

THE IMPACT OF KNOWLEDGE SHARING AMONG
DOCTORAL STUDENTS ON RESEARCH SELF-
EFFICACY

By

JULIE SWARINGIM-GRIFFIN

Bachelor of Science in Human Development and Family Science
Oklahoma State University
Stillwater, OK
2013

Master of Science in Human Development and Family Science-Gerontology
Oklahoma State University
Stillwater, OK
2016

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the degree of
DOCTOR OF PHILOSOPHY
May 2022

THE IMPACT OF KNOWLEDGE SHARING AMONG
DOCTORAL STUDENTS ON RESEARCH
SELF-EFFICACY

Dissertation Approved:

Dr. Jane S. Vogler

Dissertation Adviser

Dr. Mike Yough

Dr. Jam Khojasteh

Dr. Amber Manning-Ouellette

Acknowledgements

I would like to thank the many people who have contributed to my academic journey throughout the years.

First, I would like to thank my dissertation committee for being supportive, providing advice, and being amazing mentors throughout this process. Thank you, Dr. Vogler, Dr. Yough, Dr. Khojesteh, and Dr. Manning-Ouellette.

Second, I would like to thank the educators who have helped me along the way. Dr. Jane Vogler, thank you for teaching me how to be a better writer, researcher, and Educational Psychologist. Dr. Charles Hendrix, thank you for showing me support since my undergraduate years. Your belief in me has made a significant impact in my life. To Mary Cole, my high school Psychology teacher, thank you for instilling in me the love for learning about psychology.

Third, I would like to thank my amazing doctoral student friends Kristi, Christina, Thomas, and Jati for your advice, laughs, and overall support. You all are the best!

Fourth, thank you to my parents. You all have always believed in me and encouraged me throughout the entirety of my life. I am forever grateful for everything you have done for me over the years.

Finally, I owe a world of thanks for the unwavering support my husband has displayed throughout my entire education. Thank you for cheering me on and providing me with motivation as I complete this amazing chapter of my life. I am beyond thankful for you!

Name: JULIE SWARINGIM-GRIFFIN

Date of Degree: MAY 2022

Title of Study: THE IMPACT OF KNOWLEDGE SHARING AMONG DOCTORAL
STUDENTS ON RESEARCH SELF-EFFICACY

Major Field: EDUCATIONAL PSYCHOLOGY

Abstract: Doctoral programs experience low attrition rates and with keeping this in mind, it is important to address the challenges and barriers preventing students from reaching their academic goals. The purpose of this study is to investigate knowledge sharing behaviors and types of knowledge being shared among doctoral students and whether this process predicts research self-efficacy. The Social Cognitive Theory is used as the framework for this study with a focus on research self-efficacy. The results provide insight on how internal processes (emotion and cognition), environmental influences (research climate), and behaviors can impact knowledge sharing in doctoral programs.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION TO THE STUDY.....	1
Statement of the Problem.....	3
Significance of the Study	5
Purpose of the Study	6
Research Questions.....	7
Definitions of Terms	7
Assumptions.....	8
Limitations	8
Delimitations.....	9
Conclusion	9
II. REVIEW OF THE LITERATURE.....	10
Doctoral Studies.....	10
Doctoral Students.....	11
First Generation Doctoral Students.....	13
Social Cognitive Theory and Self-Efficacy	14
Sources of Self-Efficacy	16
Research Self-Efficacy.....	19
Social Learning in Doctoral Programs.....	21
Socialization.....	21
Social Capital	23
Peer Interactions.....	24
Knowledge Sharing.....	25
Summary	29
III. METHODOLOGY	30
Research Questions.....	30
Research Question 1	30
Research Question 2	31
Participants.....	32
Procedure	35
Instruments.....	35
Demographic Questions.....	36

Self-Efficacy in Research Measure (SERM)	36
Knowledge Sharing (KSBM).....	37
Types of Knowledge (ToK)	37
Integrity Checks	38
Open-Ended Questions	39
Data Analysis	39
IV. RESULTS	41
Quantitative Analysis.....	41
Correlational Analysis	42
Regression Analysis	43
First Generation Status as a Moderator.....	44
Qualitative Analysis.....	45
Learning about Research from Others	45
Sharing Knowledge about Research with Others	48
Factors in the Participant’s Doctoral Program Affecting One’s Willingness to Share Knowledge about Research	51
V. DISCUSSION	55
Summary of Findings.....	56
Knowledge Sharing Behaviors, Types of Knowledge Shared, and Research Self-Efficacy.....	56
First Generation as a Moderator	58
Implications.....	59
Implications for Practice	61
Implications for Policy.....	62
Limitations and Future Research	63
Conclusion	65
REFERENCES	67
APPENDICES	77
Appendix A - IRB Approval	78
Appendix B - Demographics Questionnaire	79
Appendix C- Outputs	81
VITA	84

LIST OF TABLES

Table	Page
3.1 Descriptive Description of Participant Demographics	33
4.1 Descriptive Statistics and Correlations	42
4.2 Regression Analyses Predicting Research Self-Efficacy.....	43
4.3 Coding for Learning about Research from Others.....	45
4.4 Codes for Sharing Research Knowledge	49
4.5 Factors Impacting Knowledge Sharing	52

LIST OF FIGURES

Figure	Page
4.1 Frequency of Codes for Learning about Research from Others	48
4.2 Frequency of Codes for Sharing about Research to Others	51
4.3 Frequency of Codes for Factors Impacting Knowledge Sharing.....	54

CHAPTER I

INTRODUCTION TO THE STUDY

Doctoral education is a unique experience in which individuals are stretched beyond their existing knowledge base into the position of expert within their respective fields. Doctoral students typically undergo rigorous coursework, qualification exams, the dissertation process, and extensive research training. They are expected to conduct, understand, and engage in research to prepare for their future careers (Bagaka's et al., 2015). Research is a focus, not only for doctoral students but also academics in general. Additionally, the skills learned in doctoral education are of value in organizations outside of academia, thus making doctoral education more valuable than ever before (McAlphine & Inouye, 2021). An emphasis on preparing doctoral students for conducting research in their field is often a focus of doctoral programs. Such preparation occurs through formal coursework in research methodology and data analysis. However, it can also occur informally through interactions between advisor and advisee while working together on a study or between peers working on a research team (Weidman & Stein, 2003). This informal exchange of information is known as knowledge sharing.

The give-and-take relationship when engaging in knowledge sharing behaviors is not often addressed as a contributor to doctoral student success; however, in recent studies, this informal process is increasingly becoming important to understanding the doctoral student

experience (Islam, et.al., 2013; Zaqout & Abbas, 2012). Although much of the research on knowledge sharing among doctoral students takes place outside of the United States (Zaqout & Abbas, 2012), the information offered by such research findings provide important insights to factors that could support the doctoral student experience. However, different cultural norms may mean previous findings are not transferable to students studying in the United States. Thus, research of knowledge sharing among doctoral students is needed.

Furthermore, it is important to address the barriers faced by specific populations, such as first-generation students, when it comes to the doctoral student experience. An increasing number of students pursuing their doctoral degree are considered first generation students thus making research on this population timely (Institute of Education Sciences, 2020). When discussing first generation students, it is important to recognize that there are various definitions for this population. Some definitions refer to first generation students as students whose parents or guardians did not *attend* college whereas other definitions refer to this population as individuals whose parents or guardians did not *graduate* from college (Higher Education Act, 1965). For the purpose of this research, first-generation students are individuals whose parents or guardians did not graduate with a four-year degree. This definition of a first-generation student includes those students whose parents completed a two-year degree or technical certificate. The rationale for this definition is that although their parents or guardians furthered their education beyond high school, the experience of a two-year or technical certificate varies from a four-year degree.

The four-year university experience can provide a solid research foundation for students to continue their education into graduate-level programs when undergraduate students are engaged in some type of research activity. The undergraduate research

experience at four-year institutions can vary from engaging students in writing proposals, literature reviews, and/or conducting research in various capacities. Thus, the opportunities for research skill building provided by four-year institutions better prepare students to further their education beyond a bachelor's degree. Due to the central focus on doctoral education and the in-depth research experience this population engages in throughout their educational journey, students' whose parents did obtain a two-year degree but did not obtain a four-year degree will still be considered to hold first-generation status.

Ultimately, the purpose of this study was to investigate the informal experiences of knowledge sharing (collecting/donating) and types of knowledge shared (explicit/tacit) that predict research self-efficacy among doctoral students studying in the United States, with particular interest in first generation doctoral students.

Statement of the Problem

To be accepted into a doctoral-level program is an achievement in itself, but to matriculate is a challenging feat to accomplish. An estimated 50% of doctoral students in the United States will not complete their terminal degree (Di Pierro, 2012). With low attrition rates in doctoral programs, it is important to address the challenges and barriers preventing students from reaching their end goal. Doctoral student success is measured by not only retention and completion rates, but also research productivity (Bagaka's et al., 2015). More specifically, often doctoral programs are judged based on their ability to produce effective research scholars who contribute to the field in innovative ways (Bagaka's et al., 2015). To support doctoral student success, programs must engage students in research activities and provide effective mentorship to guide doctoral students through the research process (Bagaka's et al., 2015). Unfortunately, many doctoral students achieve all required

milestones of their program except the dissertation (Leatherman, 2000). As the dissertation is primarily focused on research, understanding potential factors of research self-efficacy could provide further insight to this reality.

One important factor of the doctoral experience is focused on the social dynamic between doctoral students. Socialization in the doctoral environment is crucial for student success in research. However, socialization is easier said than done for many groups of students. One group in particular, first-generation students, face multiple barriers to success. The Pell Institute for the Study of Opportunity in Higher Education (2019) indicated that only 21% of first generation, low-income, undergraduate students will complete a four-year degree within six years (Cahalan, et al., 2019). Although the Pell Institute Study describes first generation students as the first to go to college rather than students whose parents did not obtain a four-year degree, this statistic demonstrates the need for first generation support at the undergraduate level. The National Center for Science and Engineering Statistics (2019) reported that an estimated 16.5% of students who earned a research doctorate in the United States in 2019 had parents who earned a high school diploma or less, with 13.1% having some college experience but no degree. First-generation students in general encounter several unique challenges as they progress throughout their academic careers (Terenzini et al., 1996). Challenges such as financial limitations, working full-time while going to school, and limited support are experienced by first generation students at higher rates compared to their non first-generation counterparts (Terenzini, 1996). These challenges contribute to the lower rate at which degrees are completed by this population of students (Gardner et al., 2013).

Significance of the Study

The findings of this research can help to inform higher education policy and practice through the understanding of the impact of knowledge sharing on research self-efficacy among doctoral students. Additionally, the results from this research can provide an alternative perspective of knowledge acquisition, such as knowledge sharing, as it relates to research self-efficacy. By understanding knowledge sharing practices, universities may be able to further develop their doctoral programs.

Sverdlik and colleagues, (2018) conducted an overview of research centered on various factors influencing well-being, achievement, and completion among doctoral students. Of the 163 empirical papers on the topic of doctoral students analyzed, over 50% were qualitative in nature, 29% were quantitative, and 18% utilized mixed methods (Sverdlik et al., 2018). In addition, they identified 19 studies that mentioned some aspect of social life in the doctoral experience. Of the nine papers that involved self-efficacy, research self-efficacy was discussed specifically as it relates to the variables of research productivity and interest, but knowledge sharing was not mentioned. Moreover, quantitative research on first generation doctoral students is sparse. Of 133 dissertation abstracts focused on first generation doctoral students as the population of interest, only 35% used quantitative methods (Banning, 2014). Additionally, the research on knowledge sharing as it relates to doctoral students is highly limited. This study will include quantitative data on research self-efficacy, knowledge sharing behaviors, and types of knowledge being shared with a moderating variable of first-generation status. Additionally, qualitative analysis was introduced to provide further insight to the quantitative results.

Notably, data collection occurred during the Fall 2021 semester, in the midst of the ongoing COVID-19 pandemic. Due to this pandemic, an estimated 31% of students in the United States indicated at least one person in their household elected to forgo college enrollment during the Fall 2020 semester citing the pandemic as the reason. Although enrollment was impacted by the pandemic, there was still a steady increase of conferred degrees (National Center for Education Statistics, 2021). For the 2017-2018 academic year an estimated 187,500 doctoral degrees were conferred in the United States whereas for the 2020-21 academic year, an estimated 195,500 doctoral degrees were conferred (National Center for Science and Engineering Statistics, 2020; National Center for Education Statistics, 2021). These estimates indicate an increase of 8,000 conferred degrees per academic year. Additionally, between the academic years of 2009 and 2019, postbaccalaureate (masters, doctoral, and professional programs) enrollment increased by 8%, showing the growing interest of graduate education prior to the pandemic (National Center for Education Statistics, 2021).

This research should provide insight how student behaviors regarding knowledge sharing, and types of knowledge shared contribute to research self-efficacy, potentially leading to better supporting matriculation through the program. With an estimated 50% of students graduating from their doctoral program (Di Pierro, 2012), this research is needed to support the development of knowledge sharing culture in doctoral programs from the moment of enrollment to graduation.

Purpose of the Study

The purpose of this study is to investigate the relationship of knowledge sharing behaviors and types of knowledge being shared among doctoral students and whether this

social process predicts research self-efficacy. Moreover, this research also seeks to explore whether first generation status moderates this relationship. For the purpose of this research, multiple regression was used to identify relationships between knowledge sharing behaviors, types of knowledge shared, and research self-efficacy.

Research Questions

This study is intended to help answer the following two research questions:

- 1) What is the relationship of knowledge sharing behaviors (defined as collecting/donating knowledge) and types of knowledge shared (explicit/tacit) with peers on research self-efficacy?
- 2) Are these relationships moderated by doctoral students' first-generation status?

Definition of Terms

- **First generation doctoral student:** An individual whose parents/guardians did not complete a four-year degree. For the basis of this research, students whose parents/guardians did complete a two-year degree or certificate program will still be recognized as a first-generation student (Higher Education Act, 1965)
- **Knowledge sharing:** Refers to the transfer of knowledge such as skills, information, and expertise between people within an organization; the act of both collecting and donating knowledge. (Kim & Lee, 2013; Van den Hoof & De Ridder, 2004).
Knowledge sharing is the umbrella term for the various forms of knowledge sharing behaviors.
 - **Collecting:** asking peers to share advice and results to obtain intellectual capital (Van den Hoof & De Ridder, 2004; Kim & Lee, 2013).

- **Donating:** the act of openly sharing knowledge with peers (Van den Hoof & De Ridder, 2004; Kim & Lee, 2013).
- **Types of knowledge**
 - **Tacit Knowledge:** learned information over time that can be personal in nature and developed through experience (Dhanaraj, 2004; Zaqout & Abbas, 2012). This type of knowledge is not easily accessible.
 - **Explicit Knowledge:** Objective in nature, information considered easily accessible to one's professional field, easily articulated, tangible and can be easily shared (Dhanaraj et al., 2004; Zaqout & Abbas, 2012).
- **Self-Efficacy:** One's perception of their ability to complete a task successfully (Bandura, 1977, 1986)
- **Research Self-efficacy:** One's perception of their ability to complete research or engage in research activities

Assumptions

As doctoral students typically understand the ethics of research, it was assumed that participants were truthful in their responses. It was also assumed that doctorate students who participated in this study had a basic understanding of research practices, as this is a usual requirement for admission into a doctoral program. These assumptions are important to recognize because the population possesses a unique set of skills that are relevant to research.

Limitations

This research focused only on students enrolled in doctoral programs at universities within the United States. This population included students with international status studying in the United States. Another limitation to this study was relying on self-reported data. An

individual's perception may be inaccurate and therefore, have impacted the responses and subsequent data analyses. This research also did not explore potential influences of previous experiences or personal background beyond first generation status such as marital or parental status, part-time or full-time student status, employment, cultural identity, and other factors that may have played a role in knowledge sharing and research self-efficacy.

Delimitations

Only students who were completing their doctorate in the United States of America were included in this study, including international students. In addition, students in all types of doctoral programs were invited to participate. This decision was to eliminate any biases toward non-PhD degrees, as other doctoral students also conduct research. Individuals were 18 or older to be eligible to participate in the study.

Conclusion

This chapter identified the problem and provided an overview of the purpose and need for this study. The following chapter presents a synopsis of the theoretical foundation for this study and a review of research literature on the doctoral student experience as it relates to research self-efficacy and productivity. Chapter Three describes the methodology involved in the proposed study. Chapter Four provides a thorough description of the results and finally Chapter Five includes a discussion of these results, implications for theory and practice.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter includes an overview of doctoral studies, first generation students, Social Cognitive Theory, research self-efficacy, and knowledge sharing. The theoretical framework of self-efficacy is also introduced to inform the methodology described in chapter three. Essential focus was put toward the doctoral experience, research self-efficacy, socialization, peer influences, and knowledge sharing among doctoral-level students.

Doctoral Studies

The first PhDs in the United States were conferred by the Sheffield Scientific School in 1861 (Geiger, 1993). This school, developed by faculty at Yale, was established to provide a separate and broader education beyond the traditional college experience (Geiger, 1993; Cahusac de Caux, 2019). Much like other schools that were developed at institutions of higher education during this time, these separated entities allowed for faculty members to develop curriculum outside of the institution's fixed curriculum, which informed the beginnings of graduate education in the United States (Geiger, 1993). Since then, graduate education has developed over the years and has contributed significantly to how we conceptualize education beyond the undergraduate experience today. A significant change in doctoral education from the 1980s to 2010s involves an increase in focus on research

publication and productivity, which has impacted the trajectory of doctoral education (Cahusac de Caux, 2019).

Historically, the primary focus of doctoral education was to prepare scholars who would one day prepare other doctoral scholars. Although this focus is still true, doctoral degrees are now focused on various goals, opening up the possibilities for uses of doctorate degrees. Doctoral degrees are becoming increasingly diverse, and specialized degrees, such as the Doctor of Education (EdD), have since emerged (Neumann, 2005). The EdD, primarily focused on education, is considered to be a professional degree for practitioners who seek leadership roles in the field of education. Doctoral students are no longer limited to working within the university setting, but are finding employment in other sectors, such as private research labs or corporate sector jobs (Bagaka's et al., 2015). Regardless of which type of doctoral degree an individual is working towards, research competencies are an important outcome.

Doctoral Students

The “why” behind obtaining a doctoral degree varies from person to person. Important factors such as ethnicity, gender, and employment impact an individual’s “why” for pursuing a doctoral degree. According to the 2018 U.S. Bureau of Labor statistics, individuals with doctoral degrees make on average \$1,825 per week compared to individuals with a bachelor’s degree, who make on average \$1,198. This translates to an estimated \$30,000 gap in annual salary between bachelor’s and Doctoral degrees; the monetary incentive for obtaining a doctoral degree is clear. However, money is rarely mentioned as the reason for why individuals choose to obtain a doctorate degree.

Students earning doctoral degrees tend to note research experience, vocational mobility, and influence from friends and family as contributing factors to obtaining a doctoral education (Guerin, 2015; Pretorius et. al., 2019). Other research conducted on this topic area varies but shows overlapping concepts. For example, entry into academia, professional development, lack of job satisfaction, politics, personal fulfillment, status and recognition, and upward mobility have all been cited as reasons individuals pursue a doctorate (Gill & Hoppe, 2009; Moreno & Kollnaus, 2013; Rosser, 2004; Leonard, et. al., 2005).

Overall, the two main reasons identified across these various studies are professional development and personal fulfillment. Although professional development is often discussed as a motivating factor, the professional development factor itself is varied. For example, some doctoral students have reported that they are obtaining a doctorate to get their start in academia (Gill & Hoppe, 2009) whereas others are furthering their career and need a doctorate to reach the next level (Rosser, 2004). The reasons related to personal fulfillment are more intrinsic in nature, as these students often report finding enjoyment in research, express genuine interest in furthering their knowledge about a particular subject, and/or pursuing personal achievement (Rosser, 2004). The reasoning behind obtaining a doctorate is complex and overlapping.

The transition from undergraduate and master-level education to doctoral education is one that is challenging and overwhelming (McPherson et al., 2018). Doctoral education focuses on adding to existing knowledge or creating new knowledge within a field of study. This focus is much different than the usual goal of transferring knowledge in education in which information is provided and processed. Doctoral education turns the focus to using

theoretical frameworks to expand knowledge into new and innovative information through research practices. The art of “becoming” a PhD is a difficult task that requires perseverance, sacrifice, and intellectual expansion (Harvey & Housel, 2011).

The doctoral student experience, as most individual experiences, can vary from person to person and program to program; however, doctoral students report similarities in their experiences such as thoughts, emotions, challenges, stressors, and, for some groups such as first-generation students, barriers (Sarikaya, et.al, 2017; Gardner, et.al., 2013). Doctoral students must learn to balance school, full-time or part-time employment, family life, social life, research, dissertation writing and more. In a study conducted by Martinez and colleagues (2013), students enrolled in classes full-time reported that time management must be purposeful when finding the balance between being a doctoral student and having a life outside of school. In addition, doctoral students reported the support received from both family and friends helped keep them focused on their goals and maintain balance in their life (Martinez, et.al., 2013). Doctoral students also indicate healthy well-being, both physically and mentally, as a contributor to finding balance between being a student and having a life outside of the school context (Martinez, et. al., 2013).

First Generation Doctoral Students

Challenges continue to impact first generation students as they progress in their academic career beyond a bachelor’s degree. First generation students experience significant challenges at a higher rate compared to their counterparts (Gardner et al., 2013). For example, first generation students are more likely to have financial constraints, thus taking more time to complete their degree (Abedi & Benkin, 1987). In addition, many first-generation doctoral students who hold research or teaching assistantships often hold an

additional part-time or full-time job to reduce financial constraints (Gardner et.al., 2013). As a result, the student often chooses to enroll in school part-time, which delays graduation significantly (Abedi & Benkin, 1987; Seay et al., 2008). Furthermore, first generation doctoral students have reported feeling as if they were merely surviving on student loans (Gardner & Holley, 2011). To add to the financial challenges, first generation doctoral students are more likely to be married and have children while simultaneously building their career (Seay et.al., 2008). These challenges often result in first generation students delaying their graduation significantly and contribute significantly to doctoral student stress.

Integration into the college environment is also a challenge for first generation students as they tend to face an identity struggle (Harvey & Housel, 2011). Between wanting to be a part of the campus culture and fearing that they are leaving who they are as a person behind, this struggle can hinder their ability to become involved on campus (Harvey & Housel, 2011). As a result, first generation students can become isolated and risk dropping out of college. Holley and Gardner (2012) reported that students feel as if they are living in two different worlds: academia and their real life outside of academia (Gardner et.al., 2013). Many first-generation students have reported that they felt out of place at school due to their background (Gardner et.al., 2013).

Furthermore, the strengths of first-generation students must be noted. First generation students are often motivated by personal factors, such as improving their family trajectory (Bushey-Miller, 2016).

Social Cognitive Theory and Self-Efficacy

Social Cognitive Theory, originally developed as Social Learning Theory, is a cognitive theory of learning developed by Albert Bandura. The central tenet of Social

Cognitive Theory takes an agentic perspective, meaning people are active participants in their lives and, through human agency, are able to control, to an extent, events and outcomes in their life through self-reflection and self-regulation (Bandura, 1977, 2001; Maddux, 1995). Human agency is built upon four core properties: intentionality, forethought, self-reactiveness, and self-reflectiveness (Bandura, 2001). In essence, the individual reflects and interprets their behavior, which results in a potential change in behavior in the future. Furthermore, internal processes (e.g., cognition and emotion), environmental influences (e.g., law and socioeconomic status), and behaviors intertwine throughout the learning process (Maddux, 1995), which is referred to as the principle of triadic reciprocal causation, also known as triadic reciprocity. Triadic reciprocity suggests that these three factors interact with one another but do not always occur simultaneously or at the same level of intensity (Maddux, 1995).

Social Cognitive Theory also suggests that individuals observe others' behavior, particularly others who remind them of themselves. The theory suggests that individuals can learn from others through the modeling process. Behavioral models can show how to do something, such as conduct a research study, and individuals learn from modeling these behaviors. This refers to the concept of observational learning or a vicarious learning experience. There are four processes of observational learning that take place such as (a) individuals must pay attention to what they observe, (b) retain the information, (c) try what they learned, and (d) through reinforcement, be motivated to learn how to complete the task more effectively. For example, if the model experiences negative consequences due to their behavior, such as not following institutional review board protocol, an individual will learn from what they observed and are not likely to repeat the same behavior.

Throughout the years, Social Cognitive Theory has been expanded both inward and outward to be more inclusive of the minority group experience (Boss et.al., 1993). This expansion is also more inclusive of invisible identities, such as first-generation status. The inward expansion has a broader focus on cognition and emotion whereas the outward process includes contexts that are external to an individual's environment (Boss, et.al., 1993). Social capital is an example of an external process, particularly for individuals who are not a part of the dominant or "in-group." Social capital is further explained in the following sections.

The expansion of this theory to be more inclusive provides an opportunity to utilize this theoretical framework in multiple contexts and is particularly important as it relates to understanding the first-generation student population. Social Cognitive Theory provides the theoretical context to describe behaviors, cognitions, and motivation of various topic areas. This theory provides a framework to explain how knowledge sharing influence a doctoral student's research self-efficacy, particularly a first-generation doctoral student's research self-efficacy.

Sources of Self-efficacy

Self-efficacy is defined as an individual's perception of their ability to complete a task (Bandura, 1977). Bandura (1986) indicates that self-efficacy is impacted by four areas which include (a) mastery experiences, (b) vicarious influence, (c) social persuasion and (d) physiological factors.

Mastery experiences, also referred to as performance experiences, are the experiences of completing tasks successfully or unsuccessfully (Maddux, 1995). A task completed successfully enhances one's self-efficacy, whereas failure to complete a task results in a reduction of self-efficacy. Mastery experiences are direct and provide the opportunity for

individuals to learn from their own actions in an authentic way. For example, a doctoral student engaging in the development of a research project, such as submitting a proposal for a research conference and having it accepted, would be an example of a mastery experience. Theoretically, doctoral students who perform research tasks with success would be more likely to continue producing more research in the future. As they gain research experience, they may engage in more difficult research designs as they master each task and continue to move forward as researchers. Mastery experience is considered to be the most influential source of self-efficacy (Bandura, 1977).

Vicarious experiences are observable opportunities in which the observer learns an action through active listening and remembers the observed action leading to the replication of the action (Maddux, 1995). Learning vicariously through others assists in the development of one's perception of how to complete a task. Vicarious experience introduces the concept of learning from a model. A model is described as someone who is similar to the observer or someone the observer admires. For example, a first-generation doctoral student observing a faculty member who is also first generation can elicit a positive model for the student to learn vicariously. Observing a model who successfully completes a task can create a sense of confidence within the observer to complete the task as well. In addition, peers play a significant role in this source of self-efficacy. Doctoral students who observe their more advanced peers succeed in research activities should feel empowered to attempt the same or similar tasks.

Social persuasion, sometimes referred to as verbal persuasion, refers to the verbal encouragement a learner receives from a trustworthy source who they perceive to have a certain level of expertise in the subject matter (Maddux, 1995). In addition, Bandura (1977)

hypothesized that self-efficacy impacts one's selective choice for engaging in certain activities, the degree of effort put forth in engaging in such activity, and persistence for continuing engagement. This type of persuasion can be conducted through verbal or even non-verbal feedback of one's work. Another example of this could be faculty encouraging students to apply for a research grant. If a student does not realize they qualify for a grant, but receives encouragement to apply by a trusted faculty member, they are more likely to develop the efficacy needed for moving forward with the grant application. In addition, verbal persuasion to engage in goal setting, coupled with monitoring one's progress, can invoke motivation and enhanced performance of a particular task (Zimmerman, 2000). Conversely, it is imperative for verbal persuasion to be genuine and not overdone. Too much verbal persuasion is known to impact motivation and performance negatively (Zimmerman, 2000). Meaningful verbal praise at appropriate times, such as completing a milestone in the doctoral program, is effective in increasing self-efficacy. Efficacy is better developed through targeted praise than constant praise.

Physiological factors are the emotional responses one may have toward a task thus resulting in either an increase (when positive) or decrease (when negative) in self-efficacy. A key concept of this source of self-efficacy is that the emotional response can vary depending upon the experience. Emotional factors such as stress can be debilitating to doctoral students, resulting in lower productivity and self-esteem as well as an increase in anxiety (Barry et al., 2013). Although doctoral students experience heightened levels of stress, a positive mindset toward specific activities can increase self-efficacy and the ability to endure through difficult situations or tasks. Therefore, anxiety and stress are mediated by the development of self-

efficacy. Students can use academic stress as a motivational tool to define their research purpose and strategically position themselves in the social context within their studies.

The four sources of self-efficacy contribute to the overall doctoral student experience. As students progress throughout their academic career, their experiences overtime can impact their persistence, perseverance, and success.

Research Self-efficacy

Research is a fundamental skill of doctoral education. Research self-efficacy refers to one's perception of their ability to complete research or engage in research activities and plays an important role in a student's academic success (Litson, et al., 2021). Although research is expected of doctoral students, this expectation often brings about an increase in anxiety, depression, and fear and can cause students to have lower levels of research self-efficacy (Barry et al., 2013; Razavi et al., 2017). Doctoral students engage in various scholarly activities that prepare them for future careers as researchers, such as conducting research (whether in a group or individually), presenting at conferences, writing manuscripts, peer reviewing, and other activities that contribute to the scholarly development of doctoral students. This engagement in scholarly activities is known to lead to the development of research self-efficacy (Lambie et. al., 2014). Students who are more likely to pursue research experiences independently and have higher levels of support tend to have increased research self-efficacy, thus preparing them for post-graduation careers (Overall, et al., 2011). However, research regarding research self-efficacy is highly complex and involves identifying nuanced differences between studies, making research self-efficacy an interesting phenomenon to study (Litson, et.al., 2021). The four sources of self-efficacy, as defined earlier, appear throughout the research self-efficacy literature as summarized next.

Lachance and colleagues (2020) conducted a study regarding research skills self-efficacy among first year bioscience students. They found that throughout the first semester of doctoral education, students' research skills self-efficacy significantly increased. In addition, they found that students with an increase of research skills self-efficacy reported laboratory research experience as the primary contributing factor to their experience and comfort with experimental design, with coursework being the second most influential factor.

Graduate students who receive higher levels of guidance and perceived autonomy support from their advisors tend to have higher levels of research self-efficacy than those who do not (Overall et al., 2011). Research has also indicated that graduate student's research self-efficacy varied based on their progress within the program; more advanced students who completed research training had higher self-efficacy as compared to students who completed the training but were newer to the program (Phillips & Russell, 1994).

Research on first generation students' experiences has produced mixed results that make it more difficult to predict their self-efficacy as it relates to research. Roksa and colleagues (2018) noted that first generation students, compared to their continuing generation peers in a PhD program, are not as different as hypothesized. However, these researchers also found that second year, first generation PhD students had significantly less research experiences compared to their counterparts. Although Roksa, et. al. (2018) did not find major differences between non-first generation and first-generation doctoral students, Litson and colleagues (2021) found that minority and first-generation students experience inconsistent levels of research self-efficacy on a semester-to-semester basis compared to their counterparts who reported more consistency. Bandura (1986) suggests that self-efficacy is influenced by such contextual factors which in turn, influences achievement. More

specifically, there is less research on peer support compared to faculty support as a factor in research self-efficacy.

Overall, the literature suggests that more research is needed to be done in order to understand factors relating to first generation doctoral students' self-efficacy for conducting research in various fields. Although the four sources of self-efficacy can describe the opportunities for development doctoral students undergo throughout their academic career, other factors that are influential in a student's life should also be considered, such as social capital and first-generation status.

Social Learning in Doctoral Programs

Social cognitive theory can help to explain how doctoral students develop research skills through the informal interactions they have with mentors as well as their peers. The socialization process, social capital, peer interactions, and knowledge sharing practices can help inform research on doctoral students.

Socialization

Socialization is a term used to explain the process in which individuals learn the norms and values of a particular group. The socialization process for doctoral students would be the degree to which they adapt to the academic culture, attitudes, and skills necessary to progress through doctoral education more effectively (Rigler et. al., 2017; Weidman & Stein, 2003). This socialization process differs among varying populations, including first generation students.

Institutions have policies and regulations set in place to guide decision-making processes for constituents to adhere to as a guideline for expectations (Mendoza, 2007). Aside from these formal guidelines, informal practices are also shaped due to the institution's

culture (Mendoza, 2007). As one example, how students should address their professors is not formally written down and may not even be openly discussed. At some institutions, calling professors by their first names is acceptable whereas formal titles are expected at others. Such information is not written into policy, but becomes a cultural norm with the doctoral program, and would be learned over time through socialization. Doctoral students learn the values and norms of academic institutions throughout their academic career. These norms usually refer to scholarship, service to community, autonomy and other factors that are relevant to the institution (Kuh & Whitt, 1986).

Both faculty and students play a significant role in doctoral student socialization (Weidman & Stein, 2003). In addition, the doctoral program's culture is a significant factor in the socialization process, especially when faculty work to create a supportive environment (Weidman & Stein, 2003). However, there are different experiences of the socialization process in which some students have a supportive network to prepare them for the doctoral school environment whereas others are inadequately prepared and, as a result, are not fully socialized into the academic environment (Rosser, 2004). A supportive network can be defined as family, friends, co-workers, and other networks of people who actively support the student whether emotionally or financially. Unsuccessful socialization often leads to students leaving the university (Gardner et al., 2012).

Although the socialization process is shown to increase a student's likelihood of graduating (Rigler et. al., 2017), there is little research within the changing landscape of doctoral education, particularly as it relates to the significant increase of diverse populations. Underrepresented students have found success as doctoral students when included in research, and when faculty assist in their research interests (Felder et al., 2014). This

diversity is not limited to race and ethnicity, but also includes characteristics such as gender, sexual orientation, and first-generation status.

Social Capital

Another topic to address when discussing factors that contribute to doctoral student success is social capital. Bourdieu (1986) defines social capital as resources used by individuals in their peer groups to assist in the development of overall human capital. Weidmen and DeAngelo (2020) indicate that social capital is developed through personal interactions by providing a connection among peers to the academic community on both a personal and career level (Weidmen & DeAngelo, 2020). Unfortunately, first generation doctoral students do not typically have social capital to leverage; therefore, this is often a barrier to success. First generation students have limited understanding of the processes of completing coursework, beginning a dissertation, or talking with graduate advisors (Gardner et al., 2013). Holley and Gardner (2012) reported that students indicated feeling as if they were living in two different worlds: the world of academia and their “real” life outside of academia, thus resulting in feeling out of place (Gardner et al., 2013). Insider knowledge of how to navigate a doctorate degree is not easily accessible for first generation students (Gardner & Holley, 2011).

Consistency in faculty approach is a factor in successful socialization of doctoral students, but many faculty members do not explicitly recognize the importance of their role in the socialization process for their doctoral students (Gardner, 2010). The proposed research can help inform faculty on possible ways to provide opportunities for students to engage in research activities.

Peer Interactions

Much of the existing research focuses on faculty support of doctoral students in their progression towards the completion of their degree; however, the focus toward peer support is growing in popularity. Faculty-to-student support is described as a vertical relationship with formal qualities whereas peer-to-peer support is more of an informal and horizontal relationship process (Wegener et al., 2014). Although peer support is not a completely new topic of discussion, it is important to recognize the impact peer support has on the doctoral student experience. Peer support occurs through various roles, ranging from emotional support, to writing support, engagement, student satisfaction, and persistence, which creates a supportive environment for students to work through challenges and cope with the difficulties of higher education together (Dericks et al.2019; Jolley et al., 2015;). Doctoral students who engage with their peers are more likely to be successful students (Gardner, 2008).

Toward the end of the PhD journey, students tend to become more isolated due to taking fewer formal classes in order to focus on their dissertation research, which can result in the loss of an integral supportive network of other doctoral students (Jolley et al., 2015). Doctoral students have reported creating a supportive network during the dissertation process through the use of online platforms can help during the difficult final stages of the Ph.D. (Jolley et al., 2015).

Doctoral students who engage in academic writing groups tend to develop their writing skills by learning from one another and holding each other accountable (Kumar & Aitchison, 2017). Furthermore, Kumar and Aitchison (2017) found that peer-led writing groups lead to co-construction of knowledge through the conversations held by the

participants in the groups. Students engaged in a research group feel free to open up about their research, discuss research methods, reveal lack of understanding, and exchange other information used to improve scholarly skills (Meschitti, 2019). Although students can learn from each other through consistent conversations which improve the student's scholarly skills, some students reported that exclusion from peer groups occurred due to other peer relationships forming a stronger bond within the cohort (Meschitti, 2019).

Knowledge Sharing

The evolution of knowledge sharing research begins with the idea of knowledge transmission. Knowledge transmission refers to the communication of knowledge whereas knowledge sharing focuses on the overall process of this transmission to determine if the objectives were met by sharing (Cummings, 2003). This shift from knowledge transmission to knowledge sharing shows an evolution of research within the knowledge management literature. Knowledge sharing research is rooted in the technology and innovation industry but over time has covered a wide variety of subjects that influence knowledge production (Cummings, 2003) and has now made its way to research in higher education. Initially, knowledge-sharing research focused on economic and technological advances that were the result of dynamic interactions between consumers and organization (Cummings, 2003). Today knowledge-sharing research has expanded to higher education, focusing on ways to increase research productivity among colleagues, and has been found to vary based on institutional culture (Strik et al., 2021). Clearly, knowledge sharing research has evolved, with implications that vary by industry.

There are two dimensions to knowledge sharing: collecting and donating. Throughout most knowledge sharing research, these terms differ throughout the literature. Davenport et.

al. (1998) refer to knowledge collecting and donating as the knowledge buyer and knowledge seller whereas Kankanhalli and colleagues (2005) label the concepts as knowledge seeker and contributor. For purposes of this study, knowledge collecting was defined as asking peers to share advice and results in obtaining intellectual capital (Van den Hoof & De Ridder, 2004; Kim & Lee, 2013; Abdul-Jalal et al., 2013). Knowledge donating was defined as the act of sharing knowledge with peers (Van den Hoof & De Ridder, 2004; Kim & Lee, 2013). Both collecting and donating are dimensions of knowledge sharing that should be considered when researching knowledge sharing practices among a group because these concepts refer to a different way in which individuals engage in knowledge sharing behaviors.

Along with the two dimensions of knowledge sharing (i.e., collecting and donating), there are two types of knowledge to be shared: explicit knowledge and tacit knowledge. Explicit knowledge is considered easily accessible to one's professional field, easily articulated, tangible and can be easily shared (Dhanaraj et al., 2004; Zaqout & Abbas, 2012). It is objective in nature (Zaqout & Abbas, 2012). The second type of knowledge sharing is tacit knowledge which, through socialization processes, is shared between people of a specific organization or, in this case, academia (Islam et.al., 2013). Tacit knowledge is learned information over time that can be personal in nature and developed through experience (Zaqout & Abbas, 2012). Dhanaraj and colleagues (2004) found that tacit learning helps to explain explicit knowledge, indicating that both types of knowledge are important to understand.

There are various barriers to knowledge sharing, especially in academic institutions. The barriers are categorized in three ways: (a) organizational, (b) individual, and (c) technological (Karim & Majid, 2019). Organizational barriers are specific to one's institution

and are based on the cultural environment in which that particular institution develops. The culture of an institution can potentially be a barrier if knowledge sharing is not encouraged or if there is a level of distrust among individuals. Individual barriers are often noted as one's fear of sharing information, limited time to engage in knowledge sharing, and lack of trust (Karim & Majid, 2018; Pan & Zhang, 2014). Technological barriers are specific to technology such as lack of training in using new technology or a need for upgraded technology that could be useful in knowledge sharing practices. Barriers explain reasons as to why one might not engage in knowledge sharing with the university setting.

In addition, knowledge withholding is highly prominent in academic institutions. Knowledge withholding refers to hoarding or hiding knowledge that can be useful for the organization but is not shared due to competition among academics, protection of power dynamics, or mistrust within the academic environment (Pan & Zhang, 2014; Stik et al., 2021). Moreover, tacit knowledge is more likely to be intentionally withheld. Although these barriers are real and should be acknowledged, the importance of knowledge sharing should not go unnoticed. Zaqout and Abbas (2012) found that trust and the social network of doctoral students positively affected the sharing of both tacit and explicit knowledge. They also found that tacit knowledge sharing positively affected student performance (Zaqout & Abbas, 2012).

Knowledge sharing within companies is often met with monetary rewards for the employees in order to incentivize employees to share knowledge within the institution (Kim & Lee, 2013). When it comes to doctoral students, monetary incentives are often not available, therefore it is important to understand why a doctoral student would want to engage in knowledge sharing practices. Doctoral students who engage in knowledge sharing

tend to find enjoyment in sharing, have higher levels of self-efficacy, and express trust with those with whom they are sharing information. It also argued that due to the nature of valuable knowledge, sharing may not occur due to a natural tendency to avoid sharing unique knowledge (Devenport, 1997). Fear of one's ideas being taken by colleagues is the leading reason for why academics choose to withhold knowledge and share only portions of what is known (Strik, et al, 2021). In general, students report that they choose to share knowledge only with those who share knowledge with them (Majid & Way, 2009). In Western culture, independence in the workplace is promoted which often leads to competitiveness for rewards such as raises or potential promotion to a higher job position (Demirkasimoglu, 2015). This culture often creates a power dynamic, in which knowledge is viewed as power. Individuals report having strong connections to their knowledge thus resulting in a sense of ownership which prevents the individual from sharing the knowledge with others (Peng, 2013). For example, if one has an original research idea and is considered to be an expert in this field, they may refrain from sharing this knowledge until after publication. Students actively engage in knowledge sharing by either offering knowledge to their peers or by receiving knowledge from their peers.

As a faculty member, Stracke (2010) recognized the role peers play in the doctoral education process. Upon realizing that students in their program were not regularly interacting with one another regarding research or other academic activities, Stracke facilitated a support group. At first, students were instructed to present their research topics to one another. Throughout the semester, the group began to interact on a regular basis by discussing research and sharing practical knowledge that was useful for their education, such as funding opportunities, databases to use for searching purposes, and other topics (Stracke,

2010). Student feedback indicated they valued the exchange of information between one another, as well as the moral support, feedback, and shared insight of the doctoral education process (Stracke, 2010). Students who do not share knowledge usually do not want to discuss their research topic area or have differences in language and research interest. However, doctoral students are pleased with the shared knowledge gained from their peers and have indicated that shared information enhances their overall research skills (Islam et.al., 2013).

Through peer support, knowledge sharing can take place among doctoral students to facilitate an enjoyable experience, foster a supportive environment, and provide insight on valuable research skills as they progress throughout their degree. Further research of knowledge sharing between peers as it relates to research self-efficacy specifically, further exploring the differences and similarities between first generation and non-first-generation students.

Summary

In summary, this chapter discussed doctoral students, social capital, Social Cognitive Theory and self-efficacy, peer interactions, knowledge sharing behaviors, and types of knowledge shared. Chapter two has served as the foundation for the basis of the methods for this research that will be discussed in chapter three.

CHAPTER III

METHODOLOGY

The purpose of this quantitative study was to explore the relationship between knowledge sharing behaviors, types of knowledge shared, and research self-efficacy. The epistemological understanding of this research is constructivist in nature meaning that knowledge is constructed individually and as a result there is a possibility for multiple truths based on varying perspectives (Lewis-Beck et al., 2004). The theoretical perspective that compliments this epistemology is Post-Positivism meaning that multiple truths are accepted and that observations are made based on perspectives. Through deductive reasoning, research questions and hypotheses were tested to address these relationships. The proposed methodology was to conduct survey research using multiple regression to analyze the data.

Research Questions

Research Question 1

What is the relationship of knowledge sharing behaviors (defined as collecting/transferring of knowledge; measured by KSBM subscales) and types of knowledge shared (explicit/tacit) with peers on research self-efficacy?

Hypothesis 1

Doctoral students who engage in knowledge sharing behaviors (both collecting and donating) and share both types of knowledge (explicit and tacit) with peers will have higher research self-efficacy.

Rationale

Research conducted by Stracke (2010) shows that doctoral students engaging in support groups are found to value the exchange of information they experience with their peers. Although this research was not concentrated on knowledge sharing and its impact on research self-efficacy, the results are comparable because it shows the importance of regular contact with peers regarding research practices. Islam et al. (2013) also found that doctoral students believe that the knowledge shared from their peers enhances research skills. Such findings from previous research support the hypothesis for question one.

Although tacit knowledge is easier to transfer as compared to explicit, Dhanaraj et al. (2004), indicates the importance of both tacit and explicit knowledge because tacit learning helps to explain explicit knowledge. Students who engaged in a writing focus group stated the importance of sharing their written work and reviewing their peers' work assisted in developing their skills as scholarly writers who have a goal of publication (Jalongo, 2013). The engagement of sharing written work and reviewing others' work provided students with an opportunity to engage in building their tacit knowledge as they experienced first-hand scholarly writing. The results from such research align with the Social Cognitive Theory mastery experience source of self-efficacy.

Research Question 2

Are these relationships moderated by doctoral students' first-generation status?

Hypothesis 2

First generation status will moderate the relationship between knowledge sharing behaviors (collecting/donating) and research self-efficacy, and the relationships between the types of knowledge being shared (tacit/explicit) and research self-efficacy.

Rationale

Rouska (2012) reports that first generation students in their second year tend to have less research experiences compared to their counterparts. Additionally, Litson et al. (2021) found that first generation students had inconsistent levels of research self-efficacy by semester. As mentioned, social capital, employee's intention to engage in both tacit and explicit knowledge sharing behaviors (Hau et al., 2013). Although this research was conducted on employees instead of students, it is an indicator of how social capital impacts such behaviors. For first generation students, this population typically has less social capital compared to their counterparts . Therefore, it is hypothesized that first-generation status will moderate the relationship between types of knowledge shared and research self-efficacy.

Participants

The population for this research were doctoral students enrolled in universities throughout the United States of America, including international students. In addition, first generation status was used as a moderating variable for the second research question. Students from all disciplines were encouraged to participate, as this study did not seek to focus on one specific field but rather gain an understanding of the doctoral student experience more broadly.

A total of 153 participants were included in the data analysis. Since this study focused on students who were enrolled in the United States, a question asking the location of doctoral

studies was asked. Three participants were omitted from the analysis for indicating they were not enrolled in an institution in the United States. Five participants were omitted for violating the integrity check questions.

As shown in Table 3.1, a majority of participants indicated they were not of first-generation status (53%), were female (50%), and identified as White (59%). A majority of participants also indicated they were attending a public institution (91%) with an R1 classification (66%) and enrolled in a PhD program (91%). Nearly half of participants indicated they had some research experience prior to enrolling in their doctoral program (49%).

Table 3.1 Descriptive Description of Participant Demographics (N=153)

Variable	Frequency (n)	Percentage (%)
First Generation Status		
No	81	52.9
Yes	59	38.6
Declined to answer	13	8.5
Location of Doctoral Studies		
United States	140	91.5
Outside of the United States	13	8.5
Race/Ethnicity		
Asian/ Pacific Islander	16	10.5
Black or African American	9	5.9
Hispanic or Latino	8	5.2
Native American or American Indian	4	2.6
White or Caucasian	90	58.8
Multiracial/ Multi-ethnic	7	4.6
Other	5	3.3
Prefer not to Respond	2	1.3
Declined to answer	12	7.8
Gender		
Female	77	50.3
Male	56	36.6
Transgender	0	0
Non-Binary	7	4.6
Prefer not to respond	1	0.7
Declined to answer	12	7.8

Variable	Frequency (<i>n</i>)	Percentage (%)
Institutional Type		
Public	139	90.8
Private	1	0.7
Other	1	0.7
Declined to answer	12	7.8
Carnegie Classification		
Research 1	101	66.0
Research 2	0	0
Unknown	40	26.2
Declined to answer	12	7.8
Institution Size		
Small (2,999 or less)	1	0.7
Medium (3,000 to 9,999)	9	5.9
Large (10,000 +)	128	83.7
Declined to answer	15	9.7
Student Classification		
Domestic student	116	75.8
International student	23	15
Declined to answer	14	9.2
Employment		
Graduate Teaching Assistant/Associate	41	26.8
Graduate Research Assistant/Associate	43	28.1
Part-time employee	3	2.0
Full-time employee	45	30.1
None	4	2.6
Other	4	2.6
Declined to answer	12	7.8
Program Type		
Doctor of Philosophy (PhD)	139	90.8
Doctor of Education (EdD)	1	0.7
Other	1	0.7
Declined to answer	12	7.8
Prior Research Experience		
None	32	20.9
Some Experience	75	49.0
Substantial Experience	34	22.3
Declined to answer	12	7.8

Procedure

Prior to data collection, IRB approval was obtained (see Appendix A). The survey was developed using Qualtrics Software. Upon clicking on the survey link, participants were directed to the Informed Consent statement. Participants had the option to exit the survey, thus declining participation, or proceed, thereby providing their consent.

The survey link was distributed in two ways. The first approach involved probability sampling using the simple random sampling method in which emails of doctoral students at Oklahoma State University were obtained via the Office of Institutional Research and Information Management. Probability sampling reduces bias and provides an opportunity to obtain diverse participants, therefore this method was used first in the recruitment process. Following the first approach, enough participants were obtained to reach the required power for the study. However, in an attempt to reach a wider audience, a second recruitment approach was conducted.

The second approach utilized snowball sampling to recruit participants via the social media site LinkedIn. This sampling technique typically saves time in the recruitment process; however, this type of sampling can lead to bias and is not generalizable beyond the sample (Lewis-Beck et al., 2004).

Instruments

The survey consisted of a demographic survey (13 items), three open-ended questions, three scales (49 items), and two items that served as an integrity check for a total of 67 items. Scales include the Self-Efficacy in Research Measure (SERM; 33 items) developed by Phillips and Russel (1994), the Knowledge Sharing Behaviors Measures

(KSBM; 8 items) developed by Kim and Lee (2013), and a scale to assess tacit and explicit knowledge sharing (ToK; 8 items) developed by Zaqout and Abbas (2012).

Demographic Questions

Thirteen demographic questions were included. The first question captured the needed information to address the moderating variable of first-generation status for research question two. The second question ensured that the student was enrolled in a University in the United States. Since this research solely focused on students enrolled in Universities in the United States, this question was important to address. The remaining questions collected background information of the participants and were used for descriptive purposes only. See Appendix B for the full list of demographic questions.

Self-Efficacy in Research Measure (SERM)

Doctoral student research self-efficacy was assessed by using the Self-efficacy in Research Measure (SERM) developed by Phillips and Russell (1994). The measure consists of 33 items using a 10-point likert scale, with zero indicating no confidence and nine indicating total confidence. There are four subscales included in this measure; however, a total sum of the measure can be used. For the purpose of this study, the total sum score was used to assess research self-efficacy. As reported by Phillips and Russell (1994), the total Cronbach's alpha for this measure is 0.96. The four subscales are research design skills (*electing a suitable topic for study; controlling for threats to validity*; $\alpha = 0.90$), practical research skills (*Getting an adequate number of subjects; Keeping records during a research project* ; $\alpha = 0.83$), quantitative and computer skills (*Knowing which statistics to use; Manipulating data to get it onto a computer system*; $\alpha = 0.93$), and writing skills (*Writing a research presentation for a conference; Writing the method and results sections for a thesis*;

$\alpha = 0.94$). Although Phillips and Russell did not explicitly address validity, it is important to note that the SERM was developed using existing scales of research self-efficacy. To address construct validity, convergence occurs when items in a survey measure a construct similar to other existing measures (Heale & Twycross, 2015). Therefore, it can be inferred that the SERM is a valid measure.

Knowledge Sharing (KSBM)

The Knowledge Sharing Behaviors Measures (KSBM) examines the behaviors of individuals collecting or donating knowledge and was developed by Kim and Lee (2013). The measure consists of five subscales with a total of 30 items using a 7-point likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). For the purpose of this study, two subscales were used. The first subscale includes four items addressing Knowledge Collecting behaviors (e.g., *When I need certain knowledge, I ask my colleagues about it*; $\alpha = .0.901$). The second subscale also includes four items addressing Knowledge Donating behaviors (e.g., *When I have learned something new, I tell my colleagues about it*; $\alpha = 0.867$). The discriminant validity of the scales was reported based on the average variance extracted (AVE score). For the knowledge collecting subscale the AVE was 0.684 and for the knowledge donating scale the AVE was 0.606. Both of the reported AVE's for the subscales were greater than 0.5 therefore, discriminant validity of the subscales was met. A mean score was computed for each subscale and used for subsequent analyses in this study.

Types of Knowledge (ToK)

A survey created by Zaqout and Abbas (2012) addresses the types of knowledge being shared among students. Although their instrument includes a total of six subscales (26 items) using a 4-point likert scale (1 = strongly disagree; 4 = strongly agree), for the purpose

of this study two were used. The first subscale, Explicit Knowledge ($\alpha = .858$), includes four items and were used to identify explicit knowledge sharing practices among doctoral students (e.g., *I frequently share knowledge and research techniques based on my experience with other students in my school.*). The second subscale, Tacit Knowledge (e.g., *I share my expertise at the request of my colleagues*; $\alpha = .847$), also includes 4 items but addresses tacit knowledge-sharing practices among doctoral students. A mean score was computed for each subscale.

Validity of the full scale was addressed by its authors who argued the convergent and discriminant validity was acceptable because the average variance extracted (AVE) results show the values for each construct to be greater than the coefficients for that construct (Zaqout & Abbas, 2012). For the explicit knowledge subscale AVE was 0.577 and for the tacit knowledge subscale AVE was 0.563. The construct reliability for both subscales was greater than 0.7 (explicit knowledge = .798; tacit knowledge = .774).

The original scale was adjusted slightly to fit the academic environment in the United States. The scales include the term “reports” and “papers” as a way to collect/transfer explicit knowledge. However, the term report and papers may be confusing in the context of this research, therefore the term was changed to research articles. An example of these modified items is listed below.

Original: I frequently collect *reports, papers, and notes* from other lecturers.

Modified: I frequently collect **research articles** and notes from other lecturers.

Integrity Checks

Two items were added to the survey to ensure participants were reading and responding to the items. These items were randomly embedded within the other scales:

- 1) If you are reading this, please select number one.
- 2) If you are reading this, please select number two.

Open-Ended Questions

Three open-ended questions were included to gain insight to students' experiences in their doctoral program as it pertains to knowledge sharing and the aspects of their doctoral program that contribute to knowledge sharing. These questions appeared at the end of the three likert-type scales but before the demographic questions.

1. Please briefly describe your experience learning about research from others (students, faculty, etc.) in your doctoral program.
2. Please briefly describe your experience with sharing knowledge about research with others (students, faculty, etc.) in your doctoral program.
3. Please briefly describe aspects of your doctoral program that have contributed to your willingness to share (or not) knowledge about research with others?

Data Analysis

The analysis used for this research was multiple regression. For research question one, there were four predictor variables (collecting knowledge, donating knowledge, explicit knowledge, and tacit knowledge) with the criterion variable of research self-efficacy. For the final research question a moderating categorical variable (first generation status) was introduced.

A priori power analysis using G*Power software determined a minimum sample size of 129 completed surveys needed for regression using four predictor variables (Cohen, 1988). In calculating the power, an effect size of 0.015, power 0.95, and p-value of 0.05 was used. Once data collection was complete, a power analysis was conducted again, with a final

sample size of 153, p-value of .05, and effect size of 0.14 ($\frac{R^2}{1-R^2}$), which indicated final power for this study was 0.998. SPSS software was used to conduct additional data analyses as needed.

CHAPTER IV

RESULTS

This study examined the informal experiences of knowledge sharing that influence research self-efficacy among doctoral students studying in the United States. Additionally, a moderating variable, first generation doctoral students, was explored. The following two research questions were addressed:

- 1) What is the relationship of knowledge sharing behaviors (defined as collecting/donating of knowledge) and types of knowledge shared (explicit/tacit) with peers on research self-efficacy?
- 2) Are these relationships moderated by doctoral students' first-generation status?

Quantitative Analyses

One multiple regression analysis was conducted to predict research self-efficacy based on knowledge sharing behaviors (collecting and donating) and type of knowledge shared (explicit and tacit) among doctoral students. This regression analysis was analyzed to address the first research question. Then, for the second question, the moderator variable of first-generation status was introduced by conducting another regression analysis and independent t-tests to compare means.

Correlational Analyses

Prior to running regression analysis, Pearson correlational analysis was evaluated to determine the correlation between the predictor variables and the criterion. As shown in Table 4.1, the predictor variables collecting knowledge ($r = .282, p = 0.001$) and donating knowledge ($r = .306, p < .001$) were correlated with the criterion variable of research self-efficacy. Additionally, the predictor variables explicit knowledge ($r = .228, p = .005$) and tacit knowledge ($r = .325, p < .001$) were correlated with the criterion variable of research self-efficacy. Additionally, the predictor variables were all highly correlated with one another.

Table 4.1 *Descriptive Statistics and Correlations*

Variable	1	2	3	4	5
1. Collecting Knowledge	-				
2. Donating Knowledge	.712**	-			
3. Explicit Knowledge	.457**	.542**	-		
4. Tacit Knowledge	.549**	.683**	.657**	-	
5. Research Self-Efficacy	.282**	.306**	.228**	.325**	-
Range	6	6	3	3	8
<i>M</i>	5.44	4.85	2.64	3.24	5.83
SD	1.16	1.28	.74	.65	1.51
Scale Reliabilities	.793	.832	.759	.770	.953

Note ** $p < 0.01$

Scatterplots were created in SPSS to determine the linear relationship between each predictor variable and the criterion (see Appendix C). The line of fit for each scatterplot was determined at this time in which each displayed a positive linear relationship. This means the linear relationship assumption of multiple regression was met. Furthermore, the VIF values

were analyzed in which it was determined that no multicollinearity was detected (see Appendix C); therefore, this assumption was also met. The Durbin-Watson test was analyzed to determine that each observation is independent by ensuring autocorrelation is not present. This assumption was also met (Durbin-Watson test = 2.057). Next, homoscedasticity was checked by creating a scatterplot of standardized residuals (y-axis) versus the predicted values (x-axis). This assumption was also met as homoscedasticity was not present. Finally, normality was assessed using a Quantile-Quantile (Q-Q) plot to determine if the residuals of the model followed a normal distribution. In this case, the assumption was met since the residuals roughly followed a straight diagonal line on the plot. With all five assumptions being met, the multiple regression analysis was conducted.

Regression Analysis

In real life, variables are not isolated as individual factors predicting research self-efficacy; therefore, one regression analysis was conducted with all four predictors to allow for a more robust analysis. As shown in Table 4.2, approximately 12% of the variance was explained by the predictor variables, $R^2 = 0.124$, $F(4,148) = 5.252$, $p < .001$).

Table 4.2 *Regression Analyses Predicting Research Self-Efficacy*

Predictor	KSB-Collecting		KSB-Donating		ToK-Explicit		ToK-Tacit	
	β	t	β	t	β	t	β	t
Research Self-Efficacy	0.106	0.959	0.091	0.714	-0.008	-0.080	0.211	1.762
<i>F</i>	5.252*							
R^2 (Adjusted R^2)	0.124 (0.101)							

* $p < .01$

Based on prior research, I hypothesized that doctoral students who engaged in knowledge sharing behaviors (both collecting and donating) and who shared both types of

knowledge (explicit and tacit) with peers would have higher research self-efficacy.

Collectively the predictor variables predicted research self-efficacy therefore, my hypothesis was supported.

Notably, however, individual variables were not significant predictors of research self-efficacy. That is, neither collecting knowledge ($\beta = 0.106, t = 0.959, p = .339$) or donating knowledge had a significant effect on research self-efficacy ($\beta = 0.091, t = 0.714, p = .476$). Similarly, explicit knowledge ($\beta = -0.008, t = -0.080, p = .937$) and tacit knowledge ($\beta = 0.211, t = 1.762, p = .080$) did not predict research self-efficacy either. Such results indicate a possible suppression effect, which occurs when the predictors are more highly correlated with one another than the outcome variable (as shown in Table 4.1).

First-generation Status as a Moderator

Independent t-tests were used to provide further insight on the first-generation status variable. Results indicated that research self-efficacy for first generation students ($M = 5.85, SD = 1.681$) was not statistically significantly different from their non-first generation counterparts ($M = 5.90, SD = 1.346$), $t(138) = -.185, p = .853$.

Although independent t-tests revealed no significant difference between groups, moderator variable has the potential to impact how X (predictor variables) influences Y (research self-efficacy). Thus, another regression analysis was conducted, adding first-generation status as a fifth predictor. Results revealed the overall model remained significant, $R^2 = 0.135, F(5,134) = 4.189, p < .001$, with all individual predictors again being not significant, including first-generation status ($\beta = 0.002, t = 0.025, p = .980$). Thus, my hypothesis for research question two was not supported.

Qualitative Analysis

Although the research questions for this study are quantitative in nature, three open-ended questions were asked in order to provide a deeper understanding of the participants' experience with knowledge sharing and to understand their program of study. These findings provided information that was not available via quantitative data.

Learning about Research from Others

The first question asked participants to describe their experience learning about research from others (students, faculty, etc.) in their doctoral program. Over three fourths of participants in the study ($n = 119$) responded to the open-ended question regarding their experiences of collecting knowledge from others. Through open coding, the following four themes emerged: classroom discussions, informal peer groups, faculty mentorship, and discouraging experiences (see Table 4.3)

Table 4.3 *Coding for Learning about Research from Others*

Code	Description	Examples
Classroom Discussions	described as formal discussions within the classroom setting between students and faculty.	“I primarily learn about research from courses I have taken and from research labs “Any new information or shared ideas or experiences occur when I am in class or engaging in a class activity.”
Informal Peer Groups	described as groups that were created by students in a doctoral program in which students engage with each other informally through social media, face to-face meetings, or impromptu peer discussions outside of the classroom environment.	“I have a Groupme with my cohort and we set aside several opportunities to talk about our projects and what we are doing. We also use this as a mental health tool.” “I am in an informal writing group that was formed by

		students. We read each other's work, give feedback, discuss theory and methods, and cheer each other on."
Faculty Mentorship	described as one-on-one mentorship provided to a student whether during office hours or while conducting research.	"I have learned through mentorship mostly with faculty."
Discouraging Experiences	experiences that negatively impact a student's way of navigating the doctoral experience.	"My PhD program is vastly inadequate in preparing me to conduct research"

The first theme that emerged was classroom discussions. As one might infer, *classroom discussions* referred to learning about research within a more formal classroom context that included both faculty and fellow students. A total of 22 participants explicitly mentioned the classroom as a primary method of research knowledge sharing (18%). Classroom discussion was mentioned frequently, indicating that the classroom setting provides a more formal way of collecting knowledge regarding research. Participants regularly mentioned that their courses are a primary source of learning (*primarily learn about research from courses I have taken and from research labs*). Participants also provided context about new knowledge and how new information is learned in classrooms which is to be expected (*Any new information or shared ideas or experiences occur when I am in class or engaging in a class activity*).

Informal peer groups were mentioned by 21 participants (17.6%). Participants mentioned sharing knowledge by using a social media app to communicate about research (*I have a Groupme with my cohort...*) while other participants created informal writing groups to share tips (*I am in an informal writing group that was formed by students*). Both examples

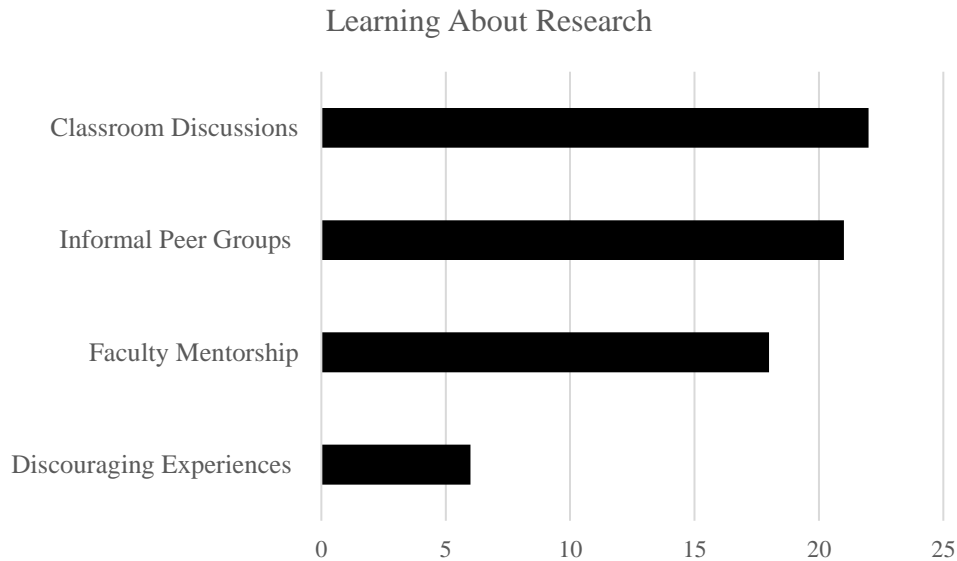
provide further insight on the various ways in which students collect knowledge from one another in an informal setting.

The third theme that emerged was faculty mentorship. A total of 18 participants referred to discussions with their faculty outside of the classroom environment that have contributed to their understanding of research (15%). Participants mentioned mentorship or informal discussions on research with faculty as being a valuable source of collecting knowledge (*I have learned through mentorship mostly with faculty*).

Overall, the experience with collecting knowledge as described by participants was positive. With that being said, not all experiences that were reported by participants were encouraging. A total of 6 participants reported discouraging experiences in their doctoral program (*My PhD program is vastly inadequate in preparing me to conduct research*). These conflicting statements suggest environmental impacts, such as the research climate, on knowledge collecting behaviors.

As shown in Figure 4.1 below, the frequency of codes for learning about research from others is displayed to provide a visual aid of the qualitative data.

Figure 4.1 *Frequency of Codes for Learning about Research from Others*



As shown in Figure 4.1 class discussions were identified most frequently as the leading way in which the participants cited learning about research from others. Additionally, participants learned about research from their peers more often than from faculty through one-on-one mentorship opportunities.

Sharing Knowledge about Research with Others

The second question was asked to address the experiences participants have with donating knowledge. Over three fourths of participants ($n = 117$) responded to the open-ended question regarding their experiences of donating knowledge to others. Through open coding, the following three themes emerged: willingness to donate and, conversely, hesitant to donate, and presenting knowledge (Table 4.4).

Table 4.4 *Codes for Sharing Research Knowledge*

Code	Description	Examples
Hesitant to donate		
Feelings of Inadequacy	described as feeling incapable or lacking confidence in donating knowledge.	“When I share research knowledge with other students, I tend to feel intimidated and less capable.”
Readiness	not feeling ready to donate knowledge or not far enough along in their doctoral studies to know enough to donate	“I can’t say I’m at the point where I am a real knowledge resource for others...”
Research Climate	the culture of the doctoral program in which students are studying	“I enjoy training others and sharing my experience and expertise. However, I have made the conscious decision to pull back on sharing because of the climate in my lab.”
Willingness to donate		
	a student's excitement and comfortability in donating research knowledge.	“I am always happy to share any upcoming research with interested parties, whether it be faculty or students.” “I always offer help to fellow students and make sure they feel comfortable asking me for help if they think I can help them.”
Presenting knowledge		
	formally donating knowledge	“I have had the opportunity to guest lecture in a research methods course at least four times...” “I present my research on a variety of scales through lab meetings, department-wide seminars, and university wide symposiums.”

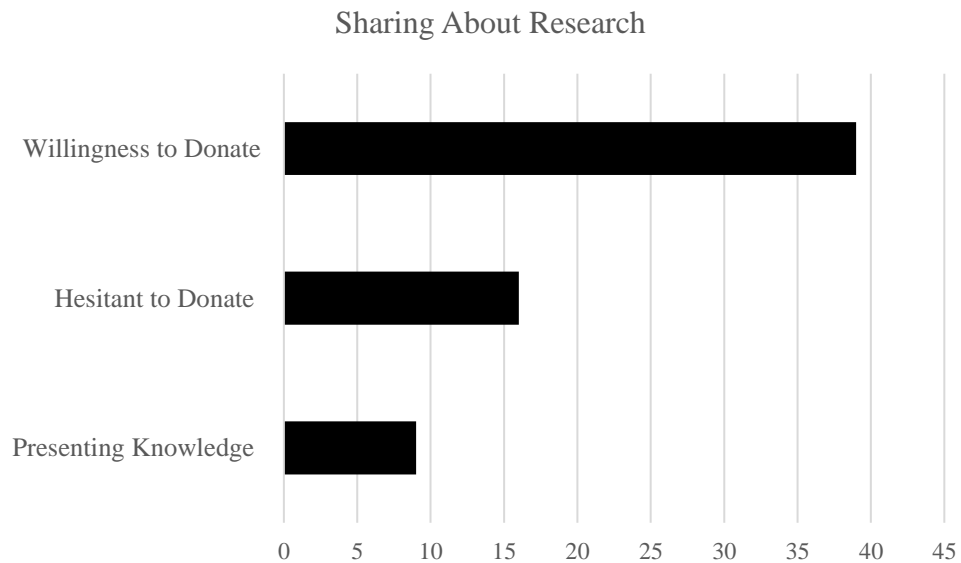
The first theme emerged was willingness to donate. Of the 117 participants who completed this question, 39 (33%) indicated their excitement in donating knowledge to their

peers (*I always offer help to fellow students and make sure they feel comfortable asking me for help if they think I can help them*).

This second theme emerged as *hesitant to donate*. A total of 16 participants provided various descriptions of hesitation (14%); therefore, this theme is further characterized by three subcategories: research climate ($n = 7$), feelings of inadequacy ($n = 5$), and readiness ($n = 4$). Participants indicated the research environment as being the primary factor for being hesitant to donate knowledge (*I enjoy training others and sharing my experience and expertise. However, I have made the conscious decision to pull back on sharing because of the climate in my lab*). The participants were more likely to indicate feelings of inadequacy compared to readiness when it comes to donating knowledge to their peers (*When I share research knowledge with other students, I tend to feel intimidated and less capable*). Many students expressed not feeling ready to donate knowledge (*I can't say I'm at the point where I am a real knowledge resource for others...*). These statements indicate a potential feeling of inadequacy leading to hesitancy when donating knowledge compared to the eagerness of collecting knowledge that was expressed from question one.

The third theme emerged was presenting knowledge. A total of 9 students explicitly described their experience of donating knowledge, drawing from their participation presenting at seminars, in class, or at conferences (*I have had the opportunity to guest lecture in a research methods course at least four times...*).

Figure 4.2 *Frequency of Codes for Sharing about Research to Others*



As shown in Figure 4.2 more than twice as many students indicated they feel excited/comfortable rather than hesitant when it comes to sharing their research knowledge. Importantly, hesitant to donate knowledge encompasses three subthemes: research climate, feeling inadequate, and readiness with research climate being cited the most (see Table 4.4). Finally, nine participants indicated their primary way of sharing research with others was through presenting at conferences, seminars, or other public events.

Factors in the Participant’s Doctoral Program Affecting One’s Willingness to Share Knowledge about Research

The third question was asked to address the factors within the doctoral program in which the participant is enrolled that affect their willingness to share knowledge about research. Over three fourths of participants ($n = 117$) responded to the open-ended question. Through open coding, the following three themes emerged: research climate, situational factors, and potential risk (Table 4.5).

Table 4.5 Factors *Impacting Knowledge Sharing*

Code	Description	Examples
Research Climate		
Openly Collaborative	a climate in which peers and/or faculty create an open space for collaboration by being willing to listen, observe, and provide feedback	“We have a very collegial and open environment where people are encouraged to share ideas and collaborate.”
Discouraging Experiences	Experiences that negatively impact a student's way of navigating the doctoral experience	“My program seems to have a prescribed way of thinking.....and my research does not always fit within that narrative, so I have been reluctant to share with anyone”
Situational Factors	External factors such as online learning or the pandemic that limit and/or prevent students in a doctoral program from sharing knowledge	“COVID-19 certainly hasn’t helped with knowledge sharing, because I really don’t see many of the people I used to see on a regular basis.”
Potential Risk	withholding from sharing knowledge due to the risk of ideas being stolen, or risk of receiving repercussions from faculty and/or peers for not agreeing on research design/ideas	“A labmate plagiarized from my unpublished thesis document and submitted it for publication without my consent.”

For the first theme, *research climate* was the most mentioned factor affecting one’s willingness to share, with a total of 47 participants mentioning the climate of their doctoral program (40%). Participants provided various descriptions of the research climate; therefore, this theme is further characterized by two subcategories: collaborative openness and discouraging experiences. The first subcategory, and the most mentioned ($n = 32, 27\%$), was the factor of *collaborative openness*. This factor was mentioned in a positive tone as a reflection of the doctoral program’s open nature in allowing students to share and collaborate

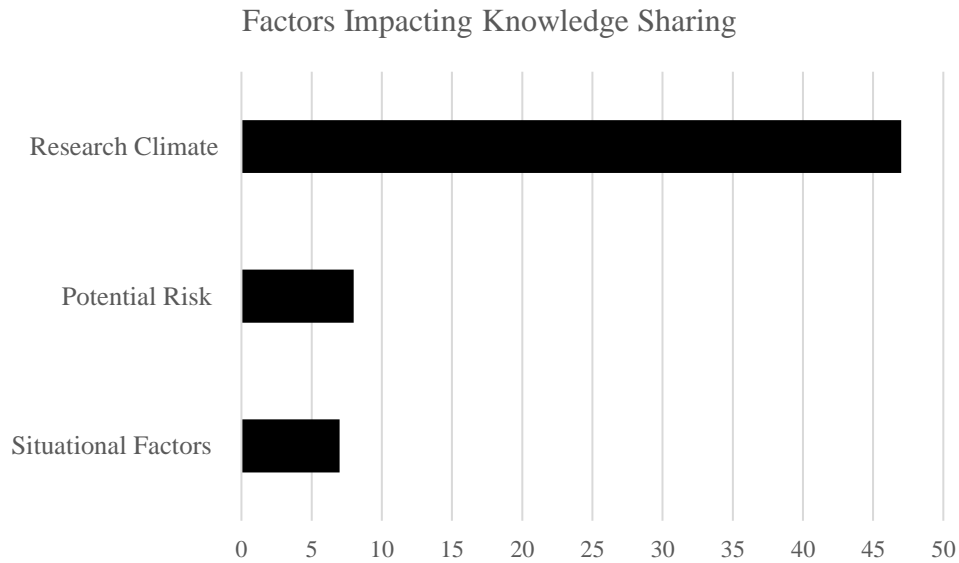
on ideas and/or projects (*We have a very collegial and open environment where people are encouraged to share ideas and collaborate*). Many participants had similar statements shedding a positive light on both their faculty and peers within their doctoral program.

By contrast, the subtheme discouraging *experiences* referred to those experiences that caused participants to refrain from sharing knowledge, with 15 participants citing direct instances of discouragement (12%). These participants had opposite statements compared to their counterparts that experienced openness and collaboration that were indicative of a negative research climate within their doctoral program that adversely affects their willingness to share knowledge (*My program seems to have a prescribed way of thinking...and my research does not always fit within that narrative, so I have been reluctant to share with anyone*).

The second theme that was mentioned was potential risk ($n = 8, 6\%$). Some participants recalled specific incidents of risk (*A labmate plagiarized from my unpublished thesis document and submitted it for publication without my consent*) whereas others mentioned the possibility of what could happen (*Sharing research ideas is always risky since it <could> involve stealing your ideas*) if research is shared.

The third theme that emerged was situational factors that affect knowledge sharing ($n = 7, 5\%$). The situational factors that were mentioned included the pandemic, online learning, and distance from campus (*COVID-19 certainly hasn't helped with knowledge sharing, because I really don't see many of the people I used to see on a regular basis*).

Figure 4.3 *Frequency of Codes for Factors Impacting Knowledge Sharing*



As shown in Figure 4.3, research climate was cited by participants in two different ways. The most for an openly collaborative doctoral program but secondly, participants also reported the opposite in which discouraging experiences with doctoral programs impacted their knowledge sharing behavior.

CHAPTER V

DISCUSSION

The purpose of this research was to investigate the informal experiences of knowledge sharing behaviors and the types of knowledge being shared that influence research self-efficacy among doctoral students studying in the United States. Additionally, the effect of first-generation status on this relationship was explored. Although previous research indicates that knowledge sharing leads to higher self-efficacy, this research focused on *research* self-efficacy specifically. Since research self-efficacy and the influence of knowledge sharing behaviors and types of knowledge being shared is a highly limited topic, I sought to address this gap in the research.

Social Cognitive Theory suggests that individuals learn by observing others. Knowledge sharing behaviors can be observed through various means of communication and in a variety of contexts in a doctoral program. Self-efficacy, a construct of social cognitive theory, is defined as one's beliefs in their ability to complete a task. For the purpose of this study, *research* self-efficacy was defined as one's perception of their ability to complete research or engage in research activities (Litson et.al., 2021). Knowledge sharing behaviors (collecting/donating) and the types of knowledge being shared (explicit/tacit) were investigated to see if these factors predict research self-efficacy among doctoral students.

Summary of Findings

For this study, I asked two research questions. The first question was analyzed through one regression analysis model using the four predictor variables (knowledge sharing behaviors – collecting and donating – and types of knowledge shared – explicit and tacit) and one criterion variable (research self-efficacy). The second question introduced a moderating variable of first-generation status; thus, an additional analysis was conducted for this question. Additionally, three open-ended questions were asked in the survey requiring qualitative analysis.

Knowledge Sharing Behaviors, Types of Knowledge Shared, and Research Self-Efficacy

The results from the regression analysis supported the hypothesis: knowledge sharing behaviors (collecting/donating) and types of knowledge being shared (explicit/tacit) collectively predicted research self-efficacy. Since research on knowledge sharing behaviors is rather new to this field, these findings provide insight to the doctoral experience. Knowledge sharing behaviors and types of knowledge shared did not individually serve as predictors of research self-efficacy, likely due to suppression effects and the limitations of this study that will be discussed in a subsequent section.

Mastery experience, noted as the most influential of the four sources of self-efficacy (Bandura, 1977), takes time, effort, and perseverance, and occurs through direct experience in completing the task. Given tacit knowledge is difficult to access directly, mastery experiences might serve as a valuable context for developing such knowledge. For example, doctoral programs providing authentic research experiences in which students are conducting actual research projects can be a way to provide an opportunity for the development of tacit knowledge.

The open-ended responses revealed that doctoral students engage with both their peers and faculty to learn about research by collecting knowledge in the classroom, as well as through informal discussions with peers and faculty mentorship. According to Weidman and Stein (2003), faculty and students play a role in doctoral student socialization. Doctoral socialization is found to increase the chances of a doctoral student staying at the University and progressing to graduation (Rigler et. al., 2017). Additionally, social capital is developed through personal interactions among peers connected to the academic community (Weidmen & DeAngelo, 2020). Based on these qualitative results, engaging in knowledge sharing with both faculty and peers is considered a positive learning experience which can lead to socialization and social capital in a doctoral program. These results also revealed that participants were more likely to donate knowledge when asked rather than offer to do so freely and were collecting knowledge through informal peer groups, class discussion, and mentorship from faculty. The theoretical framework of Social Cognitive Theory provides an explanation for how knowledge sharing takes place because, according to the theory, individuals can learn by observing others' behavior through vicarious experiences. In this case, individuals learn from others as they share research knowledge through both informal and formal processes.

According to previous research, trust is a key indicator of willingness to share both tacit and explicit knowledge (Zaqout & Abbas, 2012). Qualitative analysis also revealed a theme of *willingness to share research with others*, with many participants citing they felt comfortable sharing when asked. This theme indicates that, when a student is comfortable, they openly share research tips, ideas, and contribute to classroom discussions when needed, revealing potential opportunities for both explicit and tacit knowledge being shared.

Connecting previous research of trust as a factor in sharing, this study shows that comfortability is also a contributor. Conversely, some students revealed discouraging experiences in which their ideas were stolen and published without consent. In this situation, the research climate of the program negatively impacted students. Previous research has revealed that knowledge sharing can increase research productivity, but these effects vary based on institutional climate (Strik et al., 2021).

This study's findings provide some insight to such variance, as some students indicated research climate in a more positive manner than others.

First Generation as a Moderator

The variable of first-generation status was explored as a moderating variable. A moderator variable is one that is introduced to see if there is a significant effect on the strength of the relationship between the predictor variables and the criterion. As these results did not yield significant findings, it can be inferred that first-generation status does not have an impact on research self-efficacy. Although previous research suggests that first generation doctoral students have several external pressures impacting their progress (Abedi & Benkin, 1987; Seay et al., 2008), the results from this study show that status did not affect the relationship between knowledge sharing and research self-efficacy. A separate analysis revealed there was no significant difference between the two groups in terms of research self-efficacy thus the lack of moderation was expected. Similar to previous research, these results are indicative of the complexities of researching the topic of research self-efficacy for all doctoral students (Litson et.al., 2021). In support of these results, other researchers have also found that first generation doctoral students may not vary from their counterparts (Roksa et al., 2018), and it is expected that all doctoral students experience difficulty in their academic

pursuits. Since the definition of first generation status for this research is those whose parents/guardians did not complete a 4-year degree it could be argued that using a different definition could impact these results. For example, looking at individuals whose parents completed a graduate degree versus those who did not may yield other findings and should be considered for future research.

Implications

The results from this study indicate knowledge sharing behaviors and types of knowledge being shared predicts research self-efficacy. The information provided by this study can be used to further develop doctoral programs providing implications for both practice and policy within universities that have doctoral programs.

Although collectively the variables predicted research self-efficacy, individually they did not. As mentioned previously, this is likely due to the fact that knowledge sharing and types of knowledge being shared were more strongly correlated with one another than with self-efficacy, leading to suppression. To further explain the suppression of variables, three sources of self-efficacy were embedded within the survey questions: mastery experiences, vicarious experiences, and social persuasion. Taking this into consideration, the variables individually did not predict self-efficacy because it is likely due to the fact that multiple sources (mastery experiences, vicarious experiences, and social persuasion) interact with one another to develop one's self-efficacy and through triadic reciprocity (internal processes, environmental influences, and behaviors) these knowledge sharing behaviors likely reinforced one another, making it difficult to identify individual effects. When considering the results from this research it is imperative to implement practice and create policy that

considers knowledge sharing behaviors and types of knowledge being shared collectively, as they seemingly work together to develop research self-efficacy among doctoral students.

The qualitative analyses provided additional insight on how internal process (emotion and cognition), environmental influences such as the research climate, and behaviors can impact knowledge sharing behaviors. The findings reveal a strong connection to triadic reciprocity, a previously mentioned aspect of the Social Cognitive Theory, in which these three factors interact within the learning process (Boss et al., 1993; Maddux, 1995). Regarding the behavior of sharing knowledge about research with others, participants indicated readiness to share and feelings of inadequacy as reasons for not engaging in sharing knowledge with others. This finding supports the aspect of internal processes in triadic reciprocity because cognition (readiness) and emotion (feeling inadequate) influence doctoral student's knowledge sharing behaviors.

Secondly, the aspect of environmental influences in triadic reciprocity is shown through the consistent references of research climate. Notably, for all three qualitative questions, the theme of research climate continually appeared. Participants mentioned both encouraging and discouraging experiences in their program that directly impacted their willingness to share research knowledge, providing further evidence of how the research climate impacts students' experience throughout their doctoral journey. With such qualitative findings, future researchers might explore the role of research climate as a predictor variable for research self-efficacy. This could lead to inclusive practices for all students. Essentially, providing an opportunity for students to share knowledge in a safe, non-threatening environment could impact their overall experience with their doctoral program. When

Graduate Colleges, faculty, Deans, and other personnel think about creating culture within a doctoral program, the results from this study should be considered.

The third aspect of triadic reciprocity, behaviors, was also revealed in this research. Qualitative findings revealed a positive, openly collaborative, and comfortable research climate may contribute to student's overall willingness to share both explicit and tacit knowledge with their peers and create a safe space for students to socialize into the doctoral experience. As mentioned in previous research, the primary reason academics withhold information from their colleagues is due to fear of their research ideas being stolen (Strik et al., 2021), an experience that some of these participants described as well. Creating a supportive research climate through positive behaviors could help diminish this fear, as could research teams productively formed among the doctoral students.

Implications for Practice

Taking the above information into consideration and applying it to the context of practice in preparation for the graduate level experience, undergraduate programs might consider implementing opportunities for their students to engage in authentic research experiences. Engagement in authentic research activities may provide opportunities for both mastery and vicarious experiences as team members exchange different types of information with one another. Undergraduate students could be required to participate in different types of research experiences, such as developing a manuscript for publication, submitting a proposal to a conference, or writing a research grant. Another consideration for undergraduate research programs is to allow time for graduate students to actively engage in knowledge sharing with undergraduates. While doing so, graduate students can provide

words of encouragement to the undergraduates throughout their research journey (a form of social persuasion).

These suggestions offer opportunities for the sharing of both tacit and explicit knowledge through mastery experiences, vicarious experiences, and social persuasion respectively to assist in developing research self-efficacy among undergraduates. In turn, graduate students who serve as mentors to undergraduates will also be able to learn how to share their research knowledge with others more effectively. By bridging undergraduate and graduate programs through knowledge sharing, Universities could better prepare their students for the next step of their education and/or career while increasing research self-efficacy. Engaging in authentic research experiences may also contribute to the socialization process. As both faculty and students have been shown to play a significant role in doctoral student socialization as well as program culture (Weidman & Stein, 2003), the above suggestions for practice may impact the overall research climate, and important theme reflected in this study's findings in terms of whether or not these participants engaged in knowledge sharing behaviors.

Implications for Policy

Regarding implications for policy, University administrators can consider these results as a way to develop the research climate within their doctoral programs. For policy, it is suggested that administration could create incentives for faculty to develop positive research climates by providing funding for doctoral research experiences. Additionally, administration could consider time faculty spend providing one-on-one mentorship with doctoral students as requirements for tenure such as evidence of collaborative projects with students, such as co-authorship on conference proposals, grants, or manuscripts. University

administrators could consider implementing yearly research climate surveys to determine the state of the doctoral programs. Based on the results provided, administration can further develop policy to foster a positive climate using the suggestions above. Administration can also develop programs through the Graduate College to enhance the research climate through creating interdisciplinary opportunities for doctoral students to work with colleagues from other disciplines. This could also prepare students to further explore and expand their research thus preparing them to work in interdisciplinary teams in their future careers.

Limitations and Future Research

Although the quantitative analyses revealed significant relationships, four limitations of this study are important to consider for future research purposes. The first limitation is that a majority of the participants involved in this study were enrolled in one Midwestern University. Although some participants were enrolled in other universities across the United States, the majority of the sample were enrolled at the same institution resulting in a rather homogeneous sample. As a result, the culture of the University may affect knowledge sharing and research self-efficacy as research climate impacts knowledge sharing behaviors. Therefore, a recommendation for future research endeavors would be to include a large sample with participants from a variety of institutions to reflect more diverse doctoral student experiences, which would be more representative of the population being studied. Therefore, nation-wide recruitment of participants would be beneficial for further research in this area.

The second limitation that is important to note are the instruments used in this research, specifically the KSBM (collecting and donating). These instruments were created in the hospitality industry and were adapted to education for the purposes of this research. Although the instruments had internal reliability (as indicated by Cronbach alpha levels

greater than .759) and included relevant information for the purposes of this study, the adaptation of the instruments from the hospitality field to the education field could be a factor impacting the insignificant results. Since research on knowledge sharing behaviors in education is highly limited, the use of these instruments is a start to developing new knowledge for the field of educational psychology. However, future researchers might consider different scales addressing knowledge sharing behaviors and the types of knowledge being shared.

A third limitation to this study is the lack of generalizability inherent to qualitative analyses. A great deal of insight on research climate, sharing knowledge with others, and learning about research from others was gained, but further exploration is needed before these findings can be generalized more broadly to the doctoral student experience. Future possibilities to expand this research would be to add a measure of research climate to the quantitative analysis. According to the qualitative analysis in this study, research climate was regularly mentioned as either being supportive or a hindrance to student's willingness to share knowledge. Therefore, this variable may impact student's knowledge sharing behaviors and research self-efficacy. Further insight on this variable may yield more interesting results.

A fourth limitation is considering only the doctoral student experience; the faculty research experience should also be considered. Additional future possibilities for this research would be to explore the faculty experience of knowledge sharing within their discipline and how this contributes to their research self-efficacy. Furthermore, collecting data about the number of publications and other research experiences such as the number of grants proposed by the faculty participating in this research might provide insight to the research experience and more fully capture variables involved in developing research self-

efficacy. Furthermore, faculty experiences with research in their own doctoral program would also be an interesting variable to consider.

Finally, the qualitative findings indicate that peers and faculty play a significant role in donating/collecting both explicit and tacit knowledge to assist doctoral students with their research understanding. Although knowledge sharing behaviors and types of knowledge being shared did predict research self-efficacy, it might be prudent to return to the theoretical framing to consider the reciprocal relationship that self-efficacy shares with these behaviors. For example, it may be worth considering whether research self-efficacy serves as a predictor of knowledge sharing behaviors, specifically donating knowledge. Considering that self-efficacy is one's perception of their ability to complete a task, it could be argued that when one's perception of their ability to complete research is high, they are more likely to donate knowledge to others. This relationship should be explored in future research. Results from this research could then be used to encourage students with high research self-efficacy to mentor their classmates.

Conclusion

This study has provided a further look into the complexities of predicting research self-efficacy among doctoral students. Results revealed that both collecting and donating knowledge sharing behaviors as well as sharing both explicit and tacit types of knowledge predict higher research self-efficacy. Additionally, through questions pertaining to how doctoral students learn about research from others, share research with others, and aspects of their doctoral program that contribute to sharing or not sharing, the theme of research climate repeatedly appeared. Due to this finding, research climate is particularly important in fostering knowledge sharing behaviors among doctoral students. When considering this

information, it is important to note the contributions these behaviors and the climate of a doctoral program can have on students' research self-efficacy and their acclimation to the doctoral experience. Overall, this study has shown that research climate should be considered when addressing the doctoral experience especially when looking into knowledge sharing behaviors, types of knowledge being shared, and research self-efficacy.

References

- Abdul-Jalal, H., Toulson, P., & Tweed, D. (2013). Knowledge sharing success for sustaining organizational competitive advantage. *Procedia Economics and Finance*, 7, 150–157. [https://doi.org/10.1016/S2212-5671\(13\)00229-3](https://doi.org/10.1016/S2212-5671(13)00229-3)
- Abedi, J., & Benkin, E. (1987). The effects of students' academic, financial, and demographic variables on time to the doctorate. *Research in Higher Education*, 27(1), 3-14. <https://doi.org/10.1007/BF00992302>
- Bagaka's, J. G., Badillo, N., Bransteter, I., & Rispinto, S. (2015). Exploring student success in a doctoral program: The power of mentorship and research engagement. *International Journal of Doctoral Studies*, 10, 323-342. <https://doi.org/10.28945/2291>
- Barry, K.M., Woods, M., Warnecke, E., Stirling, C., & Martin, A. (2017). Psychological health of doctoral candidates, study-related challenges and perceived performance. *Higher Education Research & Development*, 37 (3), 468-483.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. *Psychological Review*, 84, 191-215. <https://doi.org/10.1037/0033-295X.84.2.191>.
- Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology*, 4(3), 359-373. <https://doi.org/10.1521/jscp.1986.4.3.359>.
- Bandura, A (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26. <https://doi.org/10.1146/annurev.psych.52.1.1>

- Banning, J. H. (2014). First-Generation College Student Dissertation Abstracts: Research Strategies, Topical Analysis, and Lessons Learned. *Journal of Education and Learning*, 3(2), 14-32. doi:10.5539/jel.v3n2p14
- Boss, P., Doherty, W. J., LaRossa, R., Schumm, W. R., & Steinmetz, S. K. (Eds.). (1993). *Sourcebook of family theories and methods: A contextual approach*. Springer Science & Business Media.
- Bushey-Miller, B. A. (2016). *Assets, strengths and educational pathways of first-generation doctoral students* (Doctoral dissertation, Ohio University).
- Cahalan, M., Perna, L. W., Yamashita, M., Wright-Kim, J. & Jiang, N. (2019). 2019 Indicators of Higher Education Equity in the United States: Historical Trend Report. Washington, DC: *The Pell Institute for the Study of Opportunity in Higher Education, Council for Opportunity in Education (COE), and Alliance for Higher Education and Democracy of the University of Pennsylvania (PennAHEAD)*.
- Cahusac de Caux, B. (2019). A Short History of Doctoral Studies. In: Pretorius, L., Macaulay, L., Cahusac de Caux, B. (eds) *Wellbeing in Doctoral Education*. Springer, Singapore. https://doi.org/10.1007/978-981-13-9302-0_2
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. L. Erlbaum Associates.
- Cummings, J. (2003) Knowledge sharing: A review of the literature. *The World Bank Operations Evaluation Department*, pp. 1-59.
- Davenport, T.H., Prusak, L., & Webber, A. (1998). *Working knowledge: How organizations manage what they know*. Harvard Business School Press. DOI: 10.1145/348772.348775

- Demirkasimoglu, N. (2015). Knowledge hiding in academia: Is personality a key factor? *International Journal of Higher Education*, 5(1), 128-140.
<https://doi.org/10.5430/ijhe.v5n1p128>
- Dericks, G., Thompson, E., Roberts, M., & Phua, F. (2019). Determinants of PhD student satisfaction: The roles of supervisor, department, and peer qualities. *Assessment & Evaluation in Higher Education*. <https://doi.org/10.1080/02602938.2019.1570484>
- Dhanaraj, C., Lyles, M. A., Steensma, H. K., & Tihanyi, L. (2004). Managing tacit and explicit knowledge transfer in IJVs: the role of relational embeddedness and the impact on performance. *Journal of international business studies*, 35(5), 428-442.
- Di Pierro, M. (2012). Strategies for doctoral student retention: Taking the roads less traveled. *The Journal for Quality and Participation*, 35(3), 29-32.
- Felder, P. P., Stevenson, H. C., & Gasman, M. (2014). Understanding race in doctoral student socialization. *International Journal of Doctoral Studies*, 9, 21-42.
<https://doi.org/10.28945/1947>
- Gardner, S., & Holley, K. (2011). "Those invisible barriers are real": The progression of first-generation students through doctoral education. *Equity & Excellence in Education*, 44(1), 77-92. 10.1080/10665684.2011.529791.
- Gardner, S., Holley, Karri A., & Joseph, J. (2013). The challenges of first-generation doctoral students. *New Directions for Higher Education*, 163, 43-54.
<https://eric.ed.gov/?id=EJ1030753>.
- Gardner, S.K., Jansujwicz, J., Hutchins, K., Cline, B., & Levesque, V. (2012). Interdisciplinary doctoral student socialization. *International Journal of Doctoral Studies*, 7, 377-394. <https://doi.org/10.1007/s10734-011-9415-1>

- Gill, T.G. & Hoppe, U. (2009) The business professional doctorate as an informing channel: A survey and analysis. *International Journal of Doctoral Studies*, 4, 27-57.
- Geiger, Roger. *Research, graduate education, and the ecology of American universities: an interpretive history*, in Sheldon Rothblatt and Bjorn Wittrock (editors), *The European and American University Since 1800* (Cambridge: Cambridge University Press), 1993, pp. 234-259.
- Guerin, C., Jayatilaka, A., & Ranasinghe, D. (2015). Why start a higher degree by research? An exploratory factor analysis of motivations to undertake doctoral studies. *Higher Education Research and Development*, 34(1), 89–104.
- Harvey, V. L., & Housel, T. H. (2011). Gathering ourselves and our students: Concluding remarks. *New Directions for Teaching and Learning*, 2011(127), 99-101.
<https://doi.org/10.1002/tl.461>
- Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-based nursing*, 18(3), 66–67. <https://doi.org/10.1136/eb-2015-102129>
- Higher Education Act, 20 U.S. Code § 1070a–11 (1965).
<https://www.law.cornell.edu/uscode/text/20/1070a-11>
- Hau, Y. S., Kim, B., Lee, H., & Kim, Y. G. (2013). The effects of individual motivations and social capital on employees’ tacit and explicit knowledge sharing intentions. *International Journal of Information Management*, 33(2), 356-366.
<https://doi.org/10.1016/j.ijinfomgt.2012.10.009>
- Institute of Education Sciences (2020). *Back to School Statistics*. National Center for Science and Engineering Statistics.
https://nces.ed.gov/fastfacts/display.asp?id=372#College_enrollment

- Islam, M.S., Kunifuji, S., Hayama, T., & Miura, M. (2013). Knowledge sharing practices among doctoral students in JAIST to enhance research skills. *Knowledge Management & E-Learning: An International Journal*, 5, 170-185.
DOI:10.34105/j.kmel.2013.05.012
- Jolley, D., Griffiths, A. W., Friel, N., Ali, J. B., & Rix, K. (2015). The importance of peer support during the final stages of a PhD. *A Guide for Psychology Postgraduates: Surviving Postgraduate Study*, 36.
- Kankanhalli, T., Tan. B.& Wei, K (2005). Contributing knowledge to electronic knowledge repositories: An empirical investigation. *MIS Quarterly*, 29(1), 113-143.
<https://doi.org/10.2307/25148670>
- Karim, D.N. & Majid, A.H. (2018). Barriers to knowledge sharing: Sharing among academics in tertiary institutions. *Advances in Economics, Business and Arrangement Research*, 75, 93-98.
- Kim, T.K. & Lee, G. (2013). Hospitality employee knowledge-sharing behaviors in the relationship between goal orientations and service innovative behavior. *International Journal of Hospitality Management*, 34, 324-337.
- Kuh, G. D., & Whitt, E. J. (1986). The invisible tapestry: Culture in American colleges and universities. (ISBN-0-913317) [Report]
<https://files.eric.ed.gov/fulltext/ED299934.pdf>
- Kumar, V., & Aitchison, C. (2017). Peer facilitated writing groups: a programmatic approach to doctoral student writing. *Teaching in Higher Education*, 23(3), 360-373.
<https://doi.org/10.1080/13562517.2017.1391200>

- Lambie, G. W., Hayes, B. G., Griffith, C., Limberg, D., & Mullen, P. R. (2014). An exploratory investigation of the research self-efficacy, interest in research, and research knowledge of Ph. D. in education students. *Innovative Higher Education*, 39(2), 139-153
- Lachance, K., Heustis, R. J., Loparo, J. J., & Venkatesh, M. J. (2020). Self-efficacy and performance of research skills among first-semester bioscience doctoral students. *CBE—Life Sciences Education*, 19(3), ar28.
- Leatherman, C. (2000). A new push for ABDs to cross the finish line. *The Chronicle of Higher Education*, 46(29), A18-A20.
- Leonard, D., Becker, R., & Coate, K. (2005). To prove myself at the highest level: The benefits of doctoral study. *Higher Education Research and Development*, 24(2), 135–149. <https://doi.org/10.1080/07294360500062904>
- Lewis-Beck, M. S., Bryman, A., & Liao, T. F. (2004). Objectivism. In *The SAGE encyclopedia of social science research methods* (Vol. 1, pp. 749-750). SAGE Publications, Inc., <https://www.doi.org/10.4135/9781412950589.n644>
- Litson, K., Blaney, J. M., & Feldon, D. F. (2021). Understanding the Transient Nature of STEM Doctoral Students' Research Self-Efficacy Across Time: Considering the Role of Gender, Race, and First-Generation College Status. *Frontiers in Psychology*, 12, 28. <https://doi.org/10.3389/fpsyg.2021.617060>
- Maddux, J. E. (2013). *Self-efficacy, adaptation, and adjustment: Theory, research, and application*. Springer Science & Business Media.
- Majid, S., & Wey, S. M. (2009). Knowledge sharing behavior of graduate students. In M. Jennex (Ed.), *Global aspects and cultural perspectives on knowledge management:*

- Emerging dimensions*, pp. 113-125. IGI Global. <http://doi:10.4018/978-1-60960-555-1.ch008>
- Martinez, E., Ordu, C., Della Sala, M. R., & McFarlane, A. (2013). Striving to obtain a school-work-life balance: The full-time doctoral student. *International Journal of Doctoral Studies*, 8(39-59), 039-059. <https://doi.org/10.28945/1765>
- McAlpine, L., & Inouye, K. (2021). What value do PhD graduates offer? An organizational case study. *Higher Education Research & Development*, 1-16. <https://doi.org/10.1080/07294360.2021.1945546>
- McPherson, C., Punch, S., & Graham, E. (2018). Postgraduate transitions from masters to doctoral study: Managing independence, emotion, and support. *Stirling International Journal of Postgraduate Research SPARK*, 4, 1-24.
- Mendoza, P. (2007). Academic capitalism and doctoral student socialization: A case study. *The Journal of Higher Education*, 78(1), 71-96, <https://doi.org/10.1353/jhe.2007.0004>
- Meschitti, V. (2019). Can peer learning support doctoral education? Evidence from an ethnography of a research team. *Studies in Higher Education*, 44 (7), 1209-1221.
- Moreno, M. & Kollanus, S. (2013). *On the motivations to enroll in doctoral studies in computer science — a comparison of PhD program models* [Paper Presentation]. 12th International Conference on Information Technology Based Higher Education and Training (ITHET), Antalya, Turkey. 10.1109/ITHET.2013.6671028
- National Center for Education Statistics. (2021). Impact of the Coronavirus Pandemic on Fall Plans for Postsecondary Education. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences. Retrieved [2022, April 15], from <https://nces.ed.gov/programs/coe/indicator/tpb>.

- National Center for Science and Engineering Statistics (NCSES). 2020. *Doctorate Recipients from U.S. Universities: 2019*. NSF 21-308. Alexandria, VA: National Science Foundation. Available at <https://nces.nsf.gov/pubs/nsf21308/>.
- Neumann, R. (2005) Doctoral Differences: Professional doctorates and PhDs compared, *Journal of Higher Education Policy and Management*, 27(2), 173-188.
10.1080/13600800500120027
- Overall, N. C., Deane, K. L., & Peterson, E. R. (2011). Promoting doctoral students' research self-efficacy: Combining academic guidance with autonomy support. *Higher Education Research & Development*, 30(6), 791-805.
<https://doi.org/10.1080/07294360.2010.535508>
- Pan, W. & Zhang, Q. (2014). A study on motivations of graduate students' knowledge hiding based on wuli-shili-renli system approach. 2nd International Conference on Education., Management, and Social Sciences.
- Peng, H. (2013). Why and when do people hide knowledge? *Journal of Knowledge Management*, 17(3), 398–415. <https://doi.org/10.1108/JKM-12-2012-0380>
- Phillips, J. C., & Russell, R. K. (1994). Research self-efficacy, the research training environment, and research productivity among graduate students in counseling psychology. *The Counseling Psychologist*, 22(4), 628–641.
<https://doi.org/10.1177/0011000094224008>
- Razavi, S.A., Shahrabi, A., & Siamian, H. (2017). The relationship between research anxiety and self-efficacy. *Mater Sociomed* 29(4), 247-250.
- Rigler, K. L., Bowlin, L. K., Sweat, K., Watts, S., & Throne, R. (2017). *Agency, socialization, and support: A critical review of doctoral student attrition*. [Paper

- Presentation] 3rd International Conference on Doctoral Education, University of Central Florida. <https://files.eric.ed.gov/fulltext/ED580853.pdf>
- Roksa, J., Feldon, D. F., & Maher, M. (2018). First-generation students in pursuit of the PhD: Comparing socialization experiences and outcomes to continuing-generation peers. *The Journal of Higher Education*, *89*(5), 728-752.
<https://doi.org/10.1080/00221546.2018.1435134>
- Rosser, V.J. (2004). The socialization and mentoring of doctoral students: A faculty's imperative. *Educational Perspectives*, *37*, 28-33.
- Sarikaya, E. E., McAlpine, L., & Amundsen, C. (2017). Doctoral students' experiences of feeling (or not) like an academic. *International Journal of Doctoral Studies*, *12*, 73-90. doi:<http://dx.doi.org/10.28945/3727>
- Seay, S. E., Lifton, D. E., Wuensch, K. L., Bradshaw, L. K., & McDowelle, J. O. (2008). First-generation graduate students and attrition risks. *The Journal of Continuing Higher Education*, *56*(3), 11-25. <https://doi.org/10.1080/07377366.2008.10400158>
- Stracke, E. (2010). Undertaking the journey together: Peer learning for a successful and enjoyable PhD experience. *Journal of University Teaching & Learning Practice*, *7*(1)
- Strik, N. P., Hamstra, M. R. W., & Segers, M. S. R. (2021). Antecedents of knowledge withholding: A systematic review & integrative framework. *Group & Organization Management*, *46*(2), 223–251. <https://doi.org/10.1177/1059601121994379>
- Sverdlik, A., Hall, N. C., McAlpine, L., & Hubbard, K. (2018). The PhD experience: A review of the factors influencing doctoral students' completion, achievement, and well-being. *International Journal of Doctoral Studies*, *13*, 361-388.
<https://doi.org/10.28945/4113>

- Terenzini, P. T., Springer, L., Yaeger, P. M., Pascarella, E. T., & Nora, A. (1996). First-generation college students: Characteristics, experiences, and cognitive development. *Research in Higher Education*, 37(1), 1-22.
<https://doi.org/10.1007/BF01680039>
- U.S. Bureau of Labor Statistics (2020). *Education level and projected openings, 2019–29*
U.S. Bureau of Labor Statistics Career Outlook. <https://www.bls.gov/careeroutlook/>
- van den Hooff, B., & de Ridder, J. A. (2004). Knowledge sharing in context: The influence of organizational commitment, communication climate and CMC use on knowledge sharing. *Journal of Knowledge Management*, 8(6), 117–130.
<https://doi.org/10.1108/13673270410567675>
- Wegener, C., Meier, N., & Ingerslev, K. (2016). Borrowing brainpower—sharing insecurities. Lessons learned from a doctoral peer writing group. *Studies in Higher Education*, 41(6), 1092-1105. <https://doi.org/10.1080/03075079.2014.966671>
- Weidman, J. C., & DeAngelo, L. (2020). Toward a 21st century socialization model of higher education’s impact on students. *Socialization in Higher Education and the Early Career* , 311-323. https://doi.org/10.1007/978-3-030-33350-8_17
- Weidman, J. & Stein, E. (2003). The socialization of doctoral students to academic norms. *Research in Higher Education*, 44, 641-656. 10.1023/A:1026123508335.
- Zaqout, F. & Abbas, M. (2012). Towards a model for understanding the influence of the factors that stimulate university students' engagement and performance in knowledge sharing, *Library Review*, 61(5), 345-361.
<https://doi.org/10.1108/00242531211280478>

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective.

In *Handbook of self-regulation* (pp. 13-39). Academic press.

Appendix A: IRB Approval Letter



Oklahoma State University Institutional Review Board

Date: 10/05/2021
Application Number: IRB-21-416
Proposal Title: THE IMPACT OF KNOWLEDGE SHARING AMONG DOCTORAL STUDENTS ON RESEARCH SELF-EFFICACY

Principal Investigator: Julie Swaringim-Griffin
Co-Investigator(s):
Faculty Adviser: Jane S Vogler, Ph.D.
Project Coordinator:
Research Assistant(s):

Processed as: Exempt
Exempt Category:

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB

Appendix B: Demographics Questionnaire

1. First Generation Status
 1. Yes (parents/guardians did not complete a four-year college degree)
 2. No (parents/guardians did complete a four-year college degree)

2. Location of Doctoral Studies
 1. United States
 2. Outside of the United States

3. Year in Doctoral Studies

4. Race
 1. Asian/ Pacific Islander
 2. Black or African American
 3. Hispanic or Latino
 4. Native American or American Indian
 5. White or Caucasian
 6. Multiracial/ Multi-ethnic
 7. Other
 8. Prefer not to Respond

5. Gender
 1. Female
 2. Male
 3. Transgender
 4. Non-Binary
 5. Prefer not to respond

6. Institutional Type:
Public
Private
Other

7. Carnegie Classification:
Research 1
Research 2
Unknown
Other

8. Institution Size:
 - Small (2,999 or less)
 - Medium (3,000 to 9,999)
 - Large (10,000 +)

9. Student Classification:
 - Domestic student
 - International student

10. Employment:
 - Graduate Teaching Assistant/Associate
 - Graduate Research Assistant/Associate
 - Part-time employee
 - Full-time employee
 - None
 - Other

11. Program Type:
 - Doctor of Philosophy (PhD)
 - Doctor of Education (EdD)
 - Doctor of Psychology (PsyD)
 - Doctor of Medicine (MD)
 - Doctor of Pharmacy (PharmD)
 - Other:

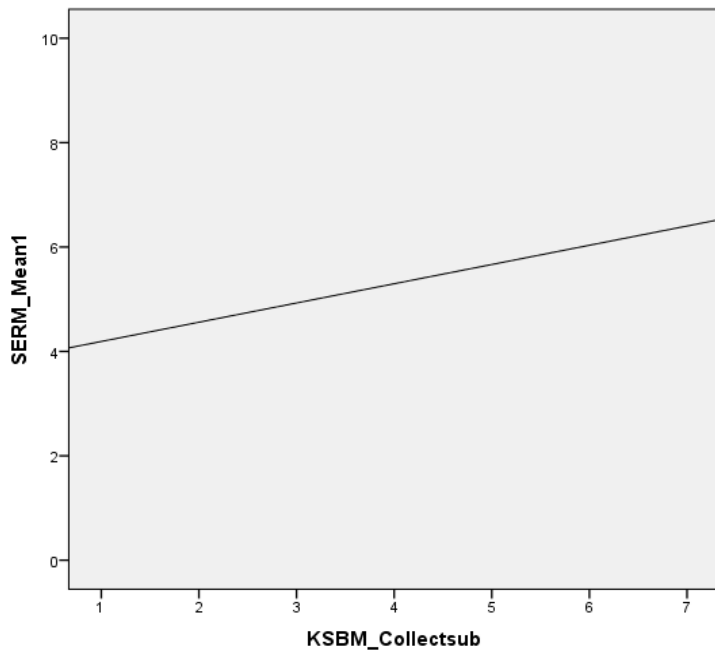
12. Prior to enrolling in doctoral education, did you have research experience? (ex. Conducted a research study or served on a research team)
 - None
 - Some Experience
 - Substantial Experience

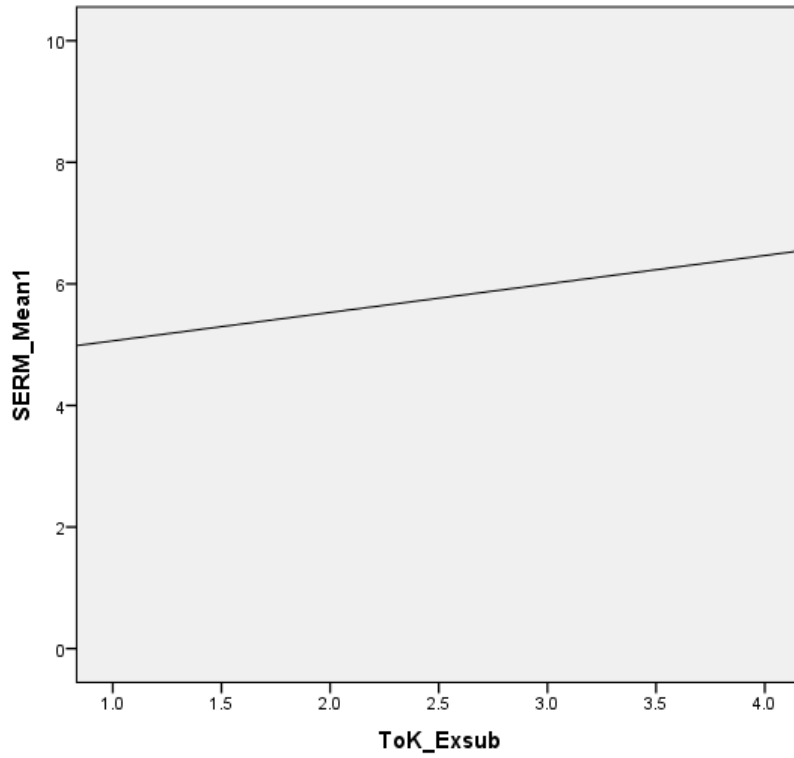
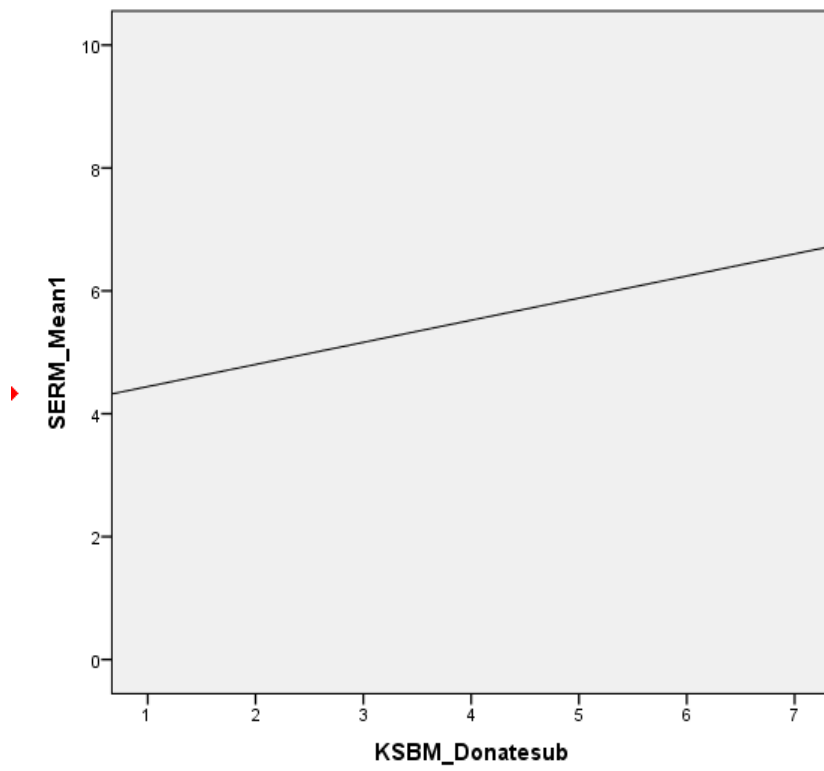
13. What University/College do you attend? (not required)

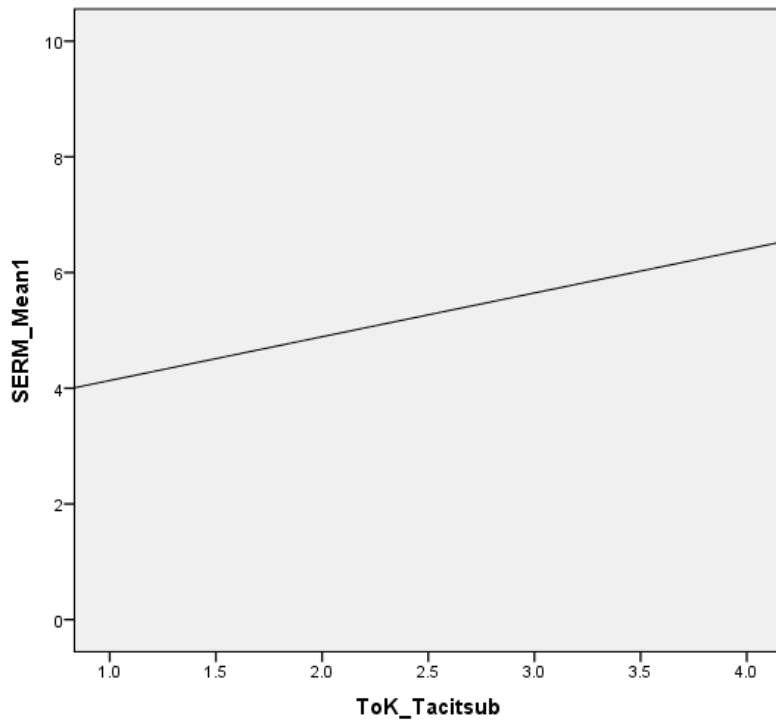
Appendix C: Outputs

Correlations

	SERM_Mean1	ToK_Exsub	ToK_Tacitsub	KSBM_Collectsub	KSBM_Donatesub
Pearson Correlation	SERM_Mean1	1.000	.228	.325	.282
	ToK_Exsub	.228	1.000	.657	.457
	ToK_Tacitsub	.325	.657	1.000	.549
	KSBM_Collectsub	.282	.457	.549	1.000
	KSBM_Donatesub	.306	.542	.683	.712
Sig. (1-tailed)	SERM_Mean1	.	.002	.000	.000
	ToK_Exsub	.002	.	.000	.000
	ToK_Tacitsub	.000	.000	.	.000
	KSBM_Collectsub	.000	.000	.000	.
	KSBM_Donatesub	.000	.000	.000	.000
N	SERM_Mean1	153	153	153	153
	ToK_Exsub	153	153	153	153
	ToK_Tacitsub	153	153	153	153
	KSBM_Collectsub	153	153	153	153
	KSBM_Donatesub	153	153	153	153







Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.014	.660		4.564	.000		
	ToK_Exsub	-.017	.213	-.008	-.080	.937	.549	1.823
	ToK_Tacitsub	.490	.278	.211	1.762	.080	.414	2.413
	KSBM_Collectsub	.139	.144	.106	.959	.339	.484	2.068
	KSBM_Donatesub	.107	.150	.091	.714	.476	.367	2.724

a. Dependent Variable: SERM_Mean1

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.353 ^a	.124	.101	1.433	2.057

a. Predictors: (Constant), KSBM_Donatesub, ToK_Exsub, KSBM_Collectsub, ToK_Tacitsub

b. Dependent Variable: SERM_Mean1

VITA

Julie Kaye Swaringim-Griffin

Candidate for the Degree of Doctor of Philosophy

Thesis: THE IMPACT OF KNOWLEDGE SHARING AMONG DOCTORAL STUDENTS
ON RESEARCH SELF-EFFICACY

Major Field: Educational Psychology

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Educational Psychology at Oklahoma State University, Stillwater, Oklahoma in May, 2022.

Completed the requirements for the Master of Science in Human Development and Family Science-Gerontology at Oklahoma State University, Stillwater, Oklahoma in July, 2016.

Completed the requirements for the Bachelor of Science in Human Development and Family Science at Oklahoma State University, Stillwater, Oklahoma in May, 2013.

Experience:

Associate Director of Pre-Award Sponsored Programs; Division of Research & Innovation, University of Arkansas, Jan. 2022-Present

Grants Manager; College of Education & Human Sciences
Oklahoma State University, May 2020-January 2022

Director & Other Roles, Division of Institutional Diversity
Oklahoma State University, January 2015-May 2020

Adjunct Instructor, Oklahoma State University, January 2015- Present

Professional Memberships: National Council for Research Administrators (NCURA)