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## Identifying the Impact of Perceived Shared Cultural Values on Knowledge Sharing Through a Social Media Application

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Identifying the Impact of Perceived Shared Cultural Values on Knowledge Sharing  
Through a Social Media Application

by

Mel A. Tomeo

A dissertation submitted in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy  
in  
Information Systems

College of Computing and Engineering  
Nova Southeastern University

2021

We hereby certify that this dissertation, submitted by Mel Tomeo conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirements for the degree of Doctor of Philosophy.

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## Abstract

An Abstract of a Dissertation Submitted to Nova Southeastern University  
in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

# Identifying the Impact of Perceived Shared Cultural Values on Knowledge Sharing Through a Social Media Application

by

Mel A. Tomeo

April 29, 2021

Knowledge sharing (KS) has been determined by many researchers as an important tool for problem-solving experiences and achieving success. Recent studies have explained KS as an activity in which knowledge is exchanged through individuals or between organizations. KS can help facilitate decision-making capabilities, stimulate cultural change, and create innovation. Through KS, individuals and organizations can capture explicit and tacit knowledge to save time and money.

Previous studies have indicated a lack of research in how perceived shared cultural values impact KS through a social media application. The purpose of this research was to add new information to the body of knowledge in regard to identifying perceived shared cultural values as measured by demographic factors such as age, race, religion, language, and socio-economic status to understand how these characteristics impacted an individual's ability to share knowledge through social media applications. The goal was to fill the gap in the literature by explaining the effect of perceived shared cultural values on knowledge creation and sharing through the usage of social media applications. The results showed potential generalizability in identifying the type of KS (tacit and explicit) that will occur. Previous studies that focused on KS, culture, social media, and barriers are discussed regarding how these features impact an individual's ability to share knowledge.

Perceived shared cultural values were identified to gain an insight into how these perceived values correlated with actual knowledge being exchanged through social media applications. To test the hypotheses, data were collected based on the analysis of social media postings. A total of 42 participants took the survey. The survey specifically collected the participants' age, race, religion, language, and socioeconomic status. A total of 113 postings were collected, 30 of which contained no exchange of knowledge. The remaining 83 were analyzed independently by three subject matter experts. The postings of the knowledge being shared between the participants based on their perceived shared cultural values was analyzed and placed into two categories: tacit and explicit KS. The structural equation modeling technique was used to analyze the relationships between the different perceived shared cultural values.

The tacit and explicit models were not supported. All ten hypotheses were not supported due to the  $p$ -values that were calculated through bootstrapping. The strength of the relationships was calculated and displayed by using SmartPLS. The data collected from the postings and the demographics collected through a survey were an attempt to test the 10 hypotheses. The results indicated that all the hypotheses were not supported due to their significance levels.

Several limitations existed in this study, such as sample size, diverse population, amount of knowledge being shared through the social media application, instructional method, and remote nature of teacher involvement. Implications regarding how this study differed from previous studies' results were provided. Future research suggestions were made to extend the body of knowledge.

## **Acknowledgments**

This dissertation was completed only through the help of my parents and many individuals who assisted me throughout the process. I want to thank my parents for always motivating me and pushing me to complete this dissertation. I am thankful to all my family members for inspiring me to continue throughout this endeavor. I also want to send a special thanks to Dr. John J. Scarpino, who recommended Nova Southeastern University (NSU) and inspired me to start the doctoral process.

I would like to thank Dr. Ellis for his quick feedback and how interested in my completion of this study. He challenged and supported me throughout the dissertation and was always available to answer questions to guide me through the process. His personality and mine matched and I could not ask for a better dissertation chair.

Thanks to Dr. Snyder and Dr. Wang for providing their feedback to help me throughout the dissertation process, and to all professors who taught me in various courses at NSU. I feel that the College of Computing and Engineering department at NSU is a great department full of faculty who care about their students' success. The Information Systems degree challenged me and is a terrific program for students to further their education.

Thanks to my many colleagues from this university who have shared their knowledge and ideas to help me complete this dissertation process. Without their advice and knowledge, this process would have taken longer. Lastly, I would like to thank the institution where I collected the data for allowing me to involve their students to participate in this study.

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## Chapter 1

### Introduction

#### Background

In a knowledge-based economy with more organizations striving to go global, the process of understanding knowledge sharing among cross-cultural organizations has never been more important (Borges, Bernardi, & Petrin, 2019). One way of categorizing knowledge sharing is through the SECI model, which is composed of Socialization, Externalization, Combination, and Internalization (Nonaka, 1991). Socialization consists of converting new knowledge through shared experiences (Allal-Chérif & Makhlouf, 2016). Externalization converts tacit knowledge into explicit knowledge to give a representation that knowledge can be stored and memorized (Allal-Chérif & Makhlouf, 2016). Combination is the development of explicit knowledge and how it changes into a new and more difficult type of knowledge (Allal-Chérif & Makhlouf, 2016). Internalization converts explicit knowledge into tacit knowledge (Donate & de Pablo, 2015).

From previous investigations and studies, different types of knowledge can be broken down into three main categories: explicit knowledge, implicit knowledge, and tacit knowledge (Al Saifi, Dillon, & McQueen, 2016; Nonaka & Takeuchi, 1995). Explicit knowledge is the type of knowledge that can be articulated, documented, and easily shared with others (Park & Gabbard, 2018). Implicit knowledge is a combination of explicit and tacit, regarding knowledge deriving from an experience that can be explained and written down (Nickols, 2000). Tacit knowledge is the type of knowledge that an individual creates from his or her personal or professional experience and is shared mainly through interpersonal interaction or socialization (Chen, Baptista Nunes, Ragsdell, & An, 2018).

The impact of culture on knowledge sharing has been frequently researched. A study conducted by Zhang, De Pablos, and Xu (2014) investigated how cultural values affect explicit and implicit knowledge sharing in a multi-national virtual class. Ardichvili, Maurer, Li, Wentling, and Stuedemann (2006) developed a qualitative study on how national and ethnic culture can impact knowledge sharing in a virtual community. They found that culture played a substantial role in knowledge sharing in that specific virtual community in which they conducted their study. Siau, Erickson, and Nah (2010) conducted their study on how national culture affects communication and the types of knowledge sharing in virtual communities. They found several national cultural differences between the United States and China.

With the increased attention and popularity of social media applications, this could be the start of a new revolution of knowledge sharing in organizations (Kane, 2017). Nisar, Prabhakar and Strakova (2019) conducted a study that found social media applications to be an increasingly important knowledge sharing tool regarding when people share their knowledge towards an individual or company on a social media application. They found that this type of knowledge sharing increases a feeling of connection and helps develop a unique culture based on trust and confidence. In a similar study, Gal, Blegind and Lyytinen (2014) found that the growth in new social media applications has increased communication and contributed to encouraging the development of knowledge creation and knowledge sharing between individuals. Leonardi (2015) found that sharing knowledge through a social media application will allow others to retain new relevant knowledge that they did not expect to gain and could be used in the future.

An investigation on the relationships between perceived shared cultural values through knowledge sharing using social media applications was conducted. This research expands upon Razmerita, Kirchner, and Nielsen's (2016) investigation by identifying the relationship between

perceived shared cultural values and the type of knowledge sharing through social media applications. This research used a quantitative research approach to identify these different relationships. Data on the exchange of knowledge sharing through a social media application was collected.

### **Problem Statement**

Previous research has addressed how team culture impacts the ability to share tacit knowledge through social media applications within an organization, but a gap in the literature revealed that a comparison of perceived share cultural values as measured by demographic factors such as age, race, religion, language, and socio-economic status had not been investigated (Jamshed & Majeed, 2019). Razmerita et al. (2016) indicated a lack of research in how people from different individual cultures could impact their ability to share tacit knowledge through social media applications. Vuori and Okkonen (2012) found that an individual's culture could be a barrier and a motivational factor when sharing tacit knowledge. Raza, Najmi, and Shah (2018) indicated that cultural diversity was one of many barriers that could cause a lack in sharing knowledge and various communication problems, resulting in an individual making poor or wrong decisions. Razmerita et al. (2016) suggested expanding their study by exploring the impact of cultural factors on knowledge sharing through social media applications.

Investigating how an individual's culture can impact his or her ability to share knowledge through social media applications is vital due to the substantial growth of interest in the Internet and social media platforms (Okazaki, Andreu, & Campo, 2017). Social media platforms provide new ways of sharing knowledge, giving organizations additional methods to benefit from social capital and valuable knowledge that individuals can contribute to an organization (Razmerita et al., 2016). A study conducted by Papa, Santoro, Tirabeni, and Monge (2018) revealed that

knowledge sharing through social media was an important factor for innovation. Their results indicated that social media allowed individuals to communicate with large communities, gather knowledge, and create new information to help produce innovation.

## **Goals**

To address the research problem, this research was a quantitative study to identify the impact of perceived shared cultural values on knowledge sharing through a social media application. Cultural characteristics can consist of several categories such as nationality, religious affiliation, gender identification, generation level, and social class level (Spencer-Oatey & Franklin, 2012). In this study on how perceived shared values can impact knowledge sharing through a social network, the demographic factors focused on were age, race, religion, language, and socio-economic status. In this research, Hofstede's cultural dimensions theory was used to explain how cross-cultural communication can affect the transfer of tacit and explicit knowledge (Hofstede, 2003). According to Hofstede's (2003) theory, there are five cultural dimensions, which are Power Distance Index (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance Index (UAI), and Long-Term Orientation (LTO). In this research, Hofstede's cultural dimensions theory was used to provide an insight into other cultures' interactions regarding the exchange of knowledge and which cultural characteristics have the greatest impact on an individual to engage in sharing knowledge.

This research expanded upon Razmerita et al.'s (2016) investigation by using a significantly more diverse population and including age, race, religion, language, and socio-economic status. The diverse population was increased significantly to include various cultural backgrounds to strengthen the internal validity of the research. In Razmerita et al.'s (2016) previous research model, they included demographics (specifically age, gender, position in the company, and years of experience), individual factors (drivers and barriers), organizational

factors (drivers and barriers), and technological factors (only barriers). In this research, a similar research model was used, but it included four new perceived shared values such as race, socioeconomic status, religion, and age, which were not previously included in Razmerita et al.'s (2016) study. The purpose of this study was to use Hofstede's cultural dimensions theory as a basis for measuring perceived shared cultural values in regard to understanding which perceived shared values had the greatest impact on an individual to engage in sharing knowledge through a social media application.

Previous studies investigated how motivational factors influenced tacit knowledge sharing through social media applications (Panahi, Watson, & Partridge, 2016; Vuori & Okkonen, 2012). Panahi et al.'s (2016) results indicated that social media applications have supported tacit knowledge and that social media encouraged individuals to socialize with each other by providing a virtual area to have conversations, discussions, and instant communication. Vuori and Okkonen (2012) explored how motivational factors could affect knowledge sharing through an intra-organizational social media application. Their results indicated that social media platforms were not a motivational factor regarding sharing knowledge with other employees in an organization. The goal of this study was to add to the body of knowledge in regards identifying the impact of perceived shared cultural values on knowledge sharing through a social media application.

### **Research Questions**

In this quantitative study, specific perceived share cultural values were identified to gain an insight into how these characteristics correlate with actual knowledge being exchanged through a social media application. The research sought to answer the following question:

RQ1. What impact does perceived shared cultural values illustrated as age, race, religion, language, and socio-economic status have on knowledge sharing through a social media application?

### **Hypothesis**

The following hypotheses were tested:

- H1. Individuals of a similar age are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar age.
- H2. Individuals of a similar race are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar race.
- H3. Individuals of a similar socioeconomic status are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H4. Individuals who share the same religion are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar religion.
- H5. Individuals who share the same native language to communicate are more likely to share tacit knowledge through a social media application compared to individuals who do not use a similar language.
- H6. Individuals of a similar age are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar age.
- H7. Individuals of a similar race are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar race.

- H8. Individuals of a similar socioeconomic status are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H9. Individuals who share the same religion are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar religion.
- H10. Individuals who share the same native language to communicate are more likely to share explicit knowledge through a social media application compared to individuals who do not use a similar language.

### **Relevance and Significance**

Organizations can grow stronger, create more innovation, and gain a competitive advantage by identifying which perceived share cultural values of an individual can increase tacit knowledge sharing through social media applications (Zhang & Jiang, 2015). A considerable amount of research exists on culture, social media, barriers, and socialization regarding how these features have impacted an individual's ability to share knowledge. However, a limited amount of research has been conducted on comparing cultural differences among individuals, specifically on language, age, population, race, and religion, through sharing knowledge (Razmerita et al., 2016).

In prior literature, the focus of research has been on identifying factors and barriers that affected employees' knowledge sharing behavior (Cabrera & Cabrera, 2002; King & Marks, 2008; Wasko & Faraj, 2005). Zhang and Jiang (2015) found a gap in the literature on how different characteristics of an individual have influenced sharing knowledge. Culture is one

characteristic that plays an important part in the lack of sharing knowledge, which can cause communication problems and barriers (Razmerita et al., 2016).

Previous literature on this topic by Razmerita et al. (2016), Aboelmaged (2018), and Okazaki et al. (2017) has led to identifying four specific areas of research related to knowledge sharing: culture, social media, socialization, and barriers. Culture refers to how an individual's culture plays a role in a his or her motivation to share knowledge. Social media refers to understanding what role social media tools play in knowledge sharing. Socialization refers to understanding how tacit knowledge is shared through social media applications. Barriers refer to understanding the type of barriers that prevent or slow down communication and interaction regarding knowledge sharing.

Jamshed and Majeed (2019) investigated the relationship between team culture and employees to detect the factors that influenced knowledge sharing behavior of team members to enhance the outcomes of the team. Jamshed and Majeed (2019) hypothesized that understanding these factors could create a great deal of knowledge for potential gains in an organization. Their results indicated that team culture did influence knowledge sharing behavior of team members. They also found that team culture played a vital role in knowledge sharing to reduce errors, decrease cost, and provide decision support to enhance team performance.

Killingsworth, Xue, and Liu (2016) conducted a research study to evaluate team environment and motivation on positive knowledge sharing attitudes in diverse global virtual teams. They investigated if knowledge sharing behavior was affected by different types of team environment factors within global virtual teams. Killingsworth et al.'s (2016) results indicated that factors such as nationality, age, and computer experience were related to an individual's knowledge sharing behavior in global virtual teams. This research attempted to identify how

different variables, specifically the demographic factors (age, race, religion, language, socio-economic status) could influence knowledge sharing through social media applications.

Due to social media applications increasing knowledge creation and sharing capabilities, organizations are now required to invest in new technologies to stay competitive (Aboelmaged, 2018). The interest in social media platforms has grown tremendously within the last decade and has found particular niche markets where knowledge sharing, knowledge creation, and reusable knowledge have become important for organizations (Mladenović, Krajina, & Kucharska, 2018). Vuori and Okkonen (2012) investigated which factors motivated and impeded employees of companies to share knowledge through an intra-organizational social media platform. They found that organizational culture or general attitude did not set particular challenges for knowledge sharing but concluded that social media should be used as a tool and should be a mutual benefit to both the participant and the organization where knowledge was being shared.

Socialization is an important part of knowledge sharing because it is based on how an individual acquires values, attitudes, norms, knowledge, and the skills needed to perform specific actions (Olweny, 2017). Olweny (2017) conducted a study to better understand how social interaction influenced educators and curriculum. Social interaction was found in all stages of the educational process. Olweny (2017) also found that social interaction could at times have negative consequences within educational programs. In a similar study, Kulangara, Jackson, and Prater (2016) explored the interrelationship between trust, social interaction, and information sharing within a business context. Kulangara et al.'s (2016) results indicated that social interaction within a business context increases trust, while social interaction in a social setting did not impact trust.

Barriers in knowledge sharing are increasing issues that can cause problems in organizations, and these barriers have been proven to decrease the effectiveness of knowledge sharing between individuals, which results in reducing the growth and innovation of an organization (Serenko & Bontis, 2016). Akgün, Keskin, Ayar, and Okunakol (2017) investigated barriers regarding why software team members could be reluctant to share knowledge with other team members during the development life cycle of a project. Their results indicated that the participants' cultures could shape the perception and behavior of the other participants and their willingness to share knowledge during the development of software projects. Akgün et al.'s (2017) results helped identify which barriers were more frequent regarding software developers being reluctant to share knowledge.

Social media is receiving considerable attention in both the academic world and in industry because it is an important tool that can create effective communication and knowledge sharing techniques (Ahern, Feller, & Nagle, 2016). In prior literature, many studies have attempted to understand which social media applications are useful for supporting managers in understanding knowledge acquisition, knowledge sharing, and knowledge transfer. In particular, Naeem (2019) explored how social networking applications (specifically targeting Facebook, WhatsApp, and Viber) could encourage knowledge sharing practices among employees of different universities. Naeem's (2019) results indicated that knowledge sharing through social media applications could help reduce knowledge hoarding and communication problems to encourage knowledge transfer practices.

Similar to Razmerita's (2016) study, this research was an attempt to add new and original information to the body of knowledge in regards to identifying specific demographic factors of individuals such as age, race, religion, language, and socio-economic status to understand how

these characteristics impact their ability to share knowledge through social media applications. The aim of this research was to add to the body of knowledge by identifying which perceived share cultural values impact knowledge sharing through social media applications. The goal of this research was to fill the gap in the literature by understanding the effect of certain perceived share cultural values on knowledge creation and sharing through the usage of social media applications. The results of this study showed which type (tacit and explicit) knowledge sharing occurred through this quantitative study.

### **Barriers and Issues**

One anticipated barrier in this study was creating groups of students to work together who did not know each other from previous classes. The purpose of creating groups with students who did not know each other and did not work on previous projects together was to prevent any favoritism between students who preferred to share knowledge with another student from past experiences. The goal of having random students with no prior experience of working together was an attempt to create a strong generalizability. This barrier was addressed by first asking the students if they knew each other and who had worked with each other in the past. By addressing this barrier, the idea was to create better results in identifying which perceived shared cultural values affected knowledge creation and sharing through the usage of social media applications.

Another barrier was the data collection regarding the surveys. Collecting data from the student-completed surveys took time and effort. This problem was addressed by sending out several emails to remind the students to complete the survey. Another anticipated barrier was receiving an adequate number of surveys from the students in a timely manner. This obstacle was addressed by having the professor count the completion of the survey into the overall grade of the project, which resulted in increased participation in the survey. This was approved by the

professor of the class. Analyzing the data was another anticipated barrier. Finding common themes and significant findings from the data was time challenging. These barriers were addressed by time management and using quantitative tools to help evaluate the data.

### **Assumptions, Limitations, and Delimitations**

#### *Assumptions*

One assumption in this research was that all participants will answer the surveys truthfully. Second, it was assumed that the participants understood each question that was asked of them. The reason behind this assumption was that most of these students had a diverse background where English was a second language, but they all needed to be able to speak fluent English to be accepted into the class where this study took place. Third, the forum posts were measured from each student's own thoughts and opinions.

#### *Limitations*

A limitation existed in the amount of knowledge being shared through the social media applications. A limitation existed in not having a diverse enough sample in terms of all demographic factors, as was the relatively small sample size. A limitation existed regarding the inability to control a variety of large variables, such as learner characteristics, instructional method, and teacher involvement. Another limitation was that all the participants were from a single college. These limitations were addressed through a quantitative approach by having them complete surveys.

#### *Delimitations*

One delimitation was that only students registered in a programming course in a single college were included in this study. Another delimitation existed in the sense that this study only focused on identifying the participants' specific demographic factors, such as age, race, religion, language, and socio-economic status. This study was limited to a particular social media

application to gather data. The participants were all from a college in the United States and should not be considered generalized across different universities and countries.

### **Definitions of Terms**

Throughout this document, specific key terms were used, and to help make this study easier to understand, an explanation of these words is provided below:

1. *Combination* is the development of explicit knowledge and how it changes into a new and more difficult type of knowledge (Allal-Chérif & Makhlouf, 2016).
2. *Explicit knowledge* is the type of knowledge that can be articulated, documented, and easily shared with others (Park & Gabbard, 2018).
3. *Externalization* converts tacit knowledge into explicit knowledge to give a representation that knowledge can be stored and memorized (Allal-Chérif & Makhlouf, 2016).
4. *Hofstede's cultural dimensions theory* explains that there five cultural dimensions, in this research, this theory would be used to explain how cross-cultural communication can affect the transfer of tacit and explicit knowledge (Hofstede, 2003).
5. *Implicit knowledge* is a combination of explicit and tacit, regarding knowledge deriving from an experience that can be explained and written down (Nickols, 2000).
6. *Internalization* converts explicit knowledge into tacit knowledge (Donate & de Pablo, 2015).
7. *Knowledge hoarding* is a behavior to hide knowledge (Holten et al., 2016)
8. *Knowledge management systems* are systems that allow an individual or program to capture, share, develop, and use the knowledge efficiently (Farnese, Barbieri, Chirumbolo, & Patriotta, 2019).
9. *Knowledge sharing* is the process of transmitting or transferring knowledge between individuals and organizations (Le & Lei, 2018).

10. *SECI Model* is a model of knowledge conversion consisting of socialization, externalization, combination and internalization (Nonaka & Takuechi, 1995).
11. *Socialization* consists of converting new knowledge through shared experiences (Allal-Chérif & Makhlouf, 2016).
12. *Social media application* is a web-based service that allows individuals to create profiles, connect with others on the same network through a messaging service, and meet new people through mutual connections (Boyd & Ellison, 2015).
13. *Tacit knowledge* is the type of knowledge that an individual creates from his or her personal or professional experience and is shared mainly through interpersonal interaction or socialization (Chen, Baptista Nunes, Ragsdell, & An, 2018).

## **Summary**

Chapter 1 of this study discussed the background, the research problem statement and goals, relevance and significance, barriers and issues, assumptions, limitations and delimitations, and definitions of terms. Knowledge sharing was briefly described, along with the importance of this study and how it added to the body of knowledge. Specific cultural values were mentioned in Chapter 1 regarding what this study focused on during the investigation on the relationships through knowledge sharing using social media applications. The research problem was clearly defined as it extended from Razmerita et al.'s (2016) previous research. The type of methodology was explained and why it was being used in this study. The research goals were stated and how using Hofstede's cultural dimensions theory helped explain which perceived share cultural values had the greatest impact on an individual to engage in sharing knowledge through a social media application.

In Chapter 2, a review of the literature gave a better understanding on how this study could fill the gap in the body of knowledge by investigating specific perceived shared cultural

values. Previous studies that focused on knowledge sharing, culture, social media, and barriers were discussed regarding how these features impacted an individual's ability to share knowledge. Acknowledgements of inconsistencies in findings between previous studies were noted. In Chapter 3, the methodology is described and why this approach was selected will be explained. In Chapter 4, the results from this study are presented. In Chapter 5, the conclusions, implications, and future recommendations on how to extend this study will be offered.

## **Chapter 2**

### **Review of the Literature**

#### **Introduction**

Four different topics of previous literature and research was reviewed to establish the viability of the research problem. These four topics consist of knowledge sharing, culture, social media, and barriers that could prevent knowledge sharing. A solid understanding of the SECI model and how it relates to knowledge sharing was investigated and researched. Culture sharing were investigated regarding how an individual's ethnic culture can impact knowledge sharing in a social media environment, how their cultural values could affect explicit and implicit knowledge sharing, and how culture affects communication. Social media was researched regarding how different cultural characteristics of an individual can increase tacit and explicit knowledge sharing through social media applications, what role social media can play in knowledge sharing, and how social media can help create new information to produce innovation. An explanation of which barriers did cause a lack in sharing knowledge and various communication problems was presented. Previous studies was presented regarding how cultural diversity could be a barrier that affects employees' knowledge sharing behavior and how cultural diversity did prevent or slow down communication and interaction regarding knowledge sharing between individuals.

#### **Knowledge Sharing**

Knowledge sharing (KS) is the process of transmitting or transferring knowledge between individuals and organizations (Le & Lei, 2018). Indrajit and Hafiza (2017) defined that knowledge sharing in the academic environment can increase students' education and potential. They believed that in the corporate environment, employees can share their knowledge, skills,

and expertise among others to help meet team goals. An exploratory study by Fauzi, Tan, Thurasamy, and Ojo (2019) was conducted to determine different academics' intentions to share knowledge and the quality of knowledge being shared between the universities and their students. They collected data from 45 different academics from the higher education system in Malaysia. The data that was collected from their study indicated that social network, attitude, management support, social media, and perceived behavioral control were the important factors for academics to share knowledge. Yang (2008) developed an exploratory study in how employees collected information and processed it and how employees' attitudes played a role towards KS. The participants of this study consisted of 499 Taiwan employees working in the tourist hospitality industry. The participants gender consisted of 57% female and 43% male. The level of experience working in the hospitality industry consisted of 26% had experience for 1-3 years and 23% had 5-10 years' experience. The data was collected through an online survey. The participants showed a direct correlation between their attitudes and KS behavior. The results of this study indicated that when participants had a positive attitude, they were more willing to share knowledge with their colleagues. In a similar study, Chung, Cooke, Fry, and Hung (2015) conducted a causal-modeling study on employees in a virtual organization regarding their sense of well-being towards KS. The participants of this study consisted of 135 employees who worked in the farming industry in Taiwan. Of the 135 participants, 57 were male and 78 were female that worked in the virtual organization. The majority of the participants were over the age of 31 with more than one year of working experience in the farming industry. They investigated if KS improved when an individual's sense of well-being increased. Chung et al. (2015) found a direct correlation between the participant's sense of well-being and the increase of KS between the employees in the virtual organization. Their results indicated that tacit and explicit KS

behavior increased when the participant's sense of well-being increased in the virtual organizations.

Knowledge management systems (KMS) allow an individual or program to capture, share, develop, and use the knowledge efficiently (Farnese, Barbieri, Chirumbolo, & Patriotta, 2019). An important feature of using KMS is its capability to spread specific knowledge and make the knowledge accessible and usable between individuals and the desired organizations (Tangaraja, Rasdi, Samah, & Ismail, 2016). Navimipour and Charband (2016) defined in their study that KS is one of the features of the KMS where an individual, team, or organization shares the knowledge with other individuals through some type of communication or activity. Becerra-Fernandez and Sabherwal (2014) believed that KS can increase the value of information and help individuals who are using a KMS program to improve their decision-making process. Lopez-Nicolas and Soto-Acosta's (2010) conducted an exploratory study on the use of information and communication technology (ICT) with a focus on knowledge creation using the SECI model as a reference. Their study consisted of a sample of 300 Spanish small and medium enterprises. They found that ICT had a significant positive influence on the four different parts of the SECI model regarding the creation of knowledge. Their results indicated that KMS gave individuals an opportunity to be more efficient in finding relevant information and resources.

Nonaka and Takeuchi (1995) defined tacit knowledge as knowledge that was gained through actions and experiences of an individual. Kucharska and Kowalczyk (2016) believed that tacit knowledge could be skills or ideas that are difficult to transfer to another individual by writing them down or verbalizing. Kucharska and Kowalczyk (2016) investigated the relationship between individuals regarding trust, collaborative culture, and tacit KS using the equal structural modelling method. Their data set consisted of 514 Polish professionals with

different functions and experience in managing projects in the construction industry. Their results indicated that trust regarding tacit KS was strongly influenced by collaborative culture. They found that for an individual to gain tacit knowledge he or she needs to experience the event to understand the specific knowledge that is being shared. They stated several examples of tacit knowledge, such as riding a bicycle, driving a car, or playing an instrument. However, Lin, Lin, and Huang (2008) conducted an exploratory study into how teachers processed KS and created knowledge in virtual teams. Based off their results, they developed a conceptual model to encompass the following variables: conditions, action/interaction strategies, consequence, and contextual environments. These variables were the most common among the participants regarding how teachers processed KS and created knowledge in virtual teams. Burnette (2017) explored tacit KS among library colleagues and how organizational culture played a role. The participants were interviewed and observed while they were sharing report incidents between colleagues through face-to-face interactions and virtual interactions. The data that was collected consisted of 9 incident reports, six by a consultant and three by consultees. The results that were discovered in Burnette's (2017) research indicated that culture and teamwork played a significant role in influencing KS behavior.

Nonaka and Takeuchi (1995) defined explicit knowledge as the opposite of tacit knowledge as it can be written down, articulated, verbalized, and shared easily. Rutten, Blaas-Franken, and Martin (2016) defined explicit knowledge as tacit knowledge that has been processed, organized, and interpreted, so that it is now accessible. They stated several examples of explicit knowledge, such as manuals on how to create an item, encyclopedias, and written procedures for an individual to follow in a company. These examples are documents that can be read by an individual to help them gain knowledge without experiencing the event. Wang and

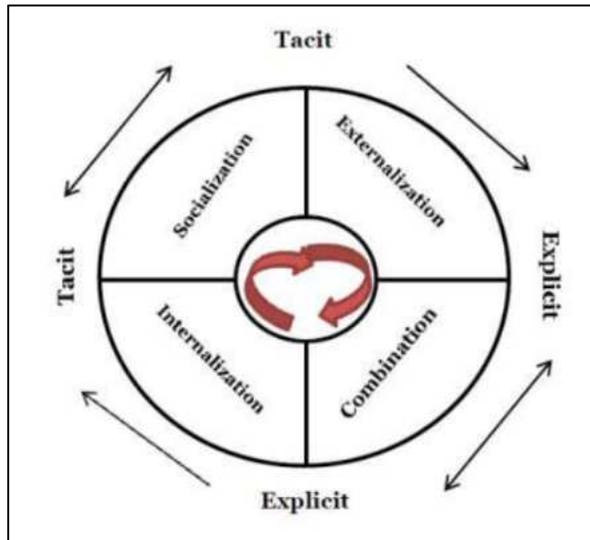
Wang (2012) created a causal-modeling study to investigate the relationship between KS, innovation, and performance. They collected data from 89 technology firms in Jiangsu, China to develop a research model to explain their results. They found that explicit and tacit KS increases innovation and performance of the technology firms. Their results indicated that explicit KS had different effects on an organization compared to tacit KS. The increase in explicit KS displayed an increase in innovation and financial performance, while an increase in tacit knowledge showed an increase in the quality of the innovation and operational performance.

Nonaka and Takeuchi (1995) defined implicit knowledge as knowledge that is gained through the actions of an activity with no awareness that learning is occurring. Almeida, de Moraes, and Campos (2019) investigated how implicit knowledge plays a role in the hotel marketing field. Their study focused on empirically analyzing the relationship between employees' cooperation within hotel marketing and the adoption of explicit and implicit KM practices. The data was collected through a survey of sales and general managers working at 57 different hotels in Portugal, the Azores, and the Madeira Islands. They found that external knowledge sources, whether implicitly or explicitly, did not lead to the adoption of knowledge sharing practices. Their results indicated that implicit knowledge increased the learning building process, innovation quality, and speed. Almeida et al.'s (2019) results aligned with previous related research that implicit knowledge occurred mainly through professional events, such as job fairs and workshops.

The Socialization, Externalization, Combination, and Internalization (SECI) model, developed by Ikujiro Nonaka in 1990, explains how tacit knowledge and explicit knowledge was created and transferred (Nonaka, Takeuchi, & Umemoto, 1996). The SECI model is the most well-known conceptual framework for understanding knowledge generation processes in

organizations (Nonaka, 1994). The SECI model is frequently used as a framework for knowledge-management-related case studies and investigations. This model explains how knowledge creation is a process in which tacit and explicit knowledge generates new knowledge and how the new knowledge can be transferred to individuals and organizations (Nonaka, 1994; Nonaka & Takeuchi, 1995). The SECI model stands out from other models because it explains the differences between tacit and explicit knowledge while also being used as a tool for assessing knowledge creation in organizations (Nonaka, 1994; Nonaka & Takeuchi, 1995).

As shown in Figure 1, Socialization is the process of tacit-to-tacit knowledge being exchanged between individuals through examples such as practice, guidance, mentorship, and observation (Chow, Ling, Yen, & Hwang, 2017). Socialization is considered a process where communication can enhance tacit knowledge (Hall & Andriani, 2003). Argote and Ingram (2000) believed that an important feature within socialization is how tacit knowledge can be passed between people and not between impersonal media. Hubers, Poortman, Schildkamp, Pieters, and Handelzalts (2016) created an exploratory study that used the SECI model to understand the process of how individuals can share knowledge in data teams. They created two teams that were consisted of school leaders and teachers to solve educational problems. They focused on how the creation of knowledge was developed and processed over a two-year time period. Hubers et al.'s (2016) aim was to understand how the participants created knowledge, collaborated, and solved educational problems using this knowledge. They discovered that engagement in the socialization and internalization areas of the SECI model increased KS. Participants that were personally engaged in these areas gained a greater understanding of the knowledge that was being shared. Their results aligned with previous research regarding how the SECI model is important to understanding the KS process and knowledge creation by individuals and teams.



*Figure 1.* SECI Model - Knowledge Creation Model (Nonaka, 1994)

Nonaka and Takeuchi (1995) defined externalization as the process of translating tacit knowledge into explicit knowledge that can be understood by others. They further discussed externalization as a process which involved techniques that could articulate tacit knowledge and transfer an individual's ideas, words, or expressions into explicit knowledge. Karim, Razi, and Mohamed (2012) conducted an exploratory study to investigate several examples of externalization where tacit knowledge was converted into explicit knowledge through visuals, metaphors, and analogies. Their study consisted of 313 executives working in selected organizations in the Sri Lankan telecommunication industry. Their results indicated that when tacit knowledge is converted to explicit knowledge, this knowledge becomes easier to be shared by others and can become the foundation of new knowledge to be built upon. Baldé, Ferreira, and Maynard (2018) conducted an exploratory study, using the SECI model as its framework, regarding how employee's knowledge creation process and sharing was developed. They collected their data from 431 employees from 51 companies who worked in various industry

sectors. Through observations and interviews, they found that motivation and trust were the two significant factors that influenced the participants to create and share knowledge.

Nonaka and Takeuchi (1995) defined combination as the process of taking explicit knowledge and combining it with other explicit knowledge to create one group of new explicit knowledge. Federico et al. (2017) conducted a causal-modeling study on how explicit knowledge can be collected by multiple individuals or organizations to then be combined, edited, or processed to form this new knowledge. They proposed a conceptual model to describe combination as a process of converting explicit knowledge into more complex sets of explicit knowledge through a system approach where individuals could exchange and combine knowledge through communication. They included in the conceptual model variables such as knowledge generation, knowledge conversion, and knowledge exploitation. Chow et al. (2017) described examples of this process where explicit knowledge was combined into databases and computer networks.

Nonaka and Takeuchi (1995) defined internalization as the process of taking explicit knowledge and converting it into tacit knowledge. Swap, Leonard, Shields, and Abrams (2001) conducted a systematic review of the literature regarding how internalization is best known as learning by doing, meaning as an individual is performing an activity, he or she is learning new knowledge. In their study, they focused on two specific types of transferring knowledge, which were mentoring and storytelling. They used these two types to understand how this process could increase the tacit and explicit knowledge of an organization. Their datasets for mentoring consisted of 27 previous literature academic reviews that used specific empirical studies. Their datasets for storytelling consisted of 44 previous literature academic reviews that used specific empirical studies. They found that internalization increased through the process of an individual

or organization continuously reflecting on this new knowledge to better improve their knowledge. Swap et al.'s (2001) results indicated that internalization and socialization were the most common processes of transferring knowledge in an organization. They stated an example of internalization would be taking an individual's explicit knowledge that was gained through routine practical work to create a new routine for that individual.

Previous literature has stated that KS and knowledge transfer (KT) are two terms that overlap each other when it comes to knowledge-management-related case studies (Tangaraja, Rasdi, Samah, & Ismail, 2016). Palvalin, Vuori, and Helander (2018) explored how KS could occur unintentionally to multiple people and without a clear objective. They developed an empirical study on the differences in subjective work productivity based on how the knowledge worker perceived the level of information flow and knowledge transfer within an organization. Their data was collected from 998 participants from Finland that were knowledge workers in different organizations. They found that KT differs from KS because it has a clear objective and a specific recipient who is receiving this knowledge. Their results indicated that KS focused on the individual's view from past experiences, while KT took more of an organizational view in using that knowledge to meet goals and expectations.

Nonaka (1994) developed the idea of knowledge generation as an ongoing procedure that would constantly occur through four processes: creation, retrieval, transfer, and application of the knowledge. Al-Kurdi, El-Haddadeh, and Eldabi (2020) researched different academics' sharing culture. They surveyed 257 different academics. They found that individuals are often not aware of the knowledge they have generated and gained through experiences or are not capable of sharing and transferring tacit knowledge among their colleagues. In a similar study, Muthuveloo, Shanmugam, and Teoh (2017) explored an idea regarding if organizations had

strategies for tacit knowledge management. They collected data through 108 questionnaires from managers, senior managers, and directors in different Malaysian organizations. Muthuveloo, Shanmugam, and Teoh (2017) found that the participants of these organizations encountered tacit knowledge problems with their employees and tried to understand how to fix these problems to avoid the loss of knowledge when an employee leaves his or her job. Their results indicated that if an organization has high employee turnover, this could cost the company a significant amount of time and money retraining employees. Wang, Bhanugopan, & Lockhart (2015) described in their research that current employees are an important key to the success of an organization due to the amount of tacit knowledge that they possess.

Sriratanaviriyakul and El-Den (2019) conducted an empirical research on how students in a group setting used KS to find solutions to questions in discussion cases. Their dataset consisted of 241 students from a university in Vietnam. They found that the environmental settings, such as working in a group setting inside of a classroom with a representative from the industry that the students were currently studying, were the greatest factors for influencing students' ability to share knowledge. Several studies have examined the factors that influence KS in various environments. One example was an experimental study conducted by Indrajit and Hafiza (2017), in which they analyzed specific individuals and technology factors on how knowledge is shared through different KS activities in an academic setting. Their data consisted of 75 students from various departments in a higher education system. Indrajit and Hafiza's (2017) results indicated that an individual's personality was a key factor in his or her ability to share knowledge with other individuals in KS activities. Regarding the technology factors on how knowledge is shared, their investigation indicated that social media was the strongest technology factor that promoted knowledge sharing between individuals.

Through previous research, several suggestions have been proposed on how to promote KS in various organizations. Marouf and Alrikabi (2015) suggested that it is necessary to create an open and caring climate to encourage KS. Such a climate can facilitate KS because it could encourage interaction among individuals and help enhance the synergy between employees (Zhang, Song, & Song, 2020). Oliveira, Curado, and Henriques (2019) conducted an empirical research study into how KS could be improved when an individual with certain behaviors and attitudes is paired with another individual with a similar personality. Their data set consisted of 620 scientists from Portuguese research centers. Oliveira, Curado, and Henriques's (2019) results indicated that scientists that are productive tend to share their knowledge. They found that individual behaviors were mainly motivated by self-interest, implying that KS could potentially become a conflict of interest among the individuals that are involved.

Previous research has indicated how KS can be increased by implementing punishments and rewards. Several investigations have been conducted that debate which one better promotes knowledge sharing. Ding, He, Wu, and Cheng (2016) conducted an exploratory study into understanding how a company's incentive program would influence an employee's behavior into KS. They collected 219 questionnaires from managers who were current MBA students or graduated from a university in China. Ding et al. (2016) found that positive and negative incentives did contribute to an individual behavior to increase KS and knowledge transfer. Their results indicated that economic and social incentives can help motivate individuals to share their knowledge with others. In a similar study, Zhang, Song, and Song (2020) conducted a causal-modeling study into whether punishment or reward could promote knowledge sharing behavior. They introduced four different models to explain the relationship between KS and rewarding individuals. They found that punishments could lead to a much better performance than rewards.

Zhang, Song, and Song's (2020) results indicated as the punishment increased so did the performance of KS between the participants.

### **Barriers**

Paul Attewell is known for the term knowledge barriers (KB) through the research that was conducted related to new technology and the barriers that come with it when being used in organizations (Attewell, 1992). Attewell (1992) conducted an exploratory study to find that barriers were created when companies lacked the knowledge of how to use technology and how to maintain this technology. Attewell's (1992) results indicated that individuals could struggle with understanding how to use new technology if the knowledge on how to use it and control it is lacking. Attewell (1992) also found that implementing new technology and how to use it for a specific purpose in an organization can be difficult for an individual to comprehend. However, Palvalin, Vuori, and Helander (2018) defined the term KB as obstacles that can interfere with the process of transferring knowledge or sharing knowledge from the source to the recipient. These obstacles can be seen through a systematic study of KM literature by Paulin and Suneson (2015) where they investigated certain KB and how they played an important part in an organization. Paulin and Suneson believed that KB would interrupt or slow down the dissemination of knowledge and innovation. They hypothesized that KB could prevent the creation of new information and its exchange between individuals and in an organization. They found that the terms KT, KS, and KB are unclear and have different meanings depending on the authors opinion.

Riege (2005) extended Attewell's (1992) research by taking previous KM literature and breaking KB into three categories: individual, organizational, and technological. However, Hawryskiewicz and Binsawad (2016) extended Riege's (2005) research by introducing a new framework to help classify KB. They created an exploratory study into understanding how this

framework could ensure that barriers can be classified in ways that best identify them. They conducted a systematic review of previous literature to identify the most common barriers. They divided their results into eight themes: social, individual, culture, technology, political, organization, content, and routine. Hawryskiewicz and Binsawad (2016) believed that being able to identify these barriers would help in determining a solution. Oliva and Kotabe (2019) explored which KB newly formed companies have encountered. They interviewed a combination of 102 different founders, co-founders, directors, and major startup managers that have previously started companies. They found several barriers and grouped them into three categories, which were environmental barriers, organizational barriers, and human barriers. Al-Kurdi, El-Haddadeh, and Eldabi (2018) conducted an exploratory study into understanding the different KB among higher education institutes. Through their systematic review of previous literature, they found several common KB in higher education institutes. Al-Kurdi, El-Haddadeh, and Eldabi's (2018) review of the literature provided them with four common KB themes: individual, organizations, technological, and cultural. Between the four common themes, organizational culture was found as the most important feature to increase KS among academic staff. Al-Kurdi, El-Haddadeh, and Eldabi found trust and motivation as common themes that played a role in an individual's ability to share knowledge in higher education institutes. Their research provided insights into how positive culture, motivation, and the correct technology at an organization can increase KS. The following three paragraphs will discuss previous literature that explored in more detail the following three themes: individual, organizational, and technological barriers.

Riege (2005) described individual KB as those that can be related to an individual feature such as age, experience, and education. Disterer (2001) believed that individual knowledge

barriers could be broken down into four categories: a loss of power, revelation, uncertainty, and motivation. Lekhawipat, Wei, and Lin (2018) extended Disterer's (2001) research by conducting an exploratory study regarding organizational and technological barriers that affect an individual's KS behavior. They found that individuals would hold knowledge to feel as if they have some type of influence towards the organization they are a part of, and if they lose that feeling, they fear that they could lose the respect of their peers and job security. Nadason, Saad, and Ahmi (2017) described this frame of mind as thinking that "knowledge is power," and by having this knowledge, individuals feel as if they have some form of power either over others or in an organization. In a similar study, Asterhan and Bouton (2017) conducted an experiment studying how individuals who are younger and less experienced can be more hesitant in sharing knowledge due to being uncertain that the knowledge they are sharing is correct. Their dataset consisted of information gathered from 206 Israeli teenage participants who completed an online survey. They found that the participants lacked the motivation to share knowledge if they felt that there was nothing to gain from their action.

Riege (2005) explained that organizational KB were related to the environment of the organization, such as a lack of leadership in knowledge sharing, organizational culture, and restrictions on the transfer of knowledge. Assem and Pabbi (2016) conducted a case study regarding how health experts shared knowledge in the health care sector. Their data was collected by interviewing healthcare experts. Assem and Pabbi (2016) found that many of the healthcare companies had similar organizational KB, such as an absence of clear direction, a lack of direction, new individuals having difficulty blending in with other people, individuals not understanding how to develop key competencies, individuals having a lack of or poor communication and feedback with others, and individuals having a lack of awareness. Akgün et

al. (2017) conducted exploratory research into KB between project software development teams. Through interviewing 18 Turkish project team managers, they found that variables such as project leadership and KS culture could help decrease KB between teams. In their research, a solution to these organizational KB was developed, which was having managers build trust between individuals so that they would understand that sharing knowledge would be beneficial to everyone who was involved. In a similar study, Ramjeawon and Rowley (2017) conducted exploratory research by interviewing 11 senior managers at different academic institutions in Republic of Mauritius, Africa, regarding the enablers and barriers that management had in KS through the education sector. They found many of the barriers the participants encountered could be solved through the implementation of a rewards program and having constructive communication from managers.

Technology barriers can play an important role in any organization. Riege (2005) explained that a technology KB could be the amount of time an individual was trained to use a specific technology in an organization. These technology barriers can be seen through a systematic literature review study that Ragsdell, Bloice, and Burnett (2016) conducted in which they focused on previous literature related to different private sectors, such as the social care sector, the health care sector, and non-profit organizations. They found that a common and critical technology barrier was the mismatch between the new information technology (IT) systems and the reluctance to use them when the employees were familiar with the older IT systems. In a similar study, Dahlström and Eriksson (2017) explored how different companies deal with inter-organizational barriers regarding KS. They interviewed 23 consultants and landowners at different forestry companies in Sweden and Norway and found that individuals who were reluctant to use or learn a specific software in an organization were a technology

barrier that could cause security issues and economic problems in the future. Blagov, Pleshkova, Soldatkin, and Koritckiy (2017) conducted an exploratory research study into how KB are related to administrative personnel in a higher education institution. They conducted interviews on employees of administrative personnel from departments such as the program directorate, program study affairs office, admissions office, extra-curriculum affairs department, and the international contacts office from one university. Their results indicated that an informational barrier was the KB that caused the personnel to miss conference calls, miss electronic signatures, and experience significant document loss.

Assegaff (2016) created a systematic literature review into identifying technology barriers that virtual communities have regarding KS. The data collected was from 42 previous studies that were related to technology barriers in virtual communities. The study focused on understanding which barriers influenced members of the virtual community into not sharing their knowledge with other individuals. Assegaff (2016) adopted Riege's (2005) concept regarding the grouping of the barriers that were found. Assegaff (2016) found several individual factors related to perception and behavior, such as lack of time, fear, and lack of trust in people towards KS. Organizational factors that impacted KS practices in virtual communities were lack of leadership, lack of rewards to motivate individuals, and the company's culture. Technology barriers that were found regarding KS in virtual communities were lack of technical support, lack of expertise, and lack of IT systems. In a similar study, Alsharo, Gregg, and Ramirez (2017) developed a conceptual model to investigate how KB could cause a negative effect on an individual and an organization. Their data came from 193 participants who completed an online survey that worked on virtual teams such as Microsoft, Google, IBM, etc. They found that if an individual shared the same organization's beliefs and feeling of identity, then he or she would be

more likely to not encounter KB compared to someone else who did not have the same type of beliefs and feeling of identity. From the results of their data, they theorized a solution to prevent or remove these barriers by suggesting the creation of an open communication environment. Kucharska and Erickson (2019) developed a descriptive study where they investigated possible relationships between job satisfaction and KS. Their focus was primarily on understanding if individuals who fostered feelings of satisfaction at their jobs would translate into increasing KS between employees. They interviewed 910 Polish knowledge workers with different roles at various companies such as IT, sales, finance, and construction. They found that individuals who were employed in IT related jobs who felt satisfied at their jobs would be more willing to KS compared to individuals in other job sectors.

A possible KB that organizations could face is when their employees hoard knowledge or hide knowledge. Davenport and Prusak (1998) described knowledge hoarding as a natural human tendency and possible barrier regarding KS between individuals and organizations. Trusson, Hislop, and Doherty (2017) conducted a descriptive study on 46 participants who were IT professionals that processed service incidents and interviewed the participants about various KS practices. Trusson, Hislop, and Doherty results indicated that the participants were inclined to share knowledge and to do so regularly. The opposite was found in a study by Anaza and Nowlin (2017), who conducted a causal-modeling study on why salespeople tend to withhold and hoard knowledge. The data was collected through an online questionnaire from 233 salespeople. They found that salespeople hoarded knowledge because they believed that it would give them an advantage over other salespeople regarding their productivity at their job. Their results indicated that the role of an individual's personality could affect the results of someone hoarding knowledge. The data from their research displayed that different characteristics such as age and

experience of an individual could influence their thinking towards knowledge hoarding. Holten et al. (2016) developed a similar study to Anaza and Nowlin (2017) regarding knowledge hoarding. Holten et al. (2016) created an exploratory study into understanding if knowledge hoarding was an antecedent to negative work-related actions and results. They collected their data through an online questionnaire from 1652 employees working in 52 different industry positions. The workplaces that the employees worked were schools, hospitals, public administration, construction, finance, and transport services. They found that knowledge hoarding occurred when individuals lacked trust in their colleagues. They also found that knowledge hoarding behavior occurred based off of how long they knew that particular employee. Holten et al. (2016) results indicated that when the participants withheld knowledge from other colleagues, this created a long-term negative impact on the individual and organization. Anand, Centobelli, and Cerchione (2020) extended Anaza and Nowlin's (2017) research by investigating if knowledge hoarding was caused by an individual's personal beliefs or situational constraints. They conducted a systematic review of previous knowledge-hoarding-related literature to find six common themes which were driven by situation, driven by performance and competition, driven by hostility, abuse by employees or managers, driven by identity and norms which, and knowledge hiding. Their research helped provide organizations a solution to uncovering knowledge hoarding and how to reduce an individual's knowledge hoarding behavior.

### **Social Media**

As social media applications become popular with their increased usage across all age ranges, so has the demand for understanding KS behaviors regarding how individuals share knowledge using social media applications (Chow & Chan, 2008). There is an extensive amount of previous literature regarding how social media applications have been used to increase KS and

help create innovation in companies (Boyd & Ellison, 2015; DiMicco, Millen, & Geyer, 2008; Wu, DiMicco, & Millen, 2010). Boyd and Ellison (2015) described social media applications as web-based services that allow individuals to create profiles, connect with others on the same network through a messaging service, and meet new people through mutual connections. Social media applications like LinkedIn and Facebook are platforms that allow an individual to communicate and connect with other individuals (Chai & Kim, 2012). Dhanaraj and Parkhe (2006) believed that social media applications were an essential tool for creating innovation within organizations because these applications could connect individuals to create new knowledge. Chai and Kim (2012) described social media applications as tools that can be used to foster knowledge constructions through a collective effort. There is a limited amount of literature regarding the relationships between various cultural factors through KS using social media applications (Razmerita, Kirchner, & Nielsen, 2016). Therefore, the influence of perceived shared cultural values and how those values affect an individual's ability to KS through social media applications was of interest for this research.

Nezakati et al. (2015) created an exploratory study into how social media applications can promote KS in tourism. They completed a systematic literature review of previous articles related to the tourism industry regarding KS and social media applications. The articles they chose were divided into three groups: KS, social media, and studies that covered KS and social media. Their review of the literature revealed that social media applications played a significant role in the dissemination of knowledge for individuals to plan their trips and make decisions. Nezakati et al. (2015) found that previous literature studies from Leung et al. (2013) and Torres (2010) indicated that social media applications increased tacit KS regarding the knowledge that was read from comments of previous individuals that have already experienced an event that was

being researched. Li, Cox, and Wang (2018) created an exploratory study into how social media applications can be used as a communication tool for KS and knowledge construction. They focused on a professional social media network known as LinkedIn. They used the purposive sampling strategy for selecting interest groups and discussions threads on LinkedIn. The interest group they chose were individuals in a Dell user group. In this group, the users helped each other solve problems related to laptops. Li, Cox, and Wang (2018) used discussion threads that were previously used by a group of individuals that solved a technical problem. Their research goal was to understand how an individual could use LinkedIn to create knowledge to solve technical problems. Their results indicated that LinkedIn was generating more knowledge in their forums compared to a traditional peer support forum. They found that LinkedIn could support knowledge construction more efficiently due to the platform's trustworthy reputation. Li, Cox, and Wang (2018) found that more interaction tools and communication channels should be implemented to help promote knowledge interactions and collaborative actions. Similarly, Naeem and Khan (2019) developed a descriptive study on how social media applications can be used to support KS behavior among employees in public and private universities in Pakistan. They randomly selected a group of 210 employees to complete an online questionnaire that used social media applications to KS. The employee's positions consisted of deans, professors, associate professors, assistant professors, lecturers and research associates. Naeem and Khan (2019) found that the social media applications such as YouTube, WhatsApp, Research-gate, and Skype were the most productive in supporting KS behavior in the university setting. Factors such as mutual trust, intention to share knowledge and new ideas, and effective communication were the most significant themes found in their research. These apps were found to have increased participants to build relationships and promote communication. Naeem and Khan's (2019)

results indicated that social media applications should receive more attention due to how they can help foster more effective and efficient KS between individuals.

Leonardi (2017) compared social media applications to leaky pipes for communication and KS. This thinking suggested that as more individuals share knowledge, more knowledge would increase from the leaky pipes to other individuals who read and viewed the social media applications. Leonardi interviewed 60 employees from American Financial in the Midwestern United States to create a list of reasons why individuals would not want to KS with others and why they would not retrieve new knowledge from social media applications. Leonardi found that individuals who did not want to KS with others and access social media applications were reluctant due to the amount of document work (detail summary of employee's actions) that would need to be recorded. Leonardi (2017) suggested that if the employees could communicate and KS with others through social media applications without the burden of documentation, KS would occur more often. This could then indicate that the leaky pipe theory would work regarding the amount of knowledge being leaked out to other individuals at the organization. However, Patroni, Von Briel, and Recker (2016) conducted exploratory research into a global retailer that implemented a social media platform to see if the platform increased employee productivity and innovation. They compared the store's retail sales from the year before to the year when the social media platform was implemented. They found that the platform allowed employees from different departments to collaborate about new innovative ideas and problem solve any issues that arose which caused sales to increase. The platform also provided a fast-paced type of learning for employees to be able to have access to different knowledge resources that they would normally not have access to without the platform being in place.

Jarrahi (2017) developed an exploratory study into how social media applications could increase KS from within and across different organizations. Jarrahi's (2017) data was collected through interviews from 58 participants working in 17 different consulting firms with a focus on their age, gender, social media application usage time, and organizational role. Their data revealed that most of the participants used LinkedIn and Facebook. Half of the participants were over the age of 30, and there were more males than females who participated in the study. Jarrahi found that different social media applications could demonstrate different knowledge practices and different types of knowledge. Participants who used Facebook as a social media application would KS with only their personal contacts, and the type of knowledge that was being shared would mainly consist of updates about their personal lives. Participants who used LinkedIn as a social media application would share KS about career changes or opportunities with professional contacts. Their results indicated that social media did increase KS between individuals and different organizations.

In a similar study, Malik, Hiekkanen, and Nieminen (2016) explored how gender, age, and educational level influenced participants' privacy, trust, and activity on Facebook. They collected their data from 378 participants who completed an online survey. As shown in Table 1, the participants were composed of Facebook users from different genders, ages, and levels of education. The participants' gender was evenly split between male and female, with most of the participants' age range between 25 and 54 years of age. The majority of the participants had a degree higher than an associate degree. Malik, Hiekkanen, and Nieminen found that the age between 18 and 24 years had the highest Facebook activity compared to other age ranges. Their data indicated that every age group took measures regarding KS and were cautious about whom they shared their information with on Facebook. They found that women were more active than

men on Facebook, but both genders were equal regarding their level of trust using Facebook to share information. The results from Malik, Hiekkänen, and Nieminen's study were similar to previous research studies regarding KS involving privacy, trust, and activity concerns among younger age groups (Tufekci, 2012).

**Table 1**

*Demographics of Malik, Hiekkänen, and Nieminen's (2016) Research*

Measure	Item	Amount
Gender	Female	188
	Male	190
Age (years)	18-24	43
	25-34	146
	35-44	108
	45-54	50
	Over 55	31
Education	High school or equivalent	19
	Bachelor's or equivalent	125
	Master's or equivalent	170
	Doctorate	64

## **Culture**

In this study, demographic factors illustrated as age, race, religion, language, and socio-economic status was focused on regarding how they impacted knowledge sharing through a social network. Hofstede's cultural dimensions theory was implemented to provide an insight into how individuals representing different cultures exchange knowledge. Using this theory did identify which cultural characteristics have the greatest impact on an individual to engage in sharing knowledge. This research expanded upon Razmerita et al.'s (2016) investigation by using a significantly more diverse population and including new demographic factors such as age, race, religion, language, and socio-economic status. The following paragraphs will discuss

previous literature that explored in more detail the variables of this study: age, race, religion, language, and socio-economic status.

Chirawattanakij and Ractham (2016) conducted an exploratory study into how sharing the same language between knowledge senders and recipients would be a predictor towards increasing an individual's behavior to share knowledge. They collected 473 paper-based questionnaires from white collar workers in different industries. Most of the workers were from finance, petroleum, government, and service industries. Chirawattanakij and Ractham collected specific characteristics of the participants' information from their questionnaires regarding their demographic information. For the participants' age, 94% fell between the ages of 30 and 39 years old. For the participants' education level, 99% held either a bachelor's or master's degree. For the participants' work experience, 67% held less than ten years of work experience. Chirawattanakij and Ractham found that when the knowledge sender and recipient shared the same language, it could be a predictor towards enhancing the individuals' likelihood to share knowledge and learn new knowledge. In a similar study, Omotayo and Babalola (2016) conducted exploratory research into how age and language played a role regarding KS among artisans in Ibadan, Nigeria. They collected questionnaires from 214 Nigerian artisans. Of the participants, 81% were male, 55% were between the ages of 15 and 44 years. Omotayo and Babalola found that when the participants had the same shared language, features such as communication, vision, and goals in KS increased. Their results indicated having the same shared language increased tacit knowledge among the artisans.

However, the opposite was found in a study was conducted by Lauring and Selmer (2011). They created an exploratory investigation into understanding the relationships between language, KS, and performance in multilingual workplaces. They collected data through a survey

that was completed by 489 participants who worked in the chemistry and physics department of a university in Denmark. Lauring and Selmer found that there were no negative predictors regarding KS and performance when an organization had multiple languages spoken. They did find that when English was the consistent language used for communication, it was a positive predictor for KS and performance in the organization. Similarly, Ahmad (2018) conducted an exploratory study into understanding the effect of language on an interpersonal KS level between individuals. The data was collected through a questionnaire that was completed by 403 participants working in a Finnish multinational company. Only 60% of the participants spoke the native Finnish language. The other 40% consisted of individuals that had a background from different countries, such as Germany, Norway, Italy, Kenya, Puerto Rico, and Panama. The results indicated that KS was increased with employees who had different linguistically diverse platforms. However, they did find that KS in a non-native language could lead to misunderstandings. These misunderstandings could result in organizational costs, such as money and time. These findings are similar to previous studies regarding the association between KS and performance in multi-linguistic organizations (Levin & Cross, 2004; Massey & Dawes, 2007).

Tuan (2020) conducted an exploratory study into how an employee's diversity can increase KS, knowledge creation, and problem solving. The focus of Tuan's study was to see how an individual's diversity impacted creativity in a tour company. The participants in this study consisted of 847 employees and 119 managers from 26 different tour companies in Ho Chi Minh City, Vietnam, who completed an online questionnaire. Tuan found evidence that KS and knowledge creation increased due to individuals having diverse backgrounds. Tuan's results indicated that individuals that have a diverse background are more interactive and open to KS. In

a similar study, Boh, Nguyen, and Xu (2013) conducted exploratory research into how trust and an individual's openness to diversity impacts KT. The focus of their study was to understand how KT occurred between a multinational corporation in Norway and its Vietnamese subsidiaries. Their data consisted of 50 responses from employees of the Vietnamese subsidiaries who completed an online survey. Their study showed that KT was not affected due to the geographical distance between the two corporations. They found that an individual's trust and openness to diversity are key factors towards increasing an employee's positive behavior regarding KT.

Hamilton, Nickerson, and Owan (2012) conducted an exploratory study into how diversity impacts a team's productivity regarding the learning and collaboration between the individuals within the team. They focused on understanding if the demographic diversity of individuals could harm the productivity of the team and cause an increase in team-member turnover rate. They used a simple model to explore the relationships between the different types of diversity, team performance, and turnover. They found that teams with more than one ethnicity were more productive and had a significant increase in collaboration between the members of the team. They found that teams that were more productive stayed together and lowered the team-member turnover rate. In a similar study, Rahmi and Indarti (2019) created an exploratory investigation into how diversity plays a role in teams' innovation regarding KS. They collected data from 39 teams who completed an online survey. The teams were a part of the radio and television broadcasting institutions in the Province of Yogyakarta, Indonesia. Rahmi and Indarti found that team diversity had a positive influence on KS that caused team innovation to increase. Their results indicated that there was a direct correlation between team diversity and KS.

Hofstede's cultural dimensions theory was developed by Geert Hofstede in 1980 and it is a popular framework that helps provide an understanding into different national cultures, the dimensions of culture, and how the culture could impact a business setting (Fang, 2003). This theory originally consisted of four dimensions which were power distance index, individualism versus collectivism, femininity versus masculinity, uncertainty avoidance index (Hofstede, 2011). Hofstede described culture as a collective form of thinking that distinguishes one group of people to another. In 1987, Hofstede added a fifth dimension known as Short-Term versus Long-Term Orientation followed by a sixth dimension known as Indulgence versus Restraint in 2010 (Hofstede, 2011).

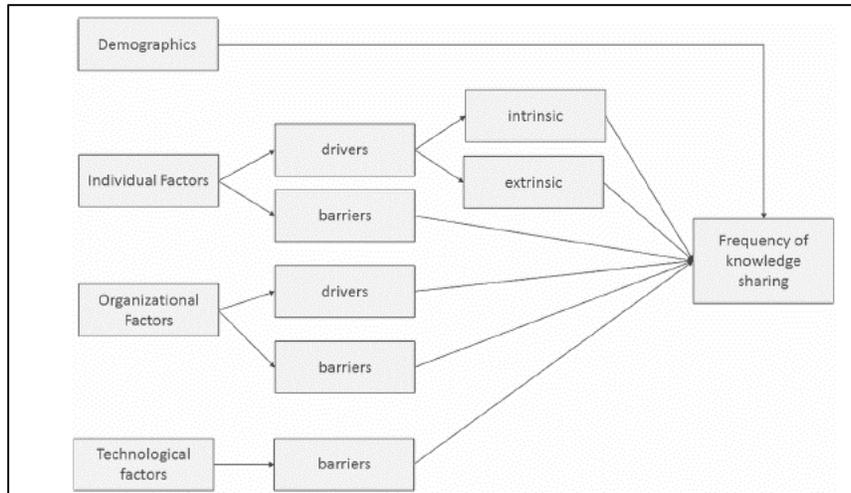
Alavi and Azizi (2020) conducted an exploratory study using Hofstede's cultural dimensions theory into understanding which factors influence an individual's decision-making process. One of the characteristics they investigated was an individual's culture and personality. The data were collected through library resources related to Islamic culture components on decision-making. They took their collected data and compared it to non-Islamic culture data. They found that the participants Islamic culture played a role in their decision-making behavior. Alavi and Azizi's results indicated that their culture belief in God and counseling played a role in the decision that they made in their life. Their study attempted to understand how the role of individual's culture affects their decision making based off the opinion of Hofstede cultural dimensions theory. Akanji et al. (2019) conducted an exploratory research into how organizational culture impacts different leadership styles in Nigerian universities. They used Hofstede's cultural dimensions theory into understanding the actions of the participants in this research. They collected their data from 40 semi-structured interviews from leaders in various universities from three selected universities in Nigeria. Akanji et al. (2019) found that the

leadership styles employed by university deans, departmental heads, and senior non-teaching staff from the three different Nigerian universities were shaped by three dimensions of Hofstede's which were Power Distance Index, Collectivism, and Feminine values.

### **Measuring Cultural Impact**

Razmerita, Kirchner, and Nielsen's (2016) research was briefly explained earlier in the KS section of this literature review. The following will provide a more in-depth review of Razmerita, Kirchner, and Nielsen's (2016) research into understanding how they measured KS, the variables that were measured, how the data from those variables was analyzed, and the statistically significant results that were gathered from the data. They investigated which factors could influence employees' intentions to share knowledge through social media platforms. Their focus was specifically on factors such as demographics, individual factors, organizational factors, and technological factors regarding how the factors could motivate or become a barrier towards an employee's intention to share knowledge within organizations.

Razmerita, Kirchner, and Nielsen (2016) collected data through an online survey questionnaire that consisted of 15 questions related to individual, organizational, and technological items. The survey was taken by 114 participants who worked in Denmark. The survey included questions regarding how often the employees used social media to share knowledge, what social media barriers they encountered, and what motivated them to share knowledge. Eight semi-structured interviews were conducted with four managers and four employees. The managers were selected due to their social media or KM initiatives. The employees were selected due to their active roles on social media platforms. The interviews were either held in person or on the phone. Figure 2 represents Razmerita, Kirchner, and Nielsen's (2016) research model.



*Figure 2.* Razmerita, Kirchner, and Nielsen's (2016) Research Model.

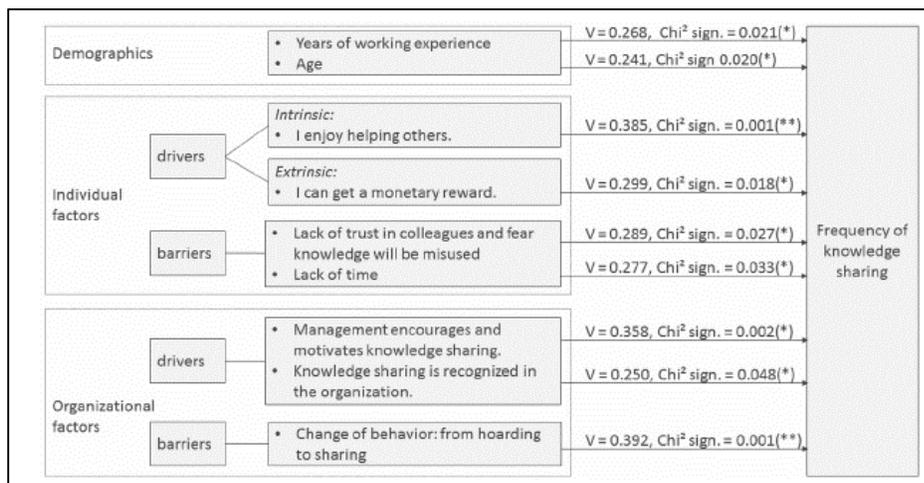
Data on the demographics of the participants were gathered through a survey. The demographics were divided into four sections, which consisted of age, gender, position, and working experience. Age was divided into five groups: younger than 30, 30-39 years old, 40-49 years old, over 49, and missing. Gender was divided into three groups: male, female, and missing. Position was divided into five groups: manager, specialist, office worker, trainee, and other. Working experience was divided into six groups: less than one year, 1-5 years, 5-10 years, 10-15 years, more than 15 years, and missing. It is important to note that the majority of the participants in the study were between the ages of 30-49 and with 1-5 years of work experience. The demographics breakdown of the actual numbers of the participants in the study can be found in Table 2.

**Table 2**

*Descriptive Statistics of Razmerita, Kirchner, and Nielsen (2016) Respondents.*

Survey participants	Frequency
<i>Age</i>	
Younger than 30	25 (21.6%)
30-39	48 (41.4%)
40-9	34 (29.3%)
Over 49	8 (6.9%)
Missing	1 (0.9%)
<i>Gender</i>	
Male	66 (56.9%)
Female	48 (41.4%)
Missing	2 (1.7%)
<i>Position</i>	
Manager	24 (20.7%)
Specialist	54 (46.6%)
Office worker	24 (20.7%)
Trainee	5 (4.3%)
Other	9 (7.7%)
<i>Working experience</i>	
<1 year	2 (1.7%)
1-5 years	81 (69.8%)
5-10 years	18 (15.5%)
10-15 years	9 (7.8%)
More than 15 years	3 (2.6%)
Missing	3 (2.6%)

Razmerita, Kirchner, and Nielsen (2016) used the chi-squared test method on the data that was collected to identify the significant factors that influenced the employee’s intention to KS through social media applications. This method evaluated the strength of the relationship between the variables. The closer the value was to 1, the stronger the relationship between the variables. Figure 3 shows the statistically significant factors that impacted KS.



*Figure 3. Statistical Factors that Influenced KS Through Social Media Applications.*

Razmerita, Kirchner, and Nielsen (2016) found that 97.4% of the survey participants considered KS important, and that 87.9% of the participants considered their contribution to KS valuable to their organization. Of the participants, 71.1% had their KS efforts recognized by the organization where they were contributing knowledge. Of the participants, 6% feared that the knowledge they were sharing would be misused, while 4.3% of the participants feared that sharing their knowledge would increase the chances of them becoming replaceable. Through the interviews that were conducted, Razmerita, Kirchner, and Nielsen (2016) found several interesting comments related to an individual's KS behavior. Their interviews were an attempt to provide a deeper insight into the individual and organizational factors that could impact KS behavior. They found one comment from a manager of a media company who suggested that national culture could play a role in an individual's KS behavior. They found another interesting comment that the knowledge the employees shared with only management would be done face-to-face and not through a social media application.

### **Measuring Knowledge Sharing**

Fauzi et al.'s (2019) study was briefly explained earlier in the KS section of this literature review. The following will provide a more in-depth review of Fauzi et al.'s (2019) research into understanding how they measured an individual's behavior regarding their intention to share knowledge, the variables that were measured, how the data from those variables was analyzed, and the statistically significant results that were gathered from the data. Fauzi et al. (2019) conducted a research study into measuring the quality of knowledge being shared between students. The goal of their study was to understand different academics' intentions to share knowledge, the quality of knowledge being shared between the students in the universities, and the actual behavior of the students regarding their intention to share knowledge. Fauzi et al.

(2019) collected data through responses to a questionnaire by emailing 399 different academics from the higher education system in Malaysia. Only responses of 45 students from those academic institutes were used in the study. The variables that were measured in Fauzi et al.'s (2019) study consisted of commitment, social network, management support, social media, attitude towards KS, subjective norm towards KS, KS intention, perceived behavioral control, perceived cost towards knowledge sharing, facilitating conditions, and trust. These variables were measured through a questionnaire using a 7-point Likert scale ranging from 1 being strongly disagree to 7 being strongly agree. Fauzi et al. (2019) used a partial least square structural equation modeling method to analyze the data.

The demographics of the participants in Fauzi et al.'s (2019) study were collected through the questionnaire to understand how gender, race, qualification, position, and years of working played a role towards an individual's KS behavior. Gender was divided into two groups: male and female. Race was divided into four groups: Malaysian, Chinese, Indian, and other. Qualification was divided into two groups: PhD and Masters. Position was divided into three groups: professor, associate professor, and senior lecturer. The amount of years was divided into six groups: 1-5 years, 6-10 years, 11-15 years, 16-20 years, 21-25 years, and 26 years and above. Figure 4 represents the structural model and the coefficient values of each relationship between the variables: commitment, social network, management support, social media, attitude towards KS, subjective norm towards KS, KS intention, perceived behavioral control, perceived cost towards knowledge sharing, facilitating conditions, and trust. The closer the value is to 0, the weaker the relationship between the variables (Hair et al., 2016).

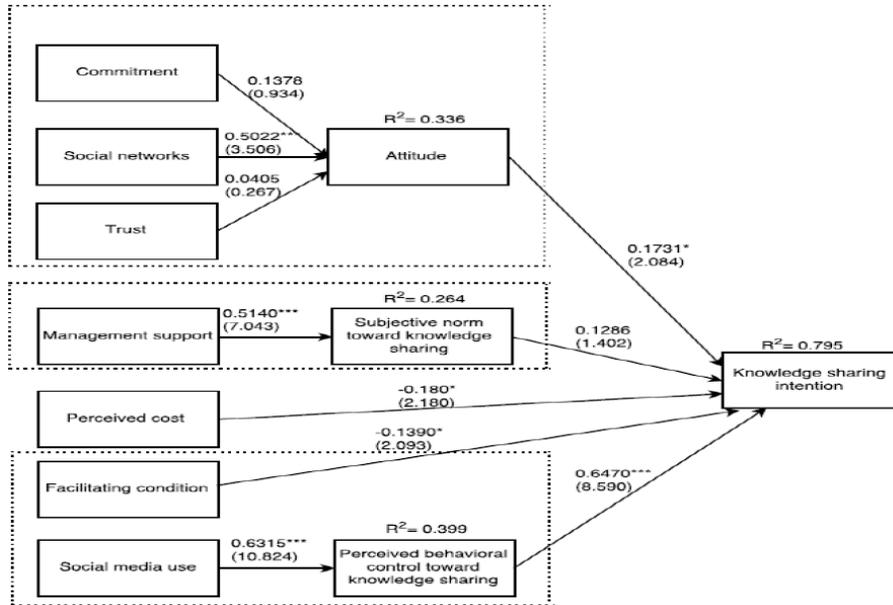


Figure 4. Structural Model Results of Fauzi et al.'s (2019) Research.

Fauzi et al.'s (2019) results indicated that factors such as attitude and perceived behavioral control had significant positive effects on an individual's behavior to share knowledge. This positive relationship can be seen through the coefficient value of .1731 that was produced in the relationship between the attitude and KS intention variables. The relationship between perceived behavioral control toward KS and KS intention variables had a coefficient value of .6470. Perceived cost and facilitating condition variables were the negative factors that were found to have significant negative effects on KS. This negative relationship can be seen through the coefficient value of -.180 that was produced in the relationship between the perceived cost toward KS and KS intention variables. The relationship between facilitating conditions toward KS and KS intention variables had a coefficient value of -.1390. Fauzi et al.'s (2019) research filled the gap in the literature regarding the implementation of individual, organizational, and technological factors in an academic setting by explaining an individual's behavior to share knowledge.

## **Chapter 3**

### **Methodology**

#### **Overview**

The previous chapter described the literature regarding how KS, culture, social media, and barriers have impacted an individual's ability to share knowledge. To bridge the gap between the inconsistent results from previous studies, a quantitative study was conducted by examining the actual KS behavior through a social media application. The postings of the knowledge being shared between the participants based on their demographic factors illustrated as age, race, religion, language, and socio-economic status was analyzed and placed into two categories: tacit and explicit KS. The demographics of the participants were collected through a survey to understand how specific individual cultural values can play a role in sharing knowledge.

Chapter 3 consists of five main sections. The first section reiterates the research question and the associated hypotheses. The second section explains how testing the hypotheses did answer the research question and what necessary data was collected to test the hypotheses. The third section explains the data collection methods. The fourth section reviews how reliability and validity was addressed. The fifth section discusses how the data was analyzed.

#### **Research Question and Hypotheses**

The main goal of this research was to gain an insight into how these characteristics (age, race, religion, language, and socio-economic status) correlate with actual knowledge being exchanged through a social media application by addressing this research question:

What impact does perceived shared cultural values illustrated as age, race, religion, language, and socio-economic status have on knowledge sharing through a social media application?

The following hypotheses were tested:

- H1. Individuals of a similar age are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar age.
- H2. Individuals of a similar race are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar race.
- H3. Individuals of a similar socioeconomic status are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H4. Individuals who share the same religion are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar religion.
- H5. Individuals who share the same native language to communicate are more likely to share tacit knowledge through a social media application compared to individuals who do not use a similar language.
- H6. Individuals of a similar age are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar age.
- H7. Individuals of a similar race are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar race.

- H8. Individuals of a similar socioeconomic status are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H9. Individuals who share the same religion are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar religion.
- H10. Individuals who share the same native language to communicate are more likely to share explicit knowledge through a social media application compared to individuals who do not use a similar language.

### **Necessary Data**

To test the hypotheses, data was collected based on the analysis of the social media postings. Each post was examined to understand which category the posting should be placed. These categories are further explained in the data analysis section. The convenience sampling method was used to select the participants. This method was chosen due to several advantages, such as low cost, efficiency, and ease of implementation. The convenience sampling method was described by Etikan, Musa, and Alkassim (2016) as a sampling of units in a population where the participants of the target population meet certain criteria, such as accessibility, availability, and willingness to participate. The participants attended a 4-year community college located in a culturally diverse community. These participants represented a meaningful population due to the geographic location where this study took place. This sampling method was chosen based on the purpose in identifying the relationship between the perceived shared cultural values through the type of KS in social media applications. The participants were chosen due to being enrolled in a particular class. The convenience sampling technique was chosen because of the quality and type

of data that was gathered. In this study, random sampling did not occur due to the participants being chosen based on enrollment in the class. This sampling technique saved time and money while collecting the data. The main goal of using the convenience sampling technique was to focus on particular characteristics that are of interest. The demographic factors focused on were age, race, religion, language, and socio-economic status.

This study occurred in an undergraduate information technology-related program within a college consisting of students ranging from 18-40 years of age. Burmeister and Aitken (2012) described that the participant sample size should consist of the minimum number of participants required to identify a statistically significant difference. They explained that to calculate a sample size, the researchers need to decide what is considered an important or significant difference for their proposed study. An estimation method in PLS-SEM known as the “10-times rule” was used to calculate the minimum sample size of a research study (Hair et al., 2016). This calculation explained that the sample size should be greater than 10 times the maximum number of inner or outer model variables pointing at any latent variables in the model (Hair et al., 2011). Given that there were four age categories, five race categories, four religion categories, four language categories, and five socio-economic status categories, the minimum number of participants used in this study was 40 students. To have this minimum number of participants, this study was conducted with participants from two different courses.

Burmeister and Aitken (2012) specified that a sample size to perform the SEM technique can be determined based on previous studies or pilot studies that were used to collect similar data. The sampling size for this study was based on Astorga-Vargas et al.'s (2017) research in which they measured the explicit and tacit knowledge interaction in a software process improvement project with undergraduate students in a software engineer program. In Astorga-

Vargas et al.'s investigation, they collected data from 22 students to justify their sample size. The minimum number of KS postings was 70 valid postings. This number was calculated by multiplying the largest number of cells by 10. The anticipated sampling size that was necessary to perform the SEM technique for this study was between 40-50 students in an undergraduate program with a count of 80-100 postings in the social media application.

Permission from the institution where this research was conducted was required, along with the cooperation of the instructors participating. The participants also completed a consent forms to take part in this study. The consent form was emailed to the participants for them to sign electronically and email back to the researcher. An example of the consent form can be found in Appendix A. The programming assignment was not part of the research, but the assignment was required as part of the students' grade in the course. Their participation in the research did not affect their grade for the course. All participants needed to have access to computers with the Internet. The participants were students from a particular institution, where they individually completed an assignment through collaboration in a social media application. The students needed to use computers made in the last two years and any type of browser. A software program called Visual Studio was required to be installed on the computers and made accessible by the participants in order to develop the program. Participants were required to create an account to access the social media application known as "Discord" where communication did occur. Each participant was required to have an email address to verify his or her account on this social media application. The social media application was moderated by an instructor while the participants completed the assignment.

## **Data Collection Methodology**

Analyzing each post from the social media platform was used to collect the data to test the hypotheses. As seen in Appendix B, the postings of the actual knowledge being shared between the participants based on their perceived shared cultural values was analyzed and placed into two categories: tacit knowledge being shared, and explicit knowledge being shared. Three subject matter experts (SMEs) made the determination of which type of knowledge was being shared in the postings. An SME is an individual who is a specialist in their field, with degrees and years of experience in a particular topic (Mattoon, 2005). The candidates to be SMEs in this research were recruited through a list of college faculty members. The candidates were determined based on their experience working within their chosen field, collaboration techniques, and soft skills. The SMEs for this research determined which type of knowledge was being shared for each post based on a model created by Wan et al. (2011). The SMEs were instructed to evaluate each posting in the social media network and then compared each other's determination of which category the posting was categorized.

This model was developed based on the knowledge creation theory. As shown in Figure 5, Wan et al. (2011) used their model to measure tacit and explicit KS among members in a software team. The data they collected consisted of six parts: demographic information, socialization for capturing tacit knowledge, externalization for capturing tacit knowledge, internalization for capturing explicit knowledge, and combination for capturing explicit knowledge.

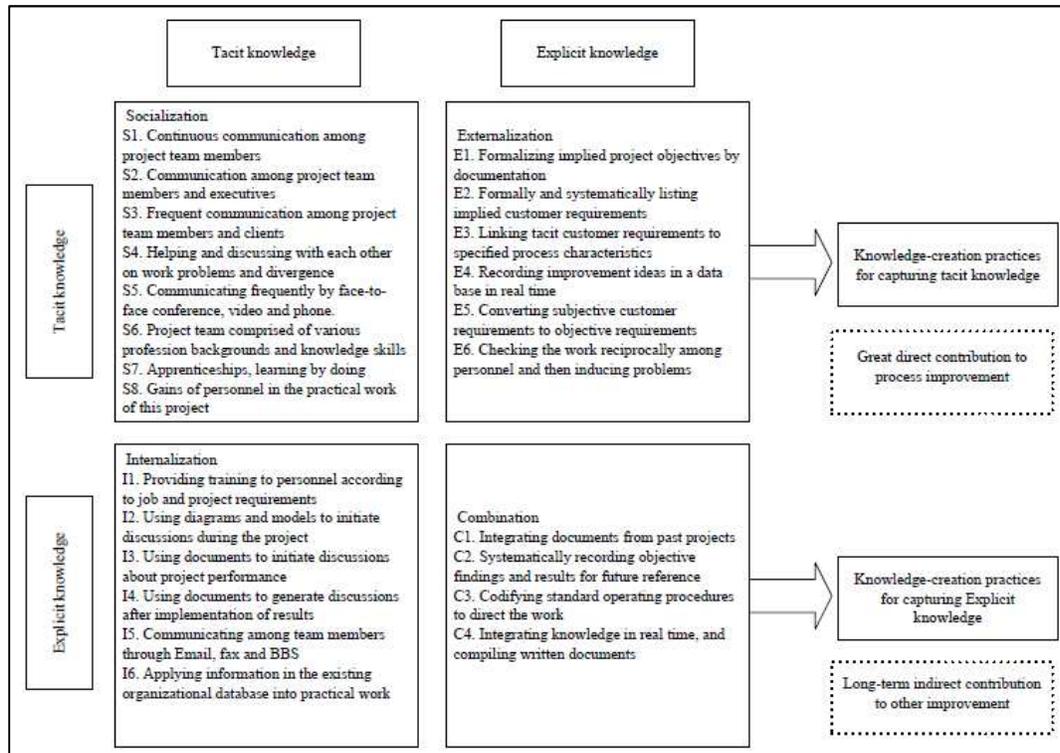


Figure 5. Research on Explicit and Tacit Knowledge Interaction

The data required to test the hypotheses was gathered from participants (students) who were working individually to complete a software program. The project had a starting and ending time in order to control the length of the study. The participants were allowed to communicate with other participants to help and receive assistance through a social media application. The participants were required to make at least two posts and have their computer camera turned on throughout the completion of the project. The software program that the participants completed required research and exchanging of knowledge between each other to finish the program. The administrator explained to the participants that using the social media network to communicate with others would help them complete the program. The social media application was the participants' only form of communication between each other that was permitted to complete the

development of the software program. The social media network postings were monitored by the administrator until the completion of the project.

### Surveys

An online survey was used to collect the demographic factors of the participants, specifically age, race, religion, language, and socio-economic status. The demographic factors of the overall undergraduate students at the institution where the study took place can be found in Figure 6 (College Factual, n.d.). An example of the survey that the participants completed can be found in Appendix C. The approach to invite the participants to complete the survey was done online through the college's email service. This survey was based on Razmerita et al.'s (2016) and Hughes et al.'s (2016) previous survey questions. A link to the questionnaire was sent to the participants through email. Within this email, an introduction was displayed explaining the terms and the estimated time to complete the questionnaire. The online survey was hosted by SurveyMonkey due to its reputation of stability and the appearance of its interface. This interface helped reduce the number of questions that the participants had regarding the questionnaire.

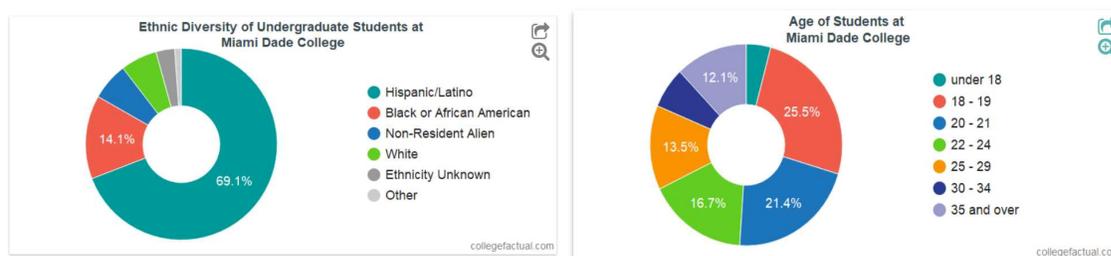


Figure 6. Ethnic Diversity of Undergraduate Students

The invitation was an important first step in collecting the data because it was the initial contact with the participants. This email explained the purpose of the research, the names and backgrounds of the researchers, the college that was involved, and gave the participant a unique identification number to use to represent themselves in the social media application. This identification number kept the participant anonymous. The survey informed the students that

participation in the study was entirely voluntary, and they could withdraw at any time without fear of reprisal. The survey had the user choose from a category list of choices for each demographic. The choices were made up of the major ages, races, religions, languages, and socio-economic statuses. These choices were based on Razmerita et al. (2016) and Hughes et al. (2016), who used similar surveys to collect demographics for their studies. Table 3 displays the survey instrument regarding the demographic questions that the participants answered.

**Table 3**

*Survey Instrument*

Q#	Survey Question	Possible Selections	Reference
Q1	Please choose your age range.	18 – 25   26-39   40-49   Over 49	Razmerita et al. (2016)
Q2	Please choose your race.	White   African   Asian   Hispanic   Other	Hughes et al. (2016).
Q3	Please choose your religion.	Christianity   Islam   Hinduism   Other	Hughes et al. (2016).
Q4	Please choose your native language.	English   Spanish   French   Chinese   Other	Hughes et al. (2016).
Q5	Please choose your socioeconomic status.	Upper, Upper-Middle, Middle, Middle Lower   Lower	Hughes et al. (2016).

**Reliability and Validity**

Reliability in research refers to the replicability of the results from a study (Mohamad, Sulaiman, Sern, & Salleh, 2015). The level of reliability is based on the results being the same if another researcher used the same methods of the study with the same sample (Cohen, Manion, & Morrison, 2013). Bowling (2014) viewed reliability as the consistency of producing the same results using the same instruments and similar respondents in a similar context. There are three types of reliability in education research: stability, equivalence, and internal consistency (Mohamad et al., 2015). Reliability and stability in this study was measured using three different SMEs that did not communicate with each other to analyze each social media posting.

Joreskog (1971) composite reliability scale was used to measure the internal consistency reliability level. Higher values indicate a higher level of reliability. Reliability values of “acceptable” are between 0.60 and 0.70 (Diamantopoulos et al., 2012; Drolet & Morrison, 2001). Values between 0.70 and 0.90 are considered as “satisfactory to good” (Diamantopoulos et al., 2012; Drolet & Morrison, 2001). Values of 0.95 and higher are considered “problematic” as these values indicate a higher possibility of items that are redundant which results in reducing construct validity in this research study (Diamantopoulos et al., 2012; Drolet & Morrison, 2001). Values of .95 and higher can suggest the possibility of adverse response patterns (Diamantopoulos et al., 2012; Drolet & Morrison, 2001).

Validity in research refers to how accurately the functionality of the research instrument in the study can be measured (Creswell, 2002). Validity has been changing throughout the years to shift focus from the validity of the instrument to the interpretation and measurement of the results that were derived from the instrument (Mohamad, Sulaiman, Sern, & Salleh, 2015). There are many different types of validation in research studies. Cohen, Manion, and Morrison (2013) described many different types of validity, such as content validity, criterion-related validity, construct validity, internal validity, external validity, concurrent validity, face validity, jury validity, predictive validity, consequential validity, systemic validity, ecological validity, cultural validity, descriptive validity, interpretive validity, theoretical validity, and evaluative validity.

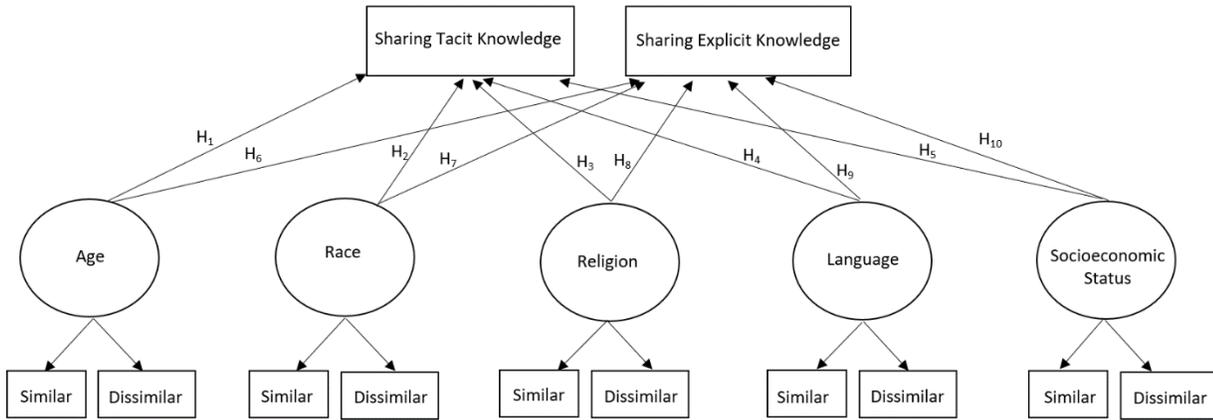
Discriminant validity was applied by using a statistical technique to determine the relationship between variables. Mohamad et al. (2015) explained that discriminant validity tests whether concepts or measurements that are not supposed to be related are unrelated. Hair et al. (2016) added to Mohamad et al.’s explanation of discriminant validity regarding that the construct is empirically unique from the other constructs in the SEM. The Fornell-Larcker

criterion (1981) was used to measure the discriminant validity. This approach compared the average variance extracted (shared variance within) of the constructs to the squared correlation between the constructs (shared variance between). Fornell and Larcker (1981) proposed that the average variance extracted for all items should be compared to the squared inter-construct correlation of that same construct and all other measured constructs. They explained that the shared variance for all constructs should not be larger than the average variance of the constructs.

### **Data Analysis**

Civelek (2018) published a book on structural equation modeling (SEM) and explained that using this technique in a research study could reveal the relationships among the variables that are not directly measured. Civelek demonstrated how the SEM technique can be used to reveal direct and indirect relationships between variables. The SEM technique was used to analyze the relationships between the different perceived shared cultural values. This technique was chosen to measure how the variation of the latent variables (perceived shared cultural values) impacted the measured variables (sharing tacit knowledge and sharing explicit knowledge). The goal was to understand and indicate a relationship between these latent variables and the measured variables. Replication of this study using this framework and research design is possible.

SEM is a statistical method used to test the impact between the measured variables that can be observed and the variables that cannot be directly measured (Civelek, 2018). Figure 7 shows the theoretical framework for this study. Figure 7 displays how the differences in age, race, religion, language, and socio-economic status are the latent variables, and that sharing tacit/explicit knowledge are the measured variables on how specific characteristics impacted KS through a social network.



*Figure 7.* Theoretical Framework

A partial least squares structural equation modeling (PLS-SEM) analysis was conducted to see if relationships existed among the variables and if relationships existed within and between the different sets of variables. This technique displayed the existence of relationships between the independent and dependent variables. This technique showed how much KS could change when there is a difference in a characteristic. A software application used the PLS-SEM to estimate the relationship between the variables. The software application used an iterative algorithm to solve the SEM by estimating the latent variables by using the measurement and structural model. This algorithm repeated itself until convergence was achieved (Civelek, 2018).

Hair et al. (2017) developed guidelines and requirements for choosing between PLS-SEM and covariance-based structural equation modeling (CB-SEM). These guidelines and requirements are shown in Table 4. PLS-SEM was chosen based on sample size being less than 100, the objective equaling the explanation and prediction, and the need for latent variable scores for subsequent analysis. These three guidelines from Hair et al., displayed in Table 4, indicated that using PLS-SEM was the correct technique for this study. The SEM technique was used to analyze the relationships between the different perceived shared cultural values. This technique measured how the variation of the latent variables impacted the measured variables. The main

goal of using this technique was to understand and indicate the relationships between the latent variables and the measured variables.

**Table 4**

*Guidelines for Selecting PLS-SEM*

<i>Types of analysis</i>	<i>Recommended method</i>		
	<i>PLS-SEM</i>	<i>CB-SEM</i>	<i>Both</i>
Objective = prediction	X		
Objective = exploratory research or theory development	X		
Objective = explanation only		X	
Objective = explanation and prediction	X		
Measurement philosophy = total variance (composite-based)	X		
Measurement philosophy = common variance only (factor-based)		X	
Reflective measurement model specification			X
Formative measurement model specification	X		
Metric data			X
Non-metric data = ordinal and nominal	X		
Smaller sample sizes – N = < 100	X		
Larger sample sizes – N = > 100			X
Binary moderators			X
Continuous moderators	X		
Normally distributed data			X
Non-normally distributed data	X		
Secondary (archival) data	X		
Higher order constructs = two 1st order constructs	X		
Higher order constructs = three or more 1st order constructs			X
Latent variable scores needed for subsequent analysis	X		

Using the SEM technique indicated if a statistical linear relationship between the independent and dependent variables existed. Once a linear relationship was indicated, the strength of this relationship could be understood. A matrix was developed to evaluate the postings of the tacit and explicit knowledge being exchanged through a social media network. Using this strategy helped to identify which specific cultural characteristics, compared to other cultural characteristics, impacted an individual's ability to share tacit and explicit knowledge

through a social media application. The postings of the actual knowledge being shared between the participants based on their perceived shared cultural values were analyzed and placed into two categories: tacit and explicit knowledge sharing. Table 5 displays how the categories were created to analyze the data for each posting.

**Table 5**

*Categories for Analyzing the Data*

<b>Type of KS Activity (%)</b>	<b>Tacit (1)</b>	<b>Explicit (2)</b>
KS with someone of similar age		
KS with someone of similar race		
KS with someone of similar religion		
KS with someone of similar language		
KS with someone of similar socioeconomic status		
KS with someone of dissimilar age		
KS with someone of dissimilar race		
KS with someone of dissimilar religion		
KS with someone of dissimilar language		
KS with someone of dissimilar socioeconomic status		

Each posting was associated with a unique identification number that was given to the user through email. Each SME had their own code to identify their evaluation of each posting. If tacit knowledge was being shared in the post, it was placed in the “1” or “tacit” category. If explicit knowledge was being shared in the post, it was placed in the “2” or “explicit” category. If a posting occurred with multiple KS activities and was shared with more than one person, it was determined who they were sharing knowledge with and was placed in the correct categories. Any disagreements related to where the posting should be recorded was resolved by having the posting be placed in the category where at least two of the SMEs agreed it belonged. Postings that were not related to KS were removed and not analyzed by the SMEs. It was possible that a

posting contained both tacit and explicit knowledge being shared, which resulted in being placed in the “1” and “2” category. After collecting this raw data, the percentage of knowledge being shared was calculated for each category. An example of the SME reviewing a post and then deciding which category it should be placed in can be found in Appendix D.

### **Summary**

The data from this study explained how certain cultural characteristics played a role on knowledge creation and KS through the usage of social media applications by addressing this research question: What impact does perceived shared cultural values illustrated as age, race, religion, language, and socio-economic status have on knowledge sharing through a social media application?

The following hypotheses were suggested:

- H1. Individuals of a similar age are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar age.
- H2. Individuals of a similar race are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar race.
- H3. Individuals of a similar socioeconomic status are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H4. Individuals who share the same religion are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar religion.

- H5. Individuals who share the same native language to communicate are more likely to share tacit knowledge through a social media application compared to individuals who do not use a similar language.
- H6. Individuals of a similar age are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar age.
- H7. Individuals of a similar race are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar race.
- H8. Individuals of a similar socioeconomic status are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H9. Individuals who share the same religion are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar religion.
- H10. Individuals who share the same native language to communicate are more likely to share explicit knowledge through a social media application compared to individuals who do not use a similar language.

To test the hypotheses, each post from the social media platform was analyzed. The postings of the actual knowledge being shared was analyzed and placed into two categories.

This study included data that was collected through the postings from a social media application (discord) and the demographics collected through a survey. An example of a posting between two participants in discord can be found in Appendix E. The survey methodology that was incorporated to gather the demographics was previously validated from an earlier study (Razmerita et al, 2016; Hughes et al, 2016). Once the data was collected from the postings, the

SEM technique was conducted to see if any relationships existed among the variables. The goal of using this technique was to indicate and understand the strength of the linear relationships between the latent variables (sharing tacit and explicit knowledge) and the measured demographic variables (the impact of age, race, religion, language, and socio-economic status). The data collected from the postings and the demographics collected through a survey was an attempt to test the hypotheses. The demographic survey results, the testing of the relationships between the variables from the postings in the social media application, and the analysis of the data will be discussed in Chapter 4.

## Chapter 4

### Results

#### Introduction

The data that were collected and analyzed to help explain how certain cultural characteristics played a role on knowledge creation and KS through the usage of social media applications by addressing this research question: What impact does perceived shared cultural values illustrated as age, race, religion, language, and socio-economic status have on knowledge sharing through a social media application?

The following hypotheses were tested:

- H1. Individuals of a similar age are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar age.
- H2. Individuals of a similar race are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar race.
- H3. Individuals of a similar socioeconomic status are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H4. Individuals who share the same religion are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar religion.
- H5. Individuals who share the same native language to communicate are more likely to share tacit knowledge through a social media application compared to individuals who do not use a similar language.

- H6. Individuals of a similar age are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar age.
- H7. Individuals of a similar race are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar race.
- H8. Individuals of a similar socioeconomic status are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H9. Individuals who share the same religion are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar religion.
- H10. Individuals who share the same native language to communicate are more likely to share explicit knowledge through a social media application compared to individuals who do not use a similar language.

To test the hypotheses, each post from the social media platform (Discord) was analyzed. The postings of the actual knowledge being shared were analyzed and placed into two categories: Tacit, and Explicit. The demographic survey results, the testing of the relationships between the variables from the postings in the social media application, and the analysis of the data are discussed in the following sections.

### **Online Survey Results**

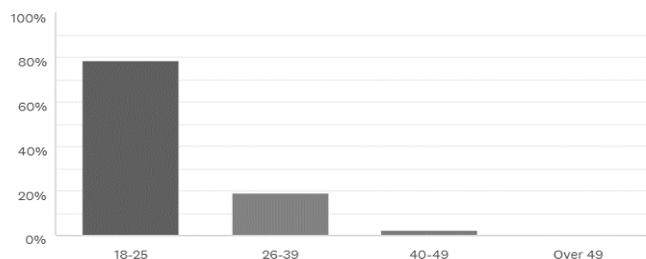
An online survey was used to collect the participants' demographic factors, specifically age, race, religion, language, and socio-economic status. The results from the survey showed 78.57% of the individuals fell in the age range of 18-25, 61.90% were Hispanics, 45.24% selected Christianity or Other (54.76%), 73.81% selected English while 23.81% selected

Spanish, and 64.29% selected Middle Class or Middle-Lower Class (23.81%). The following explains in depth the breakdown of the participants' selection regarding their demographic factors.

Question 1 asked the participants to select their age range. The possible choices were 18-25, 26-39, 40-49, and over 49. Of the participants, 78.57% (33 participants) were in the 18-25 range, 19.05% (8 participants) were in the 26-39 range, only 1 participant was in 40-49 range, and there were not any participants over the age of 49. It is important to note that the sample was heavily skewed toward the younger age category resulting in 97.62% of the participants were between the ages of 18-39. Figure 8 shows the breakdown of the first question that was provided through the survey interface:

Please choose your age range:

Answered: 42 Skipped: 0



ANSWER CHOICES	RESPONSES	
18-25	78.57%	33
26-39	19.05%	8
40-49	2.38%	1
Over 49	0.00%	0
<b>TOTAL</b>		<b>42</b>

*Figure 8.* Results for Survey Question 1

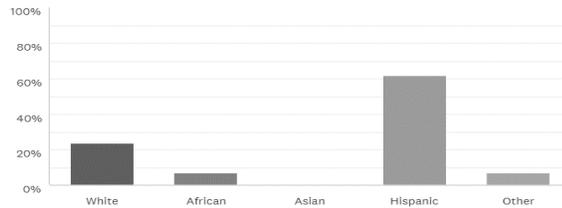
Question 2 asked the participants to select their race. The possible choices were White, African, Asian, Hispanic, and Other. Of the participants, 23.81% (10 participants) were White, 7.14% (3 participants) were African, 61.90% (26 participants) were Hispanic, no participants selected Asian, and 3 participants selected Other. It is important to note that the sample was

heavily skewed toward participants (85.71%) identifying themselves as either White or Hispanic.

Figure 9 shows the breakdown of the second question that was provided through the survey interface:

Please choose your race:

Answered: 42 Skipped: 0



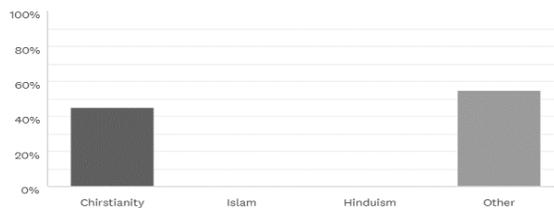
ANSWER CHOICES	RESPONSES	
White	23.81%	10
African	7.14%	3
Asian	0.00%	0
Hispanic	61.90%	26
Other	7.14%	3
<b>TOTAL</b>		<b>42</b>

*Figure 9.* Results for Survey Question 2

Question 3 asked the participants to select their religion. The possible choices were Christianity, Islam, Hinduism, and Other. Of the participants, 45.24% (19 participants) selected Christianity, 54.76% (23 participants) selected Other, and no participants selected Islam or Hinduism. It is important to note that 54.76% of the participants did not identify with any of the world's major religions. Figure 10 shows the breakdown of the third question that was provided through the survey interface:

Please choose your religion:

Answered: 42 Skipped: 0



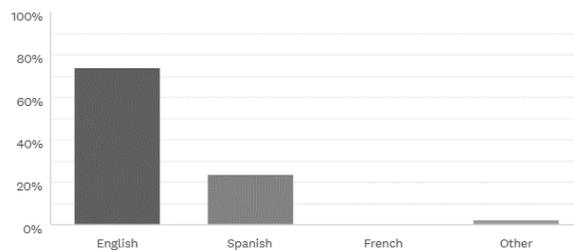
ANSWER CHOICES	RESPONSES	
Christianity	45.24%	19
Islam	0.00%	0
Hinduism	0.00%	0
Other	54.76%	23
<b>TOTAL</b>		<b>42</b>

*Figure 10. Results for Survey Question 3*

Question 4 asked the participants to select their native language. The possible choices were English, Spanish, French, and Other. Of the participants, 73.81% (31 participants) selected English, 23.81% (10 participants) selected Spanish, one participant selected Other, and no participants selected French. It is important to note that the sample of participants (97.62%) chose English or Spanish as their native language. Figure 11 shows the breakdown of the fourth question that was provided through the survey interface:

Please choose your native language:

Answered: 42 Skipped: 0



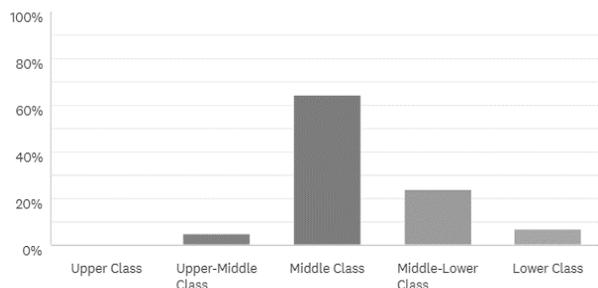
ANSWER CHOICES	RESPONSES	
English	73.81%	31
Spanish	23.81%	10
French	0.00%	0
Other	2.38%	1
<b>TOTAL</b>		<b>42</b>

*Figure 11. Results for Survey Question 4*

Question 5 asked the participants to select their socioeconomic status. The possible choices were Upper Class, Upper-Middle Class, Middle Class, Middle-Lower Class, and Lower Class. Of the participants, 0% were Upper Class, 4.76% (2 participants) selected Upper-Middle Class, 64.29% (27 participants) selected Middle Class, 23.81% (10 participants) selected Middle-Lower Class, and 7.14% (3 participants) selected Lower Class. It is important to note that the sample of participants (88.10%) chose Middle Class or Middle-Lower Class as their socioeconomic status. Figure 12 shows the breakdown of the fifth question that was provided through the survey interface:

Please choose your socioeconomic status:

Answered: 42 Skipped: 0



ANSWER CHOICES	RESPONSES
Upper Class	0.00% 0
Upper-Middle Class	4.76% 2
Middle Class	64.29% 27
Middle-Lower Class	23.81% 10
Lower Class	7.14% 3
<b>TOTAL</b>	<b>42</b>

*Figure 12.* Results for Survey Question 5

A total of 42 participants took the survey, with 0 questions skipped. The participants were enrolled in an Associate of Science (A.S.) degree program in a public institution. The survey was taken during the first week of the semester in January 2020, and the data were collected until the end of the month. The following section contains the analyzed results of each post from the social media platform, which were placed into two categories.

### **Analyzed Social Media Postings**

The SMEs considered each posting from the social media platform and the participant demographic factor by placing the posting into the correct KS category (tacit or explicit). A total of 83 postings were analyzed by the SMEs out of 113 postings. The SMEs compared each posting regarding which type of knowledge was being shared. Then the SMEs considered the demographic of the participant who was involved in the KS activity and placed the posting in the correct category. The three SMEs did not communicate with each other while analyzing the data. The posting would be placed in the category where at least two of the SMEs agreed it belonged.

A total of 17 disagreements occurred where two SMEs chose one category, and the other SME chose another category. Table 6 displays the resolved social media postings that were analyzed by SMEs, the demographic of each participant, and the type of KS activity. A total of 83 postings for each of the five categories were recorded.

**Table 6**

*Analyzed SMEs Results*

<b>Type of KS Activity (%)</b>	<b>Tacit (1)</b>	<b>Explicit (2)</b>
KS with someone of similar age	13	24
KS with someone of similar race	14	7
KS with someone of similar religion	16	10
KS with someone of similar language	28	23
KS with someone of similar socioeconomic status	30	22
KS with someone of dissimilar age	14	32
KS with someone of dissimilar race	36	26
KS with someone of dissimilar religion	39	18
KS with someone of dissimilar language	24	8
KS with someone of dissimilar socioeconomic status	14	17

**Data Synthesis for Research Question**

The SEM technique was conducted to see if any relationships existed among the variables. Figure 13 displays the tacit model and the path coefficients of the model that was created in the PLS-SEM tool. The tacit model represents sharing tacit knowledge between age, race, religion, language, and socioeconomic status as the latent variables. The social media postings between each dissimilar and similar demographic were the measured variables. The KS interactions variable represents the 83 postings that were analyzed by the SMEs. An identical model was created to represent sharing explicit knowledge between age, race, religion, language, and socioeconomic status as the latent variables. The path coefficients were calculated through

an algorithm in a sequence of regressions in terms of weight vectors. The weighting scheme consisted of 300 maximum iterations with a stop criterion ( $10^{-X}$ ) of 7.

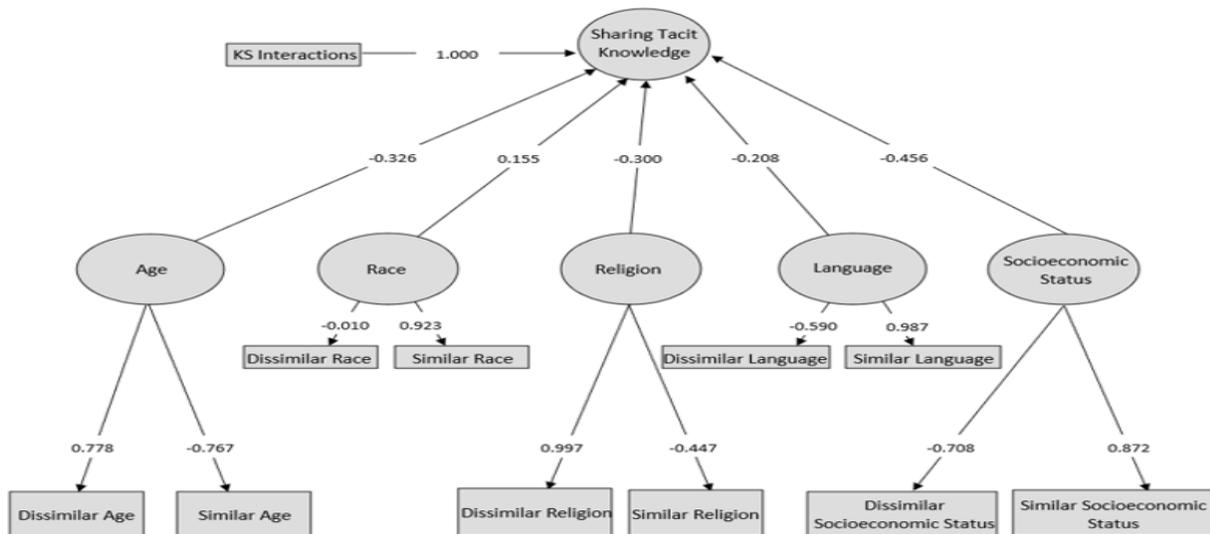


Figure 13. Coefficients of the Tacit SmartPLS Model.

The same calculation used in the Tacit SmartPLS model was repeated on the explicit model, which represented sharing explicit knowledge between age, race, religion, language, and socioeconomic status as the latent variables. The path coefficients were calculated through the same algorithm in a sequence of regressions in terms of weight vectors. Figure 14 displays the path coefficients of the explicit SmartPLS Model.

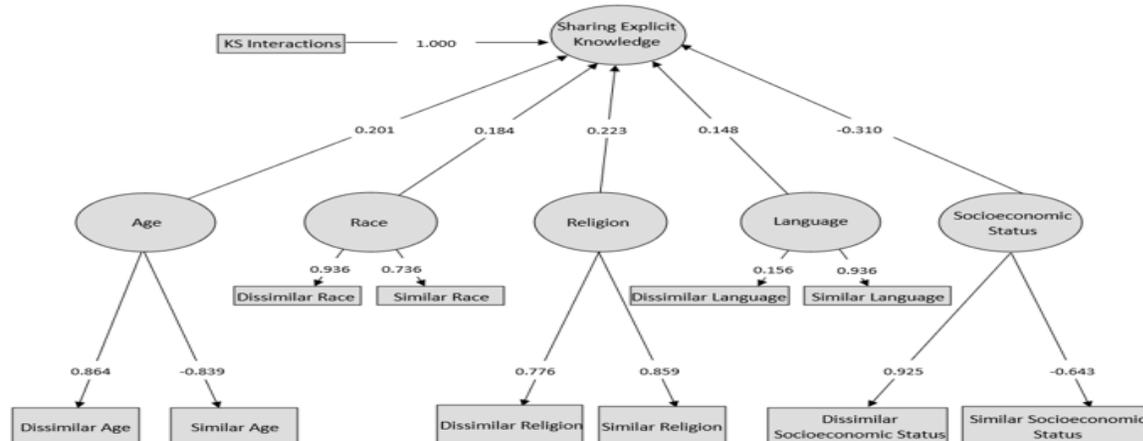


Figure 14. Coefficients of the Explicit SmartPLS Model.

An algorithm known as bootstrapping was used to test the statistical significance of the path coefficients of the tacit and explicit models. A significance level of 1% was applied with a subsample of 500 and parallel processing to the tacit and explicit model. Based on the  $p$  values derived from bootstrapping, none of the hypotheses were supported and all must be rejected. All hypotheses were not supported and rejected at the significance level of 1% ( $p$ -value > 0.1).

The breakdown of the  $p$ -values for H1 through H5 were: H1 resulted in generating a  $p$ -value of .386, H2 resulted in generating a  $p$ -value of .520, H3 resulted in generating a  $p$ -value of .591, H4 resulted in generating a  $p$ -value of .101, and H5 resulted in generating a  $p$ -value of .246. Figure 15 displays the  $p$ -value results for the tacit model.

Mean, STDEV, T-Values, P-Values	Confidence Intervals	Confidence Intervals Bias Corrected	Samples		
	Original Sa...	Sample Me...	Standard D...	T Statistics (...)	P Values
Age -> Sharing Tacit Knowledge	-0.326	-0.013	0.376	0.868	<b>0.386</b>
Language -> Sharing Tacit Knowledge	-0.208	-0.268	0.323	0.644	<b>0.520</b>
Race -> Sharing Tacit Knowledge	0.155	-0.018	0.289	0.538	<b>0.591</b>
Religion -> Sharing Tacit Knowledge	-0.300	-0.250	0.183	1.642	<b>0.101</b>
Socioeconomic Status -> Sharing Tacit Knowledge	-0.456	0.141	0.393	1.160	<b>0.246</b>

Figure 15. Bootstrap results of the Tacit Model.

The breakdown of the  $p$ -values for H6 through H10 were: H6 resulted in generating a  $p$ -value of .626, H7 resulted in generating a  $p$ -value of .450, H8 resulted in generating a  $p$ -value of .287, H9 resulted in generating a  $p$ -value of .148, and H10 resulted in generating a  $p$ -value of .463. Figure 16 displays the  $p$ -value results for the explicit model.

Mean, STDEV, T-Values, P-Values	Confidence Intervals	Confidence Intervals Bias Corrected	Samples		
	Original Sa...	Sample Me...	Standard D...	T Statistics (...)	P Values
Age -> Sharing Explicit Knowledge	0.201	-0.143	0.412	0.488	<b>0.626</b>
Language -> Sharing Explicit Knowledge	0.148	0.162	0.196	0.757	<b>0.450</b>
Race -> Sharing Explicit Knowledge	0.184	0.223	0.172	1.066	<b>0.287</b>
Religion -> Sharing Explicit Knowledge	0.223	0.195	0.154	1.451	<b>0.148</b>
Socioeconomic Status -> Sharing Explicit Knowledge	-0.310	-0.106	0.423	0.734	<b>0.463</b>

Figure 16. Bootstrap results of the Explicit Model.

### Reliability and Validity

Reliability was conducted by using three different SMEs that did not communicate with each other to analyze each social media posting. The SMEs were given the same 83 social media postings to analyze and decide if tacit knowledge or explicit knowledge was being exchanged in each posting. Three SMEs were used to enhance the reliability of this study. The posting would be placed in the category where at least two of the SMEs agreed it belonged. A total of 17 disagreements occurred where two SMEs choose one category, and the other SME chose another category. The SMEs for this research determined which type of knowledge was being shared for each post based on a model created by Wan et al. (2011).

Discriminant validity was applied by using a statistical technique to determine the relationship between the variables. The Fornell-Larcker criterion was used to measure the discriminant validity. This approach compared the average variance extracted (shared variance within) of the constructs to the squared correlation between the constructs (shared variance between). Figure 17 displays the results of the Fornell-Larcker Criterion.

Fornell-Larcker Criterion	Cross Loadings	Heterotrait-Monotrait Ratio (HTMT)	Hett		
	Age	Language	Race	Religion	Socioeconomic
Age	<b>0.773</b>				
Language	0.653	<b>0.813</b>			
Race	0.086	0.621	<b>0.663</b>		
Religion	0.555	0.033	-0.245	<b>0.773</b>	
Socioeconomic	-0.674	-0.121	0.539	-0.615	<b>0.794</b>

Figure 17. Results of the Fornell-Larcker Criterion.

Based on the Fornell-Larcker Criterion results (Figure 17), age and language had the highest number regarding whether the two constructs in the model were correlated. Socioeconomic status had the lowest number in regards to being correlated with other constructs. As all the coefficients in the diagonal (bolded numbers) are larger than the values in the table, discriminant validity is guaranteed.

### **Summary**

The data were collected through the postings from a social media application (Discord) and the demographics collected through a survey. Once the data were collected from the postings, the SEM technique was conducted to see if any relationships existed among the variables. The strength of the linear relationships between the latent variables (sharing tacit and explicit knowledge) and the measured demographic variables (the impact of age, race, religion, language, and socio-economic status) were calculated and displayed by using SmartPLS. The postings of the actual knowledge being shared were analyzed and placed into two categories. The data that were collected from this study was an attempt to explain how certain cultural characteristics play a role on knowledge creation and KS through the usage of social media applications by addressing this research question: What impact does perceive shared cultural values illustrated as age, race, religion, language, and socio-economic status have on knowledge sharing through a social media application?

The data collected from the postings and the demographics collected through a survey were attempts to test the 10 hypotheses. The results indicated that all the hypotheses were not supported and rejected due to their significance level of being greater than 1% ( $p$ -value > 0.1). The path coefficients of the explicit and tacit SmartPLS model were displayed to show the strength of the linear relationships between the variables. Reliability and the results of the

Fornell-Larcker Criterion were displayed to show how discriminant validity was applied. The Fornell-Larcker Criterion displayed age and language had the highest number regarding whether the two constructs in the model were correlated. The conclusions, limitations, implications, and recommendations for future studies are discussed in Chapter 5.

## Chapter 5

### Conclusions, Implications, Recommendations, and Summary

#### Introduction

In this chapter, the conclusions, implications, and recommendations are presented. First, the conclusions for the research question regarding the perceived shared cultural values illustrated as age, race, religion, language, and socio-economic status had on knowledge sharing through a social media application are covered. Second, the limitations of this research are presented. Third, the implications are covered for the contributions to knowledge sharing literature. Fourth, recommendations for future research are presented. Finally, the summary is presented to conclude the end of the study.

#### Conclusions

Although tacit and explicit knowledge sharing occurred on the social media application, none of the ten hypotheses were supported. This could have been due to the limitations of the study. This study consisted of limitations related to the sample size, demographics, environment, and the platform where the interactions between the participants occurred. One research question was addressed. The research question examined the interactions of the participants regarding the impact of perceived shared cultural values illustrated as age, race, religion, language, and socio-economic status had on knowledge sharing through a social media application. The purpose of this study was to use Hofstede's cultural dimensions theory as a basis for measuring perceived shared cultural values in regard to understanding which perceived shared values had the greatest impact on an individual to engage in sharing knowledge through a social media application.

The goal was to understand and indicate the strength of the linear relationships between the latent variables (perceived shared cultural values) and the measured variables (sharing tacit

knowledge and sharing explicit knowledge). The strength of the relationships was calculated and displayed by using SmartPLS. The data collected from the postings and the demographics collected through a survey were an attempt to test the 10 hypotheses. The path coefficients of the explicit and tacit SmartPLS model indicated that none of the ten hypotheses were supported due to their significance level of being greater than 1% ( $p$ -value  $> 0.1$ ). The results indicated that there was no linear relationship between the examined latent variables and how they impacted the measured variables.

There are several justifications on why the ten hypotheses were not supported. One explanation could be the tacit and explicit models that was chosen to examine the relationships between the examined latent variables and how they impacted the measured variables. Using different models could provide different path coefficients of the explicit and tacit SmartPLS model. If different path coefficients were then calculated, there could be a possibility of having the hypotheses supported. A second explanation could be using a different approach rather than using SmartPLS to calculate the strength of the relationships between the variables. An example of a different approach would be to use VisualPLS or WarpPLS to calculate the strength of the relationships. A third explanation for why the ten hypotheses were not supported could have been due to several limitations that existed and are explained in the next section.

### **Limitations**

Several limitations existed in this study. The sample size was a limitation due to having only 42 participants. The sample size could have played a role in why the ten hypotheses were not supported. Another limitation was that the study consisted of participants from only two courses within the same college. A limitation also existed in not having a diverse enough sample in terms of all demographic factors. The demographic results that were collected from the survey

indicated that 78.57% were between the ages of 18-25, 61.90% were Hispanic, 54.76% selected other as their religion, 73.81% selected English as their native language, and 64.29% selected middle class as their socioeconomic status.

A limitation existed in the amount of knowledge being shared through the social media application. A total of 83 KS postings were analyzed by the SMEs. The number of postings could have played a role in why the ten hypotheses were not supported. A higher number of postings could have generated different *p*-value results when calculated through SmartPLS. A higher number of postings could have displayed a higher correlation between the different constructs.

Another limitation existed regarding the inability to control a variety of variables, such as instructional method and teacher involvement. Initially, the study was to be conducted in a traditional classroom setting, but due to the restrictions mandated by the coronavirus pandemic, the classes were changed to an entirely online format. In an entirely online format, it is unclear how aware the participants were of the demographic differences between each other even though they did meet in video-conferenced virtual classrooms. A limitation existed regarding how the instructional method was conducted remotely through a social media application and how the teacher involvement was minimal due to the study being conducted remotely. These limitations could have played a role in why the ten hypotheses were not supported.

### **Implications**

This section presents the implications for the conclusions that were discussed earlier in this chapter. This research expanded upon Razmerita, Kirchner, and Nielsen's (2016) investigation by identifying the relationship between perceived shared cultural values and the type of knowledge sharing through social media applications. This study contributes to the body

of literature regarding how social media platforms provide new ways of sharing knowledge, giving organizations additional methods to benefit from social capital and valuable knowledge that individuals can contribute to an organization. This study contributes to KS literature regarding how people from different cultures could impact their ability to share tacit knowledge through social media applications.

This research expanded upon Razmerita et al.'s (2016) investigation by using a significantly more diverse population and including age, race, religion, language, and socioeconomic status. The diverse population was increased significantly to include various perceived cultural backgrounds to strengthen the internal validity of the research. This study used a research model that was similar to Razmerita et al.'s (2016) model, but it included four new perceived shared values of race, socioeconomic status, religion, and age, which were not included in Razmerita et al.'s (2016) study. The survey that was used in this study was based on Razmerita et al.'s (2016) and Hughes et al.'s (2016) previous survey questions. The survey choices were based on Razmerita et al.'s (2016) and Hughes et al.'s (2016) research, which used similar surveys to collect demographics for their studies.

Razmerita et al. (2016) suggested expanding their study by exploring the impact of cultural factors on knowledge sharing through social media applications. This study measured the impact of perceived shared cultural values on actual knowledge sharing while Razmerita et al. (2016) investigated the intention to share knowledge. The postings were analyzed and calculated to understand the impact perceived shared cultural values had on knowledge sharing through a social media application. Only tacit and explicit knowledge sharing was recorded and analyzed.

Vuori and Okkonen (2012) found that an individual's culture could be a barrier when sharing tacit knowledge. The results of this study are not conclusive, but they could imply that culture might be moderated as a barrier in certain environments. This study contradicts Vuori and Okkonen's (2012) theory regarding culture as a barrier because the study took place through a moderated social media environment. Vuori and Okkonen (2012) did not consider that the environment in which the study is taking place could prevent a culture barrier from being created.

This research was an attempt to fill a gap in the literature that revealed a comparison of perceived shared cultural values as measured by demographic factors such as age, race, religion, language, and socio-economic status that had not been investigated (Jamshed & Majeed, 2019). There is a limited amount of literature regarding the relationships between various cultural factors through KS using social media applications (Razmerita, Kirchner, & Nielsen, 2016). This research adds new and original information to the body of knowledge in regards to identifying specific demographic factors of individuals, such as age, race, religion, language, and socio-economic status, to understand how these characteristics impacted their ability to share knowledge through social media applications.

### **Recommendations for Future Research**

There are several directions this research could be extended. This study could be extended by increasing the sample size. The sample size in this study was small and an increase in the size could lead to supporting the previous hypotheses. The sample could change to include participants from different courses in various colleges instead of just one college. The demographics of the sample could be more diverse regarding the participants' age, race, religion, native language, and socioeconomic status.

Another direction this research could be extended could be the environment in which knowledge sharing is occurring. Instead of using Discord as the social media application, another popular social media application could be used. This study could be extended regarding the instructional method, using face-to-face delivery instead of remote delivery with minimal teacher involvement. Resolving these limitations could change the outcome to possibly support the previously stated ten hypotheses.

### **Summary**

The data from this study explained how certain cultural characteristics played a role on knowledge creation and KS through the usage of social media applications by addressing this research question: What impact does perceived shared cultural values illustrated as age, race, religion, language, and socio-economic status have on knowledge sharing through a social media application?

The following hypotheses were tested:

- H1. Individuals of a similar age are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar age.
- H2. Individuals of a similar race are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar race.
- H3. Individuals of a similar socioeconomic status are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H4. Individuals who share the same religion are more likely to share tacit knowledge through a social media application compared to individuals who are not of a similar religion.

- H5. Individuals who share the same native language to communicate are more likely to share tacit knowledge through a social media application compared to individuals who do not use a similar language.
- H6. Individuals of a similar age are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar age.
- H7. Individuals of a similar race are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar race.
- H8. Individuals of a similar socioeconomic status are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar socioeconomic status.
- H9. Individuals who share the same religion are more likely to share explicit knowledge through a social media application compared to individuals who are not of a similar religion.
- H10. Individuals who share the same native language to communicate are more likely to share explicit knowledge through a social media application compared to individuals who do not use a similar language.

To test the hypotheses, each post from the social media platform Discord was analyzed. The postings of the actual knowledge being shared were analyzed and placed into two categories (tacit and explicit). The demographics of the participants were collected through a survey. A SEM technique was conducted on the data from the postings to see if any relationships existed among the variables. The goal of using this technique was to indicate and understand the strength of the linear relationships between the latent variables (sharing tacit and explicit knowledge) and

the measured demographic variables (the impact of age, race, religion, language, and socioeconomic status).

A total of 42 participants took the survey. The survey specifically collected the participants' age, race, religion, language, and socioeconomic status. While there was a significant amount of interaction between the participants on the social media application, only 83 of the 113 interactions related to the project were recorded and given to the SMEs to analyze. All ten hypotheses were not supported due to the  $p$ -values that were calculated through bootstrapping.

The breakdown of the  $p$ -values for H1 through H10 were: H1 resulted in generating a  $p$ -value of .386, H2 resulted in generating a  $p$ -value of .520, H3 resulted in generating a  $p$ -value of .591, H4 resulted in generating a  $p$ -value of .101, H5 resulted in generating a  $p$ -value of .246, H6 resulted in generating a  $p$ -value of .626, H7 resulted in generating a  $p$ -value of .450, H8 resulted in generating a  $p$ -value of .287, H9 resulted in generating a  $p$ -value of .148, and H10 resulted in generating a  $p$ -value of .463. The results indicated that all the hypotheses were not supported and were rejected due to their significance level being greater than 1% ( $p$ -value > 0.1).

Three different SMEs who did not communicate with each other to analyze each social media posting were used to keep a high level of reliability for this study. The Fornell-Larcker criterion was used to measure the discriminant validity. The Fornell-Larcker criterion was used to calculate that discriminant validity was guaranteed due to all the coefficients in the diagonal being larger than the rest of the values.

The data that were collected from this study was an attempt to explain how certain cultural characteristics play a role on knowledge creation and KS through the usage of social media applications by addressing this research question: What impact does perceived shared

cultural values illustrated as age, race, religion, language, and socioeconomic status have on knowledge sharing through a social media application? The impacts of the results were covered, as the findings extended the research literature by adding to the body of knowledge on the exchange of tacit and explicit knowledge sharing through a social media application.

The aim of this research was to add to the body of knowledge by identifying which perceived shared cultural values impacted knowledge sharing through a social media application. The goal of this research was an attempt to fill the gap in the literature by understanding the effect of certain perceived shared cultural values on knowledge creation and sharing through the usage of a social media application. The results of this study showed which type of knowledge (tacit and explicit) sharing occurred.

Limitations were expressed regarding sample size, demographics, environment, and the platform used by the participants. Recommendations to extend the body of knowledge through various directions for future studies were suggested. The most valuable recommendation in furthering this study would be to focus on eliminating the limitations, such as having a larger sample size, a more diverse population, and a larger amount of knowledge sharing postings.

## Appendices

## **Appendix A: Participants Consent Form**

### **General Informed Consent Form NSU Consent to be in a Research Study Entitled**

Identifying the Impact of Perceived Shared Cultural Values on Knowledge Sharing  
Through a Social Media Application

#### **Who is doing this research study?**

College: Nova Southeastern University (NSU) - College of Computing and Engineering (CCE)

Principal Investigator: Mel Tomeo – MS, Instructional Technology, BS, Digital Forensics, AS, Information Systems

Faculty Advisor/Dissertation Chair: Dr. Timothy Ellis

Co-Investigator(s): None

Site Information: None

Funding: Unfunded

#### **What is this study about?**

This is a research study, designed to test and create new ideas that other people can use. The purpose of this research study is to identify the relationship between perceived shared cultural values and the exchange of knowledge through contributions to a social application. The results from this research will help measure perceived shared cultural values towards understanding which perceived shared cultural values have the greatest impact on an individual to engage in sharing knowledge through a social media application.

#### **Why are you asking me to be in this research study?**

You are being asked to be in this research study because you fit the criteria and background to be a part of this study.

This study will include about 30 people.

#### **What will I be doing if I agree to be in this research study?**

Research Study Procedures - as a participant, this is what you will be doing:

You will first be given a unique identification number to identify yourself when you take a survey that will provide your demographics for this study. You will then be asked to work on a game development project that will take the span of one week to complete. You will only be allowed to communicate through a social media network with other classmates who are

completing the same project. When you communicate with others, you will only be identified as the unique number that was originally given to you when you took the survey. The expected duration of this study will be three class sessions.

### **Are there possible risks and discomforts to me?**

This research study involves minimal risk to you. To the best of our knowledge, the things you will be doing have no more risk of harm than you would have in everyday life.

Possible risks when completing the survey could include being asked questions that may be personal, and you can skip any questions you do not want to answer. You will gain a better understanding of sharing knowledge and communicating with other classmates through a social media application. No records identifying who specifically took the surveys will be disclosed. Your participation is completely voluntary, and you are free to withdraw from the study at any time.

### **What happens if I do not want to be in this research study?**

You have the right to leave this research study at any time, or not be in it. If you do decide to leave or you decide not to be in the study anymore, you will not get any penalty or lose any services you have a right to get. If you choose to stop being in the study, any information collected about you **before** the date you leave the study will be kept in the research records for 36 months from the end of the study but you may request that it not be used.

### **What if there is new information learned during the study that may affect my decision to remain in the study?**

If significant new information relating to the study becomes available, which may relate to whether you want to remain in this study, this information will be given to you by the investigators. You may be asked to sign a new Informed Consent Form, if the information is given to you after you have joined the study.

### **Are there any benefits for taking part in this research study?**

There are no direct benefits from being in this research study. We hope the information learned from this study will provide you with a better understanding of sharing knowledge and communicating with other classmates through a social media application.

### **Will I be paid or be given compensation for being in the study?**

You will not be given any payments or compensation for being in this research study.

### **Will it cost me anything?**

There are no costs to you for being in this research study.

**How will you keep my information private?**

Information we learn about you in this research study will be handled in a confidential manner, within the limits of the law and will be limited to people who have a need to review this information. This data will be available to the researcher, the Institutional Review Board and other representatives of this institution, and any regulatory and granting agencies (if applicable). If we publish the results of the study in a scientific journal or book, we will not identify you. All confidential data will be kept securely with the researcher in a password protected file. All data will be kept for 36 months from the end of the study and destroyed after that time by permanently deleting the data file.

**Whom can I contact if I have questions, concerns, comments, or complaints?**

If you have questions now, feel free to ask us. If you have more questions about the research, your research rights, or have a research-related injury, please contact:

Primary contact:

Mel Tomeo can be reached at 570-417-3032 or by email at [mt1142@mynsu.nova.edu](mailto:mt1142@mynsu.nova.edu).

If primary is not available, contact:

Dr. Ellis can be reached at 954-663-8463 or by email at [ellist@nsu.edu](mailto:ellist@nsu.edu).

**Research Participants Rights**

For questions/concerns regarding your research rights, please contact:

Institutional Review Board  
Nova Southeastern University  
(954) 262-5369 / Toll Free: 1-866-499-0790  
[IRB@nova.edu](mailto:IRB@nova.edu)

You may also visit the NSU IRB website at [www.nova.edu/irb/information-for-research-participants](http://www.nova.edu/irb/information-for-research-participants) for further information regarding your rights as a research participant.

**All space below was intentionally left blank.**

### **Research Consent & Authorization Signature Section**

Voluntary Participation - You are not required to participate in this study. In the event you do participate, you may leave this research study at any time. If you leave this research study before it is completed, there will be no penalty to you, and you will not lose any benefits to which you are entitled.

If you agree to participate in this research study, sign this section. You will be given a signed copy of this form to keep. You do not waive any of your legal rights by signing this form.

#### **SIGN THIS FORM ONLY IF THE STATEMENTS LISTED BELOW ARE TRUE:**

- You have read the above information.
- Your questions have been answered to your satisfaction about the research

#### **Adult Signature Section**

I have voluntarily decided to take part in this research study.

\_\_\_\_\_  
Printed Name of Participant

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name of Person Obtaining  
Consent and Authorization

\_\_\_\_\_  
Signature of Person Obtaining Consent &  
Authorization

\_\_\_\_\_  
Date

## Appendix B: SMEs Instructions and Matrix

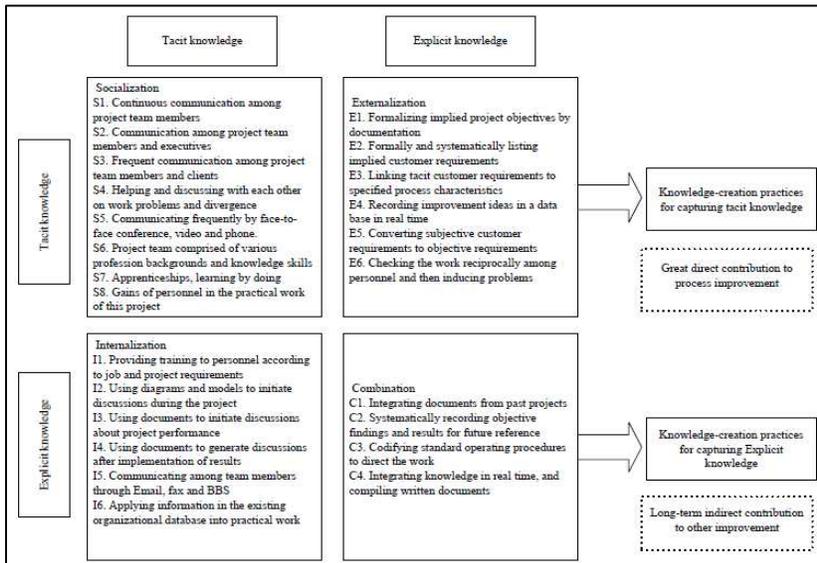
### Instructions:

Hello SMEs, please gather the posts and put them into an Excel spreadsheet. Then determine which type of knowledge (tacit, explicit, and other) is being shared for each post based on the model created by Wan et al. (2011). You will only be determining between tacit knowledge, explicit knowledge, and other. An example of other would be a post that is off topic or not related to the project. Then compare each other's determination (sharing your spreadsheet with the other SMEs) of which category the posting should be categorized. Since there are three SMEs, the determination of which category the posting would be placed in would need at least two of the SME's to agree to that category. Each posting will be labeled with a unique identification number, please use that number to categorize the posting.

The matrix that you (all SMEs) will be using to place each post can be found below:

Type of KS Activity (%)	Tacit (1)	Explicit (2)
KS with someone of similar age		
KS with someone of similar race		
KS with someone of similar religion		
KS with someone of similar language		
KS with someone of similar socioeconomic status		
KS with someone of dissimilar age		
KS with someone of dissimilar race		
KS with someone of dissimilar religion		
KS with someone of dissimilar language		
KS with someone of dissimilar socioeconomic status		

### Wan et al. (2011) Model:



## Appendix C: Survey Instrument

A link to the survey can be found here: <https://www.surveymonkey.com/r/HW22WRP>

### Demographics Survey

1. Please choose your age range:

- 18-25
- 26-39
- 40-49
- Over 49

2. Please choose your race:

- White
- African
- Asian
- Hispanic
- Other

3. Please choose your religion:

- Chirstianity
- Islam
- Hinduism
- Other

4. Please choose your native language:

- English
- Spanish
- French
- Other

5. Please choose your socioeconomic status:

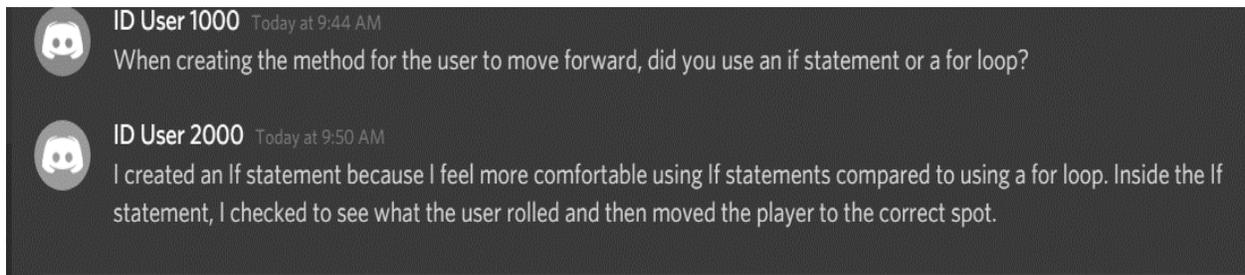
- Upper Class
- Upper-Middle Class
- Middle Class
- Middle-Lower Class
- Lower Class

Done

Powered by  
 SurveyMonkey

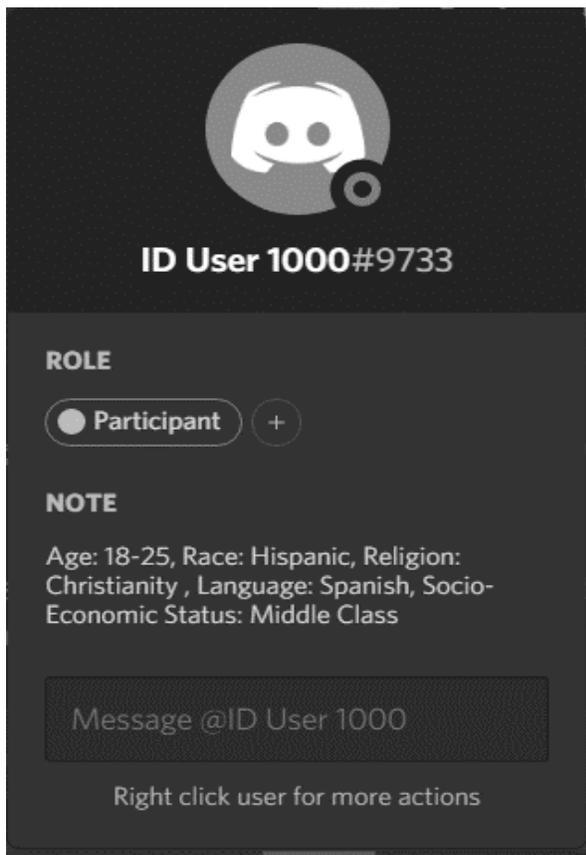
## Appendix D: Example of a SME Categorizing a Social Media Post

Social Media Post ID #01:



*Figure 18.* Example of a Social Media Post

Examples of tacit and explicit knowledge being shared in a social media post will be given to the SMEs. The example above represents tacit knowledge being shared between User 1000 and User 2000. The SMEs would view the profile for the demographics of User 1000 and 2000. The SMEs would give each posting a unique identification number; this example is 01. They would then check the profiles of the users that are posting by clicking on their usernames, which start with “ID User \*\*\*\*\*”:



*Figure 19.* Example of a User’s Profile

Based off the Wan et al. (2011) Model, the SME's would then categorize if tacit knowledge, explicit knowledge, or other knowledge were being shared between the participants:

<b>Type of KS Activity (%)</b>	<b>Tacit (1)</b>	<b>Explicit (2)</b>
KS with someone of similar age	01	
KS with someone of similar race		
KS with someone of similar religion		
KS with someone of similar language	01	
KS with someone of similar socioeconomic status		
KS with someone of dissimilar age		
KS with someone of dissimilar race	01	
KS with someone of dissimilar religion	01	
KS with someone of dissimilar language		
KS with someone of dissimilar socioeconomic status	01	

## Appendix E: Example of a Social Media Application Posting

Below is a screenshot of the social media application known as discord. A server is created where the participants will be invited to participate in the research to share knowledge while completing the project:

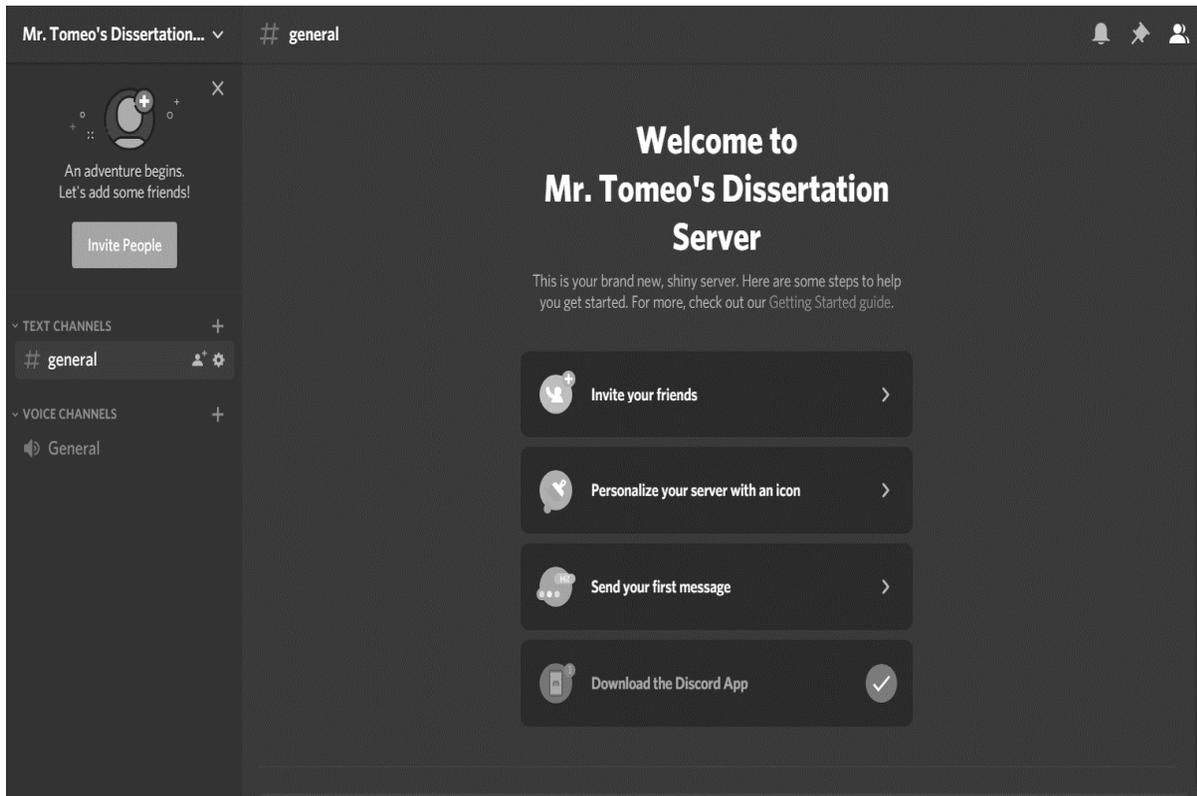
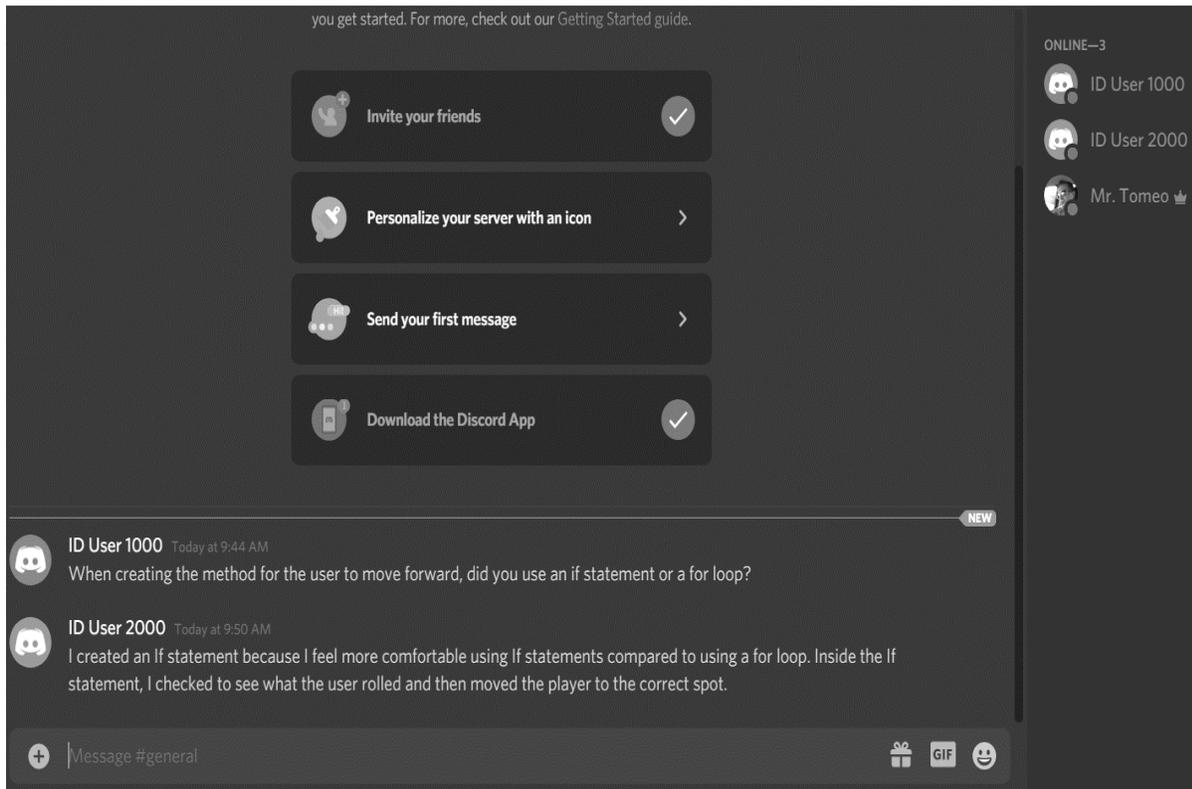


Figure 20. Example of a Server in Discord

Below is a screenshot of an example of two users sharing knowledge in discord:



*Figure 21. Users Sharing Knowledge in Discord*

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