of these factors can impact faculty readiness to integrate technology. Technology integration sets expectations that educators will become proficient in technology (Orr et al., 2009), but in reality, ever-changing technology makes mastery near impossible (Ertmer & Ottenbreit-Leftwich, 2010). Although technology support should be available (Esterhuizen, et al., 2013; Gutman, 2012), additional support is still needed (Lackey, 2011). Additionally, unpredictable technology leading to undependable technology support makes educators nervous at times to attempt to integrate technology (Keengwe & Ochwari, 2009). Although faculty participants in the current study found the professional development increased their readiness to integrate technology through the content presented and the strong community of learners, faculty participants indicated there was additional college technology and technical support personnel needed which could prepare them even further.

Through discussion boards and semi-structured interviews, faculty participants indicated they needed two types of support; technical support and technology support.
Technical support focused on the troubleshooting in terms of having someone available to contact when something goes wrong with the technology. For example, Alexa stated in a discussion board, “The type of support I would like to receive would include having a dedicated person on the regional campus who is trained to help troubleshoot in real-time when issues of technology integration arise.” This was supported by Chris who stated in a semi-structured interview, “People just almost bang their heads against the table or the laptop or whatever with the complexities of trying to figure out how to do this [use the technology] right.” Through this, it was clear there was lack of technical support that needs to be increased so faculty participants feel more ready and more comfortable integrating this technology.

On the other hand, technology support focused more on having support to teach faculty participants how to use technology so they were prepared to integrate it into their online courses. This included tutorials and trainings on how the technology works. The need for this was demonstrated through comments in the discussion boards. For example, Sarah stated that she needed, “Someone that will effectively communicate the what, why (bring all together), and the how for technology today, and what technology will be necessary in the future to stay competitive as an institution of higher education in a global economy.” Steph supported this finding by stating “Some of the issues I struggle with are technology itself and receiving the right professional development to assist with becoming efficient in digital technology.” In terms of overcoming this barrier, Katie proposed a solution,

An idea, that I would be willing to make a time commitment to viewing ---

Springfield hosts a 1-hour zoom session presentation that is an EdTech for
Instructors. Each session [monthly?] focuses on a "tool" or a technology update. Sessions will be taped for easy access 24/7 by instructors. This would demonstrate an appreciated level of technology support by the college.

Through the quotations above, it was clear the professional development revealed the need for additional college technology and technical support to bring faculty readiness to the next level.

**Research Question 2: How, and to What Extent, Does Participating In Online Technology Integration Professional Development Impact Faculty Perceptions about the Advantages and Challenges of Integrating Technology?**

This professional development was a learning opportunity for faculty participants to become well-informed on all the different elements of technology integration, including advantages and challenges of technology integration. In terms of advantages, reasons were identified to integrate technology (Almekhlafi & Almeqadhi, 2010; An & Reigeluth, 2011; Anyanwu, 2015). By addressing the advantages of technology integration, it provided valuable faculty perspective into ways that technology integration could improve various elements of their online teaching and learning. In terms of challenges of technology integration, possible barriers were identified (Dinc, 2019; Kopcha, 2012; Wachira & Keengwe, 2011). By addressing the challenges of technology integration, potential barriers were identified so at the least faculty participants would be knowledgeable of barriers they may face, and at the best they would be prepared to overcome these barriers. Therefore, the rationale for inclusion of this research question was to determine if this professional development would impact faculty perceptions related to the advantages and disadvantages of technology integration, as both are critical.
to understand before integrating technology. The findings from this current study indicate that the professional development had a positive impact on faculty perceptions as it related to identifying advantages to technology integration, as well as recognizing barriers and starting to overcome them. This section will discuss the positive impact faculty participants believe technology integration will have on future (a) student learning and (b) student engagement. This section will also discuss two foreseeable challenges related to technology integration including (c) lack of time and (d) changing technology.

Positive impact on student learning. An advantage offered by the faculty participants through their engagement in professional development about integrating technology is the positive impact they could foresee on their student’s learning. By integrating technology, students have more up-to-date, comprehensive learning resources easily available and learning can be enhanced because educators are able to personalize learning and provide students with new viewpoints and concepts (McKnight et al., 2016). Additionally, digital technology can be useful to college students because it allows students to learn information in various ways and review resources at their convenience to improve their learning comprehension (Henderson et al., 2015). Furthermore, technology integration can have a positive impact on student performance (Shi, 2019; Smarkola, 2008). The faculty participants in this professional development also agreed that an advantage of technology integration was the positive impact it could have on their student’s learning.

Throughout the discussion board interactions in this study, faculty participants shared their experiences in the professional development in support of the interconnectedness between technology integration and student learning. For example,
Maria stated, “…[what] I’m learning through Anna's study, is integrating technology is additive to already good practice in order to enhance the learning environment and reach more learners.” This was supported by Steph who stated,

Incorporating technology across all subjects within the course room enables educators to craft powerful collaboration learning experiences that support problem solving and critical thinking. With strategic integration of both content-specific and content-neutral technology, students and educators can construct their learning together in authentic ways that elevate learning.

Furthermore, faculty participants expanded on the advantage of student learning as it related to specific tools. For example, Jen stated, “I think the Infographics tools could make the dry material more entertaining and therefore more likely for students to retain. The surveys could be a good way to gauge the students' belief systems and understanding of a topic.” Additionally, Alexa stated, “Kahoot is an interactive, fun and engaging tool that can be used to introduce new topics, review content, teach a new lesson, reinforce knowledge, run formative assessments, foster creativity and teamwork and much, much, more.”

Through these participant responses, faculty in the professional development discussed how they viewed there to be a positive impact between technology integration and student learning when integrating technology into their teaching. Yet, as was an unexpected qualitative finding, it is a misconception to assume that college students know how to use course technologies effectively (Switzer & Switzer, 2016) and like the faculty participants of this study, their students may need additional support to be able to successfully integrate technology into their courses.
As it related to RQ2, the first section of the TIFPBQ pretest and posttest, called Technology Beliefs, included quantitative data that substantiated the qualitative findings related to the advantages of technology integration. This section explored technology beliefs related to the advantages of technology integration and asked questions about faculty participants perceived how technology could maximize learning and help students learn. The impact of professional development is reflected in the increase of mean scores on the TIFPBQ Technology Beliefs section pretest to posttest. The mean score of the responses increased from 3.24 on the pretest to 3.34 on the posttest. Therefore, when comparing the TIFPBQ pretest means to the TIFPBQ posttest means, faculty participants responded higher in this section after the professional development ended, indicating their beliefs related to the advantages of technology increased as a result of participation in the professional development. Through the integration of the findings from qualitative data in the discussion boards and semi-structured interviews, as well as the results from the quantitative TIFPBQ Technology Beliefs pretest and posttest section, faculty participants identified their perceptions related to the advantages of technology integration.

**Positive impact on student engagement.** Technology integration as it relates to student engagement has been studied in many contexts in previous research (Chen et al., 2010; Günüş & Kuzu, 2014; Rashid & Asghar, 2016; Smarkola, 2008). Integrating web-based learning technology into higher education courses had a positive effect on student engagement (Chen et al., 2010). Additionally, when using technology successfully, it can help facilitate genuine student engagement when learning (Günüş & Kuzu, 2014; Smarkola, 2008). Finally, when considering the interconnectedness of technology use,
student engagement, self-directed learning, and academic performance, technology had a direct beneficial impact on student engagement (Rashid & Asghar, 2016). In this current study, faculty participants also recognized the advantage that technology could have on student engagement.

In the discussion boards and semi-structured interviews, faculty participants repeatedly shared how they perceived technology integration to have a positive impact on student engagement. For example, in the discussion board James stated, “I feel that these edtech options will more fully engage our students.” This was supported by Chris in his semi-structured interview when he stated, “I can see how this would be relevant or interesting or engaging to students who might otherwise kind of be drifting off.”

Other faculty participants explained the advantage of engagement by aligning it specifically to tools they thought increased student engagement. For example, in the discussion board Alexa stated Powtoons was “one engage my younger self while doing an adult” because it was a “fun and captivating way to get students engaged in the course material. Additionally, Lauren stated in the discussion board that Google Forms “could be useful in engaging students in a fun, interactive manner, and be useful in affirming students' comprehension of a topic” because it “give[s] immediate feedback, [is] attached to specific content (text reading, article, info-graphic, video), [and] increase[s] student's engagement and learning.” Through these statements, it indicated that the professional development impacted faculty perceptions about the advantages of technology integration by exposing faculty participants to the engagement element of technology.

**Lack of time.** Learning and exploring technology takes time (Chen, 2008; Davies, 2011; Dinc, 2019; Frederick et al., 2006; Johnson et al., 2016; Morehead &
LaBeau, 2005), which is often a commodity many faculty may not have. Even after a technology has been learned, there is still a lack of time as it relates to finding potential areas to integrate technology into a course (Frederick et al., 2006), and actually practice teaching with that chosen technology (Georgina & Olson, 2008). The findings from this study aligned with the findings above, as faculty participants indicated in semi-structured interviews and through discussion boards, finding time to integrate technology will be a barrier.

In the professional development, there was one module which specifically addressed technology challenges. This idea of technology challenges was also threaded throughout other modules so that faculty participants would be as prepared as they could for possible barriers. In terms of time, it was clear this was not a barrier that was overcome after the professional development, but instead it was acknowledged, which in this case was just as important. This professional development provided realistic expectations to faculty participants about the type of planning and commitment it takes for proper technology integration following best practices for online learning.

Faculty participants continued to mention after the specific module on technology challenges how finding time was going to be a barrier for their learning about the different technology as well as how to integrate it. As stated by Alexa in the discussion board, time was also going to be a barrier, “Especially if it's a new technology that I need to learn and have not carved out the time needed to learn the new technology.” Matt, Steph, and Jess all agreed with Alexa and responded to her post which cited that finding time was going to be “no easy feat.” This barrier was echoed throughout the semi-structured interviews as well. When discussing barriers Maria stated, “Do I really have to
do this?” and followed up by saying “I realize I have to change the way I prioritize” in order to make time. By being able to identify time as a barrier, faculty participants were now aware it was something they needed to prioritize to make technology integration possible.

In terms of quantitative results, there was a section of the TIFPBQ pretest and posttest called Perceived Technology Barriers. This section compared the perceived barriers of technology integration prior to the professional development (TIFPBQ pretest) to after the professional development (TIFPBQ posttest), therefore aligning to RQ2. Items in this section asked about barriers related to time, access, and knowledge. The impact of professional development is reflected in the decrease of mean scores on the TIFPBQ Perceived Technology Barriers section pretest to posttest. The mean score of the responses decreased from 1.92 on the pretest to 1.70 on the posttest. Selecting a 1 in this section would indicate not a barrier towards technology integration, while selecting a 3 would indicate a major barrier. Therefore, a decreasing mean score in this section was a positive result, as it indicated faculty participants were viewing elements of technology as less of a barrier after they completed the professional development compared to before they completed the professional development. Therefore, although the qualitative findings suggested faculty participants became knowledgeable and informed of possible technology integration barriers as a result of the professional development, the quantitative results indicated these barriers (among others) were still manageable and not major barriers.

Changing technology. Considering how much technology has advanced over the years, recognizing that it can be difficult to keep up with technology is expected. With
how quickly technology changes, it “has made the knowledge base for technology a moving target” as it relates to successful technology integration for educators (Abbitt, 2011, p. 134). When looking at technology changes over a seven-year period, the findings of Martin et al. (2014) indicated that some technology that was expected to have an impact on education, ending up not living up to expectations, therefore proving how unpredictable and everchanging technology truly is. In an attempt to keep educational institutions current with technology trends, the federal government has also funded various technology projects to ensure that schools are able to keep up with the technology changes and advances (Lawless & Pellegrino, 2007). Additionally, because technology is changing so quickly, faculty have to continually update their courses to keep up with the technology changes and updates (Shulte, 2010). By the conclusion of this professional development, faculty participants agreed with the findings above, by identifying constantly changing technology as a barrier to technology integration.

Although this professional development highlighted multiple tools for faculty participants to integrate into their courses, there was thousands of others that could have been featured, because that is how abundant technology options are and how quick technology changes. For example, Matt stated in the discussion board, “But, technology evolves so quickly that it is hard to assess where I am on the learning curve at any given time” because “the tech advances a lot faster than any of us can.” This was supported by Dan in the discussion board when he stated, “Technology has to undergo continuous revision since technology is dynamic and never static.” Through the statements above, the faculty participants openly shared their perceptions related to the barrier of changing technology that was explored throughout the professional development.
Research Question 3: How, and to What Extent, Does Participating in Online Technology Integration Professional Development Impact Faculty Plans to Integrate Technology Into Their Course Design?

The purpose of professional development is to change existing teaching practices to increase student outcomes and learning (Guskey, 1986; Odden et al., 2002). Professional development provides participants an opportunity to continually learn (Clarke & Hollingsworth, 2002) and involves time commitment to implement what was learned (Odden et al., 2002). Ideally, content learned from the professional development should be applied after the professional development has finished. This aligns with adult learning theory, as one of the elements is willing to learn and apply knowledge promptly (Knowles, 1974; Merriam, 2001; Zmeyov, 1998). Therefore, the rationale for inclusion of this research question was to determine if this professional development would actually impact faculty plans to integrate technology into their online courses moving forward.

The findings from this current study indicate that the professional development had a positive impact on faculty plans to integrate technology into their course design. This section will discuss that impact of the professional development on (a) future course design and also (b) the specific technology tools that faculty plan to implement.

Impact of technology integration professional development. Professional development is a common way to educate faculty about various technology elements and integration (Alsofyani et al., 2013; Bese, 2016; Esterhuizen et al., 2013; Macdonald & Poniatowska, 2011; McQuiggan, 2012; Rienties et al., 2013). Specifically, online professional development has also been found to have a positive impact on technology integration (Brinkerhoff, 2006; Rienties et al., 2013; Treacy et al., 2002), with some
participants even indicating that infusing technology into their curriculum was part of their regular practice (Brinkerhoff, 2006). Additionally, completion of a technology integration professional development increased likeliness to use technology (Cullen & Greene, 2011). Faculty participants in the current study agreed with these findings, as the professional development positively impacted their technology integration plans moving forward.

There was a section of the TIFPBQ pretest and posttest called Technology Integration. This section compared the plans for technology integration prior to the professional development (TIFPBQ pretest) to after the professional development (TIFPBQ posttest), therefore aligning to RQ3. The impact of professional development is reflected in the increase of mean scores on the TIFPBQ Technology Integration section pretest to posttest. The mean score of the responses significantly increased from 3.20 on the pretest to 3.62 on the posttest. In relation to RQ3, this meant that in their future course design that faculty participants planned to integrate technology more, to increase the role technology played in their future curriculums, and to use technology to design new learning experiences for their students.

These results were also supported with the qualitative findings from the semi-structured interviews and discussion boards. For example, in a discussion Sarah stated, “Technology really adds the challenge that many students want and need to stay motivated. As a result, I do plan to integrate technology into courses moving forward.” Alexa found the professional development had a similar impact as she stated in the discussion board, “I certainly plan on integrating technology into my courses moving forward. I am so looking forward to trying out at least one of these in the near future.” A
similar impact was found by Matt in a discussion board when he stated, “This came at a great time. I will be working on a new Undergraduate course. Putting it together will allow (Strike that)…compel me to be more innovative with my course design.” By viewing the faculty participants’ responses above in combination with the results of TIFPBQ pretest and posttest Technology Integration section, the professional development positively impacted faculty participants’ plans for online course design implementation.

**Technology tools.** In addition to confirming the professional development had a positive impact on faculty participants’ plans for online course design implementation, this research question also provided insight into the specific technology tools that faculty actually planned to integrate. Not only do faculty want to be more proficient in a variety of tools (“EDUCAUSE”, 2017b), but students also want to see more technology integrated into courses (“EDUCAUSE”, 2017a). Lane (2013) integrated an online professional development which focused on free technology tools to encourage creative and innovate uses of technology in future online course design and found these technology tools helped faculty cultivate their pedagogy and create materials and content for their future courses. The professional development in this current study also included an infusion of different technology tools for all different levels of technological skills to align with the varying needs of the faculty participants. Some specific technology tools are discussed below while also answering RQ3.

The impact of the professional development is reflected in the increase of mean scores on the TIFPBQ Technology Integration section pretest to posttest. The mean score of the response significantly increased from 3.20 on the pretest to 3.62 on the posttest.
Through the integration of the findings from qualitative responses in the discussion boards and the semi-structured interviews, as well as the results from the quantitative TIFPBQ pretest and posttest Technology Beliefs section, this indicates the professional development had a positive impact on faculty perceptions about readiness to integrate technology. This result supports the technology tools section as well, as there were specific items in this TIFPBQ pretest and posttest section which discussed the plans to use a variety of tools in future course design. Underpinning that the professional development positively impacted faculty plans related to technology tool implementation.

These results were also supported with the qualitative findings. Faculty participants discussed a variety of tools they planned to integrate into their online course design as a result of participating in the professional development. For example, Jen stated in the discussion board, “I have been wanting to add some surveys into my classes and I think some of those tools would work. I also would be interested to see if the Quizzes and Formative Assessment tools would work well with discussions that are based on videos.” Additionally, James stated in a semi-structured interview, I’m going to start with Doodle to organize a meeting for online students and use Canva and Adobe Spark as well. I feel that these edtech options will more fully engage our students.” Through these statements, the professional development introduced faculty participants to a variety of new tools that they identified as planning to integrate into their course design.

## Implications

This section will explore the implications related to this action research study. Specifically, the following will be considered: (a) personal implications, (b) implications for designers of professional development, and (c) implications for future research.
**Personal Implications**

As a result of this study, I have yielded many personal implications that I will apply to my future professional endeavors as an instructional designer. It is critical to share these due to the significant role a researcher has throughout the action research process (Buss & Zambo, 2014). Specifically, these lessons include (a) benefits of conducting a mixed-methods study, (b) importance of succinct professional development, and (c) willingness of faculty participants to integrate technology.

**Benefits of conducting a mixed-methods study.** This study utilized a mixed-methods design approach, meaning that both quantitative (TIFPBQ pretest and posttest) and qualitative data (semi-structured interviews and discussion boards) were collected and analyzed (Mertler, 2017). A benefit of this mixed-methods design was that by combining the strengths of both types of data, it helped provide a stronger comprehension of the proposed research questions (Creswell, 2014). A mixed-methods approach also “improves the credibility of the findings when information from different data sources converge” (Peersman, 2014, p. 8) and draws impactful conclusions when numbers (quantitative) and comprehensive details (qualitative) are displayed together (Lodico et al., 2006).

The aforementioned benefits above were very influential in this current study. My study in particular used a convergent mixed-methods design (Creswell & Plano Clark), also known as a triangulation design (Mertler, 2017). This type of design highlights the equal importance of qualitative and quantitative data, as both are critical to the study and are collected around the same time and support each other (Creswell & Plano Clark, 2018; Mertler, 2017). In this study, the qualitative findings from themes (discussion
boards and semi-structured interviews) and quantitative results from descriptive and inferential statistics (TIFPBQ pretest and posttest) were merged together to answer the research questions.

Each of the three data collection sources played important, but different, roles in making sense of the research questions. For example, qualitative data sources, which in this study were the discussion board responses and semi-structured interviews, helped discover “…the understandings, experiences and imaginings of our research participants…” (Mason, 2002, p. 1). The discussion board responses provided rich, informative insight into each of three research questions and allowed faculty participants to explain in detail about their experiences and thoughts about technology integration throughout the entire professional development. Additionally, due to the professional development being completed fully online, it provided participants time to reflect and think about what they wanted to write before posting discussion board responses. The collaborative nature of the discussion boards also allowed faculty participants, all of who were fellow faculty members at the college, to discuss with each other similar interests.

Next, the semi-structured interviews allowed faculty participants to speak openly in an interview format to expand on any of their discussion board thoughts as they related to technology integration. The semi-structured interviews also provided faculty participants an opportunity to take part in a conversation with the researcher, and therefore expand further on their experiences and takeaways from the professional development. In terms of how this type of data enhanced the study for the researcher, this provided me an opportunity to also ask clarifying questions that otherwise may not have
been able to be answered in a discussion board setting, but certainly could be in an interview setting (Mertler, 2017).

Finally, the TIFBPQ pretest and posttest provided an opportunity to collect numerical data and analyze it statistically (Mertler, 2017). Using the results of the descriptive and inferential statistics, I was able to get a better understanding of the statistical impact (if any) the professional development had on faculty perceptions and plans for technology integration in course design. Therefore, by merging these results with the qualitative findings, I was truly able to see the bigger picture of how all the data collected influenced faculty participant experiences throughout the professional development, that I otherwise would not be able to see by only collecting one type of data (Creswell, 2017). Moving forward to any research I do in the future, I value the benefits of a mixed-methods design and found it to be a thorough research methodology by incorporating the significance of both qualitative and quantitative data.

**Importance of succinct professional development.** During this professional development, I learned how valuable time was to the faculty participants. Looking back, I am very grateful I had 16 faculty participants in this study, because I learned faculty were stretched so thin for time due to other obligations, both professional and personal. When originally reviewing the literature to determine what the length of the online professional development should be, the recommendations were not concrete. Studies have reported online professional development lengths anywhere from one day (Campbell, 2016; Carter, 2004), to three weeks (Macdonald, 2010), to eight weeks (Chitanana, 2012), to nine weeks (Teräs & Kartoğlu, 2018), to even 12 weeks (Rienties et al., 2013). Therefore, I decided to make my study six weeks, which was in the middle of the suggestions. In
terms of how time should be allocated during each week, I decided on 1-2 hours (see consent form in Appendix C), as I viewed this a reasonable expectation for a professional development. When designing my study, I took very seriously the time commitment I made to faculty participants to keep within this time frame. As the professional development was six weeks, I had one new topic introduced each week, which split up the information to keep faculty participants engaged and aware of weekly expectations. I feel that because of the realistic expectation I made (and stuck to) for the weekly time commitment, faculty participants were able to stay focused and interested.

At the time of the professional development design, I was not aware how busy all faculty participants were going to be. However, this became very clear when faculty participants were discussing one of their main expected barriers to technology integration was time. Although time to integrate technology was different than time to participate in the professional development, time is still time, and faculty participants continually stated reasons why they had little, to no extra time. When reading through discussion boards and hearing about this barrier in the interviews, I was very happy I chose a small time commitment during each week, and had the professional development last only six weeks. I think that if the professional development was any longer, I would have lost engagement by some of the faculty participants. Furthermore, the COVID-19 pandemic began during the final week of this professional development, meaning if the professional development was any longer, many faculty participants may have had even less time to complete it due to possible pandemic demands. In considering how I may design online professional development in the future, I will certainly take into consideration the
element of time commitment for potential participants to ensure the design is succinct, but still an effective professional development opportunity.

**Willingness of faculty participants to integrate technology.** Marzilli et al. (2014) found that faculty willingness to integrate technology was fundamental to their technology integration transformation. When I started to consider how this professional development would take shape, my biggest fear was that faculty participants would not be willing to integrate technology into their course design. But, the findings and results from this professional development proved quite the opposite, which was a welcomed surprise. Wachira and Keengwe (2011) found that even if educators had some hesitation about elements of technology, they still felt positive about technology integration in general and expressed a willingness to continue to learn about how to integrate technology into their curriculum. The current study supported the findings of Wachira and Keengwe, as faculty participants in my study at times seemed hesitant about pieces of technology integration, but overall were willing to try.

The findings from my study also supported the findings from Bennett and Bennett (2003), who conducted a professional development to explore what specific instructional technology characteristics impacted faculty willingness to integrate technology. The results indicated faculty would be more willing to integrate technology if the professional development discussed various technology advantages, provided technology tutorials, allowed faculty to test out the technology, took participant technology experience into consideration, and aligned technology with participant foundational learning beliefs (Bennett & Bennett, 2003). The professional development I designed incorporated each of these elements into the design, which may have increased faculty participants
willingness to integrate technology. Additionally, when potential barriers of technology which may cause possible negative feelings toward technology are discussed upfront to educators in professional development, they are more likely to move past those barriers (Potter & Rockinson-Szapkiw, 2012), which would in turn make them more willing to integrate technology. This professional development had a specific module dedicated to the barriers of the professional development for that exact reason, so the faculty participants could expect the unexpected and still have enough confidence to be willing to try to integrate technology. In considering my college positionality and how much I work together with faculty in integrating technology into their course design, I became more optimistic about faculty interests in technology integration as well as became more sensitive to the possible barriers the faculty may face.

**Implications for Designers of Online Technology Integration Professional Development**

As a result of this study, there are significant implications related to the design of online technology integration professional development that should be considered. One of the primary goals of action research is for the researcher to gain a better understanding of their educational environment to increase effectiveness (Mertler, 2017), so sharing implications is critical so future researchers can be as effective as possible moving forward in their own studies. Specifically, implications from my study include (a) availability of support after the conclusion of professional development, (b) opportunities for personalized and authentic connection to content, (c) flexibility through an online professional development, and (d) discipline-specific professional development.
Availability of support after the conclusion of professional development. As answered in RQ1, faculty participants expressed their perceptions of readiness to integrate technology, but indicated the lack of technology and technological support available to them. Technology can be unpredictable (Keengwe & Ochwari, 2009), and therefore follow up support and training should be offered once the professional development has ended (Ertmer, 2005; Kopcha, 2012; Potter & Rockinson-Szapkiw, 2012), as well as during the actual integration process (Avci et al., 2020) to ensure participants are prepared and confident to successfully integrate technology into their courses. When ongoing technical support is not available after professional development has ended, educators struggle to maintain the technology integration, and therefore, changes may end up being only for the short term (Smolin & Lawless, 2011).

Specifically, after technology integration professional development has ended, there needs to be dedicated technical support staff to provide assistance to faculty when they need it, which may include troubleshooting technical issues or helping with overall integration (Avci et al., 2020; Keengwe & Ochwari, 2009) and pedagogy (Ertmer, 2005). Yet, as found in the research of Anyanwu (2015), participants were never contacted by the professional development facilitators after it ended to see if technology implementation actually occurred. Or as found by DeSantis (2012), participants in professional development learn about technology from experts, but those experts are not present to help or see if they were successful with technology integration.

This study supported the findings from the research above related to the need for technology and technical support after the professional development has ended. Understanding that technology integration can be intimidating, I recommend to other
professional development course designers that they include a plan for technology and technical support for their participants as they move towards integrating technology into their courses after the professional development has ended. As was offered from the participants of this study, the support could come in a variety of forms, such as Zoom sessions, specific personnel who were strictly available for technology integration support, or additional professional development if needed. Regardless of the ways in which technology and technical support is available to faculty participants after the professional development is concluded, ensuring that support is critical to the success of the professional development about technology integration. These types of support are essential to consider prior to designing the professional development to ensure faculty participants can continue to thrive with technology integration when they are ready to put their new knowledge into action.

**Opportunities for personalized and authentic connection to content.** By ensuring the professional development content is applicable to those enrolled, content should be personalized to the needs of the participants (Baran & Correia, 2013; Powell & Bodur, 2019; Qian et al., 2018; Sullivan et al., 2018). By taking into consideration the needs of the specific participants, professional development is more effective and beneficial (Powell & Bodur, 2019). In the current study, faculty participants were given various choices on all discussion boards and assignments to ensure what they were doing specifically aligned to their specific needs and goals. By doing this, faculty participants had a way to feel more connected to the content.

Specifically related to technology integration professional development, technology tools should be varied based on the participants, so they are relatable to their
skill level and needs (Liao et al., 2017). Additionally, content should be specialized as it relates to technology, design, development, and pedagogy (Baran & Correia, 2013). To accomplish this, it is the responsibility of the designer of the professional development to ensure participants are learning and understanding on a personal level (Macdonald, 2010; Powell & Bodur, 2019; Qian et al., 2018), which may entail differentiated materials for specific participants (Macdonald, 2010; Qian et al., 2018). In this study, the technology tools included were broken down into various categories such as presentations, infographics, videos, blogs/websites, word processing, video conferences, collaboration, group work, and quizzes/formative assessment tools. Therefore, it is my recommendation to other technology integration professional development designers when they are designing the professional development, the technology tools incorporated should be separated based on skill level and belief about how their participants would use them. This differentiated design may take additional time by the course designer to up front, but it proved at least in this study to be valuable to my participants.

Closely linked to personalized professional development is authentic professional development. By focusing on real-world experiences, participants are able to take into consideration their prior knowledge and incorporate technology into the professional development in an authentic way (Chitanana, 2012). Participants in professional development also found authentic tasks made learning more entertaining (Teräs & Kartoğlu, 2018). In this study, the design of the professional development encouraged participants to bring in their real-world experiences when exploring technology. For future technology integration professional development designers, I recommend considering opportunities for building authentic reflection into professional development
to ensure participants have the same opportunity to explore content that matters to them and that they find enjoyable.

**Flexibility through an online professional development.** As identified in various parts of this study, integrating technology takes time (Chen, 2008; Davies, 2011; Dinc, 2019; Frederick et al., 2006; Johnson et al., 2016; Morehead & LaBeau, 2005), and extra time is something many professional development participants do not have. Designing an online professional development allows for time flexibility for participants (Campbell, 2016; Carter, 2004; Cercone, 2008; Healy et al., 2014; Liao et al., 2017; Rizzuto, 2017; Sullivan et al., 2018; Thomas, 2009). As this study was conducted at a college with numerous regional campuses, where faculty participants were from different states, and in different time zones, an online design was critical. Therefore, because of the advantage of time flexibility that an online professional development offers, I recommend to other professional development designers that this learning environment be considered for future professional developments to promote inclusivity of all participants, regardless of their physical location.

Although some participants prefer incentives for completing of professional development (Carter, 2004; Wyants & Dennis, 2018), by creating a professional development that is online, it allows participants to find time for engagement while they are at home or another environment of their choice (Powell & Bodur, 2019; Wyants & Dennis, 2018). Meaning, no travel time or expense is required. An online professional development also provides continuous access to resources and offers a sense of control to participants (Cercone, 2008; Powell & Bodur, 2019; Wyants & Dennis, 2018). Therefore, resources can be viewed and reviewed as often as needed to ensure knowledge
comprehension. Due to the strenuous time commitments of many potential participants, I recommend to other professional development designers that participants may be more willing to invest their time if they know the flexible online format would work in combination with their busy professional and personal schedules.

**Discipline-specific professional development.** This study included faculty participants from various different disciplines. Therefore, the technology tools explored for possible integration had to be applicable to many disciplines, so that all faculty participants could potentially relate. However, I recommend to other professional development designers that it could also beneficial to design technology integration professional development specific to each discipline (Hsu, 2010). For example, math faculty could participate in a professional development that focused on technology integration related to specific needs of that subject using tools specifically designed for them. This was supported by Liao et al. (2017) who asserted technology integration professional development was not as useful if a “one-size-fits-all approach” was used (p. 532), but instead should account for interests and needs of participants by differentiating content because different subject areas require different technology integration practices (Howard et al., 2015). Therefore, it is my recommendation that technology tools could be better personalized to the specific need of a discipline, rather than offering a more general professional development.

**Implications for Future Research**

Findings from this study suggest implications into further research related to technology integration professional development. For those seeking further research in these areas, implications will be discussed related to (a) hands-on application of
technology, (b) alignment to learning outcomes, and (c) embracing the importance of technology integration.

**Hands-on application of technology.** Technology integration professional development may include numerous different components, but hands-on time with the technology should be one of them. Professional development related to technology integration could be improved by providing more time for hands-on exercises and preparation so teachers are more prepared when it comes time to actually integrate the technology discovered (An & Reigeluth, 2011; Curwood, 2011; Keengwe & Onchwari; Sullivan et al., 2018). Furthermore, another study took this concept a step further by surveying teachers at two different times, with a 7 year gap in between, and found there was an increase in the preference of hands-on time to practice technology (Liao et al., 2010). In this current study, the time commitment for engagement in the profession development was only 1-2 hours per week and therefore faculty participants were introduced to tools and had time to explore and evaluate tools so they could provide feedback to others. In this study, faculty participants did have the chance for hands-on technology application, as they created a scavenger hunt and submitted it for feedback and shared with others.

Furthermore, as an optional final assignment, faculty participants were given an opportunity for additional hands-on application with a technology of their choice. Only 2 faculty participants chose this option (likely because of the COVID-19 pandemic beginning to increase their workloads significantly), but I recommend to future researchers that they consider that impact that hands-on application of technology may have. Without hands-on application during the professional development, participants do
not feel they have enough experience to actually implement technology into the
classroom once the professional development was over (Anyanwu, 2015). Therefore, for
future studies related to technology integration professional development, it would be
beneficial to ensure hands-on application is considered in their research design early on.
That way their participants will have plenty of time to practice before applying what they
learned into practice.

Alignment to learning outcomes. The purpose of technology integration relies
on integrating technology into curriculum for meeting learning outcomes (Davies, 2011;
Dockstader, 1999; Ertmer & Ottenbreit-Leftwich, 2010). Yet, sometimes that alignment
is not as obvious in technology integration professional development, as participants
wanted technology integration to not only focus on how to use tools, but also how it may
align with their learning outcomes (Ertmer & Ottenbreit-Leftwich, 2010). In this study,
there was a focus for faculty participants to continually keep their learning outcomes at
the forefront of their thinking when they explored tools because “technology use should
be for the sake of learning, not for the sake of technology” (Dinc, 2019, p. 388). To
support this, this current study also had a tool evaluation discussion, where faculty
participants were asked specific questions relating to how the tool they were considering
aligned to their course outcomes. Ideally, by making this connection, faculty participants
were able to validate their thinking about choosing the tool and considering how they
could integrate it into their course design.

Furthermore, an element of effective technology professional development was
ensuring there was continually a focus on student learning outcomes and goals that were
focused on curriculum (Curwood, 2011). Yet, if much professional development time is
focused on teaching tools, when it comes time to integrate technology on their own, teachers are not prepared to align technology to student learning (An & Reigeluth, 2011). Therefore, I recommend to that there should be a clear focus on alignment of technology to student learning outcomes in the development of their research intervention. After all, professional development is training that transforms how educators teach, which in turn should produce increases in student outcomes and learning (Guskey, 1986; Odden et al., 2002). Therefore, the professional development research design should be aligned to the learning outcomes to ensure positive shift happens.

**Embracing the importance of technology integration.** Another consideration for future research related to technology integration professional development is to ensure participants feel supported by their workplace. In order to do this, embracing the importance and value of technology integration needs to be clear from an administrative level (Avci et al., 2010), yet often times stakeholders like administrators do not speak up about their opinions related to professional development (Twinning et al., 2013). By technology integration initiatives being supported at a higher level, it would provide an optimistic and affirmative environment related to technology (Avci et al., 2020) and encourage participants to integrate technology into their teaching (Liu & Kleinsasser, 2015). Furthermore, at a collegiate level, faculty should be encouraged by administration to integrate technology into their course design and administration should consider compensating them for it in some way (“EDUCAUSE”, 2017b). An area for future research that I recommend is identifying ways to bridge the desire for financial compensation of the professional development faculty participants and the higher
education administration finding ways to financially support their faculty in attending professional development.

**Limitations**

As with any research, it is essential to share the limitations associated with this study so they could be improved upon in future research related to technology integration professional development. The limitations are related to the (a) action research design, (b) self-reporting of data, and (c) criteria for inclusion of participants.

The first limitation lies within the action research design itself. In action research, it is typical for researchers to study problems specific to their own educational environment (Creswell, 2012; Herr & Anderson, 2005) to make progress within that setting (Carr & Kemmis, 1986). Using action research, researchers are able to engage in the learning process (Mills & Butroyd, 2014), as they are invested in the results (Mertler, 2017). Yet, the limitation associated with action research is that the results are not generalizable to a larger population (Stringer, 2014). Therefore, the findings and results from this study may not be an accurate representation of online technology integration professional development elsewhere because my results are focused on the faculty participants within my college setting at LC. If future researchers are interested in yielding more generalizable findings and results, it may be beneficial to utilize a different type of research design.

The second limitation was related to the data collected in this study, as data in this study was collected and analyzed from a variety of instruments. Utilizing the various instruments, participants were responsible for self-reporting data, which can be noted as a limitation (Li et al., 2015). Self-reported data are data that originates from the participants.
themselves (Gonyea, 2005). Furthermore, combining self-reported data with a small sample size may have impacted the validity (Brinkerhoff, 2006). Therefore, the data that were self-reported in this study related to various elements of technology integration may have impacted the findings and results.

The third limitation of this study was related to the faculty participants. Similar to other studies exploring technology use (Albee, 2015) and professional development (McQuiggan, 2015), I used purposeful sampling to identify the sample for my study. One of the criteria for inclusion to be invited as a faculty participant in this study included at least one year of teaching online. I originally chose this as inclusion criteria because at the time, I was primarily working with faculty who taught online, so I viewed those faculty as within my sphere of influence. However, since that time, my role at the college has transitioned and although I do still work with many faculty who teach online, I now also work with faculty who are designing online courses to teach for the first time. The faculty who have never taught online before have either been approached to design/teach an course for their department or have shown interest in designing/teaching an online course themselves. With the shift in my role, as well as the new demands for faculty to teach online learning due to the pandemic, it may have been beneficial to allow faculty who have never taught online before to participate in this study. Therefore, regardless of prior experience teaching online, this professional development could have prepared faculty for technology integration for future online courses.

Closing Thoughts

With every passing day, technology integration into course curriculum is becoming more relevant in the lives of educators, including faculty members. Students
want faculty to integrate technology into their courses ("EDUCAUSE", 2017a), but faculty are not skilled enough to do so ("EDUCAUSE", 2017b). The findings from this action research study show that when carefully designed, online technology integration professional development can positively impact faculty perceptions about readiness to integrate technology. Furthermore, this type of professional development can highlight the advantages of technology integration, and prepare faculty participants for the possible barriers related to technology integration. Finally, it can positively impact faculty plans to integrate technology into course design. Empowering faculty to integrate technology into their online course design is one of the reasons I am so passionate about being an instructional designer, with the findings from this study being promising steps in the right direction.
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(304454739)


Lane, L. (2013). An open, online class to prepare faculty to teach online. *Journal of Educators Online, 10*(1), 1-32.


Macdonald, J., & Poniatowska, B. (2011). Designing the professional development of staff for teaching online: An OU (UK) case study. *Distance Education, 32*(1), 119-134.


McQuiggan, C. A. (2012). Faculty development for online teaching as a catalyst for change. *Journal of Asynchronous Learning Networks*, 16(2), 27-61.


Ozuah, P. O. (2005). First, there was pedagogy and then came andragogy. *Einstein Journal of Biology and Medicine, 21*, 83-87.


APPENDIX A

RECRUITMENT EMAIL TO FACULTY

Email Subject: Join a Professional Development Opportunity for My Doctoral Dissertation

Hello XXX,

My name is Anna Loftus and I work as an Instructional Designer here at Laken College. I am also pursuing my Doctorate of Education from the University of South Carolina.

I am writing to invite you to participate in my research study focusing on professional development technology integration for online faculty at Laken College. The purpose of this action research will be to implement and evaluate the impact of online technology integration professional development for faculty teaching at a distance at Laken College. Topics for this professional development opportunity may include the best practices for video creation, accessibility, and more. You are being invited to participate in this study because you are a faculty member at Laken College who has taught an online course within the past year and has either worked with an instructional designer, or attended a professional development session hosted by Laken College.

If you decide to participate in this study, the professional development opportunity will take place asynchronously and completely online in Brightspace. The study will take six weeks, and will require approximately 1-2 hours of participation each week. As this is an asynchronous professional development opportunity, you will not be required to log in at any one particular time. Instead, you will have weekly modules with a definitive end date. For each module, you will be expected to participate and complete the activities for that week. You will be engaging with other faculty members, the instructor, and the content through readings and weekly discussion posts and assignments.

**Study Start Date:** February 3, 2020
**Study End Date:** March 15, 2020

This is a completely voluntary study. If you'd like to participate or have any questions about the study, please respond to this email or contact me at aloftus@laken.edu by **January 22nd, 2020.**

I look forward to hearing from you and hope you will consider joining my study on technology integration professional development for online faculty at Laken College. Thank you very much for your time.

Sincerely,
Anna Loftus
APPENDIX B

LAKE COLLEGE SITE SUPERVISOR PERMISSION

July 26, 2019

To Whom This May Concern:

My name is Kim Colangelo and I work as the Associate Director for Technology Services for the Office of Regional, Online, and Continuing Education at [Redacted]. I work as the direct supervisor of Anna Loftus, Instructional Designer at [Redacted]. This letter is to give permission to Anna Loftus to conduct her dissertation for the University of South Carolina regarding online technology integration and professional development for faculty teaching at a distance at [Redacted] College.

Please let me know if you have any questions.

Thank you,

Kim Colangelo
Associate Director for Technology Services

Office of Regional, Online, and Continuing Education
(413) 748-3983
kcolangelo@[Redacted]
APPENDIX C

UNIVERSITY OF SOUTH CAROLINA CONSENT TO BE A RESEARCH SUBJECT

Study Title: Online Technology Integration Professional Development: Action Research Evaluating Impact on Faculty Perceptions and Practices

KEY INFORMATION ABOUT THIS RESEARCH STUDY:
You are invited to volunteer for a research study conducted by Anna Loftus, as an Instructional Designer at College and a doctoral student in the Curriculum and Instruction program at the University of South Carolina under the direction of Dr. Michael M. Grant (michaelmgrant@sc.edu; 803-777-6176) in the Department of Educational Studies.

Recent studies have shown students want faculty to integrate technology more in online learning. Yet, faculty are not always prepared or ready to integrate this technology. The purpose of this action research will be to implement and evaluate the impact of online technology integration professional development for faculty teaching at a distance at College. You are being asked to consent to participate in this study because you are a faculty member at College that has taught online within the last year.

If you agree to participate, you will be enrolled in the professional development and asked to share your experiences to collect data for this research study.

PROCEDURES:
If you agree to participate in this study, you will do the following:
1. Participate in a completely online faculty professional development in Brightspace by engaging with other faculty members, the instructor, and the content through readings, weekly discussion posts, and assignments.
2. Complete a pretest and posttest questionnaire during two different points in the professional development.
3. If selected, take part in a semi-structured interview in the last week of the professional development.

DURATION:
This study is six weeks long, with approximately 1-2 hours of time allocated each week.
Study Start Date: February 3, 2020
Study End Date: March 15, 2020
**RISKS/DISCOMFORTS:**
The activities in the online professional development are intended to be engaging for all participants. I foresee no risks to subjects beyond those that are normally encountered when completing activities in an online classroom.

However, with online discussion boards, responses will be visible to all participants. The purpose of this is to foster discussion, and the researchers cannot guarantee what you post say will remain completely private, but the researchers will ask that you, and all other group members, respect the privacy of everyone in the group.

**BENEFITS:**
This study may contribute to a better understanding of how to integrate technology into future course design, as well as prepare you to understand the technological needs of your class and students better.

**COSTS:**
There will be no costs to you for participating in this study.

**PAYMENT TO PARTICIPANTS:**
You will not be paid for participating in this study.

**VOLUNTARY PARTICIPATION:**
Participation in this research study is voluntary. You are free not to participate by excluding your data or declining to participate in the data collections. You may also stop participating at any time, for any reason without negative consequences. In the event that you do withdraw from this study, the information you have already provided will be kept in a confidential manner. If you wish to withdraw from the study, please email aloftus@.

I have been given a chance to ask questions about this research study. These questions have been answered to my satisfaction. If I have any more questions about my participation in this study or a study related injury, I am to contact Dr. Michael M. Grant at 803-777-6176 or by email at michaelmgrant@sc.edu.

Questions about your rights as a research subject are to be directed to Lisa Johnson, Assistant Director, Office of Research Compliance, University of South Carolina, 1600 Hampton Street, Suite 414D, Columbia, SCX 29208, phone: (803) 777-6670 or email: LisaJ@mailbox.sc.edu. As data will be collected through College, the College IRB Office can be contacted at (413) 748-3959 with any questions.

I agree to participate in this study. I have been given a copy of this form for my own records.

If you wish to participate, you should sign below.
Signature of Subject / Participant

Date

Researcher’s Signature

Date
APPENDIX D

TECHNOLOGY INTEGRATION FACULTY PERCEPTIONS AND BELIEFS QUESTIONNAIRE PRETEST AND POSTTEST

The purpose of the Technology Integration Faculty Perceptions and Beliefs Questionnaire (TIFPBQ) pretest and posttest is to explore faculty perceptions related to readiness to integrate technology, advantages and disadvantages technology of integration, and future impact on online course design and delivery. The TIFPBQ will be taken two times by each participant in the professional development; once prior to the start of the professional development (pretest), and the second at the conclusion of the professional development (posttest). Results will be compared to demonstrate the impact of the professional development on the participants. The TIFPBQ asks both demographic and close-respond/close-ended Likert scale items. Directions for each section will clearly be outlined.

Section I: Demographic Information

Directions for items 1-10: Below is a list of questions to collect demographic data regarding the study participants. Please answer each question in the line beside the question or using the dropdown menu/check box below the question.

First & Last Name______________________

1. What is your gender? ________________
2. What is your age? _________________
3. What is your ethnicity? ______________
4. How many years have you been teaching in general?
   0-1 years
   2-5 years
   6-9 years
   10 or more years
5. How many years have you been teaching online?
   - 0-1 years
   - 2-5 years
   - 6-9 years
   - 10 or more years

6. Do you teach full-time or part-time/adjunct?
   - Full-time
   - Part-time/adjunct

7. How long have you worked at Laken College?
   - 0-1 years
   - 2-5 years
   - 6-9 years
   - 10 or more years

8. What school at Laken College do you work in?
   - School of Arts, Sciences, and Professional Studies
   - School of Physical Education, Performance and Sport Leadership
   - School of Health Sciences
   - School of Social Work and Behavioral Sciences

9. What department do you work in?
   - Biology/Chemistry
   - Business Management
   - Criminal Justice
   - Counseling
Education
Exercise Science and Athletic Training
Health Sciences
Humanities and Social Sciences
Human Services
Literature, Writing, and Journalism
Math, Physics, and Computer Science
Occupational Therapy
Psychology
Physical Education and Health Education
Physical Therapy
Physician’s Assistant
Sport Management and Recreation
Social Work
Visual and Performing Arts

10. Please identify the learning management systems in which you have taught or you have utilized in your teaching. (check all that apply)

Blackboard
Brightspace
Canvas
Moodle
Web CT

Other (please identify):_________
Section 2: Technology Beliefs

Directions for the items below. Below is a list of statements regarding technology. For each statement, please determine your level of agreement and mark the appropriate number on the questionnaire. Use the key below to determine your response:

**KEY:**
1 = Strongly Disagree
2 = Disagree
3 = Agree
4 = Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>11 I support the use of technology in the classroom.</td>
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<td>12 A variety of technologies are important for student learning.</td>
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<tr>
<td>13 Incorporating technology into instruction helps students learn.</td>
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<td>14 Content knowledge should take priority over technology skills.</td>
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<td>15 Most students have so many other needs that technology use is a low priority.</td>
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<td>16 Student motivation increases when technology is integrated into the curriculum.</td>
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<td>17 Teaching students how to use technology isn’t my job.</td>
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<tr>
<td>18 There isn’t enough time to incorporate technology into the curriculum.</td>
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<tr>
<td>19 Technology helps teachers do things with their classes that they would not be able to do without it.</td>
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<td>20 Knowledge about technology will improve my teaching.</td>
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<td>21 Technology might interfere with “human” interactions between teachers and students.</td>
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<tr>
<td>22 Technology facilitates the use of a wide variety of instructional strategies designed to maximize learning.</td>
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Section 3: Perceived Technology Barriers

Directions for the items below. Below is a list of potential barriers to integrating technology into your future teaching and learning activities. For each statement, please determine your response and mark the appropriate number on the questionnaire. Use the key below to determine your response:

KEY:
1 = Not a Barrier
2 = Minor Barrier
3 = Major Barrier

<table>
<thead>
<tr>
<th>Barrier</th>
<th>1</th>
<th>2</th>
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<tbody>
<tr>
<td>23 Lack of or limited access to computers in schools.</td>
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<tr>
<td>24 Not enough software available in schools.</td>
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<td>25 Lack of knowledge about technology.</td>
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<tr>
<td>26 Lack of knowledge about ways to integrate technology into the curriculum.</td>
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<td>27 My university assignment doesn’t require technology use.</td>
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<td>28 Lack of technology accessibility in my university classes.</td>
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<td>29 There is too much material to cover.</td>
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<td>30 Lack of mentoring to help me increase my knowledge about technology.</td>
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<td>31 Technology-integrated curriculum projects require too much preparation time.</td>
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<tr>
<td>32 There isn’t enough time in class to implement technology-based lessons.</td>
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</tbody>
</table>

Section 4: Technology Integration

Directions for the items below. Below is a list of statements regarding technology integration. For each statement, please determine your response and mark the appropriate number on the questionnaire. Use the key below to determine your response:

KEY:
1 = Strongly Disagree
2 = Disagree
3 = Agree  
4 = Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
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<tbody>
<tr>
<td>33 I (plan to) integrate computer activities into the curriculum.</td>
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<td>34 Technology plays (will play) an integral role in supporting content</td>
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<tr>
<td>learning in my class</td>
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<td>35 I (will) encourage students to work collaboratively on technology-</td>
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<tr>
<td>based activities.</td>
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<td>36 I (plan to) locate and evaluate educational technologies, including</td>
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<td>software, hardware, and online resources for use with my students.</td>
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<td>37 I (will) require students to use a variety of software tools and</td>
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<td>electronic resources to support learning.</td>
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<td>38 I (will) use technology to support project- and problem-based</td>
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<td>learning activities in my classroom.</td>
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<td>39 I (will) use technology in my classroom to help support the state</td>
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<td>curricular standards.</td>
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<td>40 I (will) use technology to assist me with classroom management and</td>
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<td>recordkeeping activities (e.g., grading, attendance).</td>
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<td>41 Technology (will) help(s) me meet the individual needs of a variety</td>
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<tr>
<td>of students in my classroom.</td>
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<td>42 I (will) encourage my students to use technology to demonstrate</td>
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<td>their knowledge of content in non-traditional ways (e.g. Web sites,</td>
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<td>multimedia products).</td>
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<tr>
<td>43 I (will) use technology to design new learning experiences for</td>
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<td>students incorporating the unique capabilities of technology.</td>
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APPENDIX E

DISCUSSION BOARD PROTOCOL

Each discussion board was located within the Brightspace module and aligned with specific research questions. Faculty were expected to read and watch the resources for the week prior to answering the discussion questions. All discussion boards below include the title, location within the professional development, and prompt. All discussions, excluding the Introduce Discussion, were used for qualitative data collection. Each original post was due by Thursday of the given week, with responses to 2 participants due by Sunday of the given week.

**Discussion Board Topic:** Introduce Yourself  
**Location:** Module 1 (What is Technology Integration)  
**Prompt:** Welcome! Please take a minute to introduce yourself to the other participants by answering the following questions:
- What is your name?
- What courses have you taught online?
- Why did you decide to participate in this technology integration professional development?

If you would like, feel free to try utilizing the video note feature in Brightspace. If you prefer not to use the video note or are having technical difficulties, please use written text. Please introduce yourself by Sunday, February 9th.

**Discussion Board Topic:** Technology Integration Readiness  
**Location:** Module 1 (What is Technology Integration)  
**Prompt:** Now that we have learned more about technology integration this week, take some time to reflect on the resources and how they relate to your current courses.
- How ready do you think you are to integrate technology? Rate yourself between 1-10 with 1 being least ready and 10 being most ready. Provide an example for your rationale.
- After watching the video about Roger’s (2003) Diffusion of Innovations theory and the adoption curve, where do you think you currently fall on this curve based on your feelings and experience related to technology?  
- **After** this professional development, where would you like to fall on this curve? If you would like to fall on the curve in the same place as before the professional development, please note that as well.
- Original post due by Thursday, February 6th, and responses to 2 participants by Sunday, February 9th.
**Discussion Board Topic:** Technology Tools & You  
**Location:** Module 2 (Exploring Technology Tools)  
**Prompt:** This module introduced us to various technology tools we can use for presentations, infographics, videos, blogs/websites, word processing, web-conferencing, collaboration/group work, and quizzes/formative assessment tools. To review the list, visit the Technology Tools Menu resource in the Read/Watch section of this week. There are also additional resources provided to assist you in choosing technology tools that might interest you. Out of the tools you explored this week, choose one tool that you would like to focus on. This discussion can help you determine if the tool is actually the right fit for your course and whether or not it aligns with your goals and objectives. Regardless of whether or not you'll end up using the tool, your discussion will be helpful for other participants to see your thoughts and review on your selected tool. To determine the feasibility of using the tool in your course, answer the following questions:

- Why did you ultimately choose this tool?
- Discuss two foreseeable benefits of integrating this technology into your future online courses. Explain how these would be advantageous for both you and your students?
- Discuss two possible challenges of integrating this technology into your future online course. Explain how these would be disadvantageous for both you as the faculty member, as well as for your students.
- Overall, can you see yourself integrating this tool into your classroom in the future?
- Original post due by Thursday, February 13th, and responses to 2 participants by Sunday, February 16th.

**Discussion Board Topic:** Barriers to Technology Integration  
**Location:** Module 3 (Barriers to Technology Integration)  
**Prompt:** It is no secret during a technology integration, you'll discover unique advantages and barriers.

- Using specific examples, explain the two biggest potential challenges you foresee may impact whether or not you decide to integrate technology after this professional development is over.
- Discuss the type of support that you would like to receive in order to overcome these challenges.
- Original post due by Thursday, February 20th, and responses to 2 participants by Sunday, February 23rd.

**Discussion Board Topic:** Evaluating A Technology Tool of Your Choice  
**Location:** Module 4 (Evaluating Your Technology Tools)  
**Prompt:** Review the Technology Tool Menu. Choose a tool (that is different from the one you chose in Module 2) that you would like to evaluate for future use. Feel free to use another tool even if it is not on this list and you find one that interests you! Regardless of what role you play in a course, choose a tool that genuinely interests you, that you think your students would enjoy, and that has the ability to link to your course objectives. Once you've selected a tool to evaluate, download and complete the
Technology Tool Evaluation Template. Then, come back here and attach your completed evaluation. Additionally, answer the following questions.

- Overall, what were your first impressions of the tool? After your evaluation, did those change?
- Was there anything on the evaluation that you feel would ultimately prevent you from integrating this tool into your course?
- Based on the evaluation of this tool, would you consider integrating it in your future courses? Why or why not?
- Would you recommend this tool to a colleague for his or her course? Why or why not?
- Original post due by Thursday, February 27th, and responses to 2 participants by Sunday, March 1st.

Discussion Board Topic: The Future of Your Technology Integration
Location: Module 6: Technology Integration: Your Turn
Prompt: Throughout this professional development you've learned that integrating technology into online courses takes time and has many intricacies. Please answer the following questions regarding your experience in this professional development:

- Now that you have almost completed this last module, do you feel that you're more prepared to integrate technology into your future courses than you were at the beginning of this course.
- Do you plan to integrate technology into any of your courses moving forward? If so, how? If not, why?
- Original post due by Thursday, March 12th, and responses to 2 participants by Sunday, March 15th.
APPENDIX F

INTERVIEW PROTOCOL

Hi and welcome to the interview portion of my study. I truly appreciate your willingness to take part in this interview. As a reminder, purpose of this action research will be to implement and evaluate the impact of online technology integration professional development for faculty teaching at a distance at Laken College. I am exploring how this professional development specifically impacts faculty perceptions related to readiness to integrate technology, advantages of technology integration, and disadvantages of technology integration. I am also interested in learning how this professional development impacts future faculty online course design and delivery.

This is a semi-structured interview, so what this means is that please feel free to ask questions during the interview and treat it more like a conversation. I anticipate this interview will take about 45 minutes to an hour to complete.

Prior to this interview, you signed a consent form with information about the purpose of this study and signified you are okay with me recording the audio of our conversation. Is this still accurate?

• (If Yes): Great! Before we get started, do you have any questions? (Answer questions if applicable and proceed to interview).
• (If No): Thank you. I will just take notes on your responses instead of recording. Before we get started, do you have any questions? (Answer questions if applicable and proceed to interview).

I wanted to start with gathering some basic information about your teaching experience and comfort level when teaching online.

1. Based on the information you shared in the demographics section of the questionnaire, I understand you have been teaching online for X years. Is this correct?
   a. If yes: Great. What initially made you want to begin to teach online?
   b. If no: I understand. How long have you been teaching online?
2. How comfortable do you feel teaching online?

Great, thank you! The next few questions will address your overall perception prior to this professional development and after this professional development.
3. Thinking back to before this professional development, can you tell me your overall perception of technology integration for online learning? For example, does it excite you? Scare you? Why?
4. Can you think of a time where you ran into an issue teaching online such as issues with students or problems with technology?
5. Prior to this professional development, can you provide an example of a time when you integrated technology in your online course? (If they cannot provide an example): I understand. Instead, can you think of a time in your online course that technology integration would have been helpful?
6. Are your perceptions the same now that the professional development has ended? Why or why not?
   a. Can you provide an example of this?

I appreciate your honesty in these questions. Now, we will explore some more specifics related to the advantages and disadvantages of integrating technology into your online courses.

7. I know that technology integration is no easy feat. Prior to this professional development, what were some of the most significant barriers to success you encountered related to technology integration for your online courses?
8. Now that you have completed this professional development, do you still view these as barriers?
9. I know a lot of new information was presented in this professional development. So, do you anticipate any new challenges related to technology integration in your online courses?
10. Now that you have completed this professional development, what do you think will be most challenging about integrating technology into your courses?
11. Is there anything specific you think your students will find challenging about your new ideas on technology integration?
12. If you are trying to integrate technology into your course and you run into trouble, do you think you would feel supported by the assistance available to you?
13. I appreciate you being so open about your challenges. On the opposite side of the spectrum, before you enrolled in this professional development what, if anything, did you view as positive aspects of integrating technology into online learning?
14. Did you learn anything new in this professional development that revealed new advantages to technology integration?
15. Is there anything specific you learned in this professional development that you think your students will be excited to see integrated into your online class?
16. The professional development explored a lot of new tools for online learning. Are there any tools, in particular, you are most optimistic about integrating?
17. How do you plan to use these tools?

This last section of questions will explore whether or not this professional development may impact your future course design and delivery.
18. Typically, how often do you revise and review your online courses? If you are new to online learning, how often do you think it is appropriate to review and revise your online courses?

19. Now that you have completed this professional development, do you plan to make any updates to your course in terms of technology integration?
   a. (If yes): How soon do you plan to make these changes? Next week, next semester, next year?
   b. (If yes): What is your plan to begin making these changes?
   c. (If yes): What updates are you most excited about?
   d. (If yes): What updates intimidate you the most?
   e. (If yes): Why is that?
   f. (If no): Do you feel more support should be offered?

20. Is there anything else you wish was included in this professional development that would have prepared you better to integrate technology into your future course design?

21. Do you have anything else you want to share about your overall perceptions of this professional development and readiness to integrate technology in your online courses in the future?

Thank you so much for your time to complete this interview.
APPENDIX G

INSTITUTIONAL REVIEW BOARD APPROVALS

UNIVERSITY OF
SOUTH CAROLINA

OFFICE OF RESEARCH COMPLIANCE

INSTITUTIONAL REVIEW BOARD FOR HUMAN RESEARCH
APPROVAL LETTER for EXEMPT REVIEW

Anna Loftus

Re: Pro00091633

Dear Anna Loftus:

This is to certify that the research study *Online Technology Integration Professional Development: Action Research Evaluating Impact on Faculty Perceptions and Practices* was reviewed in accordance with 45 CFR 46.104(d)(1), the study received an exemption from Human Research Subject Regulations on 8/1/2019. No further action or Institutional Review Board (IRB) oversight is required, as long as the study remains the same. However, the Principal Investigator must inform the Office of Research Compliance of any changes in procedures involving human subjects. Changes to the current research study could result in a reclassification of the study and further review by the IRB.

Because this study was determined to be exempt from further IRB oversight, consent document(s), if applicable, are not stamped with an expiration date.

All research related records are to be retained for at least three (3) years after termination of the study.

The Office of Research Compliance is an administrative office that supports the University of South Carolina Institutional Review Board (USC IRB). If you have questions, contact Lisa Johnson at lisaj@mailbox.sc.edu or (803) 777-6670.

Sincerely,

Lisa M. Johnson
ORC Assistant Director and IRB Manager
October 21, 2019

Dear Anna Loftus:

This letter is to inform you that the Institutional Review Board (IRB) has approved the research project titled Online Technology Integration Professional Development: Action Research Evaluating Impact on Faculty Perceptions and Practices.

The approval for your study is active for a period of one year from the date of this letter. If you have not completed the data collection for your study within this timeframe, you will need to apply for an extension through the IRB. You are expected to adhere to the procedures as outlined in your proposal. Any changes in procedures, protocol, or the consent form will require the approval of the IRB. You are also expected to notify me immediately in the event of injury to or any problem with a subject participating in the study.

As the primary investigator, you have primary responsibility for protecting the rights and welfare of human research subjects and for complying with the provisions of the IRB. Additionally, you are expected to retain the raw data, including, but not limited to, signed consent forms, for at least three years beyond the completion of the research. These data should be stored in a locked and secure location. At the end of the three-year period, you will be responsible for shredding the documents.

Best wishes on the completion of your research project. Please contact me if you have any questions.

Sincerely,

[Signature]

cc: Dr. Michael Grant
    Kim Colangelo
    File

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