ONLINE DOCTORAL PERSISTENCE: A CASE STUDY EXPLORING THE USE OF

TECHNOLOGY FOR CONNECTEDNESS

by

Folarinwa Ojuola

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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ABSTRACT

The purpose of this case study was to explore the perceptions and experiences of online doctoral students and online professors' utilization of technology for doctoral persistence. This study focused on how online professors and students use technology to enhance a sense of community and connectedness at a southeastern university. Technology plays a crucial role in the online doctoral candidates' persistence, so this study explored the technological strategies implemented to promote a sense of community and connectedness among online doctoral students. Vincent Tinto's 1975 student integration model (SIM), which explains the interactions of several aspects and processes that influence a student's decision to leave university, was used as the theoretical guide for this study. The study enrolled 19 participants, and data collection was performed using document analysis, semi-structured interviews, and focus groups. Data analysis utilized a flexible pattern match analytical model. The study found that support services, strategic curriculum and instruction, social integration, and technological experience are predominant factors that participants identified as essential for developing a sense of community and connectedness in the online learning environment.

Keywords: technology, sense of community, doctoral persistence, online learning, connectedness

Dedication

I dedicate this Ph.D. dissertation to my wife, Olubukola, and children (Toluwani and

Oluwatosin) for giving me their unwavering love and support. I also dedicate this dissertation to

my mother, Mrs. Omotunde Ojuola, father-in-law, Professor Samuel Ibiyemi and life coach,

Professor Richard Adegbola. They are deserving of double honor for their labor of love.

Acknowledgments

My Ph.D. journey would not have been possible without the help I got from many people who did their best to get me to the finish line. I want to acknowledge the grace of God that has sustained me through the years and his provision to finance the doctorate program. I am grateful to Dr. Laura. E. Jones, who chaired my dissertation committee with a genuinely caring heart. I want to thank Dr. Park for believing in me and encouraging me through the process. I am grateful for my wife, Olubukola, who would not let me abandon the Ph.D. journey, and my children, who faithfully served as my cheerleaders.

Above all, I thank God for making my Ph.D. dream a reality.

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List of Abbreviations

CoI- Community of Inquiry

EdD- Doctor of Education

IRB- Institutional Review Board

OLE- Online Learning Environment

PhD- Doctor of Philosophy

SIM- Student Integration Model

UX- User Experience

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this single case study is to explore the perceptions and experiences of online doctoral students and online professors' utilization of technology for doctoral persistence by developing a sense of community and connectedness. Although research has shown a high attrition rate for online and residential doctoral students, online doctoral programs have demonstrated a higher attrition rate (Studebaker & Curtis, 2021). This chapter includes an overview of doctoral persistence as offered from historical, theoretical, and social contexts. As the number of online doctoral students grows steadily, it is becoming increasingly essential to inquire about these students' experiences to understand the factors that contribute to their success. The high attrition rate for online doctoral programs is mainly attributed to a lower sense of community and connectedness among online doctoral students (Martin et al., 2020; Vickers, 2018). Although many authors (Olive, 2019; Rockinson-Szapkiw et al., 2016; Willging & Johnson, 2019) acknowledge a sense of community and connectedness as a significant contributor to the high attrition rate in online doctoral programs, the literature concerning the characteristics of the two phenomena is limited. In this chapter, technology's role in promoting doctoral persistence is introduced with a specific focus on how technology influences a sense of community and connectedness. The study's empirical, practical, and theoretical significance are also discussed following the problem and purpose statements. My philosophical assumptions and motivation for conducting the study are included in addition to the research questions, definitions of terms, and a brief summary of this chapter.

Background

Online learning has offered unprecedented access to higher education in America. Online learning has also created opportunities for non-traditional students to get into higher education in colleges and universities (Robinson, 2019). The ubiquity of online programs in higher education requires continued focus on designing instructional environments that improve students' learning (Capp, 2017). Studies have indicated that online doctoral students are interested in leveraging technology and on-campus support to promote social and academic activities (Berry, 2017; Gray & Crosta, 2019). Students in an online doctoral program are heavily dependent on technology for interactions and experience challenges associated with a sense of community (Alqurashi, 2018).

Historical Context

Online education has become widely accepted globally due to the rising demand for higher education, leading to global competency development as the pedagogical framework for teaching and promoting global learning (Iuspa, 2018). Diverse opportunities for distance learning have arisen with the explosion of more contemporary technological advancements. For instance, recent innovations have led to open courseware development, allowing higher learning institutions to make university-level online courses available to millions worldwide at no cost to the learner (Campbell, 2017). The appeal of online learning has led to a continual increase in online student enrollment and an increased interest in using technology to understand students' teaching presence, social presence, and cognitive presence in an online learning environment (Zhu et al., 2019). Despite the widespread acceptance of online education and several strategies that have been suggested to mitigate the high attrition rate, the dropout rate remains unacceptably high (Netanda et al., 2017; Phirangee & Malec, 2017).

Research has shown that approximately 50% percent of online doctoral students abandon

their programs because of insufficient persistence, even though they have demonstrated prior academic excellence (Castelló et al., 2017; Marston, 2020; Rockinson-Szapkiw, 2019). Online doctoral students go through a transformational experience as they transition from undergraduate to graduate-level, especially in learning aptitude and critical thinking (Berry, 2017). In the first year of doctoral studies, students encounter challenges associated with the institution's orientation practices, course requirements, and relationship development with peers, faculty, and staff (Berry, 2017). At least 30% of first-year doctoral students exit their programs and fail to attain a terminal degree (Willging & Johnson, 2019). The early phase of doctoral studies sets the tone for subsequent years as students begin to think critically and independently, make decisions, and follow through with them. The socialization and development skills that students gain in this phase become the foundation for success as they progress to the succeeding stages of development (Berry, 2017).

A significant constraint to the research of persistence is the lack of consensus on the terminology used in literature. Whereas some literature describes persistence as the antonym of attrition, other researchers refer to persistence as a conglomeration of factors that aid program completion (Burns & Gillespie, 2018). For this study, doctoral persistence will be defined as the continuation of a student's progress toward finishing an online doctoral degree (Bair & Haworth, 2005). Tinto (1993) was the first to document the causes for doctoral attrition, which has been significantly expanded throughout the year by various researchers (Burns & Gillespie, 2018; Hudson et al., 2020; Van der Linden et al., 2018). Several scholarly discussions have examined doctoral attrition causes to determine the institutional, individual, and environmental factors that determine student attrition (Devos et al., 2016; Gittings et al., 2018a; Rockinson-Szapkiw & Herring Watson, 2020; Ruud et al., 2018).

Theoretical Context

This study has theoretical significance for researchers and theorists of doctoral persistence. Tinto conceptualized the theory on student premature departure from a chosen course of study in collaboration with Cullen (Tinto & Cullen, 1973). In 1993, Tinto developed a theory of doctoral student persistence due to a paucity of research dealing with graduate student persistence. He set out to engage the educational community in a discussion that would generate models to examine students' persistence, specifically at the doctoral level. Tinto built his doctoral persistence theory on his previous work with undergraduate students by applying the same persistence principles to doctoral students. Tinto's (1993) longitudinal doctoral persistence model is the principal theoretical framework for much of the current literature on doctoral persistence, particularly the traditional doctoral program.

The community of inquiry framework, a potent tool used to determine online learning quality, measures three essential parts that an online educational design should possess: social, teaching, and cognitive aspects (Arbaugh et al., 2008). The community of inquiry framework has demonstrated that teaching, social, and cognitive presences are essential components of online learning (Amemado & Manca, 2017). These three factors are intertwined and have proven to be critical foundational blocks for establishing a learning community (Amemado & Manca, 2017). As online education has flourished over the past decade, social media use among college-age students has also increased tremendously (Kapoor et al., 2017). Over the years, proponents of computer-based technology have argued that technology can affect learning and teaching. Research has shown that teachers can use technology for differentiated and individualized learning programs for students (Brevik et al., 2018).

The nature of doctoral persistence represents norms and principles related to particular

disciplines rather than the educational institution (Tinto, 1993), unlike undergraduate persistence factors that reflect the university community. Also, doctoral student persistence reveals the interaction in a microsystem of students and faculty within a particular department (Loh et al., 2020). Much of the current literature on doctoral persistence in the online learning environment supports Tinto's (1993) model, designed for traditional doctoral programs. Academic and social integration in the traditional doctoral program differs significantly from the online doctoral program. As the number of online doctoral students grows, exploring how technology fosters social and academic integration, and subsequently, online doctoral persistence will continue to be essential. This study seeks to reveal the role of technology in online doctoral persistence, contributing to Tinto's (1993) longitudinal doctoral persistence model.

Social Context

The study of persistence in higher institutions as a phenomenon has been conducted extensively to determine the crucial factors for academic success (Burns & Gillespie, 2018; Devos et al., 2016; Rockinson-Szapkiw & Herring Watson, 2020). Historically, higher learning institutions' persistence has been attributed to assimilation into the institution's academic and social fabric (Ives & Castillo-Montoya, 2020; Knight et al., 2016; Stevens et al., 2018; Tinto, 1975). However, the challenges experienced by doctoral students are quite different from traditional undergraduate students, which include a perceived low sense of community and connectedness with professors and other students (Lenzi et al., 2017; Thai et al., 2019). The traditional persistence theory considered the lack of doctoral students' integration into higher institutions a more significant factor for attrition than students' attributes (Astin, 1985; Tinto, 1993).

Two broad categories of factors have been identified as significant contributors to

doctoral students' inability to persist, specifically those relating to the individual and the educational institution (Burns & Gillespie, 2018; Yang et al., 2017). Numerous researchers have reported that online learners have a lower sense of community and connectedness to their classmates than those in a traditional classroom (Lenzi et al., 2017; MacLeod et al., 2019; Thai et al., 2019). This lower sense of community and connectedness has been attributed, in part, to the absence of face-to-face communication and body language between learners and instructors (Lenzi et al., 2017). In a traditional classroom setting, non-verbal communication expressed through varying body language is an integral part of the interaction between teachers and learners, which adds to the student's overall learning experience. These elements are missing in online learning, resulting in decreased These elements are missing in online learning, resulting in decreased meaningful communication and increased lack of connectedness among online students taking the same course (Stefanile, 2020).

Additionally, studies have revealed that the students who have strong and positive social interactions in the online learning environment have a greater tendency to persist in their studies (Bolliger & Martin, 2018; Bradley et al., 2017; Law et al., 2019; Luo et al., 2017). The absence of social presence in the online learning milieu is a significant challenge that has been associated with a decline in academic performance among online students, leading to high attrition rates (Bradley et al., 2017). Researchers have explored the effectiveness of integrating technologies into online learning environments to alleviate the lack of social presence in an online learning environment (Panigrahi et al., 2018; Wong et al., 2019). Most traditional college-age students are considered 'digital natives' with extensive experience in using technology tools for academics, social interaction, networking, and entertainment (Evans & Robertson, 2020). In their study, Sharp and Whaley (2018) described how wikis' technology-facilitated collaborative learning

among online students. Rockinson-Szapkiw (2012) also observed a deeper sense of connectedness among doctoral candidates who used Microsoft SharePoint as a collaborative workspace in their doctoral dissertation. Her observation, along with Sharp and Whaley's (2018) study, suggests that technology plays a significant role in promoting a sense of community and connectedness in the online doctoral learning environment.

Technology plays a much more significant role in the digital era than it did for previous generations, giving today's students a high level of technological literacy and expanding technology in education (Hashim, 2018). Some researchers consider that any organization intent on maintaining a competitive edge must take advantage of the power technology has to connect with new sources of creativity and knowledge (Raja & Nagasubramani, 2018; Ratheeswari, 2018). Technology is used in various industries to increase productivity (Cloete, 2017). For example, technology has been used in labeling documents or images (Signoroni et al., 2019), collecting distributed data (Angeli et al., 2017), exchanging expertise and knowledge (Bouncken & Aslam, 2019), and developing collaborative efforts in the education industry (Davies et al., 2017). This development provides a high likelihood of technological tools for personalized studies, virtual community, and collaboration with other online doctoral students.

However, it is noteworthy to draw attention to research that has described the potential tension between formal and informal technology uses in education (Chugh & Ruhi, 2017). Kumar and Nanda (2019) reported that students' participation levels in social media activities were connected to their core motivations. Hence, it is challenging for higher institutions to merge technology for social media into online curricular activities. In the online learning environment, the effective use of technology is imperative for students to integrate into the institution academically and socially.

Situation to Self

I am an enthusiastic advocate for integrating applicable technology into the practice of education because of my engineering background. My interest stems from experiences developing technological educational products across different cultures and higher institutions. Research studies have revealed that online learners have a significant level of expertise in social media use and a keen interest in peer-to-peer collaboration (Sarwar et al., 2018). Other researchers have confirmed and supported these findings across diverse cultures and educational institutions (Alhashem et al., 2020; Harney et al., 2017; Manca, 2020).

Despite the research findings mentioned above and the adoption of technology among most college students, its pedagogical instruction in higher learning remains limited. The theory of rational inquiry entrenched within the epistemology theory (Rescher & Morgan, 2019) informed the study methodology because it provides insight into the participants' reasoning and attitude toward their online doctoral program. My epistemological view will also allow for a study design, the case study, to investigate the benefits of incorporating technology into online doctoral education from the doctoral students' perspective to grasp their unique historical background and cultural preferences (Creswell & Poth, 2018).

My approach to this study is based on a constructivist paradigm, which allows this research study to reflect the perspectives of the participants and myself. My research study will place a high value on participants' views and rely on opinions developed from interaction with others (Creswell & Poth, 2018). My ontological viewpoint will allow each participant to express their unique view of reality and their understanding of cultural and societal values and philosophies that contributed to their decision to persist in their online doctoral studies. I will endeavor to give each participant the ability to express their thoughts on doctoral persistence

while exploring the factors that influence their determination to persist. My axiological outlook recognizes the significance of each online doctoral student's unique experiences as I admit my perspective and potential biases in interpreting the study findings (Creswell & Poth, 2018). As online education increases, higher learning institutions must explore other means of reducing the persistently high attrition rate among online doctoral students. A potentially viable option to consider is the inclusion of appropriate technologies to support online doctoral education.

Problem Statement

The problem is the lack of a systematic approach to technology usage for online doctoral programs, which has significantly contributed to a perceived low sense of community, connectedness, and an overall low retention rate among online doctoral students. Several research studies have revealed that about half of online doctoral students do not complete their studies with the eventual attainment of a terminal degree, despite a universal acceptance of online education (Burns & Gillespie, 2018; Fiore et al., 2019; Lee et al., 2020). Research has shown technology to be a powerful resource to enhance students' online learning experiences (Dahdouh et al., 2018; Gouseti, 2017). Various factors have been identified as contributing to the doctoral students' decision to drop out of their programs despite an appropriate expectation of success from previous superior academic performance and careful selection criteria and screening by each program. Among the diverse factors that explain an online doctoral program's high attrition rate is the lack of a systematic approach to using technology to strengthen each type of student interaction (Hill & Conceição, 2019; Lim et al., 2019).

Purpose Statement

The purpose of this case study is to explore the perceptions and experiences of online doctoral students and online professors' utilization of technology for doctoral persistence by

developing a sense of community and connectedness at a southeastern university in the United States of America. Doctoral persistence was generally defined as persisting through coursework and the dissertation to earn a terminal degree (Tinto, 1993). The theory that guided this study was Tinto's (1975) student integration model (SIM) of attrition, which explains the interactions of the several aspects and processes that influence a student's decision to leave their program prematurely. Tinto's (1975) theory allows for exploring the perceived role of technology on online doctoral persistence.

Significance of the Study

This study is significant because there is limited published research on the role of technology in doctoral students' sense of community and connectedness in the online learning environment. The development of an appropriate technology strategy can enhance doctoral students' sense of community and connectedness, reduce attrition rate, and raise academic performance. The proposed study will provide insights into how online doctoral students and professors use technology to develop connections and a sense of community. This study's findings may help online universities develop strategies to mitigate some of the non-academic challenges of online doctoral students and contribute to the limited scholarly knowledge on the role of technology in doctoral persistence.

Empirical Significance

The research study results can help university administrators, professors, and students understand the perceived negative and positive aspects of using technology in the online doctoral program. The extensive adoption of technology by higher education learners in their daily lives leads to the belief that appropriate technologies could potentially play a substantial role in promoting sustainable online doctoral education. The widespread acceptance of online education

among higher institutions calls for further exploration of technology's role in student-student and student-teacher connections. Steele (2018) revealed that students' feedback on teachers who use social media sites was positive; the teachers were perceived to be caring and in tune with ongoing student interests, which may boost teachers' trustworthiness with their students. University administrators, professors, and students could use this qualitative study's findings to develop effective technological strategies for the online doctoral program.

Practical Significance

A university's strategic use of technology tools supports online doctoral students by creating a shared culture of responsibility and commitment in the school (Lim et al., 2019). The deployment of technology tools enables a collaborative research environment and increases effective communication between students and professors (Lim et al., 2019). McGuinness and Fulton (2019) recognize the legitimate concerns of using technology in online higher education. Their research also shows that schools' adoption of appropriate technologies streamlines and enhances student learning while supporting collaboration and creativity. From a practical standpoint, this study's findings could help universities, administrators, and professors develop effective technological strategies for social integration in the doctoral online learning environment.

Theoretical Significance

While the theories of doctoral attrition, retention, and connectedness have contributed considerably to the understanding of doctoral persistence in an online learning environment, there is no appropriate technological framework designed explicitly for online doctoral persistence. Additionally, most of the published literature on doctoral persistence is based on Tinto's model, which deals extensively with the academic and social factors, with little mention

of technology's role (Rockinson-Szapkiw et al., 2016). Although burgeoning research identifies technology as a critical factor for online doctoral persistence (Hill & Conceição, 2019; Lim et al., 2019; Rockinson-Szapkiw et al., 2016), a qualitative study that explores technology's role in doctoral persistence, particularly how schools choose and implement technology for social integration in online doctoral programs, does not exist. This qualitative research intends to fill that gap in the literature and contribute to the body of knowledge on doctoral persistence.

Research Questions

Compared with traditional doctoral education, online doctoral studies can be remarkably challenging because of the limited peer-to-peer interface and social presence (Castelló et al., 2017; Rovai, 2002; Sverdlik et al., 2018). In addition to other identified factors, this has accounted for the high attrition rate described among online doctoral students. Students require sufficient support to attain academic success, and college students have widely used technology to promote social interaction and increase online education persistence.

Central Research Question (CQ):

How do online doctoral students and professors utilize technology for a sense of community and connectedness? Research has shown that online students have limited opportunities to collaborate with their colleagues and professors (Dougherty & Dougherty, 2020; Schneider, 2018; Willging & Johnson, 2019; Wynants & Dennis, 2018). Researchers have identified a sense of community as a critical factor that affects doctoral students' satisfaction and connectedness in an online learning environment (Lenzi et al., 2017; Thai et al., 2019). The absence of a sense of community is linked to low self-esteem, loneliness, and depression, especially in the online learning environment (Lenzi et al., 2017).

Sub-Question 1: How do online doctoral students and professors choose technology for a sense of community and connectedness? Most of the published research on technology integration into online education focuses on academic purposes. There is a need to explore technologies explicitly designed to promote a sense of community and connectedness (French, 2017).

Sub-Question 2: How do prior technological challenges hinder online doctoral students' and online professors' sense of community and connectedness? Tinto (1993), in his revised student retention model, identified three key attributes, namely, pre-college education, individual traits, and family background, as essential to the understanding of student persistence. This question aims to identify the specific technological handicaps and threats the online doctoral students and professors bring to the online doctoral program.

Sub-Question 3: Why do online doctoral students and professors explore technological experiences, activities, and practices for a sense of community and connectedness? Some research studies have elaborated on the effectiveness of the different technologies to foster a sense of community and connectedness among online students and professors, leading to a more remarkable ability to persist in their academic programs (Jameson & Torres, 2019). This question aims to identify why online doctoral students and professors use technology for a sense of community and connectedness.

Definitions

The relevant terms and concepts pertinent to this study are defined as follows.

1. *Asynchronous learning* - A learning event whereby the interaction is delayed by time (Hrastinski, 2008).

2. *Attrition* - A student's decision to leave an educational institution before graduating (Bair & Haworth, 2005).

3. *Community of inquiry* - Provides insights and methodology for studying online learning (Arbaugh et al., 2008).

4. *Distance education* - Instruction that takes place at a distance, utilizing technology, and does not require face-to-face meetings (Bireda, 2018).

5. *Doctoral persistence* - The continuance of a student's progress toward the completion of an online doctoral degree (Bair & Haworth, 2005).

6. *Instructional design* - A systematic process for developing training or education in a methodical manner (Gardner, 2008).

7. *Limited residency* - Limited residency is a degree program primarily offered in an online learning environment, which requires students' attendance on campus for some courses (Bolliger & Martin, 2018).

8. *Online learning* - 80% or more of the instruction is delivered in an online learning environment with no face-to-face meetings (Bireda, 2018).

9. *Retention* - Making reasonable progress towards a degree of study and enrolling each semester until graduation usually takes about four years (Gardner et al., 2014).

10. *Sense of community* - A feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to being together (McMillan & Chavis, 1986).

11. *Student-to-student connectedness* - Students' perception of a corporative and supportive interactive learning environment (Dwyer et al., 2004).

Summary

The expanding landscape of online education globally is hampered by the high attrition rate, which research has shown is between 40 to 60% for doctoral students (Olive, 2019; Rockinson-Szapkiw et al., 2016; Willging & Johnson, 2019). Several factors have been identified as causes for the high attrition rate among online doctoral students. A prime reason for high attrition is the lack of a systematic application of technology in the online learning environment (Hill & Conceição, 2019; Lim et al., 2019), contributing to a low sense of community and connectedness to other doctoral students (Martin et al., 2020; Vickers, 2018). This proposed single case study qualitative research will explore the perceptions and experiences of online doctoral students and online professors' use of technology for doctoral persistence, particularly how it promotes a sense of community and connectedness in the online doctoral learning environment.

CHAPTER TWO: LITERATURE REVIEW

Overview

This qualitative single case study examines the role of technology in online doctoral persistence by exploring how online doctoral students and professors use technology to create a sense of community and connectedness. This chapter explores the historical development of Tinto's (1975) theory on student integration and its relevance to the proposed study, emphasizing its applicability to online doctoral students' and professors' sense of community and connectedness. A synthesis of recent literature exploring academic and socialization factors of doctoral persistence and online technology evolution is systematically delineated. A gap will then be identified relating to the need for this proposed study. This chapter concludes with the ethical issues of technologies in the online learning environment and a summary.

Theoretical Framework

Doctoral education in an online learning environment (OLE) is different from resident doctoral education in terms of autonomy, competence, and technology (Bolliger & Martin, 2018; Kebritchi et al., 2017; Smith et al., 2017). Online doctoral candidates drop out at a high rate due to lack of community connectivity, isolation, inability to be self-directed, and poor mentorship and feedback (Rockinson-Szapkiw et al., 2016). Research has shown the strengths and weaknesses of using technology in the online learning environment (Paudyal, 2020; Richardson et al., 2017; Schneider, 2018; Sinacori, 2020). Paudyal (2020) and Schneider (2018) postulated that technology literacy is a requisite for 21st-century college students, highlighting the number of resources spent on technological tools in education, which has yielded a viable way to support several learning environments. In exploring the role of technology on online doctoral persistence, Tinto's (1975) student integration model is best suited to provide the theoretical framework for

the proposed study because it offers the opportunity to explore changes in students' conditions (Rockinson-Szapkiw et al., 2016). Tinto's (1975) seminal work, which focused on residential undergraduate students, has evolved over the years to become the foundation for many studies on student persistence and attrition in residential and remote learning settings (Burke, 2019; Nicoletti, 2019).

Historical Background of Tinto's Theory

Although student persistence in higher education has been broadly studied over the years, Tinto's (1975) research provided groundbreaking insight into this issue. Tinto (1973) developed his theory of student departure in higher education with Cullen, building upon Durkheim's (1953) suicide theory, which focused on the egotistical form of departure (Tinto & Cullen, 1973). Through their partnership, Cullen and Tinto (1973) developed the theoretical model of attrition and persistence, which contained the following elements: the attributes, aspirations, and educational goals of the students before starting higher education and the characteristics of the institution, including academics, co-curricular activities, and interactions with faculty and peers. Tinto and Cullen (1973) also explored a student's ability to integrate on a social and academic basis as well as the external commitment and support available to the student. Lastly, the model examined each student's outcome – whether they persisted to graduation, transferred to another program or school, or dropped out of higher education.

Tinto (1975) also incorporated findings from Van Gennep's (1960) research centered on students' rites of passage through an academic institution. Tinto (1975) extended Van Gennep's concepts into higher education, explaining that students needed to learn to find their way through the educational institution of higher learning to adapt to their unique environment adequately. Tinto (1975) focused on students' inability to adjust and acclimate to their new environment as a

reason for dropping out of higher education. Astin's (1970) talent development theory also influenced Tinto's research that shed some light on learners' ability to develop particular talents inherent to both the learner and the institution. Tinto (1975) included findings from Astin's (1975) work exploring the role of financial aid in a student's decision to persist through higher education in his student integration model. Tinto (1975) described an input-process-output model presented in figure 1, which defines student involvement in higher learning. He summarized that the more involved a student is in the different aspects of his school, including extracurricular activities, the higher the likelihood of attaining a degree.

Figure1

Tinto's (1975) Student Integration Model
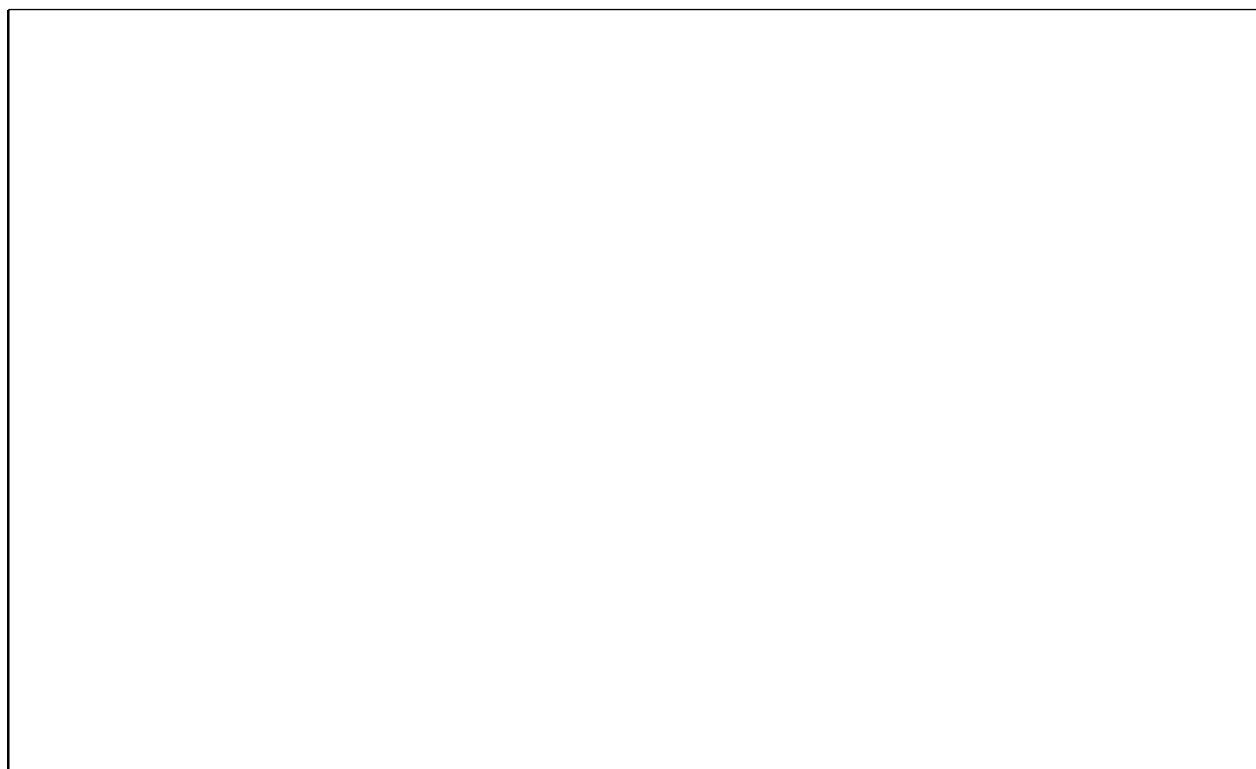
Note. Vincent Tinto's 1975 Student Integration Model (SIM) of attrition offers a longitudinal model which seeks to explain all of the phases and processes that shape an individual's decision to leave college or university. Image covered for copyright purpose.

Tinto's persistence theory incorporated findings from Spady's (1970) work which centered on the students' dropout process. Spady's (1970) theory examined students' specific goals and attributes that impacted their academic performance and ultimately played a vital role in their behavior. Tinto (1975) developed his theory with a strong emphasis on academic and social integration as central to students' decision to persist in higher education as they assimilate into the dimensions of college life. Through his work, Tinto provided insight into the impact of a lack of social and academic integration into an academic environment on persistence among higher education students.

Evolution of Tinto's Theory

Tinto's 1975 work, in turn, became the springboard for other researchers, such as Bean (1980), who extended the work done by Tinto by developing a causal theoretical model of student attrition. Bean's (1980) theory integrated variables from Tinto's work, namely academic integration, student goals, intent, expectations, internal and external factors that influence the student's decision to persist in their studies. Bean introduced a new variable, which he termed "attitudinal variables," and described it as a subjective assessment of the student's perceived quality and satisfaction with the educational institution. Bean (1980) connected his theory on student attrition and persistence to organizational behavior and reported similarities between employers who leave their employment and students who drop out of college.

In collaboration with Metzner, Bean introduced other elements relating to non-traditional students and environmental factors on students' persistence in college (Bean & Metzner, 1985). Their theoretical model highlighted additional variables such as the student's high school performance, grade point average, and specific psychological variables, including stress, satisfaction, and family acceptance (Metzner & Bean, 1987). They evaluated the influence of

these factors on student outcomes of persistence and departure from higher education. In turn, Pascarella and Terenzini (1980) built on Bean's (1980) work on social and academic integration by developing a student intent and persistence theory. Pascarella and Terenzini explored students' perspectives on their interaction with faculty and peers, creating a student involvement theory. Pascarella and Terenzini's theory examined the direct and indirect effects of student involvement and interaction on higher education outcomes. It stated that the amount of time the students spent with faculty, both within and outside the classroom, greatly influenced their persistence. Additionally, they expanded Tinto's (1975) work to multiple institutions, bringing a more diverse perspective to persistence research. Okun et al. (1996) investigated Tinto's theory and discovered that total credits students earned per term and grade point average were strong predictors of the students' persistence in community colleges.

Changes to Tinto's Theory

Tierney (1992) and Nora (1990) criticized Tinto's theory predominantly for excluding students enrolled in two-year programs in community colleges, non-traditional students, and non-residential students. Tierney (1992) also noted that Tinto's theory lacked ethnic diversity and failed to explore gender differences. Tierney's (1992) and Nora's (1990) observations were instrumental to the revised version of Tinto's original theory, which included psychological, societal, economic, organizational, and interaction factors to better understand student persistence (Tinto, 1993).

Cabrera et al. (1992) explored Tinto's theory's weaknesses and subsequently developed theories investigating novel aspects of student persistence, which describes the differences between students attending two-year community colleges and those enrolled in four-year programs. Cabrera et al. (1992) also explored external factors overlooked in Tinto's theory, such

as differing expectations, roles, access to financial aid, financial support, ethnic and gender characteristics, institutional characteristics, support from friends, and parental involvement. Tinto's (1975) work was also limited to one educational institution, further limiting its application to other institutions with characteristics that differed from Tinto's research institution.

Building on Tinto's concept of student "dropout," Grosset (1992) created the term "stopout" to describe a specific set of students who were no longer in college and never received a degree or certificate for their attendance. Bonham and Luckie (1993) focused their work on community college students, introducing another term, "optout," defined as students who voluntarily depart from college, intending to return later. Bonham and Luckie (1993) suggested the need to differentiate between stopout, dropout, and optout, to provide additional clarity on the subject of persistence. Bonham and Luckie's (1993) research reported the importance of distinguishing between goals set by students at two-year colleges and those at four-year colleges and maintaining that distinction when evaluating the two groups' persistence.

Overall, the criticisms of Tinto's (1975) theory of student persistence limited its applicability and generalizability to students in higher education, specifically two-year community college students and graduate students. The work of researchers that came after Tinto, Bean, and Metzner, highlighted the need for empirical research into the multifactorial nature of student persistence and attrition. In addition, some researchers also emphasized the need to include additional variables to expand the reach of student persistence and attrition across diverse educational institutions of learning (Bonham & Luckie, 1993; Cabrera et al., 1992; Grosset, 1992; Nora, 1990; Tierney, 1992).

Tinto (1998) highlighted the value of institution-specific studies because they allow for an in-depth evaluation of each institution's strengths and weaknesses. Consequently, multiple recent studies have been conducted at the individual institution level rather than the national level. Strayhorn (2017) included age and enrollment status, like full-time or part-time, as predictors of persistence in students enrolled in two-year community college programs. After incorporating psychological, sociological, and socioeconomic variables into their research conducted on individual students at individual institutions, Liu and Liu (1999) did not find a specific factor with the best predictive value for student attrition. In his study, Sturtz reported that financial constraints and limited time were two factors that influenced students' decisions to persist or drop out of community college educational programs. Students were able to return when more time and money became available. Departing from a two-year program may not be an entirely negative experience, Sturtz (1995) concluded in his study. These research works led to recent findings of student departure from two-year colleges.

Truesdell (1997), Rosenbaum (1998), and Grimes (1997) focused their work on two-year community colleges to close the knowledge gap about student persistence in these institutions. As a result, Tinto (1998) revised his theory, suggesting that academic integration was an integral and essential element to persistence at the two-year level. Tinto (1998) stressed the importance of exploring the multiple layers of academic integration within the classroom and student-faculty relations. Even though Tinto maintained his original report on the impact of academic and social integration on student persistence in a four-year program, he acknowledged that time constraints were a major limiting factor for the two-year college students to integrate into their environment.

Four decades after Tinto's groundbreaking research on student persistence in higher education, researchers continue to evaluate numerous influential variables as the subject of

persistence continues to emerge and expand (French, 2017). Data on minority students, females, non-traditional students, and learning environments have spurred the need for further research in this area. The data findings are critical for educational institutions, policymakers, government, and non-governmental bodies to review to gain more insight into the factors influencing student persistence in diverse educational settings. The findings will also help develop lasting solutions to the high attrition rates among students in higher education (French, 2017; Savage et al., 2019).

Tinto's (1975) theory is the most appropriate theoretical framework for this proposed research study because it provides a well-researched, dynamic student persistence model. Tinto's theory supports the study of personal and institutional changes, such as technology that affects online doctoral students' persistence (French, 2017; Rockinson-Szapkiw et al., 2016; Savage et al., 2019).

Related Literature

Educational research literature is replete with several factors that contribute to doctoral persistence, typically categorized into academic and social integration factors. This related literature section will evaluate various authors' viewpoints on the factors that affect doctoral persistence and explore research on the role of technology on doctoral persistence. This section will conclude with relevant justifications for this proposed study's importance, exploring the role of technology on online doctoral persistence.

Factors That Impact Academic Integration

Education is the process by which knowledge, skills, and attitudes are imparted to learners. The educational process encompasses specific theories and principles to solidify the knowledge, skills, and attitudes taught (O'Connor, 2016). The educational system in any community reflects the acceptable methods and approaches in teaching approved skills and

attitudes to learners within the specific society (O'Connor, 2016). The structure of a society's educational institution reflects the fundamental values that determine and sustain societal priorities. The educational process reveals and strengthens the core societal values.

The desire to pursue a terminal degree comes with a choice of residential, online, or hybrid program format for prospective students. A residential full-time doctoral program requires complete immersion in coursework, research, and scholarly activities at a specific school location, which typically precludes students from maintaining full-time employment (James, 2017). However, an online doctoral program provides students with the flexibility to learn at their own pace, retain a full-time job and continue their societal commitments (Rockinson-Szapkiw et al., 2016). Residential and online doctoral programs have their advantages and disadvantages, which has led some institutions to adopt the hybrid doctoral program, which blends some residential and online programs' characteristics (Zhang et al., 2020).

Characteristics of Online Learning

Online doctoral courses are attractive because they allow individual adaptation and flexibility as students balance work and family needs with their studies (Castelló et al., 2017). However, Miller (2021) stated that students enrolled in online classes typically experience less collaborative learning, student-faculty interactions, and student-student interactions compared to traditional students. They also contend that students who persist tend to have sustainable study habits and complete their work on time. The asynchronous online learning format promotes self-pacing and task completion with less disruption to work and family schedules, requiring an institutional understanding of the online student cohort's nature and diversity for a successful learning process (Steele, 2018).

Most online doctoral programs are designed with full-time doctoral students' characteristics and needs in mind, but the unique needs of online doctoral students—time restrictions, identity development, and professional aspirations are not sufficiently factored in (Zhang et al., 2020). Rockinson-Szapkiw and Herring Watson (2020) found that online doctoral students have lower academic-family satisfaction and functioning than residential doctoral students because they struggle to find the right balance between family and academic demands.

Personal Commitment

Doctoral persistence is affected by an individual's commitment to concluding the doctoral study and their specific career objectives (Skakni, 2018). A strong desire to attain goals, such as completing one's degree, is a powerful motivator for online doctoral students. Regardless of the year of study, students who withdrew were the least motivated towards degree completion (Jung & Lee, 2018). Students who estimated their education as an essential factor for their career development and financial outcome persisted in completing their degrees (Gittings et al., 2018b). Skakni (2018) and Berry (2017) suggested that the intrinsic motivation of pursuing a dream, coupled with the personal challenge and appreciation for learning and personal responsibility, contribute to successful degree completion among online students.

Doctoral Program Stages

The first part of a doctoral program has an essential blend of problems and strengths. The entry phase covers the period leading up to and running through the first year of doctoral studies (Gardner, 2010). Caskey et al. (2020) support Gardner's (2010) doctoral development model, which expects doctoral students to encounter, in the first year, common challenges related to the institution's admission and orientation practices, specific course requirements, amongst others.

Besides, Geesa et al. (2018) indicated that the first year provides the opportunity to develop relationships with peers, faculty, and staff.

Additionally, in their first year, students experience the transformation in learning capacity and critical thinking, significantly associated with transitioning from undergraduate to graduate-level training (Archer-Kuhn et al., 2020; Cornwall et al., 2018; Tseng, et al., 2020). Students develop a support system that enhances their ability to handle several challenges accompanying their new opportunities. Hence, failure to generate adequate support may play a significant role in students' decision to persist in their doctoral studies (Gardner, 2010). The early phase of doctoral studies sets the tone for subsequent years as students begin to think critically and independently, make decisions and follow through with them (Caskey et al., 2020). The socialization and development skills that students gain in this phase become the foundation for success as they progress to the succeeding stages of development (Gardner, 2010).

Appropriate orientation and understanding of doctoral program expectations are crucial to promoting students' development and adapting to novel challenges and a new environment (Guo et al., 2018). Numerous doctoral students face an inherent challenge that involves making the necessary adjustments to succeed in the doctoral coursework and expectations inherent in graduate school compared to undergraduate studies (Guo et al., 2018; Kebritchi et al., 2017). Often, students recognize the lack of clarity associated with graduate courses as a significant challenge that can be alleviated by developing supportive collaborations between students and faculty (Gardner, 2010). Peer relationships are more readily developed amongst first-year doctoral students who may feel uneasy about cultivating faculty relationships (Caskey et al., 2020; Gardner, 2010).

The second stage of a doctoral program encompasses completing the necessary coursework and preparing for the requisite assessments for doctoral candidacy (Gardner, 2010). Berry (2019) asserts that the difficulties that are peculiar to this phase include: developing proficiency in the field of study through completed coursework, cultivating and establishing peer and faculty relationships, preparing for examinations, and transitioning from the role of student to researcher to expert in a specific subject. Throughout the second phase, doctoral students become immersed and trained in their particular fields' vocabulary and philosophy (Berry, 2019). Students in phase two acquire a deeper understanding of the prerequisites necessary for completing assigned coursework related to their study's broad aspects and discipline-specific aspects (Gardner, 2010). Students who successfully transition through the first phase and complete their required coursework develop a deep sense of purpose and achievement regarding their core competencies (Abes, 2016). The relationship between the faculty advisor and the student becomes subsequently strengthened during this phase as it sets the foundation for dissertation research work. The advisor-student relationship has proven to be critical to students' success and persistence in graduate training (Vianden, 2016).

The third doctoral stage is the period of consolidation when ideas crystallize (Corcelles et al., 2019; Gardner, 2010; Sverdlik et al., 2018). The institution's commitment is resolute at this stage, especially when the students pass their comprehensive examination and are admitted to candidacy (Corcelles et al., 2019). Doctoral students in this stage are expected to proactively cultivate good relationships with faculty members, build on core competencies and exhibit a high level of commitment to their research study (Corcelles et al., 2019; Gardner, 2010). Dissertation ideas are developed and continuously refined until the student's research committee approves it for thesis defense (Gardner, 2010; Sverdlik et al., 2018). The biggest challenge in the

consolidation phase for doctoral students is establishing ties with expert faculty members in their

research study. In most cases, failure at this stage is fatal, translating to a student not finishing

the doctoral program (Corcelles et al., 2019; Sverdlik et al., 2018)

Quality of Interactions and Feedback

Constructive, meaningful, and timely feedback from instructors was identified as a

facilitator of doctoral persistence (Mulliner & Tucker, 2017; Thompson et al., 2018). Bolliger

and Martin (2018) reported that the link between the learning environment, motivation,

feedback, and perceptions results directly in positive student outcomes. Students who persisted in

their courses expressed satisfaction with program quality, quality of peer interaction, the course's

relevance to individual needs, and the learning environment. In contrast, Wong et al. (2019)

concluded that students dissatisfied with faculty or learning are more likely to drop out of their

online courses.

Motivation

Students who have high self-motivation and enjoy the challenge of online learning tend

to be more persistent than those who do not possess these qualities (Adams et al., 2020). This

attribute is more evident as students engage in daily class activities and put effort into solving

problems. According to Buzzetto-Hollywood et al. (2019), self-motivation is an intrinsic

motivation for completing online programs in conjunction with personal challenge and

responsibility. Therefore, self-motivation has been identified as a determinant between persistent

and non-persistent students (Fang et al., 2017). Overall, a sense of individual and professional

development can increase motivation to complete an online course and encourage persistence

(Adams et al., 2020; Fang et al., 2017).

Access to Academic Resources

Yang et al. (2017) indicated that difficulty accessing resources, primarily the electronic library, is a significant problem for online students. Other factors that result in dissatisfaction include the lack of a single point of contact and dissatisfaction with resources, which increases the tendency to withdraw from the course of study (Schmidt & Hansson, 2018; Sverdlik et al., 2018). Students who withdrew from programs report a lesser degree of participation than completers (Murphy & Stewart, 2017). Yang et al. (2017) cited isolation from faculty and fellow students as significant barriers to successful online studies completion. Computer access is required for successful program execution in an online doctoral program, and institution administrators identified computer access and accessibility as a number one concern for students' persistence, even though students did not rank it high (Au et al., 2018). Overall, administrators, faculty, and students agreed that computer accessibility was necessary for online students' persistence (Yang et al., 2017).

Factors That Impact Social Integration

Socialization is the process through which students acquire the knowledge, skills, attitudes, values, norms, and appropriate actions of their community (Borges et al., 2017; Kim, 2018; Weidman et al., 2001). Spaulding and Rockinson-Szapkiw (2012) described socialization as networking and connectedness. They further described connectedness as social integration with diverse groups, including peers, faculty, advisors, and the training department (Spaulding & Rockinson-Szapkiw, 2012). Connectedness provides the doctoral student the sense of belonging, drive, and knowledge base needed to advance through the program, specifically the dissertation phase (Weidman et al., 2001).

The student's level of engagement, which comprises commitment, investment, and involvement, is a predominant driving force for academic and professional success (Weidman et al., 2001). The socialization process model's primary goal (Fig. 2) was to inaugurate a foundational socialization process model with general applicability across disciplines, institutions, and student populations (Twale et al., 2016; Weidman et al., 2001). Doctoral students' socialization experiences are widely varied, depending on each students' personal dispositions, pre-doctoral preparation, and intrinsic and extrinsic motivation (Twale et al., 2016; Weidman et al., 2001).

Other individual characteristics such as personal identity, gender, language, roles, demographics, financial independence, family and professional responsibilities, and coping skills contribute significantly to the academic life of the non-traditional online doctoral student (Spaulding & Rockinson-Szapkiw, 2012). The organizational qualities of program and course flexibility, traditional versus an online program, student advisor, and dissertation committee influence the students' academic life (Twale et al., 2016).

Figure 2

The Concept of Graduate Student Socialization (Twale et al., 2016; Weidman et al., 2001)

Note. Bold elements in the framework are additions in Twale et al. (2016). Image covered for copyright purpose.

The doctoral student's expectations, the study program, and the course curriculum that align with individual and professional goals contribute significantly to their performance (Twale et al., 2016). Attributes at the individual and organizational levels shape doctoral students' experiences and their decision to persist in the program (Spaulding & Rockinson-Szapkiw, 2012). As the number of accredited institutions offering online degrees to students in the United States increases, there is also a significant increase in attrition rates (Rockinson-Szapkiw, 2019). These findings led to novel challenges in the socialization process for universities and institutions of higher learning, and communication difficulties in both verbal and written domains arose for faculty teaching online courses (Gardner, 2009). According to Kerr et al.

(2018), cultural diversity is the norm in online programs, and instructors are required to attend to the needs of a diverse group of learners.

Stages of Socialization

According to socialization researchers (Gittings et al., 2018a; Roksa, et al., 2018; Twale et al., 2016), socialization can be defined as a set of processes over a period of time that spans the different stages of graduate student experiences, ultimately culminating in the acquisition of skills, knowledge, and aptitudes essential for a smooth transition into academic and professional careers. Furthermore, socialization is a process of development that transports the student progressively through the socialization process toward the eventual goal of professionalization (Weidman et al., 2001).

The formal stage of socialization encompasses a period when the neophyte doctoral student enrolls in specialized courses that are usually non-transferable to other fields, an indication of dedication to the chosen field, and a considerable investment of resources (Weidman et al., 2001). Sverdlik et al. (2018) described double-socialization as the point where doctoral students become socialized as advanced learners and individual members of a professional community. Weidman et al. (2001) reported that the doctoral students' goals and commitment to the set goals dictate their professional socialization. Additionally, the students' investment, individual pride, and expectations fuel their professional identity development (Twale et al., 2016).

The doctoral student's involvement occurs at both an academic and a professional level. The student's educational participation calls for interpersonal interaction with faculty and colleagues, whereas professional involvement incorporates other aspects of development separate from academic activities (Twale et al., 2016). Professional involvement typically

involves an assistantship, practicum apprenticeship, or fellowship. Weidman et al. (2001) introduced the concept of involvement theory in the socialization process, defined it as the degree to which each student engages in the doctoral program and integrates socially with others involved in the program.

Gardner et al. (2014) identified socialization as fundamental to understanding doctoral students' experiences and how they persist in their studies. The process of socialization encompasses interaction, integration, and learning (Gardner et al., 2014). The central elements of socialization, otherwise known as engagement, involve knowledge acquisition, investment, and involvement (Twale et al., 2016). The groundbreaking research published by Weidman et al. (2001) identified socialization as a course of development that allows doctoral students to interact, integrate, and understand the values, skills, attitudes, and norms of a group to facilitate their participation with the group. Additionally, Weidman et al. (2001) stated that the normative context, the concept of teaching, research, and service, is the bedrock of the socialization framework. Johnson et al. (2017) posited that socialization is how students interrelate and integrate with a group to learn the group's values, attitudes, and norms to function well within the group.

Even though the design of the doctoral socialization process by Weidman et al. (2001) was intended to have a generic application, it drew criticism from Twale et al. (2016) for its lack of allowance for students from disadvantaged minority groups. The socialization process model developed by Weidman et al. also had limited application across multiple disciplines, online and hybrid learning environments. Twale et al. (2016) highlighted a drawback of Weidman et al.'s (2001) socialization process model, which did not identify the entity responsible for setting the benchmarks and determining group norms within the socialization process.

Consequently, Twale et al. (2016) made modifications to the Weidman et al. (2001) socialization model by identifying the following six dimensions of organizational socialization that existed within the model: collective versus individual, formal versus informal, random versus sequential, fixed versus variable pace, serial versus disjunctive, and investiture versus divestiture. They further described a relationship between the researcher and doctoral student as the work advances into the analysis phase. The perceptions of organizational socialization experiences and their effect on online doctoral students' decision-making are shared through the researcher's and students' interpersonal interactions.

Adaptions to Socialization Model

Twale et al. (2016) adapted the socialization process model to include African American students based on the original model's criticisms, focusing on the lack of diversity among graduate school faculty, and including the following components of diversity - gender, race, ethnicity, culture, socioeconomic status, religion, and international students. Twale et al. (2016) revealed that 15-16% of senior male and female faculty in higher education were from minority groups, whereas about 33% of the student population identified as minority students. As doctoral students progress through the stages of their doctoral studies, they mature in their cognitive, psychosocial, and professional identity (Weidman et al., 2001). The developmental advancement varies among students depending on each student's demographics, the field of study, and each department's culture and milieu (Weidman et al., 2001). Espinoza (2018) also criticized the model because it excluded disadvantaged minority groups, particularly Evangelical Christian students.

The revised socialization model attracted criticism from Felder and Freeman (2016) and Espinoza (2018), who critiqued both the original and revised models. Felder and Freeman (2016)

and Espinoza (2018) raised questions about Weidman et al.'s (2001) study that presented homogeneous assumptions in the socialization model without taking into account factors that affect minority students and other marginalized groups.

According to Espinoza (2018), the socialization process requires that students forsake their individual values and beliefs. Espinoza (2018) cited Felder and Freeman (2016) and Gardner (2009), who argued that Weidman et al.'s (2001) socialization model represents a repressive force against racial minority groups. Gardner (2009) criticized the Weidman et al. (2001) model for failing to tackle disciplinary, personal, and organizational differences that impact doctoral students' progress. Espinoza (2018) further criticized the Weidman et al. (2001) model as it requires students to forsake their personal values in the pursuit of acceptability within their field of study. Espinoza (2018) opined that Twale et al.'s (2016) revised model was a minor modification of the original, incorporating ethnic and racial characteristics. Removing the Evangelical Christian student's right to his or her values drew additional criticism of the revised socialization process model. Espinoza (2018) argued that relinquishing personal values was unacceptable to many Evangelical Christian doctoral students.

As a result, Espinoza (2018) modified the revised socialization model by creating a conceptual reconciliatory socialization model focused on the Evangelical Christian student's unique secular higher education experiences. Studies that focus on minority and disadvantaged students indicated that the original socialization process model posed unique socialization problems for minority groups (Espinoza, 2018; Felder & Freeman, 2016).

Weidman et al. (2001) describe the process requiring beginner doctoral students to abandon their personal features that did not align with the group's culture (Weidman et al., 2001). In their research, Felder and Freeman (2016) addressed the socialization model presented

by Weidman et al. (2001) and showed how historically, socialization sidelined African American doctoral students. They also discussed Twale et al. (2016) extension of the socialization model, highlighting how Twale et al. focused on contemporary literature regarding the factors that affect African American doctoral students' experiences, both at the individual and institutional levels.

Furthermore, Felder and Freeman (2016) examined the need to curtail the social distance and isolation that minority students experienced from peers and faculty. Felder and Freeman (2016) noted how Gardner's (2008) research criticized the socialization model presented by Weidman et al. (2001). In contrast, Felder and Freeman (2016) supported the modified socialization model Twale et al. (2016) proposed while stressing the importance of promoting healthy relationships between students and faculty, fostering academic advising, and social networking.

Felder and Freeman's (2016) research explicitly addresses African American doctoral students' issues and cuts across multiple disciplines. Socialization research critics evaluated the parameters that should guide the establishment of standards, norms, and ethics for doctoral student groups. Gardner et al. (2014) recognized that faculty members play a significant role in the socialization process because they are subject matter experts in their respective disciplines and fields. Gardner et al. (2014) described two socialization processes: socialization to the graduate student's academic role and the profession (Gardner et al., 2014).

Gardner et al. (2014) focused their research on interdisciplinary doctoral programs, which typically incorporate at least two distinct disciplines. According to Gardner et al. (2014), the socialization process described by Weidman et al. (2001) is complicated. Arguably, interdisciplinary programs' socialization process is expected to be more complex than single, traditional doctoral programs for which the initial socialization process was developed. Gardner

et al. (2014) designed their study based on the call by the National Science Foundation Integrative Graduate Education Research and Training (IGERT) and the National Science Foundation (NSF) for interdisciplinary research. Gardner et al. (2014) emphasized the important role that doctoral student-faculty and mentors play in arbitrating the socialization process.

The Process of Connectedness

According to Gardner et al. (2014), students were more open than faculty participants in learning the interdisciplinary socialization process. Gardner et al. (2014) also realized that asking faculty members to learn novel techniques and viewpoints was challenging. They also discovered that older faculty were unfamiliar with interdisciplinary socialization, and many faculty members did not possess the necessary skills to support their students in the process adequately. According to Gardner et al. (2014), doctoral program faculty need to receive training in interdisciplinary socialization processes to better support their students in institutions promoting multidisciplinary research.

Doctoral students start their programs with stereotypes and preconceived ideas and gradually advance through socialization's role identity stages. The intensity of their development increases as they progress from a graduate program to acquiring a professional identity (Weidman et al., 2001). According to Roberts and Bandlow (2018), the doctoral socialization process moves through many stages. The beginner doctoral student steps into the anticipatory stage, observing higher-level doctoral students as they learn the group's ways and ideals (Lamar et al., 2019). At the initial phase of this process, communication is typically unidirectional from faculty to students. During this stage, coursework, which serves as the formal stage of role acquisition, is when the new doctoral student acquires an understanding of his or her program (Antony & Schaps, 2021).

Following the preliminary stage, the doctoral student starts to gauge how they fit within the study program. The beginner doctoral student keenly watches and reads the environment and colleagues as they set goals, solicits feedback, and adjusts expectations as they grow in accepting responsibility for individual work or outcomes (Roberts & Bandlow, 2018). This process is affected by each doctoral student's maturity and functioning (Weidman et al., 2001). There is an informal stage in the process, representing the period when the novice doctoral student understands the program's informal rules from peers and more advanced doctoral students (Weidman et al., 2001).

In general, doctoral students create a peer culture and a social and emotional support system, particularly those in the same cohort. The doctoral student begins to form a professional identity in the personal stage, a distinct stage in role identity (Weidman et al., 2001). This stage is when a fusion of the doctoral student's personal and academic identity, personality, and professional part occurs. According to Weidman et al. (2001), the cohesive state of mind becomes apparent. Likewise, Roberts and Bandlow (2018) declared that the merging of the doctoral student's role of scholar, personal, and professional identity occurs in the personal stage of the socialization process. Weidman et al. (2001) asserted that the student's role identity and professional commitment create a professional social order.

As the doctoral student transitions from the first year through advanced classes that involve more complex and specialized learning, he or she progresses through the socialization process that further develops a professional identity (Weidman et al., 2001). A doctoral student repeats the process many times, going in an upward spiral cycle as he or she successfully advances through the program. The attributes of personal investment, involvement, and commitment to the program and profession are prerequisites for attaining success in the doctoral

program. Weidman et al. (2001) described the investment as a personal commitment that requires earmarking time and financial resources for the novel academic and professional identity sought by the doctoral student.

Socialization Role in Persistence

Socialization plays a vital role in graduate students' retention and persistence (Gardner et al., 2014; Perez et al., 2020; Williams et al., 2018). Every successful doctoral student needs to carefully study the academic environment to identify the values, attitudes, and subtle differences among their faculty and peers in their small groups and their more extensive academic program (Weidman et al., 2001). The doctoral student's departmental chairperson, immediate supervisor, or instructor establishes the socialization process, which sets the values, norms, attitudes, and skills needed for success (Berry, 2017). Gardner et al. (2014) stated that socialization existed as a common framework that understood the traditional doctoral student's experience in a specific discipline. Gardner et al. (2014) further indicated that unsuccessful socialization in graduate school increases the attrition risk for the graduate student. The doctoral student's ability to form positive and encouraging relationships with faculty, mentors, and supervisors enhance the student's sense of connectedness and integration to the department, fostering a strong sense of belonging and appreciably improving the socialization process (Kaur et al., 2021).

Graduate or doctoral persistence cannot be defined with a single model like undergraduate persistence because its features differ based on the specific field of study and time (Tinto, 1998). Some of the factors that impact persistence during the initial phase of doctoral training may differ significantly from those that play a role in another training process phase (Hill & Conceição, 2019; Steele, 2018). Overall, the process of doctoral persistence has three distinct phases: the transition and adjustment period, the period of attaining candidacy—also

described as the stage of developing competence, and the period of finishing a research work, which ends in the award of a doctoral degree (Tinto, 1998).

Richardson et al. (2017) reported a strong positive correlation between social presence and student persistence. Students who are more comfortable developing positive social relationships in the online environment are more likely to persist in their studies. Students with more robust social connections to peers will get the needed support to persist (Maddrell et al., 2017). The student who can form relationships within each course has a more positive experience, leading to persistence (Law et al., 2019). Support from family, friends, co-workers, study peers, and technical staff has been identified as a significant contributor to persistence in online programs. Rockinson-Szapkiw et al. (2016), in their study, found that students who persisted reported that friends and family supported their studies, compared to students who withdrew. The virtual community provides a sense of comradeship and can help students work through problems (Richardson et al., 2017).

Interestingly, Delnoij et al. (2020) noted a negative correlation between increased computer skill level and increased attrition rate among online students. The authors proposed specific reasons to explain this finding, including students' overestimation of their computer ability or underestimating the level of skills required in an online class. Also, students with higher computer skills may be more distracted by the Internet and focus less on the course content (Delnoij et al., 2020).

Given that 60% of online learners are adults, researchers (Abruzzo, 2019; Eakins, 2019; Kumar & Dawson, 2018) have proposed adopting new methods directed at the adult learner and modification of the socialization process to better support online doctoral students. Eakins (2019) recommended that university leaders create a sense of community among online doctoral

students by utilizing the principles of andragogy, how adults learn, and heutagogy, how students learn in an online classroom. Kumar and Dawson (2018) described adult learners as self-directed and self-determined learners since numerous online doctoral students enrolled in professional doctoral degrees search for innovative means of applying their newly acquired knowledge in their professional work and practice.

Abruzzo (2019), building on Kumar and Dawson's (2018) research, recognized the socialization process as a vital part of the steps taken by doctoral students before and through the dissertation phase of the program. He also recommended a distinct socialization process for online doctoral students separate from the process designed for traditional students according to the model described by Weidman et al. (2001). James (2017) described a new socialization model based on student user experience (UX). The concept of UX is built upon knowing the things that learners count as essential. James (2017), Kumar, and Dawson (2018) reported the use of mobile technologies that relate to a community of inquiry (CoI) and units that serve the student UX. Socialization represents a development process for doctoral students desiring to attain academic success and professional growth.

Twale et al. (2016) stressed that socialization is not a linear process that researchers are investigating to fit graduate students' experiences into distinct sections along the process. Each student's adventures vary significantly based on factors that apply to both the student and the organization. Self-efficacy in research and writing are two significant factors that impact doctoral students at the individual level, right from the onset of the socialization process (Johnson, 2019). Role identity stages seem straightforward until doctoral students advance to the stage of independent learning, where many doctoral students find out the lack of capacity to advance to the next level. For the socialization process to be successful, each doctoral student

must attain knowledge acquisition, investment, and involvement, otherwise referred to as engagement (Twale et al., 2016).

Several authors have identified the ability to create a balance between work and family life as a factor that significantly influences students' persistence in online programs (Jung & Lee, 2018; Rockinson-Szapkiw, 2019; Williams et al., 2019). Williams et al. (2019) proposed that personal time constraint was a common subject among students who did not complete an online course. Williams et al. (2019) also viewed incomplete and ineffective communication as a substantial barrier to persistence. The negative perception among students of the instructor's level of responsiveness was identified as a contributor to online class withdrawal (Jung & Lee, 2018). The lack of timely notification of program changes, slow or contradictory feedback from faculty, and the inability to reach staff or technical support contributed significantly to students' non-persistence in online programs (Jung & Lee, 2018). Identifying the factors that determine or predict online students' likelihood of successful course completion is essential as institutions develop effective strategies to mitigate the persistently high attrition rates among online learners (Rockinson-Szapkiw, 2019).

Technology Integration

Educational technology has provided much-needed access to on-demand education and virtual campus opportunities for millions of learners, effectively narrowing the longstanding digital divide, which had significantly hindered the educational process. Unfortunately, technology has also generated an educational crisis that has enabled learners to cheat by using cutting-edge technological products cunningly (Al-Samarraie & Saeed, 2018; McMurtrie, 2019; Thomas, 2017). According to Thomas (2017), the war on eliminating student plagiarism has turned into a multibillion-dollar business. As higher learning institutions continue to battle

plagiarism among their learners, the development of artificial intelligence (AI) and machine learning in the classroom has become the next frontier of educational advances (McMurtrie, 2019).

The idea of AI in the classroom was originally designed to assist instructors and teachers in reviewing students' work, digitally or physically, and recognizing specific academic challenges students face (Luckin & Cukurova, 2019). McMurtrie (2019) described various AI products that help students improve their writing aptitude, math skills, and science-based research. Technological advancements have facilitated the rapid expansion of educational products while also enabling some to misuse available technologies, posing new challenges for the educational sector (Al-Samarraie & Saeed, 2018).

When telecommunication technology became accessible to a specific population in the 1960s, it gave rise to television for educational purposes, especially in the United States of America (Rahman et al., 2020). By 1961, 53 telecourses operated under the National Educational Television Network (NET). In 1969, the first distance learning university in the Open University was established in the United Kingdom, followed by Canada's Open University in 1970 and the National University of Distance Education in Spain in 1972 (Guri-Rosenblit, 2019). The concept of distance learning has been embraced globally, providing educational opportunities to people in remote locations (Guri-Rosenblit, 2019). The rapid development of the massive open online course (MOOC) in 2008 gave rise to the era of interactive online learning (Gul et al., 2018). Social media platforms, such as YouTube, Facebook, and Twitter, have enriched students' learning experience with tools that enhance educational connectivity and assimilation, leading to the inception of personal learning environments (Rahman et al., 2020).

Over the years, proponents of computer-based technology have argued that technology can affect learning and teaching (Guri-Rosenblit, 2019; Jean-Francois, 2018; Pretto & Curro, 2017; Rahman et al., 2020). Recent research shows that teachers use technology in ways that are in line with their current instructional practices (Matzen & Edmunds, 2007). Tondeur et al. (2017) did not find any convincing evidence to support the report that the change in educational instruction to constructivism is attributable to incorporating technology into pedagogy. Furthermore, Ottenbreit-Leftwich et al. (2018) and Kopcha et al. (2020) reported that a student-centered approach is necessary to integrate technological innovations into educational practices effectively.

Technology for Online Education

In recent times, online learning has become the best alternative mode of education to the traditional classroom environment (Dhawan, 2020; Medina, 2018; Schneider, 2018; Sinacori, 2020). Richardson et al. (2017) suggested that the use of technology by itself in online instruction, including media and other specific tools, has no direct impact on students' social presence, connectedness, learning, or achievement. In the last decade, in particular, most organizations and institutions of higher learning have procured tools that foster the creation of social presence within Online Learning Environments (OLEs) to promote student satisfaction while minimizing reports of isolation or disconnectedness (Joosten & Cusatis, 2020).

Smith et al. (2017) reported that when technology is well applied, it has the propensity to promote students' ability to achieve success in their learning outcomes, enable a sense of social presence, eliminate feelings of social isolation in the learning environment. Presently, the fastest developing communication media is mobile technology (Squires, 2017). Furthermore, technological applications such as wikis have proven ideal tools for increasing social presence

and collaboration among online learners. Reinhardt (2019) recognized that incorporating wikis into OLEs could promote peer-to-peer collaboration among students, resulting in improved cognitive skills and increased learning outcomes. Also, Luo and Chea (2020) demonstrated that integrating wikis in OLEs could promote learner collaboration and interactivity while diminishing feelings of social isolation. Wikis could also be used for teacher-to-student and student-to-student feedback (Reinhardt, 2019). Various technology adaptations in the online learning environment involve using social media as an educational platform (Chugh & Ruhi, 2017).

As mobile communication technology penetrates the world's remotest parts, educators and instructional designers are tasked with engaging students on mobile technology platforms (Sinacori, 2020). The present research in this field suggests that Augmented Reality (AR) mobile learning applications, as an electronic performance support system, increase students' spatial and working memory, response times, and engagement (Sungkur et al., 2016). Augmented Reality has enabled instructional designers to develop pedagogically enhanced courses and support systems for online learning environments (Gandolfi, 2018). Ibili (2019) shows that AR-designed courses increase learners' cognitive abilities, positively impacting working memory. As AR develops over the coming years, the online learning environment will incorporate assistive and mobile devices to facilitate self-directed learning in technology-enhanced learning environments (Chu et al., 2019).

Technology Ethics

The global economy has grown tremendously due to numerous technological innovations, and technology has become the bedrock for novel industries and unprecedented competition in the marketplace (Tim et al., 2021). Simultaneously, the technology carries with it

the risks associated with changes that impact society's lifestyle, health practices, and the physical environment (Gonzalez, 2015). For society to maximize the benefits of technology, all community stakeholders must be committed to developing processes and regulations that safeguard its utilization.

Based on its objectives, undertakings, and commodities, technology is considered an end-product of human endeavors and is therefore not free of the influence of the producers' values (Gonzalez, 2015). Miller (2021) shared the perspective that technology is value-neutral and proposed that technology by itself lacks the intrinsic ability to be good or evil. These viewpoints contributed to the slow and limited development of ethical guidelines for introducing and utilizing technology in society (Gonzalez, 2015).

Overall, for the proponents of the thought that technology, by itself, cannot cause any harm, they argue that value is only produced when technology is put to use; therefore. As a result, latent technology is considered of no value (Miller, 2021). According to Gonzalez (2015), another school of thought proposes that technological artifacts' value is built upon their external properties. Technology holds distinct intrinsic values such as design, processes, and outcomes (Miller, 2021). A responsibility system that evaluates and analyzes the current and potential features and impact of the novel technology on society needs to be created well in advance of any technology design phase (Gonzalez, 2015).

The undesirable and unexpected adverse effects of some current technologies, including drones, social media, and nanotechnology, on society demonstrate the need to develop a robust ethical framework for the design, development, and deployment of technology (Jobin et al., 2019). Jobin et al. postulated that the external setting in which technology operates influences that particular technology's internal ecosystem, encompassing research, design, and artifacts.

Therefore, the creation of effective and efficient systems is critical in ensuring that technology achieves its expected outcome (Drozdova & Guseva, 2017). It is clear from research that human-technology interactions sometimes produce inadvertent and detrimental effects, making developing a system that explores the potential impacts of new technologies on society imperative (Gonzalez, 2015; Jobin et al., 2019).

NEST-ethics, a relatively new field of study, seeks to understand future technological, social, and moral changes (Swierstra, 2017). Although no system can accurately predict every new technology's future impact on society, any community that can evaluate a particular technology's potential effects before its deployment will serve their communities more effectively (Gonzalez, 2015). Technology ethics is grossly under-researched, primarily because, traditionally, ethics has been viewed as a branch of philosophy (Spector et al., 2014). The military and medical disciplines pioneered the introduction of ethics into their educational curriculums by developing ethical principles into their work operations (Mattingly & Throop, 2018).

Subsequently, the legal, engineering, and science academic disciplines introduced discipline-specific ethics into their curricula, but not until after many scandals and public objections arose regarding unacceptable operational standards (Gonzalez, 2015). In the educational fields, the study and practice of ethics have been restricted predominantly to research ethics (Mulhearn et al., 2017). Some ethical themes conspicuously absent in education include issues around universal design, open content, accessibility, privacy, access, and digital divide, and intellectual property (Spector et al., 2014).

Practitioners of technology face substantial challenges in accepting responsibility for technology's role in society. The landscape of technology and social interconnections is

continually changing, posing a considerable challenge to the ability to accurately predict the influence of technology on societal norms (Schwanen, 2018). For practitioners to assume responsibility for technology, there needs to be a system that allows for educated guesses about technology based on society's moral imagination (Waelbers, 2011). According to Richterich (2020), a society's morality is not static, especially concerning the utilization of technology, so it needs to be regarded as a variable factor that shifts as society adapts to new technologies. Practitioners must consider moral practices as they develop a forward-looking responsibility for technology's anticipated social roles (Waelbers, 2011). Overall, practitioners can leverage their practical reasoning skills to highlight different views, options for actions, and moral principles that dictate society's choice of technology (Gonzalez, 2015; Waelbers, 2011).

Summary

There has been extensive study of doctoral persistence over the years using Tinto's (1975) seminal theory on student integration as a theoretical framework. Even though Tinto's theory on student integration primarily focuses on residential students, it is the best theoretical framework for this study that seeks to explore the role of technology in online doctoral persistence because of the opportunity the theory presents to study changes in students and institutional characteristics (Rockinson-Szapkiw et al., 2016). This chapter presented the evolution of Tinto's 1975 seminal theory on student integration and the related research works that have contributed to the general understanding of online doctoral persistence and attrition.

The identified academic and socialization factors that contribute to doctoral persistence are more prevalent in residential doctoral programs, particularly in universities that run the cohort doctoral model. Doctoral students need to integrate within their academic and social communities and develop the requisite skills and reliance to complete their dissertation. Students

in an online doctoral program are heavily dependent on technology for academic interactions and developing a sense of community (Alqurashi, 2018). Berry (2017) posited that online doctoral students are interested in leveraging technology and on-campus support to promote social and academic activities. Various technologies have been successfully deployed for online academic and socialization purposes. However, university administrators, professors, and students face substantial challenges in choosing and accepting responsibility for technology's role in the online learning environment. The landscape of online technology is continually changing and fraught with various ethical dilemmas (Schwanen, 2018).

This review of the literature demonstrates that though there are studies about the need for technology in online doctoral learning, there is a gap in the literature about understanding the perceptions and experiences of online doctoral students and professors' utilization of technology for doctoral persistence by developing a sense of community and connectedness. This research work will provide valuable insights into how universities choose and implement technology in the online doctoral education environment, which will advance the understanding of online doctoral persistence.

CHAPTER THREE: METHODS

Overview

The purpose of this case study is to explore the perceptions and experiences of online doctoral students and professors' utilization of technology for doctoral persistence by developing a sense of community and connectedness. The study of persistence in higher institutions as a phenomenon is the subject of extensive research to determine the crucial factors for academic success (Lee et al., 2020; Lim et al., 2019; Olive, 2019). Even though the technology is well established as a critical factor for doctoral persistence (Willging & Johnson, 2019; Williams et al., 2019), there is a need to study how online doctoral students and professors use technology for social integration (Campbell, 2017; Gouseti, 2017; Vickers, 2018). This chapter discusses the rationale for choosing a qualitative single case design and data collection procedures. This chapter also includes in-depth details of the study participants' characteristics, the researcher's role, data analysis, validity, and trustworthiness and concludes with a summary.

Design

Every type of empirical research study has a research design, which creates a logical structure that relates the empirical data to a study's preliminary research questions and, finally, its conclusions (Yin, 2018). This research study explores the role of technology on online doctoral persistence using the qualitative research methodology. A qualitative method is the best research design for this study because the role of technology on online doctoral persistence is not easily identified and needs to be appropriately explored by the researcher (Patton, 2015). This research of online doctoral students' use of technology for socialization also focuses on students' definitions of terms versus the definitions the researcher brings to the study or from pre-existing literature (Creswell & Poth, 2018). This study fits into a case study paradigm, which implies the

existence of an ultimate reality that can be researched and understood (Creswell & Poth, 2018; Yin, 2018).

A case study approach is the most appropriate research design because it allows a researcher to reflect throughout the research study. The case study design also gives a researcher the ability to assess the different technological features of student-to-student and student-to-teacher interactions for social purposes to communicate the crux of the online doctoral students' experiences (Creswell & Poth, 2018). According to Yin (2018), a case study is appropriate for this research study because the study's phenomenon and the role of technology are relevant to the online doctoral program context, but the boundaries between the phenomenon and its context are unclear. An explorative single case study also allows the researcher to explore a phenomenon through a holistic approach to discover a useful generalization pattern or further develop a theory (Yin, 2018).

Research Questions

This research study exploring the role of technology on online doctoral persistence relied on the following research questions based on the purpose and problem statements.

Central Research Question (CQ):

How do online doctoral students and professors utilize technology for a sense of community and connectedness?

Sub-Question 1: How do online doctoral students and professors choose technology for a sense of community and connectedness?

Sub-Question 2: How do prior technological challenges hinder online doctoral students' and professors' sense of community and connectedness?

Sub-Question 3: Why do online doctoral students and professors explore technological experiences, activities, and practices for a sense of community and connectedness?

Setting

The research study setting was Synergy University (pseudonym), a fully accredited Christian liberal arts school. More than 90,000 students are enrolled in online courses from undergraduate through doctoral programs, in addition to the residential course offerings. The enrolled student population at Synergy University is 47.3% White, 14.2% Black or African American, 5.15% Hispanic or Latino, 2.06% Two or More Races, 1.33% Asian, 0.477% American Indian or Alaska Native, and 0.16% Native Hawaiian. The racial makeup puts the University at 1,934 in ethnic diversity nationwide, close to the national average. The online student population is 40% Male, 60% Female, the average age of 36 years, with a faculty to student ratio of 17:1. The university is structured in a decentralized format, with most of the professional workforce tasked with promoting the university's core focus, which is teaching and learning.

At Synergy University, students can customize their associate, bachelor's, master's, or doctoral degrees to match their area of interest while studying locally at the university's campus or globally online. The university's status as a recognized global academic leader in online education delivery informs the choice for this research case study. In 1985, the university began offering distance learning programs by mailing VHS tapes to students, which became a precursor to Synergy University's current online learning program. With the advent of high-speed internet connections at homes and campuses around 2005, Synergy University began offering online courses to a larger adult population.

The university has extensive experience in online learning delivery, and the expansion of the online program indicates its commitment to providing quality and affordable online education across national and cultural boundaries. The University's online teaching is organized

in a circular structure, characterized by low formality, low complexity, and high centralization (Bolman & Deal, 2017). The circular system enables students to attain the cognitive level of comprehension on a subject matter by drawing on a circle of knowledge sources, including other students, professors, real-life experiences, and observation (Bolman & Deal, 2017).

<div align="center">Participants</div>

The research case study participants were selected from doctoral students in their dissertation phase and online professors at Synergy University's School of Education. The selection of 13 online doctoral students and 6 online professors (Table 1) as study participants was made using maximum variation purposive sampling methodology (Etikan et al., 2016). Creswell's proposal to use a range of ten to twenty participants supports selecting 13 online doctoral students and 6 professors for the study (Creswell & Poth, 2018). Participants were purposefully sampled with a non-probability sampling method that is very effective for studies of a particular domain with experts (Creswell & Poth, 2018; Yin, 2018) based on their doctoral educational experience. Table 1 shows the enrolled study participants' demographic characteristics, including pseudonyms, age range, race, and gender.

Table 1

Demography of the Study Participants

Name	Position	Age range	Race	Gender
James	Student	35-40	Caucasian	M
Mary	Student	45-50	Amerindian	F
Jane	Student	35-40	Caucasian	F
Alexis	Student	40-45	African American	F

Calvin	Student	35-40	African American	M
Brianna	Student	40-45	African American	F
Alex	Student	35-40	Chinese	M
Maria	Student	40-45	Asian American	F
Gloria	Student	40-50	Caucasian	F
Emma	Student	30-35	Caucasian	F
Grace	Student	30-35	Caucasian	F
Charles	Student	40-45	African	M
Laura	Student	30-35	Caucasian	F
Abigail	Professor	40-45	Caucasian	F
Olivia	Professor	55-60	Caucasian	F
Peter	Professor	55-60	Caucasian	M
Rose	Professor	55-60	Asian American	F
Eric	Professor	55-60	Caucasian	M
Aron	Professor	40-45	Caucasian	M

The selected doctoral students were in their dissertation phase and had prior experience using various technologies in their doctoral educational pursuit of a sense of community and connectedness. The selected online professors also have prior experience using technology for a sense of community and connectedness in the doctoral online learning environment. The study participants were invited via email to participate in the study and complete an accompanying consent form. The participants were encouraged to send emails to other potential participants to

consider joining the study. This process is known as the snowball sampling technique, a non-probability sampling technique where existing study subjects recruit future subjects from their acquaintances (Patton, 2015). The study participants were selected to reflect the university's demographic makeup after getting approval from Institutional Review Board (IRB) to commence the study.

Procedures

A formal application was submitted to the Institutional Review Board (IRB) for approval. The approval of the IRB ensures that ethical standards are adhered to in research involving human subjects. This case study exploring the role of technology on online doctoral persistence involved working with adults and took place in a setting that required site permission. Upon getting the site permission and IRB approval, I conducted a peer review with a colleague in the doctoral program to refine my question guide and interview protocols. The study participants were recruited directly through email from the university's community website.

The study participants received a recruitment letter (Appendix A) describing the purpose, benefits, and procedure of the research study, along with an invitation to participate. The recruitment email had the consent form as an attachment (Appendix B), which explained the purpose of the study, requirements for participation, potential risks and benefits of the study, and their right to privacy and confidentiality. The consent form also informed study participants of steps taken by the researcher to ensure their privacy and confidentiality, their right to withdraw from the study at any time, whom to contact with questions about the study, the data collection process, and how they will receive feedback from the researcher after the data collection and the study had been completed. Study participants were required to sign the consent form to agree to participate in the research study.

The research recruitment phase involved reaching out to potential participants to ascertain their eligibility before enrolling them in the study. Eligible participants returned a document specifying their prior use of technology for a sense of community and connectedness to the researcher. This was followed by individual interviews, and lastly, focus group interviews.

The document analysis phase involved requesting public records, personal documents, and physical evidence from the study participants about technologies that helped them develop a sense of community and connectedness in the doctoral online learning environment. Semi-structured interviews were then conducted with the selected online doctoral candidates from the School of Education after the document analysis phase was completed. There was adequate information about the research given to participants, who were duly informed of the researcher's ethical obligations throughout the research study. Interviews were conducted using MS Teams software, audio-recorded and transcribed verbatim using Otter software. The researcher checked the transcribed document and shared it with the study participants to ensure their words were accurately transcribed. Three focus group sessions, consisting of three to six selected "information rich" participants in each focus group, were then conducted using the MS Teams software platform to elicit more in-depth information about their experiences using technology for a sense of community and connectedness in the online learning environment. The three focus group sessions were audio and video recorded and transcribed verbatim. I performed memoing, the art of recording reflective notes throughout the focus group interactions among study participants. The researcher checked the transcribed document from the focus groups and selected study participants for accuracy.

After the document analysis, interviews, and focus group phases were completed, I started the classification process, arranging the information set in a productive manner. Yin

(2018) suggests that it is imperative for research study data to be appropriately organized. After adequately organizing the data set, I started coding with the NVivo software using a pattern matching technique to generate themes and patterns. Pattern matching involves comparing the findings from this empiric case study with results from the predicted Tinto's persistence theory, which predates the data collection (Yin, 2018). The emerged themes and patterns were analyzed and reported in the findings section of this study.

The Researcher's Role

As the human instrument for the data collection and analysis, it was crucial that I bracketed my doctoral study experiences, biases, and prejudices before the start of the study and throughout the study period (Korstjens & Moser, 2017). The bracketing technique ensures the participants' voice is accurately reflected in the study (Patton, 2015). I am an enthusiastic advocate for integrating applicable technology into education because of my engineering background. My interest is based on experiences developing technological educational products across different cultures and diverse learning institutions. Despite the extensive use of technology in online doctoral education, its use in pedagogical instruction remains limited (Manca, 2020).

I adopted a constructivist paradigm for this research study, which supports the fact that people construct their own understanding and knowledge of the world by experiencing things and reflecting on those experiences. The reflections of the study participants were core to the research. The theory of rational inquiry entrenched within the epistemology theory (Rescher & Morgan, 2019), was the motivation for this study, which is designed to explore the perceptions and experiences of online doctoral students and online professors' utilization of technology for doctoral persistence. I am enrolled in an online doctoral program, and I chose study participants

that I do not have any authority over to avoid any unintended interference. My approach to this study as a researcher was to maintain objectivity by accurately documenting participants' views about the role of technology on online doctoral persistence. I had no authority over the selected participants for this research study.

Data Collection

Qualitative research relies on several methods and sources to validate the research. The most important feature of qualitative research is gathering and analyzing data. The data collected in this study was triangulated to ascertain that it is trustworthy, reliable, and valid. Data triangulation involves incorporating multiple data sources within the case study (Creswell & Poth, 2018). Data collection was done from various sources to ensure validity (Creswell & Poth, 2018). For this case study, data collection included document analysis, interviewing selected online doctoral students and professors, and conducting three focus group sessions.

The study's data was collected systematically (Creswell & Poth, 2018), utilizing three data collection methods: document analysis, semi- structured interviews, and focus groups. The order in which data collection was performed is significant. The planned sequence of events involved selecting the sequential order of collecting data (Creswell & Poth, 2018; Yin, 2018). The sequential order for this study was first to conduct document analysis. Document analysis is a form of qualitative research in which the researcher interprets documents to give voice and meaning around an assessment topic (Yin, 2018). The documents consisted of public records, physical evidence, and personal documents from study participants related to their use of technology for a sense of community and connectedness in the online doctoral learning environment. Secondly, semi-structured interviews allowed for open-ended questioning for additional information gathering and seeking clarification. During the interviews, the researcher

observed certain behaviors, took notes on behaviors, and followed up with additional questions as necessary. The focus groups revealed interactions between online doctoral students and professors, a critical source of rich information for a case study (Yin, 2018).

Document Analysis

The extensive use of technologies in the online doctoral program makes documentary information relevant to this proposed case study. The use of documentation as a source of evidence provides the case study with stable, unobtrusive, specific, and comprehensive sources of rich information (Yin, 2018). However, retrieving information might be difficult in the online learning environment because of the learning environment's personalization (Rovai, 2002). There are also issues with access to information, biased selectivity, and reporting bias that must be considered (Yin, 2018). Document analysis is a systematic procedure for analyzing documents to elicit meaning, understand, and develop empirical knowledge (Bowen, 2009). This research study assembled documents from the public domain (course syllabi) and personal documents (emails, text, video, and social media postings).

Interviews

The interview is considered the most effective method of obtaining an individual's perception of reality (Creswell & Poth, 2018). Though the interview questions should be focused, the interviewees should be allowed to respond openly and honestly. The use of semi-structured questions to obtain information from the study participants was appropriate, giving room for flexibility and follow-up questions (Yin, 2018).

Semi-structured interviews require personal sensitivity, adaptability, and an ability to stay within the research protocol (Yin, 2018). Gathering information about each person's experience was crucial in the case study utilized in this research to evaluate students' experiences and

perceptions as they use available technological products at Synergy University. Creswell and Poth (2018) recommend using an interview protocol so the researcher will create a single interview protocol to use with faculty and doctoral students who will participate in the case study. The interview protocol was peer-reviewed and approved by the dissertation committee before implementation.

The utilization of open-ended questions enabled the researcher to ask supplementary follow-up questions to explore different concepts, themes, and trends (Creswell & Poth, 2018). Prospective study participants were identified through faculty and current doctoral students' recommendations for the semi-structured interviews, which were scheduled for 60 minutes.

1. Please tell me about yourself— what is the topic of your dissertation?

2. What made you decide to get a doctoral degree?

3. Why did you choose to pursue an online doctoral degree?

4. Please describe the process you followed for choosing the specific courses you registered for.

5. How much experience do you have with online learning in higher education?

6. Please describe how your past experience with online education influenced your decision to enroll in an online program rather than a residential program.

7. Describe significant situations that have impacted you since your enrollment in the doctoral program.

8. How do you use technology for social integration and connection with faculty and other students?

9. Describe how you have connected with other doctoral students using technology.

10. Describe how you use technology to engage with your course-mates.

11. What informed your choice of Synergy University's online doctoral program for your terminal degree?

12. What role does technology play in your ability to complete your online classes?

13. Describe the technological challenges you have encountered in your doctoral program.

14. Please describe your institution's process of moving from the course phase to the dissertation phase of your doctoral program.

15. At what point during your doctoral program did you feel ready to initiate your independent scholarly research work?

16. What experiences helped prepare you for candidacy and the completion of your dissertation?

17. In what ways, if any, did the online experience contribute to your decision to persist in your doctoral program from an academic perspective?

18. Please describe any academic resources you utilized, such as library access to online resources, faculty, or other resources, and why they were valuable to you as a doctoral student.

19. Please describe how you identified and selected your chair and committee.

20. What would you like to tell me about your technology use that I may not have asked?

The first seven questions were opening questions created to gather background data on each participant, build the participant's profile and assess the participants' level of commitment to completing the doctoral program successfully (Patton, 2015). The interaction between a student's commitment to completion and the university's commitment influences the successful completion of a doctoral degree (Tinto, 1993). Drawing from Tinto's (1975) theoretical framework, social and academic integration are fundamental to persistence at all post-secondary

education stages. The research questions, and consequently, interview questions were based on the elements relating to integration. At the doctoral level of training, social integration involves interpersonal interactions and connectedness and a sense of belonging with colleagues, faculty, and the school or department community (Tinto, 1975, 1993). Questions 8 and 9 were asked because participants are molded by their upbringing, environment, and their familial situations after enrolling in their chosen course of study (Skakni, 2018). This question appraised individual occurrences that might have impacted the participant since starting their doctoral studies.

Tinto's (1975) theory on integration is the focus of questions 10, 11, 12, and 13. The questions endeavored to determine the extent of integration the participants experienced while enrolled. Students' lack of social integration tends to lead to course abandonment (Castelló et al., 2017; Tinto, 1993). According to Tinto (1993), if a student's rating for their university of choice is high, they have a higher chance of persisting in their studies than those who did not place much importance on their university, which makes question 10 crucial. Steele (2018) discovered that technology impacts online students' perception, and questions 10 and 11 seek to confirm this finding from the study participants. Hill and Conceição (2019) identified technology as a viable educational tool that can positively enhance the online learning experience. Hence, questions 12 and 13 explored the experiences of study participants using technology in the context of an online learning environment.

Questions 14 through 19 focused on factors that have been established as contributors to academic integration, including choice of a dissertation committee chair and members (Gardner et al., 2014; Lovitts, 2008) and students' readiness to undertake independent scholarly research work (Bagaka et al., 2015; Rockinson-Szapkiw et al., 2016; Tseng et al., 2020).

Focus Group

The focus group setting gives the researcher access to the study participants' actions in real-time, providing contextual data (Yin, 2018). A researcher gets the opportunity to observe non-verbal clues through this data collection method, especially crucial for understanding how online doctoral students and professors use technology for a sense of community and connectedness in the online learning environment (Rovai, 2002). This data collection method is time-consuming, and participants might modify their behavior because of the presence of other participants (Yin, 2018). This research study had three focus group sessions, consisting of four to six selected "information-rich" participants in each focus group. The selected doctoral students and professors for each focus group were invited to participate in an online discussion forum that explored questions about the role of technology in online doctoral persistence. The selected 12 participants for the focus group sessions were sufficient to obtain the "essence" of the research study (Yin, 2018). The session was recorded with the permission of the study participants and transcribed using Otter® software. The transcribed document was checked for accuracy by the researcher and selected study participants.

Standardized Open-Ended Focus Group Questions

1. To student participants**:** Will each participant please state your full name and the degree you are studying toward?

2. To faculty participants**:** Will each participant please state your full name and the courses you teach in the online doctoral program, and describe other roles you play?

3. From an academic perspective, please describe the strengths and weaknesses of the technologies used for your online doctoral program courses.

4. From a social perspective, please describe the strengths and weaknesses of the

technologies used for your online doctoral program courses.

5. Why is it important for online doctoral students to integrate into their institution's communities in the same manner as traditional doctoral students?

6. To student participants: Please describe the role, if any, that online technological tools had on your decision to persist in your doctoral studies.

7. To faculty participants: Please describe the role, if any, that online technological tools have on doctoral students' decision to persist in their studies.

8. Please share any additional information you would like to provide.

The first two questions were designed to allow participants to introduce themselves and ease them into discussing the research topic (Patton, 2015). Questions 2 and 3 were based on Tinto's (1975) theoretical model of persistence to explore any additional social and academic integration elements that study participants have identified about their persistence and to substantiate their answers further to interview questions. Questions 4 and 5 expanded on the individual's viewpoints on technology's role in their academics, sense of community, and connectedness (Tinto, 1975). The final question provided the participants another opportunity to add new information, expound on earlier questions, and clarify information to ascertain confirmability of findings (Patton, 2015).

Data Analysis

Following IRB approval, data gathering and analysis began and continued throughout the study period (Creswell & Poth, 2018). The collection of data from multiple sources generated a robust and large amount of rich descriptive datasets. For this research study, the first step in data analysis involved gathering and organizing data. Large amounts of data were generated during

the qualitative research study, and the recommendation is continuous data analysis (Creswell &

Poth, 2018; Yin, 2018). The researcher must analyze a vast amount of data which constitutes a

significant challenge in qualitative research. Yin (2018) suggests creating a data analysis

protocol before data collection. Diverse analytical strategies exist for use in case studies

(Creswell & Poth, 2018). This research study used the flexible pattern matching data analysis

procedure recommended by Yin (2018) for an explanatory case study.

Pattern matching logic is one of the most suitable data analysis techniques utilized in case

study research. Pattern matching involves comparing the findings from an empirical case study

with results from a predicted case study predating the data collection. The more similar the

empiric and predicted data are, the stronger the empirical case study's internal validity (Yin,

2018). The use of pattern matching in evaluating processes and outcomes is one way of

determining the "hows" and "whys" explored in this case study. The patterns observed were

founded on the propositions created at the beginning of the study design. There are specific

challenges peculiar to utilizing pattern matching in data analysis (Yin, 2018). A significant

challenge of case study analysis is the overall pattern of results and how much similarity exists

between the empirical study pattern and the predicted study. In utilizing pattern matching, it is

essential to recognize threats to the study's validity by conducting repeated comparisons, which

apply to single-case and multiple-case studies (Yin, 2018).

In general, the pattern matching technique does not require statistical analysis due to

minimal data points to analyze. As an alternative, the researcher can set predetermined targets

measured in numeric data to serve as the benchmark for the described data outcome. Even with

numeric data, some researchers regard the pattern-matching procedures to be less precise than

the statistical testing possible with quantitative data. The upside of the lower level of precision in

case study research is that it allows the researcher to interpret the data. Developing more precise measures and setting targets are ways to strengthen the case study. At the same time, it is crucial to avoid hypothesizing patterns that are difficult to discern (Yin, 2018).

The pattern matching approach comprises writing notes in the margins of fieldnotes, writing reflective pieces in notes, creating a summary of the fieldnotes, generating metaphors, coding, observing patterns and themes, counting the frequency of codes, making a logical chain of evidence, and comparing and contrasting. The predicted patterns for this case study were derived from Tinto's theoretical framework of doctoral persistence and documented before the start of data analysis (Yin, 2018).

After interviewing each study participant, the researcher generated a summary to note the initial thoughts and perceptions, as Yin (2018) suggested. Each session was recorded and then transcribed using Otter® software to ensure that the transcripts were objective and not subject to the researcher's interpretation. All participants' records were saved and kept on a password-protected laptop computer. Member checking was utilized to ensure that the intent of the participants' voices was successfully captured (Creswell & Poth, 2018). Creswell and Poth (2018) recommend utilizing member checking for precision and accuracy. After reviewing the data collected, the researcher organized the unstructured data using NVivo® software. The comparison of the predicted and observed patterns was done using a table format, an effective way to compare patterns and present insights from the findings. The research study findings were then presented in a narrative format to complement and interlink with the table format approach.

Trustworthiness

Lincoln and Guba (1985) describe trustworthiness as the characteristic of research and its results that make it meaningful to readers. The term trustworthiness outlines a set of principles

for determining the significance of a qualitative study. Creswell and Poth (2018) state that validation measures the accuracy of the research study findings. The criteria Lincoln and Guba developed to achieve this paralleled conventional quantitative criteria.

The first criterion described is credibility (equivalent to internal validity), which deals with the researcher's issue ensuring congruency between the study participants' expression of their experiences and the researchers' account of the experience. Transferability, similar to external validity, is the second criterion described by Lincoln and Guba, and it addresses the issue of generalization regarding case-to-case transfer. It focuses on providing the researcher's audience with adequate information about the case study.

The third criterion, dependability (equivalent to reliability), focuses on the research method and the assurance that it is valid, observable, and documented. Lastly, confirmability, also referred to as objectivity, establishes that the investigation's data and interpretations are not merely constructions put together by the researcher. There has to be a clear linkage between study data, findings, analyses, and the researcher's conclusions in a way that is obvious to the reader.

Credibility

An audit process was used with data triangulation to achieve credibility. Triangulation is a process that uses multiple and different sources, methods, investigators, and theories to provide corroborating evidence (Creswell & Poth, 2018). The study's conclusions have varied authentic support by connecting the various methods, resources, and theories. The researcher used this method to connect the different methods, resources, and theories shared during the study to describe technology use for a sense of community and connectedness in online doctoral study. Member checking, an effective way to provide credibility and reduce researcher bias was used. The

exhaustive documentation of research procedures and findings that was followed during this research ensures that the credibility criterion is fulfilled.

Dependability and Confirmability

In order to ensure dependability and confirmability, member checking, bracketing, and peer review procedure were employed. Member checking seeks participants' interpretation of the findings. This process increases the dependability of the study because the participants can provide critiques and alternate perspectives. The researcher shared data, analyses, interpretations, and conclusions with some students and professors enrolled in the study. The participants had the opportunity to provide critiques and offer alternative perspectives, which were analyzed appropriately to increase the study's validity and dependability. Peer review provided an external check of the research process, which increases the study's confirmability. The researcher's elected peer kept him honest and ensured the completeness of the research process. The peer also reviewed the interview questions, enriching the overall research process by offering additional insights.

Transferability

The triangulation of data collection will establish the transferability of the research study findings (Creswell & Poth, 2018). Although the research design is a single case study about a specific phenomenon, the study results may be transferable to other institutions with similar characteristics to the institution chosen for this research study. The thick description concept, which is imperative for transferability, was completed through document analysis, interviews, and focus groups (Yin, 2018). The researcher carried out an audit trail by keeping the study field notes and transcripts.

Ethical Considerations

A potential ethical consideration was the invasion of students' and professors' online privacy. Online communications always carry an inherent risk, for example, hacking. Pseudonyms were used for the participants to ensure confidentiality and limit hacking and all unauthorized data access,. The participants were informed of their right to withdraw from the research study at any time and given feedback after data collection and conclusion of the study. There is a possibility that some technological activities discovered during this study might violate the university's ethical standard for online learning, which are reported in the study. Data was regularly backed up on a password-protected laptop and stored in a locked cabinet at the researcher's office. The data collected during the study will be destroyed three years after the completion of the research study.

Summary

This qualitative case study explores online doctoral students' and professors' perceptions of and experiences with technology to promote a sense of community and connectedness. A case study research methodology was chosen for this proposed research work because it allows the researcher to investigate doctoral students' different technological socialization interactions with each other and online professors in the online learning environment. The setting for the research was a university in the southeastern part of the United States with an extensive online doctoral program, a diverse population, and a commitment to providing quality and affordable online education across national and cultural boundaries.

Following approval from the IRB board, the recruitment of potential participants began with purposive sampling. The data collection process employed document analysis, semi-structured interviews, and focus group sessions. The data collected in this study was triangulated

to ascertain its trustworthiness, reliability, and validity. The flexible pattern matching data analysis procedure, recommended by Yin (2018) for an explanatory case study, was used to analyze the data collected. The research study followed the ethical guidelines of the institutional review board, ensuring the study participants were provided with relevant information about the proposed study, and the study data was kept safe in a password-protected laptop kept in a cabinet in the researcher's office.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this case study is to explore the perceptions and experiences of online doctoral students and professors' utilization of technology for doctoral persistence by developing a sense of community and connectedness. This chapter begins with a rich history describing the experiences and technological perceptions of the study participants. The themes that emerged during the data analysis are presented with supporting evidence from the study participants. The other sub-questions explored in this chapter are how online students and professors choose technology for a sense of community, prior technological challenges of online students and professors, and why online doctoral students and professors explore technological experiences, activities, and practices for a sense of community. This chapter concludes with a narrative of the study findings and a summary.

Participants

The participants recruited for the research study are adult online doctoral students at the dissertation phase and professors who chair or serve on dissertation committees in the school of education. Maximum variation sampling was used to select doctoral students and professors to provide a wide range of perspectives on using technology to create a sense of community and connectedness in the online doctoral environment. The recruitment of doctoral students and professors for the research study was based on the racial makeup of the university. The interviews were conducted using the Microsoft Teams application, which captured the video and audio interactions and transcribed the interviews. The transcripts of the interviews were edited to replace the research participants' names with realistic pseudonyms to protect their identities.

James

James, a Caucasian American male doctoral student between the ages of 35-40 years, grew up in the southern part of the United States and has nursed the desire to complete a doctoral program since an early age because of the prestige of having a doctoral title. He is a father of three active girls and is involved in several sporting activities during the week. He said, " I was encouraged to enroll in the online doctoral program by a friend who recently graduated with a doctoral degree from a local university." James teaches dual enrollment college-level classes at a high school and hopes to train future teachers at a college after completing his doctoral program. His current use of technology includes teaching with various technological tools, finding ways to connect with his learners, and staying up to date with technological advancements in education.

Mary

Mary, a Guyanese woman, aged between 45-50 years old, grew up in a resource-poor society and culture that prioritized the education of the males over the females. Her father was so concerned about the limited opportunities for females in Guyana that he relocated the family to the United States. She struggled to adjust to life in the eastern United States, where she faced new challenges as she worked her way through the educational system. Her background from her home country and racial experiences during her undergraduate and postgraduate studies influenced her to become a teacher in an underserved area in the United States. She has found her purpose: fighting for minority girl rights using the formidable weapon of education. She reckons that girls in every country, either rich or poor, are at risk of being taken advantage of if their society does not actively work to protect them. She plans to use the research skills gained in the doctoral program to be a loud voice of conscience for vulnerable girls worldwide. Mary's use

of technology is minimal, with a heavy reliance on her technically savvy children to help her with her activities that require a computer.

Jane

Jane is a Caucasian American female doctoral student aged between 35-40 years. She worked from home for many years while raising her two children. Her remote work allowed her to develop the skills to work alone effectively. After her children left the house for college, she got an administrative role working for a small art college on the West Coast of the United States. Her work in academic affairs in higher education gave birth to her desire to pursue a doctoral degree. Her doctoral dissertation focuses on student assessment, building on years of prior study and work experience in student assessment. According to Jane, obtaining a doctoral degree will give her credibility with colleagues at work, encourage her children and improve future work options at a higher level of responsibility. Currently, she uses diverse technological platforms for her day-to-day work assignments.

Alexis

Alexis is an African American female doctoral student between 40-45 years old with a master's degree in forensic psychology. She is a divorced mother of two who enrolled in the doctoral program to switch careers to higher education because she was experiencing burnout as a therapist in an all-male facility for ages 18-21. She was frustrated with the therapeutic activities at work and consulting with the boys twice a month. In her opinion, the frequency of the counseling was far from ideal for the well-being of the boys. Her mother, a retired school principal, provides moral support for her doctoral journey, hoping that she will follow in her steps. Her work as a licensed therapist requires minimal use of technology, and she is not adventurous with technology.

Calvin

 Calvin, an African American United States military veteran, aged between 35-40 years, is a doctoral student born and raised in the mid-Atlantic region. He received his undergraduate degree in English from a military school where he grew up, started his military career as a second lieutenant, and was honorably discharged after seven years of service. Afterward, Calvin took a teaching position at a public high school in the mid-Atlantic area and remained in the National Guard for three years. His goal was to become a United States marshal, but he enjoyed teaching so much that he stayed with his newfound career. He took a break from classroom teaching to work as an institutional medic representative for a health insurance company, where he learned to create financial success from education. In 2009, he founded an educational company that offers teaching and consulting services for teachers and students globally. He uses technology extensively across various countries, teaching and consulting for different schools and organizations. He has extensive experience in online education and is very comfortable using technology for educational and non-educational purposes. Online learning was attractive to Calvin because it was the most cost-effective way for him to attain a doctoral degree.

Brianna

 Brianna is currently employed as a mental health counselor at an institution of higher learning located in the southeast region of the United States. She is an African American female aged between 40-45 years. She had considered enrolling in a doctoral program but felt she was too old to go back to school. She had always nursed the desire to hold an administrative leadership position in education, but she needed a terminal degree to achieve this. Her interaction with a co-worker enrolled in a doctoral program encouraged her to apply to the same institution. Barbara does not have a vast technology background and reports struggling with technology in

the online learning environment. She grew up in a low socioeconomic community with limited exposure to technology during her early education, contributing to her reluctance to embrace technology.

Alex

Alex, a Chinese male aged between 30-35 years, was born and raised in Singapore. He struggled during his early education and was not expected to succeed academically. He mainly got C and D grades until he discovered the concept of teaching other students what he learned in class. This idea unlocked his cognitive abilities and changed the trajectory of his education. He completed his bachelors' and masters' degree programs with high grades and is currently enrolled in the Ph.D. program focusing on education administration. He works with at-risk students at a university in Singapore, a passion born out of his personal, educational experience. He completed his master's degree online and stays active on social media to connect with other students. He is an avid blogger and enjoys using various technological tools to virtually promote connectedness with other learners. Alex chose online learning because he wanted an American doctoral educational experience with a Christian worldview.

Maria

Maria is an Asian American female aged between 35-40 years. She started an online doctoral program to change her career path from mental health counseling to teaching in higher education. Maria has a young family and a hectic work schedule. She encouraged her co-worker to enroll in the same program, and they became study partners with the same dissertation chair and plans to graduate together. Maria is passionate about the well-being of minority students. She intends to continue advocating for minority students after her graduation. She connects with other people on social media and is very comfortable using technology for educational purposes.

Gloria

Gloria, studying for a Ph.D. in education administration, is an African American female between 45-50 years old. She is a mother of two with a project management background. After 18 years managing several high-profile projects for a fortune 500 company, she unexpectedly lost her job. Her job required extensive use of different technologies, which made her a very skillful user of a wide variety of technological applications. The loss of her job and family relocation to the West Coast because of her husband's job led to a change in her professional aspiration. She held various teaching roles for 12 years while raising her two children. She is passionate about empowering Black students to become successful entrepreneurs. She is also actively involved with an organization that provides homes and mentorship for young girls rescued from sex trafficking. She relies heavily on social media technology to connect with her mentees.

Emma

Emma, a 25-30-year-old Caucasian American female student, is an active United States military service member. She enrolled in the online doctoral program to become a better leader, equipped with research skills to solve leadership challenges in her United States military branch. Her work schedule requires constant movement and different time shifts, making the online program the best way to achieve a doctoral degree. She wants to earn a doctoral degree, specifically a Ph.D., which will allow her to fulfill her dream of becoming an instructor in the military. She is exposed to cutting-edge technologies at work and is quite comfortable with remote learning.

Grace

Grace, a Caucasian American female pursuing a Ph.D. in curriculum and instruction, is between 30-35 years old. She finds teaching very stimulating and gets excited by the growth she sees in her students over a period of time. She stated, " teaching allows me to mold the lives of future leaders and make a significant difference for future generations. I see teaching as more of a calling than a career, and I hope to extend my teaching influence after completing my doctorate program." She is interested in researching issues around multicultural education and plans to forge scholarly relationships with other students and faculty. Grace enjoys using different technological applications for curriculum design and teaching. She is also a frequent social media user and reported choosing online learning to achieve work-life balance.

Charles

Charles, an African American male military veteran, is between 40-45 years old and married with two children. Charles elucidates that teachers' beliefs, practices, and attitudes shape educational processes, which in turn determine the state of any society. He is working on making educational opportunities available to people in the rural parts of the world. According to Charles, getting children into an educational system at an early age is crucial for the development of any nation. Charles had minimal exposure to technology as a growing child but has found technology's usefulness in education and social activities in recent years.

Laura

Laura is a Caucasian American female doctoral student, aged between 30-35 years, a mother of two boys, teaching high school English on the East Coast of the United States. She enrolled in the online doctoral program to get the prerequisite for an anticipated teaching position in higher education. Laura chose online education to allow her the flexibility to study while

raising a young family and working full time. She came into the online doctoral program with extensive online learning and teaching experience. She was a college athlete, which instilled a competitive spirit and an attitude to finish whatever she started. Laura enjoys learning and exploring new technological ways to teach her students.

Dr. Abigail

Abigail, a Caucasian American female aged 40-45 years, got her love for serving people from her parents, who are pastors in the Midwest. Her passion for caring for people led her to the nursing profession, which provided numerous opportunities to interact with people. After 25 years as a registered nurse, she went back to school to earn a doctorate in education and a masters' degree in business administration. During her nursing career, she stayed abreast of technological advancements in the medical world, including electronic health records, administrative reports, and interprofessional communication. As an educator, she turned her attention to preparing students for the nursing profession. She said, "I find academics exhilarating, and eleven years ago, I shifted to teaching online classes and chairing dissertation committees." She has held significant academic and administrative positions in higher education, making decisions among many other priorities, including finding the appropriate technologies to use for online learning. She is an active advocate of emerging technology in the online environment.

Dr. Olivia

Olivia, an avowed K-12 education champion, is a Caucasian American female aged 55-60, with 32 years of teaching experience in physics and chemistry in the public school system. In describing herself, she said, " I am a staunch supporter of technological pedagogy," she worked on several public school initiatives as an expert in using technology in the residential and online

learning environments. In the last seven years, she has been teaching online at a university, focusing on helping students develop their research proposals. She is actively engaged in research that creates an online environment that closely simulates the residential classroom. The primary goal of her research is to close the gap between online and residential learning experiences.

Dr. Peter

Peter, a Caucasian American male between 55-60 years old, teaches online doctoral classes and serves on dissertation committees at Synergy University. A 2014 doctoral graduate of Synergy University, he has roots in the Midwest. After traumatic early years of drug use and expulsion from college, Peter went back to complete his bachelors' and master's degrees following a divine intervention. He went on to have a fruitful 30 years of varied experiences teaching special education before retiring to focus on hunting and enjoying outdoor activities. After six months of hunting and fishing, boredom set in, and Peter began to question the wisdom of doing nothing productive to affect other people's lives. The quest to make his days count for others led him to apply for a teaching position at Synergy University, where he enjoys preparing future researchers and leaders in the field of education. He stated that " in general, technology does more harm than good in the practice of education." For example, he decries the use of technology for writing and grammatic work because it negatively impacts students' learning and academic rigor, especially at the doctoral level. Therefore, he limits his use of technology to content delivery and communication with students, staff, and faculty.

Dr. Rose

Rose, an Asian American female professor between the ages of 55-60 years, was born and raised on the West Coast of the United States. She was raised by immigrant parents from

Asia who worked very hard to ensure that she had the requisite educational qualification to succeed in their new society. She became a Christian at 17 years old before heading to a local university to earn a bachelors' degree in music. After graduation, she enrolled in graduate studies in music education at a Christian university in the southeastern United States. Even though she did well academically at the Christian school, she was looking forward to finishing her graduate studies and returning to the familiar terrains of the West Coast. According to Rose, God had other plans for her life, as she got employed by the university soon after completing her graduate studies. She spent thirty-five and a half years as faculty at the same university from where she retired in 2018. She taught undergraduate and graduate classes and served on dissertation committees at the Christian university. While teaching at the university, the school transitioned some of her classes from residential to online to provide greater flexibility to students. She said, " I initially resisted the proposal due to a firm belief that online technology was detrimental to the study of music." However, she lost the battle to keep all her courses residential and eventually transitioned some of my courses online with the help of instructional designers at her school. To her surprise, the performance of online students surpassed the residential student." This experience made her embrace the use of online technology in education. She has also developed a very successful academic coaching strategy for her doctoral students in the online learning environment. She is passionate about working with minority students and developing Christian scholars.

Dr. Bob

Bob is a Caucasian American male professor between the ages of 55-60 years. He teaches residential undergraduate courses at the school of education. After earning his undergraduate degree in curriculum and instruction from a university in the southern part of the United States,

he decided to try out teaching as a possible career. He thought he might not enjoy teaching, so he actively worked on other plans while adjusting to his first teaching role in a school district in the southeastern part of the United States. He was offered a financial incentive by the school district to earn a masters' degree, which he completed in a year and a half. He ended up teaching at the school district for 35 years primarily because his family enjoyed the proximity to the beaches. While in the school system, he used technology only out of necessity. He did not explore the use of technology to enhance curriculum development, instructional purposes, or content delivery. After retirement, with the children out of the house, living in a mountainous area became his new quest in life. The search for the mountains led him to Synergy University, where he took up an appointment to teach undergraduate residential courses and serves on doctoral dissertation committees. As a dissertation committee member for online doctoral students, he typically uses emails and occasionally phones to interact with students. His use of online technology remains minimal, and he is not enthusiastic about exploring technology uses for educational purposes.

Dr. Aron

Aron, a Caucasian American male between the ages of 35-40 years, is an instructional coach with particular emphasis on technology at a suburban middle school in the midwestern region of the United States. Aron is a fourth-generation doctorate holder from a family with educational éclat. He graduated with a bachelor's degree in biblical studies and found it challenging to get a good-paying job. In his quest for a financially rewarding career, he discovered his love for teaching and kept earning one teaching degree after another, culminating in a doctoral degree from Synergy University. He currently teaches in a middle school and serves as an adjunct faculty member at Synergy University, serving on dissertation committees. Dr. Aron describes himself as a champion for technology practices in education, and he regularly

trains teachers and students to use appropriate technology for education. Additionally, he is a firm believer in using technology for connecting with his students. In particular, he favors video technology that allows for nonverbal communication, fosters relationship building, and enhances trust between instructors and learners.

Results

The study data gave valuable insight into how online doctoral students and professors use technology for a sense of community and connectedness by exploring the fundamental social and academic factors necessary for the successful completion of an online doctoral program. Although the experiences of the online doctoral students and professors' use of technology for a sense of community and connectedness were quite varied and depended on various factors such as discipline, structure, and organization of the dissertation committee, four significant themes and three sub-themes emerged from the research data analysis. The theme development section details how the predominant themes: support services, strategic curriculum and instruction, social integration, and technological experience, and subthemes: communication, feedback, and cohort were extracted from the research data using pattern matching logic method.

Theme Development

This study utilized Yin's (2018) suggestion to create a data analysis protocol before data collection and use the flexible pattern matching data analysis procedure for the exploratory case study. Pattern matching logic is one of the most suitable data analysis techniques employed in case study research, which involves comparing the findings from an empirical research study with the results from a predicted research study predating the data collection. After completing the document analysis, individual interviews, and focus interviews phases, the data collected were organized according to their sources using NVivo software. This qualitative analysis tool

lets a researcher organize research data and quickly discover patterns using the coding process.

The query function in NVivo software was used to generate the frequent words in the individual

and focus group interviews, which gave insight into the possible codes (Figure 3).

Figure 3

Word Frequency Query from Study Data

A total of 19 specific codes were extracted from the data sources using an inductive

coding technique to create the set of codes based on the research study data and categorized into

themes. The themes that emerged from the inductive coding process starting with the most

predominant theme are support services, strategic curriculum and instruction, social integration

with faculty and peers, and technological experience. Two subthemes, communication, and

feedback were extracted from the support services theme, and one subtheme, cohort, was

obtained from the social integration theme. The frequency of codes generated is presented in

Table 2.

Table 2

Frequency of Open Codes

Open Codes	Frequency of Codes Across Data	Number of Professors Discussed	Number of Students Discussed
Accessibility	17	5	13
Approachable	20	4	11
Assistance issues	62	5	12
Care	16	4	10
Encouragement	30	6	13
Fear	50	2	11
Feedback	13	6	13
Isolation	26	3	12
Learning curve	26	3	11
Learning environment	55	6	13
Mentorship	18	4	7
Relationships	91	3	12
Research skills	15	3	9
Response time	11	5	10
Social interactions	81	2	11
Software issues	71	5	13
Technological resources	56	4	10
Training	17	3	13
Trust	15	4	13

The codes, predicted themes, extracted themes, and subthemes that emerged during the data analysis process are presented in Table 3. Three themes extracted from the data, namely, support services, strategic curriculum and instruction, and social integration, matched the predicted themes. These themes were highlighted by Lehan et al. (2021) in a published paper which synthesized and critically analyzed the body of research exploring the factors associated

with persistence among online doctoral students based on Tinto's persistence theoretical framework. The technological experience theme does not fit the predicted theme pattern.

Table 3

Codes, Predicted Themes, Extracted Themes, and Subthemes

Predicted Themes	Extracted Themes	Extracted Subthemes	Open Codes
Support	Support	Communication	Accessibility
			Approachable
			Care
		Feedback	Encouragement
			Response time
Strategic curriculum and instruction	Strategic curriculum and instruction		Learning curve
			Training
			Research skills
			Learning Environment
Social integration	Social integration	Cohort	Relationships
			Social Interactions
			Isolation
			Mentorship
			Trust
			Encouragement
	Technological experience		Technological resources
			Software issues
			Assistance issues
			Fear

The data analysis showed that completing an online doctoral degree requires commitment from doctoral students and professors. There was agreement among all the study participants that a successful doctoral program, especially the dissertation phase, requires the integration of social and academic factors using technology. The commitment of an online doctoral student to finish

the doctoral program and the university's commitment is established through the effective use of technology for support services.

Support

The online doctoral education program at Synergy University is designed to be fully dependent on the use of technology. There are no provisions for students enrolled in the program to have any physical contact with fellow students, professors, and school administration until the graduation ceremony, which takes place on the school campus. Dr. Abigail and Dr. Rose expressed the joy and excitement they experienced seeing their doctoral students for the first time in person during the graduation ceremonies. Dr. Abigail has numerous emails, cards, and letters from her past students who appreciate her contribution to their learning and support through the doctoral training. Dr. Abigail succinctly sums up the online doctoral experience in these words:

> You support a student through the highs and lows of completing the dissertation phase, and all the bottled-up emotion gushes out when you finally meet the student in person on graduation day, filled with hugs, sobs, laughter, and pictures that make the whole journey worthwhile for the student and professor.

Although doctoral students choose online education for its flexibility, which allows them to fulfill other important life obligations, most worry about the support services available to them to complete the doctoral program. Grace articulated the need to use technology for effective support services by stating, "once you actually start that dissertation phase, I feel like that is when the real learning kind of sets in. Moreover, that is a lot of trial and error, and I leaned on my chair a lot. I have read about coding and that kind of thing, but doing it is a very different kind of experience than just reading it." Brianna, in agreeing with Grace, further added:

Because, you know, of course, we all experience things that we do not expect to happen, and to me, it has been a very great teachable moment for them to be understanding. They are empathetic. I had a death in the family, which affected my work, and this instructor said, you take the time you need, and I would not count it against you. For me, that is very, that is very helpful. And that is something that students need. We never know what is going to happen in our lives, and sometimes we just need a little grace.

Alex, Calvin, and Emma emphasized their need for constant support because their jobs require constant mobility, making staying on task academically difficult. Alex said, "I live in a country, which is 12 hours ahead of the Synergy University location in the USA and have to constantly interact with people at the university, who assume I am located in the same time zone as the university. Most times, I am limited to basically using emails to correspond with professors and administrative staff, and occasionally stay up late in the night to make calls, issues take far too long to resolve." Emma echoed Alex's sentiment:

One of the first things I was told by a professor was to try and get a group of doctoral students because nobody can commiserate with each other quite as doctoral students do. We get what we are going through, and our spouses and friends may not, which has been pretty difficult in this online format to connect with other people. The discussion groups work, but they are not great.

Calvin summed up his use of technology for support services with these harsh words:

So it was almost always emails. And that was actually one of the things that I was a little bit frustrated by is that most of the time, there was no office phone number or any phone number at all listed for professors. And I know that they are super busy and probably teaching multiple classes at once. So, I could see why they would not want to have a

phone number listed. However, a lot of the time, just having a quick five-minute conversation probably would have answered my questions in the time that it would have taken me to send five back and forth emails, just because communication like this is much easier.

The doctoral students expressed more concern about using technology for practical support than the professors who participated in the research study. Even though the doctoral students and the professors agree on the need to use technology for practical support, their perspective on how it should be used is different. Dr. Rose expressed her view of support services for online doctoral students by narrating this story:

This ruler came to Christ, and Christ loved him and told him what he needed to hear and what he needed to do to enter the kingdom. And yet, he just walked away from Christ. And if you notice, Christ did not go after him. He let him go. And I said, you know, I will go after a candidate and contact them and say, make sure you do this and that, and I am ready to help if you need me. But if they just do not want to make contact to ask for help, I have to pray and leave them to the Lord.

Dr. Rose's opinion that doctoral students should take the lead in using technology to establish a robust support service for themselves is shared by Dr. Aron, Dr. Abigail, and Dr. Peter. In contrast, Mary, James, Jane, and Brianna opined that establishing an effective support service for online doctoral students is a shared responsibility between the students, faculty, and administration. Alexis and Maria spoke to the sense of loneliness and isolation, especially as they embarked on the dissertation phase of their doctoral program. Despite the extensive time, energy, and resources dedicated to the process, they both expressed the frustration of not knowing if they were making appropriate progress with their dissertation work. The doctoral

students agree that establishing a robust support service starts with using technology to connect with professors, school administration, and fellow students. Also, there is a general belief among doctoral students that success in the online doctoral program requires establishing a committed community to provide the necessary support services throughout the doctoral program. Gloria elucidated on the importance of using technology to establish a connection with people that are needed for support by stating, "I have a couple of friends who had gone through a program at some of the universities in the area, and I get so jealous because they always talk about how they still meet with their cohorts."

The professors and doctoral students alluded to the fact that having an effective support service largely depends on maintaining continuous communication between the doctoral students, faculty, and university administration using applicable technological tools. Even though doctoral students chose the online option for completing their terminal degrees, for the primary reason of the flexibility it affords, but many report feelings of loneliness and isolation because they are working independently.

Communication

The essential role that communication plays in the online doctoral program was repetitively discussed during the individual and focus group interviews. Research (Lenzi et al., 2017; MacLeod et al., 2019; Thai et al., 2019) has shown that online students have a lower sense of community and connectedness than traditional students, in part, because of the absence of face-to-face communication and body language between learners and instructors. The doctoral students and professors believed that negotiating how to communicate is an essential first step in the dissertation phase of the doctoral program. Dr. Aron, Dr. Oliva, Dr. Abigail, Maria, Emma,

and James spoke extensively about the various technological tools such as email, phone, audio, and video teleconference available to doctoral students and professors to use for communication.

Dr. Abigail's observation that "the doctoral studies, especially in the online realm, can be a little lonely at times. And you are working all on your own, and all of a sudden, the chair disappears and only responds to you when you have a random question" captures the communication challenge Calvin, Mary, and James expressed during the interviews. Even though there are many technological tools available for communication in the online doctoral learning environment, the use of the tools for communication is selective and does not foster a sense of community, according to Jane, who said:

> I was already 40 credits in or 41 credits into my degree when I saw a professor offering online office hours. If this had been offered from the beginning of my program, I would have been able to have many of my questions answered on time

In support of the fact that doctoral students want to establish a connection with professors and form a community using the various communication tools, Dr. Olivia said of the doctoral students, "they lose that camaraderie sometimes of having a cohort of people to support them. And so, my goal is to meet with my students every month, every semester, and set goals and have them on my calendar so that I can check in on them." Dr. Abigail, realizing how impersonal online communication could become, decided to act more candidly in her video postings to her doctoral students to promote openness and connectedness. She said:

> I also really believe that videos are a great way to support doctoral students, and I have some guys who do our videography for our department. They laugh at me because I am really one and done. I do not do a lot of practice. I do not have a script. I know what I want to talk about. And I am just talking, so it becomes real. So yes, I mess up. And yes, I

say things that I am like; that is not what I meant. Hold on, let me rewind that. But I think it adds that transparency of realizing that a professor is a real person.

Charles, Emma, and Gloria implied that they are generally not sure how a particular technology is chosen for communication by the professors and do not understand the university's policy regarding what technology is allowed for communication. They expressed a desire to see the university educate the doctoral students on the capabilities of the available technologies for communication and open a channel for active feedback from the doctoral students.

Feedback

Rockinson-Szapkiw et al. (2016) identified the lack of effective feedback as one of the factors affecting online doctoral students' ability to develop a sense of community. Dr. Bob, Emma, and Gloria expressed that constructive, meaningful, and timely feedback from professors and university administration invigorates students, giving them the impetus to persist during the dissertation period. Grace, remembering the importance of timely feedback to her studies, said, "I thrive on those comments on the side of my papers. I love seeing that." Alexis, agreeing with Grace, said, "when you get those bubbles, those comments on your paper, it is like, oh, yes, okay, now I know exactly what I need to fix. So, I think it is very helpful, and I wish I would have had the same with other professors." Dr. Olivia and Dr. Rose noticed a connection between feedback and motivation. Dr. Oliva said:

> I think it is helpful if I try to get feedback back to them pretty quickly. This used to be four weeks. They said you got to wait four weeks for the professor to respond. But I try to go a little faster than that. Sometimes somebody will send me something, and I may be busy with another dissertation or something for a weekend. So, it may be a couple of weeks, three weeks, but I try to get the feedback pretty quick to them.

Calvin, James, and Alex indicated that they experienced a loss of motivation and creativity when they did not get timely feedback from their professors, which hindered their studies. Calvin shared the email from his chair, who said, "standby, I will get to you shortly. Your prospectus is solid." in response to his request to meet over Zoom after waiting for two weeks without feedback.

All the doctoral students concluded that if effective feedback is not established at the beginning of the dissertation phase, they would likely take longer to complete their doctoral program or drop out of the program. Dr. Bob suggested that feedback to students should be timely and encouraging, noting that "the encouraging and timely words of my dissertation chair motivated me to complete the doctoral program on time." Maria, agreeing with Dr. Bob's observation, said, "My chair is extremely busy with her position at Synergy, and I believe I am her seventh doctoral student, but she has reviewed and provided feedback on my draft twice. I feel very fortunate and blessed." Clearly, the doctoral students understand how constructive feedback is essential to the success of their doctoral program, which informs how they use technology to elicit feedback from their dissertation chair. The professors recognize the crucial role that timely, specific, and constructive feedback plays in motivating students to persist in the online doctoral program. Though the faculty handbook states the expectations for online faculty, most students are unaware of the university's policy guidelines governing the timing of student feedback responses.

Strategic Curriculum and Instruction

The strategic structure of the university's curriculum and instruction is a significant theme that emerged from the data analysis, with professors and doctoral students remarking on how technology affects instructional delivery and learning. Dr. Peter, Dr. Rose, and Dr. Bob indicated

that they use technology in line with their classroom instructional practices for teaching and assessments in the online doctoral program. However, Dr. Olivia, Dr. Abigail, and Dr. Aron incorporate technology into pedagogy, advocating for a student-centered approach to curriculum and instruction. Dr. Olivia remarked, "I also use Kaltura; I make a lot of videos instead of teaching face to face. Now we use teaching videos. And we can put that into the course." Dr. Aron believes the COVID pandemic has provided the opportunity to use more technology in curriculum and instruction, noting, "I think that the post COVID world has shifted that some of this kind of video call, it is a normal thing now. People getting comfortable with using the technology, knowing how to share your screen and a Teams call or things like that, that has really helped." Dr. Olivia shared her technological experience stating:

> I taught in K 12 schools for 32 years, before moving exclusively to the university level, did both at the same time for a while. And I had extensive training in using technology in public school, so I was very fortunate to work in a very forward-thinking county. And they provided us with excellent training in pedagogy for the teacher using the technology and provided opportunities for our students to use technology to learn.

Laura, Emma, Alex, and James agree that the curriculum that incorporates technology into the learning process is better for online doctoral students, especially if the technology provides opportunities for interactions with peers and professors. Emma shared an email of an interaction with a professor she approached with questions about her research work, who reminded her that she was a doctoral candidate and should be able to figure out how to do this research on her own without his guidance. The encounter with the professor made Emma reluctant to ask other professors for help in her studies and made her struggle through several courses on her own. Laura shared her view on the use of technology in the curriculum by stating, "I feel like it is

probably because of COVID, to be honest. But being able to connect with the whole class through Teams surely has been a big one for me".

Doctoral students strive to use technology to connect with the professors responsible for creating and delivering the curriculum because it helps to alleviate the fear of not doing well and makes the learning curve easier (Alex, Brianna, Gloria & Charles). Jane said, "it is very self-directed, and you are just kind of thrown in, and I remember that first semester. It was tricky. I was like, wait, so I just read the book and like, do the work. And that is how this works. And I, unfortunately, had statistics as one of my first classes. So, that was a steep learning curve for me." Another pertinent issue in delivering the curriculum using online technology is the expectation from the professors. Mary said:

> The hardest part was kind of finding the workflow, you know, teaching during the day. So, when am I going to do my homework? What about those weeks when you have a discussion board, a quiz and a paper and all that work piles up. So, kind of scheduling that out. And especially my daughter, my oldest child, was born when I was starting the dissertation phase.

Brianna felt that if the professors understood her world and her time and resources demands, they would be more empathetic towards her. In support of Brianna, Maria said, "I felt like I was really learning as I was going, without much help from the professors, you know, moving that theoretical knowledge into practical working knowledge."

Grace spoke about the rapid change from Blackboard to Canvas and the general expectation that students will adjust seamlessly. She said, "I am still trying to figure things out on Canvas, adding to my challenges." She shared a picture of Canvas inline comments from a professor she failed to respond to because inline comments were not available in Blackboard. On

the other hand, Laura was thrilled about the change from Blackboard to Canvas because she used the same learning platform as a teacher and was familiar with the tools in Canvas.

The curriculum and instruction at the dissertation phase of the program require careful negotiation between the chair and the doctoral student, which depends on establishing and maintaining a good connection using technology (Dr. Abigail, Dr. Olivia, Grace, Mary & James). While some professors explore technology at the dissertation phase to connect with their doctoral students (Dr. Olivia, Dr. Abigail, Dr. Rose, and Dr. Aron), the other professors (Dr. Bob and Dr. Peter) limit their technology use with doctoral students to emails and occasional phone calls. Dr. Abigail and Dr. Peter chair dissertation committees in very different ways in terms of how they use technology that could potentially affect the experiences of doctoral students. Dr. Abigail said:

> I am chairing, I think, seven or eight dissertations right now. And I meet with them regularly. So, we meet face to face on Teams, at least once a semester, usually two or three times to connect; I think emails are fantastic, and phone calls are great. However, there is something about seeing someone's face and getting that nonverbal communication that you cannot get in an email. I think it actually adds value for more transparency. Because when you ask me a question in an email, I have time to formulate my thoughts and put it all nice succinctly, and send it back to you.

Dr. Peter stated concerning technology use as a dissertation chair, "The plain old phone and email is just fine to work with students, I do not need to see their faces to be effective in chairing their research work." Dr. Rose shared her feeling that "there is something beneficial as understanding who the students are if you could look them in the eye and see them and they could understand you too. And that is why I feel like teleconferencing is an important dynamic,

we could do things, many times, we could do things on the phone, but I will say let me make an appointment on Teams." Dr. Olivia pointed out that "the faculty members who could be very successful in teaching doctoral studies online, are relational, good at explaining things, patient and willing to adjust their pedagogy." Doctoral students described their dissertation chairs as "facilitator, experts, leader, and mediator of the dissertation process." In the words of Mary, "the success of the dissertation rests on the ability of the student to connect with the chair and develop an engaging relationship." Regardless of the learning management system in use, the online doctoral students report that the more interactive the curriculum delivery, the better it is for learning. According to the students, any curriculum that incorporates technology for connectedness into learning is superior to a curriculum that lacks it.

Social Integration

Social integration encompasses interpersonal interactions, connectedness, and a sense of community with colleagues, faculty, and administrators at the doctoral level of training (Burns & Gillespie, 2018; Devos et al., 2016; Tinto, 1975, 1993). Professors and doctoral students cited the use of technology for social integration as an important factor for success in the online doctoral program. Gloria, drawing on her experience in the online learning environment, suggests that properly deployed technology has the propensity to promote social integration in the online doctoral program. Laura likens online studies without a robust social interaction among students and faculty to "a tree falling in the woods with no one around to hear the noise." Laura asserted that "people have to hear the noise for it to make a difference." Alexis, Grace, and Jane recalled that the technologies in their doctoral program were deployed to help students complete their academic work and did not assist with the provision of social presence nor deal with the feeling of social isolation.

Dr. Aron, recognizing the importance of using technology to foster social integration, tells his students, "You need to get on a social media platform and form a group where you can support each other with such things as having an issue with technology or questions in my class." He does his best to encourage his doctoral students to reach out to each other and provide needed support. However, he does not want to be part of a social media platform with students, stating, "I am not a fan of much what is going on in social media today. So, I no longer use social media sites for connecting with either students or faculty." Dr. Abigail, Dr. Rose, and Dr. Bob also acknowledged the importance of social presence in the online doctoral program but are equally hesitant to connect with their students through social media platforms continuously. Dr. Olivia shared some Facebook postings by students and spoke of uncomfortable chats with some of her doctoral students on Facebook that crossed the boundary between a teacher and student, making her stop using the social media platform to socialize with her students.

James, Alex, Alexis, and Grace expressed concern about the privacy of the university's social media platform. Grace suggested to her classmate in a particular course to move the class discussion from a Synergy email to a personal email because it felt safer. Grace explained the rationale this way:

> We were not bad-mouthing a professor, but we were like, a lot of us felt like the grading was really unfair, and that there was no, like, rhyme or reason. This instructor was not following the rubrics very well. Many of us who had done very well up to that point received D's and F's on assignments and had never had that happen. And it seems like we were all doing poorly. So, we were like, let us chat, let us get our personal emails, and let us chat about if we want to try and collect all this information and go to that professor or the school of education.

Maria would have liked to see technological applications such as wikis incorporated into the online courses to enhance student collaboration. Alex sums up the experience in the online doctoral program this way:

> You know, online education is not bad or worse than in person, but it is a different kind of thing, where if you are going to want to have a strong network of support, you have to be very intentional about supporting it with a social group like a Facebook group. You do not have an opportunity to share space with other people like in an in-person classroom. With fewer interactions, the network is just going to be weaker.

Calvin believed that the lack of sufficient social presence is responsible for students dropping out of courses after some weeks. Alexis supported Calvin's statement about the lack of social presence by stating, "I can tell you today, I do not know anybody in my doctoral program, I cannot even name one person whom I went through my program with." Jane, in an effort to connect with other students, shared what she tried to do:

> Every once in a while, I will go on to Yammer and ask a question. Usually, it is just course-related, not anything to do with life issues, just course questions. Something like, has anybody taken this class? Can you tell me what to expect? And so, I think you miss that connection.

The comments of the doctoral students and professors suggest that the university's technology policy is primarily focused on course delivery and not designed to foster social integration in the online doctoral program. The professors frequently pointed to the university's faculty handbook and departmental policies as their guild for student interactions. In contrast, none of the doctoral students have read the online student handbook from the university. During the focus group interviews, the doctoral students alluded to the fact that they would like to develop an

individualized relationship with their professors that helps them persist in their doctoral studies. The students have found community using various social media platforms, but many professors are reluctant to engage with students on social media. The university's social media platform is not trusted because of concern for privacy and confidentiality issues, and students choose to connect for social interactions on their own. Overall, students endorse the use of social media for social integration and a sense of community as they complete their online doctoral degrees.

Cohort

The main reason doctoral students gave for enrolling in the online doctoral program is the flexibility that promotes self-pacing and task completion with minimal disruption to work and family commitments. Despite the flexibility of the online doctoral program, Gloria, Emma, and James underlined the importance of having a cohort for academic and social support. Brianna attributed her success so far in the doctoral program to being part of a vibrant cohort, declaring, "my cohort is very important to me. I am on the journey with them. We get to bounce ideas off each other and support each other. And when I was about to jump off the cliff, they were there to pull me back." Maria echoed Brianna's outlook, stating:

> There are times when I say to myself, okay, I am done. And then someone in my cohort says, oh, no, you are not going to give up, giving me the extra push. We bounce ideas off each other, you know, being each other's sounding boards.

Professors confirmed that they regularly encourage doctoral students to be part of a cohort and not travel the doctoral journey alone. Dr. Abigail, Dr. Olivia, and Dr. Aron actively work on forming a cohort for their students at the dissertation phases, which in their opinion, is helpful for the doctoral students and professors. Alex shared several social media chat postings that have encouraged him on his doctoral journey, calling his social media doctoral group his "doctoral

family." In Alex's view, each cohort member has a distinct identity and brings different ideas and interests to the group. The cohort allows students to resolve many academic and social issues with their peers faster than they would have done with their professors (Dr. Abigail & Dr. Aron). Dr. Olivia's view of the importance of a cohort is succinctly captured in her words**:**

> Doctoral students are synthesizing their very own study; they are creating something new. We know that that is the most difficult thing to do, cognitively, is to create a truly new, anything, come up with something entirely new. So, having the support of people going through a similar journey is vital.

Gloria suggested making the doctoral program more interactive and collaborative, using technology to promote the collegial spirit of the program. Professors recognize the importance of having a cohort to travel with on the journey to completing an online doctoral program. Many professors facilitate the creation of cohorts among their doctoral students, emphasizing the benefit of shared burdens and problem solving as peers without involving faculty in every issue.

Technological Experience

Technology impacts online students' perception of success (Steele, 2018). Even though technology has been identified as a viable educational tool that can positively enhance the online learning experience (Hill & Conceição, 2019), some professors and doctoral students expressed discomfort using online technologies. Grace described herself as a "book person" who likes to learn rather than using technology to get a task done. Grace stated:

> I literally took that APA book and went through it during my first class because I was not familiar with APA. I was used to MLA. When I was doing my writing, I just looked it up if I did not know what to do. My mom, at the time I started my program, was working on another degree. And she told me about the Perla software, which I think is for

the APA system, and she was like, yeah, you can use Perla, and it will correct everything

for you. And honestly, I have seen it, but I never really felt compelled to, like, you know,

hit the button to try it.

Dr. Peter and Dr. Bob prefer to have only the essential technology necessary to carry out the

function of teaching online. They both see the pervasiveness of online technologies as a

distraction from the practice of education. Dr. Aron had a different view, stating:

It is one of those kinds of delicate balances of you needing certain competencies, but

sometimes you can strengthen those competencies or at least have a check and balance

system using the software. There is a level of English writing skill that I want students to

have, and hey, this technology is not a replacement for that competency. However, it can

strengthen and reinforce hopefully what is already there.

Emma, James, and Calvin are technologically savvy and believe that students should be

encouraged to use technology to assist their research work. During their dissertation phases, they

have used technology to search, retrieve and organize scholarly articles. James explained**:**

There is technology inequality in the online learning environment. And I will give an

example of what I mean. For example, you will discover that you have the APA in the

classes, so professors actually mark APA styles, and they leave comments for students.

So, you are meant to learn about the APA, right? But there are students using software to

do the APA formatting. So how will this inequality be taken care of"

Dr. Olivia raised the challenge that technology in online doctoral programs poses by stating,

"there is a right and wrong way to use technology. So, when we talk about the downside of

technology, I think more about how you can go online and find an assignment from my class that

someone has posted who has turned in this assignment before and just change the name and turn

it in. Those are kind of the downsides of technology that I see. The use of technology as supplemental is good, but just fully relying on it is, I do not think it is going to do you as much good in the future." Doctoral students (James, Emma, Laura, & Gloria) and professors (Dr. Abagail, Dr. Olivia, Dr. Rose, & Dr. Aron) who used technology extensively in their professional work came into the online doctoral program with a level of technological comfort that gave them the confidence to explore relevant technologies that are applicable to their courses.

Research Question Responses

The process of reviewing relevant literature in the field of doctoral persistence led to the development of the central research question, which is, "How do online doctoral students and professors utilize technology for a sense of community and connectedness?" The three sub-questions derived from the central question are: (SQ1) How do online doctoral students and professors choose technology for a sense of community and connectedness? (SQ2) How do prior technological challenges hinder online doctoral students and professors' sense of community and connectedness? and (SQ3) Why do online doctoral students and professors explore technological experiences, activities, and practices for a sense of community and connectedness? The four themes and three subthemes which emerged from the data analysis process provide answers to the central question and the other three sub-questions. The first theme, support, has two sub-themes- communication and feedback. The second theme is strategic curriculum and instruction, and the third theme is social integration, which has a subtheme, cohort. The fourth theme is technological experience, which is the only theme different from the predicted theme pattern.

Central Question

How do online doctoral students and professors utilize technology for a sense of community and connectedness? The data analysis of this case study gives significant insight into how technology is utilized for a sense of community and connectedness by doctoral students and professors. All the doctoral students and professors recruited for this case study assented to the importance of a sense of community and connectedness for a successful online doctoral program.

Support

The support from professors, administrative staff, family, friends, co-workers, and peers were identified as significant contributors to success in the online doctoral program by the professors and doctoral students. Despite acknowledging the crucial role of support, the doctoral students frequently spoke to the sense of loneliness and lack of community, especially in the dissertation phase of their doctoral program. The doctoral students confirm Richardson et al. (2017) finding that students can work through problems better in the online learning environment if they can develop a sense of comradeship with their peers. Alex felt isolated in the doctoral program, disconnected from his professors and peers that he decided to start two social media chat groups to mitigate the effects of his isolation. Alex said, "the doctoral program can become very isolating. And unless you are in it, you do not understand what it takes to be isolated. You know, I am delighted with the chat group, and it has been awesome so far." Emma, supporting Alex's view, said:

> The chat group has filled that isolation void. Because we are in the chat groups, we
> support each other, and we understand the journey of doctoral study. The support has
> been tremendous, and I feel like I am in the classroom some days.

Dr. Peter and Dr. Bob described online doctoral students as adult learners who should be self-directed and self-determined because of their professional responsibilities. Dr. Peter said, "I am concerned about bombarding people with information, and especially if what I say is like an extra communication, it can make somebody think differently about an assignment, so I have to be careful. Dr. Bob, in agreeing with Dr. Peter, said, "I make sure that the expectations of the assignment are absolutely in line with all of my communication because if I say too much, and then they are like, Oh, no, I have to redo that one, and these one and assignments are not completed on time."

Emma and Grace noted that professors sometimes feel that doctoral students should be able to work independently with little or no support. There was a strong emphasis on the need for the university to provide the online doctoral students with a supportive and collegial environment (Emma, Grace, Maria & Brianna). Calvin opined:

> Support from faculty helps keep things in proper perspective, assures that work is on track, and one has not gotten off into the deep end, and someone with authority in the field is making sure that the research work makes sense and is worth the effort and sacrifice.

Doctoral students frequently cited the timely support of professors and administrative staff of the university as having a positive influence on their ability to develop a sense of community and connectedness.

Response Time

Professors and doctoral students generally differ in their understanding of what constitutes timely and reasonable support. The type and level of support professors provide to doctoral students are affected by the university's policy and teaching contract. Dr. Bob and Dr.

Aron, adjunct faculty at the university, expressed their frustration at not being able to help their

doctoral students with issues such as obtaining permission to recruit study participants from the

university because they do not have working relationships with administrators. Dr. Abigail and

Dr. Olivia hold administrative and teaching positions at the university and are more equipped to

navigate the administrative realm of the university with their doctoral students. In discussing the

importance of response time, Dr. Peter said:

> I am quick to respond via email or Canvas message, and just letting them know, hey, I am
>
> here, and I am going to try and get back to you very quickly. Even if it is just to say, hey,
>
> I am not going to be able to give you a better response until you know, this evening.

Gloria and Laura spoke of how pleased they are when a professor or administrative staff at the

university acknowledges their email or voice message promptly. Laura indicated she "definitely

would prefer either a phone or a video call over email," especially to resolve time-sensitive

issues such as registration for classes. Laura and Gloria shared some lengthy email

communications they had with faculty and support staff at the university over issues they deemed

could have been quickly resolved over a phone call. Laura felt "a quick five-minute conversation

probably would have answered my questions, instead of sending like five back and forth emails."

James, Calvin, and Alexis consider professors and support staff that respond on time to their

inquiries as caring and interested in their success.

Empathy

Professors and doctoral students acknowledged the need for empathy in a doctoral

program and recognized the limitation of using technology to demonstrate empathy in the online

learning environment. Mary, reflecting on the significance of empathy in the doctoral program,

said:

I think it might have been the lit review for advanced research, and the professor had

online office hours. He posted it as a Teams link. And it was easy; you just jumped in,

and video chat and could ask him any questions like every Monday and Wednesday from

5 pm to 8 pm. I think maybe something like that, where I would have had the opportunity

to connect with my classmates over more than just a discussion board, would have been

helpful.

Gloria elaborated on some communications she received from professors and peers, which were
meant to convey empathy but sounded hollow. She stated:

It is very easy to quote scripture. And you know and put it out there. But I think for me,

to feel that scripture from someone saying it, you know, it is different. So, you can

always cut and paste the scripture, but when you are saying it from the heart, it is

different. So, I think from that, from that standpoint, it is there, but I do not feel it, you

know, it is kind of hard to explain. I do not feel it. It is like, okay, you know, it is there in

print. The most encouragement I have received has been put on some of the discussion

boards just with the other classmates. In the discussion boards, you may, you know, share

different experiences and so forth.

Accessibility

Professors and doctoral students use technology for accessibility, allowing them to

interact with each other more inclusively. Brianna talked about how accessible her dissertation

chair is and the effect it has on her studies. She indicated, "My chair, she is so accessible, and so

I mean, we can send her message, you get a response right back. And so that is wonderful." Dr.

Aron repeated Brianna's observation, saying, "availability is a big key. I like being able to offer

a Teams call for about one hour, those couple times to be able to see some faces and interact like

this because it is a very different kind of experience." Dr. Peter and Dr. Bob argued that there should be a boundary to doctoral students' access to professors to prevent burnout and abuse. Dr. Peter, in support of his stance on accessibility, said**:**

> I tell my doctoral students right off the bat, I am reachable primarily through emails, texts, and phone calls only if urgent. I will answer your questions as soon as possible but realize that I have other responsibilities and other doctoral students. I want to be helpful but do not want to be inundated with superfluous requests.

Sub-Question 1

How do online doctoral students and professors choose technology for a sense of community and connectedness? There are many published research works on the integration of technology into online education for academic purposes (French, 2017). Since research has shown that a sense of community and connectedness are vital contributors to online doctoral program success (Lenzi et al., 2017), there is a need to explore how technology can be deployed to promote these crucial success factors. The responses from doctoral students and professors point out that there are no logical, policy-driven methods for choosing technologies for a sense of community and connectedness in the online educational doctoral program at Synergy University. An interaction that James had with a professor elucidates this fact. He said:

> I asked my chair if we could work on my dissertation using a reference manager software that keeps things tidy and easy to follow, and he replied with a firm No. It is a case of no; you cannot use that technology, end of story.

In their experience in the doctoral program, Alex, Mary, and Gloria believe that the use of technology for a sense of community and connectedness depends on the professors and not a

school-wide policy, which is unfavorable to the doctoral students. Dr. Abigail affirmed their thought, stating:

> I prefer PowerPoint; I do not like Prezi. However, if a student likes it, and that is what they want to use, I am happy to watch it, but I do not want to sit down and watch six Prezi presentations at once. But I will definitely let them do it.

Laura considers doctoral students' ability to use technology for connectedness to be "contingent on the professor's approval and the more tech-savvy they are, the greater the chance for a doctoral student getting to choose the technology to use for a connection." Dr. Olivia, who deems herself as tech-savvy, in supporting Laura's opinion, recounted this episode with a student:

> I had one student emailed me, a former student who graduated like three years ago, email me, and she said, Dr. Olivia, I just wanted to ask you about this situation, what advice do you have? I have had them reach out to me and have stayed connected with me on social media stuff, whether it is either my personal Facebook page or my professional LinkedIn page.

Dr. Bob, in contrast to Dr. Olivia, stated:

> I probably am not, like the technology hog, that, you know, there are people who kind of have all of these apps and everything else like that. I probably use basic things. You know, I use, of course, I am reviewing their papers on Microsoft Word.

Overall, doctoral students would prefer to have more technology choices in the program to connect socially with professors and fellow students, while the professors are generally focused on using technology for academic purposes.

Sub-Question 2

How do technological challenges hinder online doctoral students' and professors' sense of community and connectedness? Internet and technological challenges emerged from the study data as critical factors that hinder online students' and professors' sense of community and connectedness. Doctoral students and professors frequently commented on the challenges of a lack of stable and reliable internet connectivity. For instance, Dr. Aron indicated:

> The other thing I have found is not everyone lives in an area where their internet is particularly good. So, some of us have challenges with students who live in rural areas. I have noticed that their internet is not reliable. One student lived in Alaska, literally up there, just far from everybody; her nearest neighbor is about 20 minutes away. When her internet is down, it could be sometimes days before it gets fixed, and there is very little she can do under that condition, unfortunately.

Similarly, Dr. Olivia remarked on students who are not digitally literate, stating:

> So, we have issues with the quality of our students' connection. From time to time, there are also those students who just, despite living in a digital age, still do not seem comfortable using technology. They have problems with simple tasks such as uploading things in Canvas, and I do not understand why that is difficult, but then I had been in a technology rich profession for a couple of decades, so you know, I am probably fortunate, and maybe some other people are not.

Emma, Gloria, and Alexis have jobs that require traveling. They have found themselves in places with a poor internet connection, which resulted in turning in their assignments late or canceling scheduled Teams meetings. Gloria spoke about feeling like a lazy student when she is forced to email to request an extension on her assignment because of poor internet connectivity. She summed up her sentiment with these words, "I do not know how many excuses I will ask for

before I am officially labeled a lazy student; it does feel exhausting at times." Brianna recalled

her technological challenges:

> I did not grow up in a rich neighborhood, and our public school did not invest much in
>
> technology. I did a lot of reading books and had few contacts with computers for
>
> education or games. I experience some level of fear when people assume I should be able
>
> to do all the technology stuff because I am a doctoral student. Hmm, not sure if it is fair
>
> or not, but training should be available for those that need it.

Charles and Alex alluded to the fact that technology challenges are a common source of

frustration for those of them in the developing world. Charles said, "The internet service provider

may not just work when you are time-bound to submit your assignments and the supply of

electricity power is also erratic." It has been difficult for Charles and Alex to explain the impact

of these technology challenges to their professors. Alex remembered a comment from one of his

professors, who said, "why did you decide to enroll in an online doctoral program with such

unpredictable technological infrastructure to support your study?" Professors and doctoral

students agree that the university needs to pay more attention to the technological challenges that

intending students have before offering them admission to the online doctoral program. Overall,

the technological challenges identified by the doctoral students are a result of the learning

platform, technological skill, and inadequate infrastructure.

Sub-Question 3

Why do online doctoral students and professors explore technological experiences,

activities, and practices for a sense of community and connectedness? The responses from the

professors and doctoral students indicate that they explore technological experiences, activities,

and practices for a sense of community and connectedness to enhance student motivation to

learn, increase collegiality, lessen the sense of isolation, and improve student performance. The doctoral students consider achieving a sense of community and connectedness crucial to their educational success because the online learning environment provides fewer opportunities to engage with the professors and administrative staff of the university. Jane, who lives in the same state where the university is located, said:

> I live close enough to the university, but I am fully online. So, the one thing that I can say that I do miss about course study, in general, is to be able to be on campus to build those relationships with my professors.

Jane's comment is repeated in different ways by several doctoral students, who desire more connection with the university system.

Dr. Abigail spoke of "engaging technological strategies to provide constructive learner experiences to foster active learning opportunities, using collaborative group work, students facilitated presentations and discussions." She has also created "course assignments with hands-on components and integrate case studies and reflections to promote a sense of community and connectedness." Maria explained the goal of exploring video technology for a sense of community, stating:

> I think online has been great for me. I have been able to speak with different professors, but I think it is different and another level when you can see and talk with your professors. I think video technology helps build a strong relationship, as you can observe many non-verbal clues. A good relationship with your professor could help career-wise in the future, and you might be able to publish together in the future, which would be nice if you intend to go into academia.

The professors stressed that deploying an effective technology strategy for connectedness in the online learning environment is fundamental to mitigating against learner isolation and dropout and increasing retention and graduation rate. The responses from the doctoral students indicated that their active and positive interaction with peers, course content, and professors helped them become more engaged in their studies. In summary, professors and doctoral students agree that intentionally exploring technology for connectedness and a sense of community will result in high-quality education, more effective learning outcomes, and greater doctoral persistence.

Summary

The purpose of this case study is to explore the perceptions and experiences of online doctoral students and professors' utilization of technology for doctoral persistence by developing a sense of community and connectedness. Many students expressed a desire for more significant support from faculty, especially during the lonelier phase of the dissertation. While the professors agreed that establishing support using available technology is vital for doctoral persistence, they put the responsibility of building the support on the student. Students proposed the use of phone services to promote support in addition to email services. Students and professors engaged in online doctoral programs agreed to the critical role of communication in a student's decision to persist in their program. For communication to work effectively for connectedness and to create a sense of community, it is critical to establish the rules and systems early in the doctoral program. Doctoral students could not identify the university administration's process or rationale for the existing communication policy and expressed the need for a more transparent and diversified communication system to support online doctoral students. The students affirmed that the professors' timely feedback is something they look forward to

receiving. The quicker and more targeted the feedback, the higher the likelihood of the student persisting in the online doctoral program.

Professors highlighted different approaches to their use of technology in curriculum delivery and instruction. Some incorporate technology into curriculum delivery and restrict their use of technology in classroom interactions. In contrast, others extend the use of technology beyond the classroom to promote connectedness between faculty and students. While online doctoral students expect a weaker network and social interaction with students and faculty, they cherish the social integration that social media has made possible for peer-to-peer interactions and interactions with faculty apart from curriculum delivery and instruction. The doctoral students eulogized the important role of their cohorts in their decision to persist in their doctoral studies. Professors support the use of technology in learning and education but are cautious of the undesirable overreliance on technology that could stifle individual creativity and innovation. The need for establishing checks and balances in the use of technology was emphasized by professors, focusing on technology in education as a supplement and not the centerpiece of educational experience.

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this single case study is to explore the perceptions and experiences of online doctoral students and professors in the utilization of technology for doctoral persistence by developing a sense of community and connectedness. Among the diverse factors that explain the high attrition rate in online doctoral programs is the lack of a systematic approach to the use of technology for active student engagement. This chapter presents the study's findings and discusses the findings and implications, considering the relevant literature and theory. This chapter also includes delimitations and limitations of the research study, recommendations for future research studies, and a summary.

Summary of Findings

The study participants were doctoral students at the dissertation phase and online professors at Synergy University. Individual semi-structured interviews, focus groups, and document analysis were utilized for data collection to provide insight into how online doctoral students and professors use technology for a sense of community and connectedness. The study explored the following sub-questions: how online students and professors choose technology for a sense of community, what prior technological challenges online students and professors have encountered, and why online students and professors search for technological experiences, activities, and practices for connectedness. Of the 19 participants recruited into the research study, six were online professors who chair or serve on doctoral dissertation committees, and 13 were adult online doctoral students at the dissertation phase of their program. All participants were from Synergy University, a recognized global leader in online education delivery, with

about 90,000 enrolled online students. The racial composition of the participants is reflective of the racial makeup of the university, which is close to the national average in the United States.

Using pattern matching logic methodology, analysis of the study data yielded four distinct themes: support, strategic curriculum and instruction, social integration, and technological experience. Two subthemes, communication, and feedback were extracted from the support theme, and one subtheme, cohort, emerged from the social integration theme. The extracted themes and sub-themes were researched using the participants' perceptions and experiences expressed during the interviews and focus groups and through shared personal documents. All the participants affirmed that creating a sense of community and connectedness is critical to completing an online doctoral program.

Central Research Question: How do online doctoral students and professors utilize technology for a sense of community and connectedness?

The collective perception of the participants is that online doctoral students who will persist in their studies would need significant support from professors, administrative staff, family, friends, co-workers, and peers. Even though doctoral students chose the online doctoral program because of its flexibility, many doctoral students reported feelings of loneliness and isolation because of the lack of meaningful interactions with other students and professors. The online doctoral students enrolled in the research study agree that having a robust support system which is imperative for their success, starts with using technology to establish beneficial connections with peers, professors, and administrative staff of the university. While the professors concur with the doctoral students that establishing a support system using available technologies is essential for doctoral persistence, their view is that it is the responsibility of the doctoral students to explore applicable technologies to build a helpful support system for

themselves. Many participants suggested that establishing a realistic support system for the doctoral students will require continuous communication between the doctoral students, faculty, and university administration to develop appropriate technological tools. There were diverse opinions among the participants regarding the rules that govern the use of technology for communication to develop a sense of community and connectedness. The university's policy handbooks for faculty and students specify how communication between professors and students should be handled educationally but not socially.

The participants alluded that it is critical to have an established diversified communication system that caters to the educational and social interactions between doctoral students and professors. Online professors recognized the crucial role of timely, specific, and constructive feedback in motivating students to persist in the online doctoral program. The doctoral students affirmed that the professors' timely feedback invigorates them. The quicker and more detailed the feedback is, the more likely the student will develop a strong sense of community and connectedness. Professors highlighted the different approaches to their use of technology in curriculum delivery and instruction. While all the professors incorporate technology into curriculum delivery to a different degree, some of the professors restrict the use of technology in their interactions with students, especially video technology, which they consider too intrusive. Regardless of the learning management system, the online doctoral students reported that interactive curriculum delivery enhances the learning experience and suggested that curriculum and instruction should incorporate video interactive technologies into the online doctoral setting.

Sub-Question 1: How do online doctoral students and professors choose technology for a sense of community and connectedness?

The response from the participants indicates that there is no logical, evidence-based, and policy-driven method for choosing technology to use for a sense of community and connectedness in the online doctoral educational program at Synergy University. The professors' choice of technology is influenced by their educational background and prior technological experiences, with the older professors more resistant to exploring new technologies for connectedness. Prior technological experiences of the doctoral students influenced their utilization of technology in their online program. However, unlike the older professors, the students are more adventurous in exploring new technologies that they consider beneficial to their studies.

Professors' and doctoral students' experiences with diverse technology vary widely. When there is a difference in the choice of technology for connectedness, some doctoral students expressed a sense of powerlessness in advocating a particular technology choice. Some of the doctoral students opined that the use of technology for a sense of community and connectedness is highly dependent on the individual professor, which the institution does not regulate. According to several doctoral students and two professors, the lack of regulation puts the doctoral students at a disadvantage in searching for a sense of community and connectedness, especially with their professors.

Sub-Question 2: How do prior technological challenges hinder online doctoral students' and professors' sense of community and connectedness?

Some doctoral students and professors expressed discomfort with the proliferation of technologies in the online doctoral program for connectedness, preferring to use only the essential technologies necessary to carry out the function of teaching in the online environment because of the possibility of the technologies distracting from the practice of education.

However, the professors and doctoral students who described themselves as being technologically savvy, with many years of experience in using technology for educational purposes, would like to see the deployment of relevant, innovative technologies to help the students in their doctoral studies. Doctoral students and professors commented on the challenges of a lack of stable and reliable internet connectivity, which affects some doctoral students from connecting with peers and professors. Three doctoral students live in countries with internet connectivity challenges, which significantly affect their ability to complete their assigned work on time and make interactions such as video conferencing impossible.

Sub-Question 3: Why do online doctoral students and professors explore technological experiences, activities, and practices for a sense of community?

The professors and doctoral students indicated that they explore technological experiences, activities, and practices for a sense of community and connectedness to enrich collegiality, create a productive learning environment, reduce the sense of isolation, and improve academic performance. The professors emphasized that utilizing an effective technology strategy for connectedness is vital to minimizing students' isolation and dropout and increasing retention and graduation rate in the online learning environment. The doctoral students believe attaining a sense of community and connectedness is essential to their educational success because of the few opportunities to engage with the professors and administrative staff of the university in the online learning environment. The responses from the doctoral students indicated that their active and positive interaction with peers, course content, and professors helped them become more engaged in their studies, thereby increasing their ability to persist.

Discussion

This section discusses the study findings and their relationship to the theoretical and empirical framework that undergirds the research. Through the discussion, the researcher reports how the study findings corroborate existing research, areas where the study varies from past research, what new contribution the study adds, and how the study provides new insight into the theory that formed the basis for the study.

Theoretical Framework

This qualitative case study exploring the perceptions and experiences of online doctoral students and professors' utilization of technology for doctoral persistence by developing a sense of community and connectedness is based primarily on Tinto's (1975) theory. Other derivative theories that support the study of personal and institutional changes, such as technology, which affect online doctoral students' persistence (French, 2017; Rockinson-Szapkiw et al., 2016; Savage et al., 2019) contributed to the framework of this study.

Tinto's (1975) theory is the most applicable theoretical framework for this research study because it provides a well-researched, dynamic student persistence model. This study explored social integration issues, including students' interpersonal interactions, connectedness, and a sense of community with colleagues, faculty, and administrators at the doctoral level of training in the online learning environment.

The findings of this study corroborate Tinto's (1975) discovery that a student's ability to integrate on a social and academic basis in an institution determines their level of persistence. The professors and doctoral students stated that the use of technology for social integration was an essential factor for success in the online doctoral program. Spaulding and Rockinson-Szapkiw (2012) described social integration as connectedness with diverse groups, including peers,

faculty, and advisors, which provides doctoral students the sense of belonging, drive, and knowledge base needed to advance through the program, specifically the dissertation phase (Weidman et al., 2001). One of the participants opined that the lack of sufficient social presence is responsible for students dropping out of courses after some weeks. Furthermore, another participant likens the online doctoral studies without a robust social interaction among students and faculty to "a tree falling in the woods with no one around to hear the noise."

Even though all the doctoral students enrolled in this study cited flexibility as a primary reason for enrolling in the online doctoral program, they decried the lack of sufficient social interaction with peers and faculty. Some of the doctoral programs only had their first video conferencing interaction with a professor when they moved into the dissertation phase of their study. To the surprise of some doctoral students, their suggestions of a video call through Microsoft Teams software with their dissertation committee were rejected. Two of the doctoral students who actively promoted social media platforms to foster social engagement among students and professors narrated the resistance they encountered from some professors, who view the use of social media for social engagement in the online doctoral program as counterproductive. One of the professors recounted her effort to socialize with her doctoral students on a social media platform, resulting in blurring the lines between students and instructors. However, four professors out of six enrolled in the study stated that they are reluctant to engage with students on social media because the platform interactions are not regulated and, therefore, subject to abuse.

The University's social media platform, which three professors subscribe to, is not trusted by all the doctoral students because of privacy and confidentiality concerns. Overall, students endorse the use of social media for social integration and a sense of community as they complete

their online doctoral degrees but find it challenging to convince their professors to participate actively. The doctoral students have found community using various social media platforms, but the professors are not as willing to interact with their students on social media for non-educational purposes.

Tinto (1975) extended Van Gennep's concepts into higher education by explaining the need for students to learn their way through the educational institution of higher learning to assimilate into their unique environment. This research study suggests that online doctoral students explore technologies to understand and integrate into Synergy University's culture. The University's policy handbook for students and professors addresses the academic uses of technologies, with no substantive guide for how professors and doctoral students should use technology to connect socially. The doctoral students have unique experiences using technology for connectedness with professors and peers. Some students note that the use of technology for a sense of community and connectedness at Synergy University is personalized to each professor.

Pascarella and Terenzini (1980) developed a student intent and persistence theory built upon Bean's (1980) work on social and academic integration. Pascarella and Terenzini's student involvement theory examined students' perspectives on their interactions with faculty and peers. Furthermore, their theory investigated the direct and indirect effects of student involvement and interaction on higher education outcomes. The theory stated that the amount of time that students spent with faculty in and out of the classroom greatly influenced their persistence.

Some of the findings in this explorative case study support Pascarella and Terenzini's (1980) student involvement theory. The doctoral students and professors affirmed that the use of technology for connectedness and a sense of community promotes mutual understanding between the students and the professors. Even though the doctoral students have varying

experience levels, from decades of work experience to minimal work experience, they all affirmed the desire to be treated as potential colleagues throughout their doctoral training, not only at the dissertation phase. Doctoral students expressed diverse reasons for enrolling in an online doctoral program; therefore, their need for support varies significantly. Some doctoral students are in the online doctoral program for career advancement requirements, while others seek personal fulfillment, a career switch, or an interest in research. For doctoral students interested in future research in their area of doctoral studies, developing an ongoing relationship is crucial, and a strong sense of community and connectedness with their professors will enhance their development. The earlier in their program that they receive recognition from professors as colleagues, the higher their likelihood to persist. Other doctoral students who have no plans for long-term engagement with their professors have less need for a sense of community beyond the doctoral program.

Technology provides a unique opportunity for building a sense of community and connectedness that will become foundational for a lasting relationship between the professors and the doctoral students. The broad spectrum of online doctoral student experiences and expectations make it imperative to develop technological strategy that will optimize the use of technology for connectedness and a sense of community. Synergy University does not test or provide a technology readiness program for incoming online doctoral students to ascertain their ability to fully take advantage of the technologies deployed in the school's online learning environment. Online doctoral students with minimal technological capabilities often struggle to access resources for academic work such as Blackboard and Canvas. They are also often unable to utilize technology to create a sense of connectedness and community with their professors and peers.

Additionally, some students are ashamed to own up to their technological constraints, further encumbering their ability to connect with others and build a sense of community using technology. Moreover, the technology that Synergy University provides focuses primarily on academic activities. The optional technological tools available for social integration at the university are not integrated into courses or core curricular activities. As a result, professors are not obligated to use the non-required technological tools, and most professors do not use the technological tools to foster social interactions with doctoral students. Doctoral students lack the authority to demand the use of the optional technological tools even when they are beneficial to their learning experience. Furthermore, students cannot incorporate the optional technological tools into their educational activities because they lack institutional support and commitment.

These observations align with Paudyal (2020) and Schneider's (2018) postulate that technology literacy is a requisite for 21st-century college students. Their work highlighted the number of resources spent on educational technological tools, which has yielded a viable way to support several learning environments.

Empirical Framework

The third stage of the doctoral program is the period of consolidation when research ideas conceptualize (Corcelles et al., 2019; Gardner, 2010; Sverdlik et al., 2018). The institution's commitment is established at this phase, especially after the students have completed their comprehensive examination and advanced to candidacy (Corcelles et al., 2019). Doctoral students in this stage are expected to take the lead in cultivating good relationships with faculty members, strengthen their core competencies and display an unwavering commitment to their research (Corcelles et al., 2019; Gardner, 2010).

Online professors and doctoral students observed that Synergy University's commitment to developing a sense of community and connectedness in the online doctoral program is unsatisfactory. The doctoral students viewed a delay in response to communication as a lack of concern. The doctoral students felt that the professors and the school administration were not prioritizing their needs. The students also perceive that the professors cannot respond to their communications quickly because of their heavy workloads, hindering their meaningful engagement with the doctoral students. Some doctoral students reported that even when they attempted to involve their professors in important professional and personal growth activities, they met with resistance and a lack of willingness to engage outside of education or curricular activities.

The professors reported that Synergy University has no written policy on using technology for a sense of community, placing the responsibility on the doctoral students to create a sense of community and connectedness with faculty and peers. Also, online courses at Synergy University are not designed to foster connectedness. For example, there are no group projects or research publication opportunities with professors built into the online doctoral program. Two doctoral students suggested offering opportunities to work on publications with professors or as teaching or graduate assistants, creating an opportunity for a sense of community and connectedness.

The greatest obstacle in the consolidation stage for doctoral students is forming relationships with experts in their chosen field of research. Most times, failure at this stage is severe, resulting in a student's inability to complete the doctoral program (Corcelles et al., 2019; Sverdlik et al., 2018). Students identified helpful, specific, and well-timed feedback from

instructors as a critical factor in promoting doctoral persistence (Mulliner & Tucker, 2017;

Thompson et al., 2018).

The professors and doctoral students recognized a challenge in selecting a dissertation

committee. Many doctoral students end up with dissertation committees that require a lengthy

period of developing a sense of community and connectedness with professors with whom they

have no prior relationship. Doctoral students noted that the department assigned most

dissertation committee members to students without consideration for social integration factors.

The dissertation committee process did not account for pre-existing faculty-student relationships.

Consequently, the students could not form committees with the professors from their previous

classes with whom they had formed relationships. The period it takes to build new relationships

from scratch contributes to the delayed completion of the doctoral program.

Additionally, students do not know which professor can serve on dissertation committees.

They felt disappointed that after successfully cultivating a relationship and connection with a

professor, they discovered that he or she was unavailable to serve on their committee. Doctoral

students felt that they were not allowed to negotiate a sense of community with faculty because

the technology for communication mainly depended on the professors and the school's policy.

The findings of this explorative research case study support Weidman et al.'s (2001)

socialization definition as a process of development that transports the student progressively

through the socialization process toward the ultimate goal of professionalization. The professors

opined that their goal of the online doctoral program is to produce competent researchers who

esteem the principles of Synergy University in their work and life. Some of the doctoral students

agree in principle with the stated objective, noting that the principles of the University espouse

are one of the reasons they choose the online doctoral program, in addition to its self-paced

flexible structure. However, the doctoral students reported that the process of development through socialization is missing in their program. In the overall view of the doctoral students, there needs to be a strategic plan for students, professors, and school administration to work out students' interpersonal interaction with faculty and colleagues, incorporating other aspects of development separate from academic activities.

<div align="center">**Implications**</div>

This section focuses on the empirical, theoretical, and practical implications of the study findings, with recommendations for addressing the issues identified in the study.

Practical Implications

A university's design to use technology to support online doctoral students is fundamental to developing a collective culture of responsibility and commitment in the school (Lim et al., 2019). Technology tools promote collaboration in research and scholarly activities and enhance communication between students and professors (Lim et al., 2019). McGuinness and Fulton (2019) described the apprehensions of using technology in online higher education. Additionally, their study revealed that educational institutions' adoption of suitable technologies facilitates student learning experiences and promotes creativity and teamwork. From a practical perspective, this study's findings reveal that Synergy University does not appear to have a strategy that promotes the use of technology for a sense of community and connectedness for its online doctoral students. There appears to be no cohesion between the university's leadership, professors, and online doctoral students regarding using technology for a sense of community and connectedness.

This study suggests that Synergy University should explore incorporating wikis into the online learning environment to promote peer-to-peer collaboration among students. The use of

wikis in OLE has been linked to improved cognitive skills and increased learning outcomes (Reinhardt, 2019). Luo and Chea (2020) also demonstrated that integrating wikis in OLEs could promote learner collaboration and interactivity while diminishing feelings of social isolation. Wikis could also be used for teacher-to-student and student-to-student feedback (Reinhardt, 2019).

Professors and doctoral students at Synergy University face substantial challenges in accepting responsibilities for technology's role in fostering social interactions in the online doctoral program. The landscape of technology and social interactions is constantly changing, posing a considerable challenge to the ability of professors and students to predict the effects of using technology for social interactions in OLEs. Therefore, this study recommends that Synergy University develop ethical guidelines for designing, developing, and deploying technology to promote connectedness and a sense of community among online doctoral students.

Empirical Implications

This research study's findings will help university administrative leadership, professors, and students identify the perceived drawbacks and benefits of using technology in the online doctoral program. Overwhelmingly, higher education students have adopted the daily use of technology in various aspects of their lives, leading to the assumption that incorporating select technologies into the online learning environment could promote sustainable online doctoral education. The extensive utilization of online resources in higher education calls for further exploration into technology's role in student-student and student-teacher interactions.

Steele (2018) revealed that students' feedback on teachers who used social media was positive. Those teachers were perceived as caring and attuned to students' issues, making them more trustworthy. The online professors at Synergy University were resistant to using social

media because of ethical concerns and potential adverse effects on learning. The findings from this research study could serve as a basis to further explore the ethics of using technology for a sense of community and connectedness in online doctoral education.

Theoretical Implications

Extensive research describes the factors contributing to doctoral persistence in the online learning environment based on doctoral attrition, retention, and connectedness theories. However, there is no similar framework designed to understand the role of technology in online doctoral persistence. Furthermore, most of the published literature on doctoral persistence builds on Tinto's model, which elaborates on the academic and social factors. However, it offers minimal insight into technology's role (Rockinson-Szapkiw et al., 2016) in doctoral persistence. Although more recent research has identified technology as a crucial factor in online doctoral persistence (Hill & Conceição, 2019; Lim et al., 2019; Rockinson-Szapkiw et al., 2016), a qualitative study that investigates the role of technology in online doctoral persistence does not exist. Specifically, examining the process schools adopt in their choice and implementation of technology tools for social integration in online doctoral programs will provide needed insight into technology's role in doctoral persistence in the online learning environment.

This research fills a gap in the literature by providing valuable insight into how universities choose and implement technology for academic and social integration in the online doctoral learning environment. This research study indicates that universities might be implementing technology in the online learning environment primarily for educational purposes, neglecting the social aspect required for online doctoral students to persist in their studies.

Delimitations and Limitations

There are intentional decisions made to define the boundaries of this research study. The research case study participants were selected from doctoral students in their dissertation phase and online professors at Synergy University's School of Education. The first delimitation of this research study is that the 13 online doctoral students and six professors enrolled in the study are not sufficient for the generalizability of the study's findings. Creswell and Poth's (2018) proposal to use a range of ten to twenty participants for an explorative case study supports the choice of 19 participants for this study. The participants were purposefully sampled, a non-probability sampling method that is very effective for studies of a particular domain with participants that have extensive experience. The selected information-rich participants had prior experience using various technologies in the online doctoral program to pursue a sense of community and connectedness. The experiences and perceptions of the study participants provided useful insight into how online doctoral students and professors use technology for a sense of community and connectedness. The research questions for the participant's interviews and focus group interviews are purposefully focused on exploring how technology is used for a sense of community and connectedness. The choice of research questions is another delimitation because the research study focused on exploring the use of technology by online doctoral students and professors to pursue a sense of community and connectedness, excluding several other means that online doctoral students and professors use for connectedness.

The first limitation of the research study is that its detailed description of the experiences and perceptions of online doctoral students and professors is limited to Synergy University; therefore, the findings of this study cannot be generalized. The decision to select study

participants from one university is appropriate for this explorative case study to gain valuable

insight into the participants' perceptions and experiences.

Another limitation of this research study is the data collection process. The fulcrum of

this qualitative case study is contingent on the availability and truthfulness of the online doctoral

students and professors. This qualitative explorative case study data were collected

systematically using document analysis, semi-structured interviews, and focus groups. Some

participants could not participate in the focus group interviews due to conflicting schedules,

which means their reported experiences and perceptions could not be validated or challenged in a

focus group setting. However, the biases of the study participants were minimized using

triangulation, which ascertains that study data is trustworthy, reliable, and valid.

<div align="center">**Recommendation for Future Research**</div>

In light of this research study's findings, delimitations, and limitations, this section

provides several recommendations for future research studies exploring the use of technology for

a sense of community and connectedness in the online doctoral program. There are few research

studies on how a sense of community and connectedness in the online doctoral program helps

students persist; therefore, future researchers should foremost seek to validate and corroborate

the findings of this study with different participants and online school settings. Furthermore, a

quantitative study with a larger sample size to achieve generalization of findings will

significantly contribute to the body of research in online doctoral persistence. This study selected

doctoral students in their dissertation phase because prior research studies regard it as the most

challenging period in the doctoral program. Future research should aim to enroll doctoral

students at different stages of their online studies to explore their perceptions and experiences.

Synergy University's policy handbooks for faculty and students contained references to the use

of technologies for only academic purposes. Additionally, it will be worthwhile to research how universities develop technological policies to support a sense of community and connectedness in the online doctoral program.

Summary

This qualitative explorative case study provides insights into how online doctoral students and professors explore technology for connectedness and a sense of community at Synergy University. This explorative case study is significant because there is limited published research on the role of technology in doctoral students' sense of community and connectedness in the online learning environment. The findings from this research study indicate that universities' development of appropriate technology policies and strategies can enhance online doctoral students' sense of community and connectedness, possibly leading to a reduced attrition rate and increased academic performance. The findings of this research study sought to draw attention to the potential tension between formal and informal technology use in online doctoral programs for a sense of community. The study concludes that higher institutions might face challenges in their bid to merge technology for social media into online curricular activities to achieve connectedness. In the online learning environment, the effective use of technology is imperative for students to integrate academically and socially and persist.

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APPENDIX A: RECRUITMENT LETTER FOR STUDENT PARTICIPANTS

Dear Doctoral Student:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of my Doctor of Philosophy degree requirements. The purpose of this qualitative case study research is to explore how online doctoral students and online professors utilize technology for a sense of community and connectedness, and I am writing to invite you to participate in my study.

Doctoral students who wish to participate in this research must be 18 years of age or older, in the dissertation phase of their online doctoral program in education, and have experience using various technologies for a sense of community and connectedness. Participants, if willing, will be asked to provide documents on technologies used for a sense of community and connectedness, participate in an individual interview and a focus group, and review and provide feedback on the study's findings to ensure the accuracy of the information. The submission of documents related to your use of technologies will be completed during the interview and should take approximately five minutes. The interview, the focus group participation, and feedback should take approximately one hour each to complete. Your name and other identifying information will be requested as part of this study, but the information will remain confidential.

To participate, please contact me by email at fojuola@liberty.edu for more information. A consent document is attached to this email. The consent document contains additional information about my research. If you choose to participate, you will need to sign the consent document and return it to me at the time of the interview.

I appreciate your consideration to participate in this study. I look forward to learning about your experience using technology for a sense of community and connectedness in the doctoral online learning environment.

Sincerely,

Folarinwa Ojuola
Doctoral Candidate
240-374-2069/ fojuola@liberty.edu

APPENDIX B: RECRUITMENT LETTER FOR PROFESSOR PARTICIPANTS

Dear Professor:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of my Doctor of Philosophy degree requirements. The purpose of this qualitative case study research is to explore how online doctoral students and online professors utilize technology for a sense of community and connectedness, and I am writing to invite you to participate in my study.

To participate in this research, you must be a professor who teaches for the online doctoral program at Liberty University and have experience serving on a dissertation committee and using various technologies for a sense of community and connectedness. Participants, if willing, will be asked to provide documents on technologies used for a sense of community and connectedness, participate in an individual interview and a focus group, and review and provide feedback on the study's findings to ensure the accuracy of the information. The submission of documents related to your use of technologies will be completed during the interview and should take approximately five minutes. The interviews, the focus group participation, and feedback should take approximately one hour each to complete. Your name and other identifying information will be requested as part of this study, but the information will remain confidential.

To participate, please contact me by email at fojuola@liberty.edu for more information. A consent document is attached to this email. The consent document contains additional information about my research. If you choose to participate, you will need to sign the consent document and return it to me at the time of the interview.

I appreciate your consideration to participate in this study. I look forward to learning about your experience using technology for a sense of community and connectedness in the doctoral online learning environment.

Sincerely,
Folarinwa Ojuola
Doctoral Candidate
240-374-2069/fojuola@liberty.edu

APPENDIX C: INFORMED CONSENT FORM FOR STUDENTS
Consent

Title of the Project: A Case Study Exploring the Role of Technology in Online Doctoral Persistence
Principal Investigator: Folarinwa Ojuola, Liberty University, School of Education

Invitation to be Part of a Research Study

You are invited to participate in a research study exploring the role of technology in online doctoral persistence. You were selected as a possible participant because you are 18 years of age or older, at the dissertation phase of your online doctoral program in education, and have experience using various technologies for a sense of community and connectedness. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the study about and why is it being done?

The purpose of the study is to explore the perceptions and experiences of online doctoral students and online professors' utilization of technology for doctoral persistence.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following things:

1. Participate in an individual interview with the researcher. The interview will last for approximately one hour and will take place at a mutually agreed time and over an online conferencing platform, which will be audio and video recorded.
2. Provide electronic copy of personal documents, physical evidence, or public record that represent your experience with the use of technology during your doctoral program to the interview. These documents or items may include social media posts, emails, blogs, software programs, handbooks, training manuals, course papers, or journals. (5 minutes).
3. Participate in a focus group with the researcher and other selected study participants. The focus group will last for approximately one hour and will take place over an online conferencing platform at an agreed time, which will be audio and video recorded.
4. Review and provide feedback on the researcher's findings to ensure accuracy of the information, which is estimated to take one hour to complete.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society might include identifying the benefits (if any) of the use of various technologies for online doctoral students, noting the possible impact on the development of online doctoral program curriculum, and assisting prospective doctoral students who might be considering online doctoral studies.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records.

I may share the data from this research study for future research studies or other researchers. If any data from this study is shared, all information that could identify you, if applicable, will be removed before the data is transmitted.

- Participants and institutions attended will be assigned pseudonyms to protect their identity. Interviews will be conducted online from a secure location where other people will not easily overhear the conversation.
- Data will be stored on a password-protected computer for 3 years and may be used for future presentations with appropriate permission. The data will then be permanently erased from the computer per federal regulation.
- Interviews and the focus group sessions will be audio- and video-recorded and transcribed. The recordings will be stored on a password-protected computer for 3 years, after which they will be completely erased. Only the researcher will have access to the stored recordings of the interviews and focus groups.
- Although the focus group sessions will take place in a private online setting, and participants will be advised that the information shared during the focus group is confidential, I cannot assure participants that other participants will not share the information from the focus group session with other people outside the group.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please contact the researcher at the email address included in the next paragraph. Should you choose to withdraw, data collected from you, apart from focus group data, will be destroyed immediately and will not be included in this study. Focus group data will not be destroyed, but your contributions to the focus group will not be included in the study if you choose to withdraw.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Folarinwa Ojuola. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact the researcher at fojuola@liberty.edu. You may also contact the researcher's faculty sponsor, Dr. Laura Jones, at lejones2@liberty.edu.

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

By clicking on the button at the end of this document, you are agreeing to be in this study. Make sure you understand what the study is about before you click the button. You will be given a copy of this document for your records. The researcher will keep a copy with the study records. If you have any questions about the study after you click the button, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

☐ The researcher has my permission to audio-record/video-record me as part of my participation in this study.

_____   _____

Printed Subject Name   Signature & Date

APPENDIX D: INFORMED CONSENT FORM FOR PROFESSORS
Consent

Title of the Project: A Case Study Exploring the Role of Technology in Online Doctoral Persistence
Principal Investigator: Folarinwa Ojuola, Liberty University, School of Education

Invitation to be Part of a Research Study

You are invited to participate in a research study exploring the role of technology in online doctoral persistence. You were selected as a possible participant because you are a professor who teaches for the online doctoral program at Liberty University and have experience serving on a dissertation committee and using various technologies for a sense of community and connectedness. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the study about and why is it being done?

The purpose of the study is to explore the perceptions and experiences of online doctoral students' and online professors' utilization of technology for doctoral persistence.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following things:

5. Participate in an individual interview with the researcher. The interview will last for approximately one hour and will take place at a mutually agreed time and over an online conferencing platform, which will be audio and video recorded.
6. Provide electronic copy of personal documents, physical evidence, or public record that represent your experience with the use of technology during your doctoral program to the interview. These documents or items may include social media posts, emails, blogs, software programs, handbooks, training manuals, course papers, or journals. (5 minutes)
7. Participate in a focus group with the researcher and other selected study participants. The focus group will last for approximately one hour and will take place over an online conferencing platform at an agreed time, which will be audio and video recorded.
8. Review and provide feedback on the researcher's findings to ensure accuracy of the information, which is estimated to take one hour to complete.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society might include identifying the benefits (if any) of the use of various technologies for online doctoral students, noting the possible impact on the development of online doctoral program curriculum, and assisting prospective doctoral students who might be considering online doctoral studies.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. I may share the data from this research study for future research studies or other researchers. If any data from this study is shared, all information that could identify you, if applicable, will be removed before the data is transmitted.

- Participants and institutions attended will be assigned pseudonyms to protect their identity. Interviews will be conducted online from a secure location where other people will not easily overhear the conversation.
- Data will be stored on a password-protected computer for 3 years and may be used for future presentations with appropriate permission. The data will then be permanently erased from the computer per federal regulation.
- Interviews and the focus group sessions will be audio- and video-recorded and transcribed. The recordings will be stored on a password-protected computer for 3 years, after which they will be completely erased. Only the researcher will have access to the stored recordings of the interviews and focus groups.
- Although the focus group sessions will take place in a private online setting, and participants will be advised that the information shared during the focus group is confidential, I cannot assure participants that other participants will not share the information from the focus group session with other people outside the group.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please contact the researcher at the email address included in the next paragraph. Should you choose to withdraw, data collected from you, apart from focus group data, will be destroyed immediately and will not be included in this study. Focus group data will not be destroyed, but your contributions to the focus group will not be included in the study if you choose to withdraw.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Folarinwa Ojuola. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact the researcher at fojuola@liberty.edu. You may also contact the researcher's faculty sponsor, Dr. Laura Jones, at lejones2@liberty.edu.

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

By clicking on the button at the end of this document, you are agreeing to be in this study. Make sure you understand what the study is about before you click the button. You will be given a copy of this document for your records. The researcher will keep a copy with the study records. If you have any questions about the study after you click the button, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

☐ The researcher has my permission to audio-record/video-record me as part of my participation in this study.

_____   _____

Printed Subject Name   Signature & Date

APPENDIX E: IRB APPROVAL LETTER

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

August 9, 2021

Folarinwa Ojuola
Laura Jones

Re: IRB Exemption - IRB-FY20-21-993 A Case Study Exploring The Role of Technology in Online Doctoral Persistence

Dear Folarinwa Ojuola, Laura Jones,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 2.(iii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,
G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office