

SENSE OF COMMUNITY IN ONLINE EDUCATION

by

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CHAPTER 1

INTRODUCTION

This dissertation discusses the psychological sense of community or sense of community in online education. The sense of community may influence students' satisfaction from various angles. The primary research question that guides this research is: What is the relationship between sense of community and satisfaction in an online education context? Online education is ubiquitous in today's digital world, especially during the Covid-19 pandemic. Within this chapter, I provide the statement of the problem, review the purpose of the research, and present the literature review and methodology.

Statement of the Problem

Community is not a new concept in the educational context. A community can be geographical or relational (Gusfield, 1975). Unlike people in the same neighborhood, students in an online class are more likely to form a relational community as they work toward the same goal—finishing the class, although the students do not share a geographical space. Why is community critical in education? According to a policy brief, “when schools, parents, families, and communities work together to support learning, students tend to earn higher grades, attend school more regularly, stay in school longer, and enroll in higher level programs” (National Education Association, 2012, p. 38). Community can positively impact students' learning outcomes. Community and learning experience are also connected. With a higher sense of belonging to an online community, students are more willing to share knowledge, help others, and even be responsible to the community (Chang, 2012).

“Third places” such as the bookstore, student union, study rooms, and common areas in colleges and universities are typical areas for students to communicate with one another after

classes (Aldosemani et al., 2016, p. 1020). Developing third places for online education communities may be another way to foster informal learning. Third places may include physical spaces, such as coffee shops or virtual spaces, for online groups (Aldosemani et al., 2016). Replicating strategies for fostering face-to-face community in an online learning environment is neither logical nor practical (Arasaratnam-Smith & Northcote, 2017).

Virtual communities and physical communities in the educational context have similarities on content and differences on format. Virtual communities are not as weak in emotional support as some articles have suggested (Denman et al., 2018). As Bowers and Kumar (2017) stated in their research on face-to-face and online learning environments, “results indicate that students perceived stronger teacher and social presences in the online section compared to the face-to-face section” (p. 1532). Although students do not have face-to-face conversations in virtual communities, they can still discuss curriculum and support with each other emotionally. Participants’ knowledge of their communities and willingness to embrace various views are critical to successful communities (Moodley, 2019). Despite the powerful influence from the online community, community members can utilize it conversely, which implies the importance of assessing the health of online communities by role distributions and dynamics (Davidson et al., 2019).

As technology has developed, people increasingly use the term online education to refer to any instruction conducted virtually. As long as a program offers online coursework, students can participate in online education no matter where they are or when they are available (Zheng et al., 2019). Traditional college students can use online education to supplement classroom knowledge. To part-time students, online education offers more convenience, especially when they have full-time jobs and prefer not to commute to campus after a long, hard day. The

support from faculty and institutions positively influence student participation in online education (Andrade et al., 2019). In addition, online education is more affordable than traditional, classroom learning. Students usually spend less than \$500 per credit hour on online learning (Best Value Schools, 2019), but traditional, on-campus programs commonly charge more than \$1,000 per credit hour. As Nash (2015) shared, “Despite the current drawbacks, online education is still the best prospect in terms of convenience for the future provided the barriers of faculty assessment and course design are addressed” (p. 80).

Drawbacks to online education include students having low efficiency in learning, low motivation, and high dropout rates. Teachers may set low expectations when designing courses (Nash, 2015), but some students may think all online courses are easy and fail to treat them with appropriate seriousness in the beginning. When the students feel limited instructor accessibility, active learning, peer interaction, and course resources (Hew, 2014), they may start to have negative learning experiences. Also, because of the online courses being less expensive, students may perceive lower quality education and become dissatisfied (Ragusa & Crampton, 2016). The advantage of low cost, then, becomes a disadvantage for distance learning. Too many challenges and the lack of seriousness towards online learning could lead students to drop out. Massive Open Online Courses have a drop out rate of over 60% (Ruiz-Palmero et al., 2020).

Instructors have tried various ways to improve online education, such as building communities. Researchers have likewise conducted many studies about communities in online education. Rovai (2002) pointed out that online teachers might want to try to reduce dropout rates by improving students’ sense of community. Online instructors can facilitate students’ interaction with each other in and out of the classroom so that the students feel more engaged

(Berry, 2019). Students may like specific community-engagement activities based on both the class and the characteristics of the student body. For example, Poole (2000) found that a group of master's students, who were K-12 teachers, preferred the asynchronous bulletin board and email, not live chats in a discussion-based online course. Students not majoring in education could prefer other interactions in a community.

In a traditional teaching model, teachers try to transfer knowledge to students, while in an online learning environment, teaching is centered on the relationship between teacher-student and student-knowledge; “virtual world creates new opportunities and a collaborative approach developing social skills necessary for carrying out activities in the current complex, dynamic, partially virtualized context” (Mitu, 2015, p. 244). Traditional teachers can build the relationship between teachers and students in classrooms and use virtual communities to help students better understand class content; online teachers may want to utilize virtual communities to enhance the relationship and offer a secure place for students. Virtual communities in traditional education and online education could function differently. For example, students on Facebook groups build relationship and establish lifelong networking contacts; the networking function is likely to contribute to online education, such as problem-solving, in the groups (Whittaker et al., 2014). Creating opportunities for interactions among students and teachers in Facebook groups can also help increase students’ sense of community (Kocdar et al., 2018).

The concept of a psychological sense of community or a sense of community is a key component in the study of community psychology (McMillan & Chavis, 1986). Sense of community is “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together” (McMillan & Chavis, 1986, p. 9). This definition has four

elements: membership, influence, integration and fulfillment of needs, and a shared emotional connection (McMillan & Chavis, 1986). Scholars link sense of community with various aspects of student learning. Sense of community is associated with life satisfaction and flourishing (Yetim & Yetim, 2014). Scholars have not reached a conclusion about difference of sense of community based on gender (Lewis et al., 2015). Sense of community directly contributes to students thriving and indirectly contributes to their intent to graduate (Conn, 2017). Rovai (2002) mentions two components in sense of community: connectedness and commonality. Students with a higher sense of community tend to have higher learning satisfaction and lower dropout rates in online education (Rovai, 2002). Trying to improve sense of community to increase students' satisfaction with online courses is critical to student learning. Communities of practice in higher education facilitate learning, dialogue, and collaboration within a shared context (Oliphant & Branch-Mueller, 2016). A learning community can prevent a sense of isolation among students and “foster both meaningful instructor–student and student–student relationships, which have been associated with better learning outcomes, increased motivation, and persistence in the course or program” (Ratliff, 2018, p. 34).

Purpose of Research

The purpose of this study was to determine if students develop a sense of community in online courses in a U.S. southwest university. I examined students' sense of community, gender, college, and satisfaction to evaluate the sense of community in online education.

Research Questions

This study was guided by the main research question: Is there a sense of community in an online education context? To answer the main question, I looked for answers to the following subquestions:

Q1: Is there sense of community in each college? If yes, are there differences in students' sense of community scores based on the college in which students are enrolled?

Q2: Is there sense of community in each gender? If yes, are there differences in students' sense of community scores based on gender?

Q3: Is there sense of community or satisfaction in students? If yes, is there a relationship between sense of community and satisfaction for students taking an online course?

Significance of the Problem

The study's findings will provide insights on communities in the context of higher education and strengthen the importance of sense of community. During this unusual Covid-19 pandemic, education institutions can utilize the results of the study if they want to enhance their education through initiating communities for their students. As online courses are likely to become more prevalent, for online instructors, this study could help them with a lens of sense of community to view students' learning experiences. The instructors can refine their pedagogy styles by designing specific activities based on students' demographics and background. Last but not the least, students' awareness of sense of community and intention to participate communities can improve learning experiences and academic performances.

Research Positionality

As a graduate student in College of Education, I took a few online classes during the pandemic. The online experience gave me additional understanding on students' interactions with Zoom and discussion threads. I was also more interested and curious about other students' online education.

My worldview and values probably had minimal impact on the data collection phase in this quantitative study. Committee members and I refined survey questions a couple times to ensure no ambiguity. However, my background may affect your analysis of liberal arts or fine arts, as it covers education, business and technology. In Chapter 5, I might not have many comments on students from liberal arts or fine arts, but I was willing to learn more from this study and future study.

Additionally, in my full time job, I am working on identifying key factors that impact the performances of an artificial intelligence chatbot. This experience is the main reason to build a model to predict students' satisfaction in this dissertation. I believe advanced technology will have more influence in online education and want to equip myself proactively.

Definition of Terms

Sense of community: “A sense of community is a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through commitment to be together” (McMillan & Chavis, 1986, Abstract). For purposes of this study, sense of community is a feeling that students are safe to connect with one another and tackle other students' questions and concerns.

Online education: “a network-based approach to teaching” (Zheng et al., 2019, Abstract). For purposes of this study, online education is a set of instructional experiences via Internet.

Virtual community: “A group of people, who may or may not meet one another face to face, who exchange words and ideas through the mediation of digital network” (Rheingold, n.d., para. 1). For purposes of this study, virtual community is an online discussion thread where students can discuss course contents, class experiences, or other topics.

Summary

Communities in online education can be physical or virtual. Both kinds of communities can still enhance students' satisfaction through improving students' sense of community.

Chapter 2 is a review of previous literature and to build frameworks.

CHAPTER 2

REVIEW OF LITERATURE

This chapter starts with background that includes components such as community and online education. After the literature search of the background, I explored the theory, sense of community, from its debut and development. In the end of this chapter, I discussed the findings and conclusions of previous studies directly related to this study.

Background

Community

The term *community* is not an innovative concept. Many researchers have defined community in various ways throughout the literature; community can be a multifaceted concept related to factors, such as classroom and teacher, even from one scholar's definition (Drouin & Vartanian, 2010). In the early 20th century, social upper classes received education generally, but working masses could only create an envisioned community such as Workers' Institutes, one educational initiative undertaken by the Spanish Republic during the Civil War, to access secondary or higher education (Fernández-Soria, 2015). Scholars have defined and interpreted the term differently. Locality, membership, or shared values producing a common purpose can be the focus of a definition, realizing the complexity is necessary to examine a community (Flinn, 2007). In geographic communities, the community needs to provide more tangible needs such as safety to members (Obsr et al., 2002). Searching for similarities among community members may be less critical when a group of members form an interest community. In this case, they probably already have a sense of similarity. As Rovai (2001) suggested, "When community is viewed as what people do together, rather than where or through what means they do them, community becomes separated from geography" (p. 34).

A community can be a group of people in the same neighborhood, workers in the same company, or students in the same college (Boyer, 1990). Even in a university or college, scholars may form a community to discuss society while students may form another one to express their feelings on diversity, equity, and inclusion. A student can be male or female, any race or ethnicity, full-time or part-time, domestic or international, and poor or rich. While colleges and universities celebrate students' various backgrounds, many campuses have not been successful in achieving abundant loyalty or building communities. To build a larger, more integrative community, Boyer (1990) suggested six principles that define the kind of community colleges and universities should strive to be—purposeful, open, just, disciplined, caring, and celebrative.

Purposeful. Faculty and students share the same academic goals to strengthen teaching and learning on campuses (Boyer, 1990). However, “intellectual development and active citizenship are seen as being sacrificed by emphasizing narrowly defined skill sets rather than developing student potentials for both personal and societal contributions” (Willits & Brennan, 2016, p. 66). Even though an institution intends to focus on intellectual expansion, faculty might hold a different purpose from the one in the institution. For example, if an international professor wants to apply for permanent residence in the United States through first preference employment-based immigration, he or she needs to provide a significant amount of evidence, such as outstanding published material and high-quality peer reviewed listed in U.S. Citizenship and Immigration Service (2020). In this case, a disagreement of the purpose could cause a disconnect.

Open. A college or university is “an open community, a place where freedom of expression is uncompromisingly protected and where civility is powerfully affirmed” to ensure

that students speak and listen carefully to each other, but abusive language exists almost everywhere (Boyer, 1990, p. 17). Especially when public political leaders do not watch their own language or set good examples, some students follow those examples and divide each other in a community.

Just. A college or university is “a just community, a place where the sacredness of each person is honored and where diversity is aggressively pursued” (Boyer, 1990, p. 25). Diversity includes but is not limited to race, gender, national origin, and sexual orientation. It is inferred that diversity sometimes is not enough and that embracing diversity can be an advanced goal. Diversity in people’s values is often beautiful. For example, Kamala Harris, the Democratic vice-presidential nominee for the 2020 election, showed her charisma and capabilities during the vice-presidential debate. Her mother is from India, and her father is from British Jamaica. Her performance implied that she absorbed the best of the values from her parents.

Disciplined. In a community, individuals accept their obligations and well-defined governance procedures guide behavior (Boyer, 1990). Disciplines, such as policies and codes of conduct, govern campus life for the common good, so students and faculty know the boundaries of acceptable behavior to be a member in good standing.

Caring. A college or university is “a caring community, a place where the well-being of each member is sensitively supported and where service to others is encouraged” (Boyer, 1990, p. 47). One way of making connections between what students learn and how they live is completing a community service project. Schools are not families, but at least students do not have to feel they are numbers for statistics.

Celebrative. A college or university is “a celebrative community, one in which the heritage of the institution is remembered and where rituals affirming both tradition and change

are widely shared.” (Boyer, 1990, p. 55). University personnel should encourage students to share rituals and traditions that connect them to the campus community. The rituals and traditions improve the civic culture and diversity at the university and building a vital community is a challenge to both higher education and the whole society (Boyer, 1990). However, students remember and pass along the traditions and changes from generation to generation. Online education could add some complexity on passing along traditions, but instructors can be develop creativity such as putting the purpose statement of an institution in the first slide of every presentation.

A well-developed community is beneficial to students through different perspectives. Students learn fastest and deepest when they feel related to a dynamic community of connections between teachers and students (Palmer, 2002). Creating a genuine feeling or sense of a caring community among adult students may contribute to increased student retention (Harris, 2006).

To create relational communities where students feel welcome to be authentic and where everyone’s value is respected and embraced, instructors need not only to recognize and welcome the students’ intersectional identities, but also to know the students and design course work specifically for them (Klos, 2019). Besides individual identities such as gender, race and social class, a combination of two or more identities could affect individual behavior and organizational behavior. Intersectionality was conceptualized and coined by Crenshaw (1989). Pedulla (2014) pointed out that combining multiple marginalized social identities does not necessarily produce greater disadvantage than belonging to only one stigmatized group, which is against several scholars’ previous studies. A woman’s multiple identities could hinder or support her participation in science (Avraamidou, 2020). Intersectional barriers could lead to

self-doubt and unwillingness to speak in class (Garriott et al., 2019). Mackenzie (2013) uses the metaphor of “margin” to describe a relational component of the ecology of a classroom; “margins are areas in nature and society where diversity exists, where life is often riskier for the inhabitant and where species, ideas, and actions are able to have the freedom to flourish, to experiment, and to seek potentialities” (p. 101). Margins connect students and build a sense of community among them (Mackenzie, 2013).

Student involvement is often a challenge to those working in higher education. In a class or a community, some students may feel they are important, while another group may think they are marginal (Schlossberg, 1989). Marginality and mattering are an angle to examine in a community. Marginality can be a temporary condition during transition, a description of personality traits, or a permanent condition through life (Schlossberg, 1989). For example, the students who shift majors in the second year of their college lives could experience isolation and disengagement; as they interact with classmates and professors in new majors more, the feelings of marginality decrease. Some people research LGBTQ+ topics and run campaigns to support students with minority sexual orientations. First-generation immigrants to the United States are frequently bicultural and identify with the American culture and the cultures of their original countries. When questions regarding the conflicts between the United States and the original countries arise, these bicultural individuals sometimes experience hard time from my own experience. Rosenberg and McCullough (1981) defines mattering as “the feeling that others depend on us, are interested in us, are concerned with our fate, or experience us as an ego-extension exercises a powerful influence on our actions” (p. 165) and points out that “one problem of retirement is that one no longer matters; others no longer depend on us” (p. 179). Schlossberg (1989) summarizes five dimensions of mattering: attention, importance, ego-

extension, dependence, and appreciation. The first dimension is attention; people often feel lonely when they go to a new city or new job when no one pays attention on whether they appear. The second dimension was importance; mattering does not necessarily mean importance or approval but caring. The third dimension was ego-extension which means that others are proud when people succeed and that others are upset when people fail. The fourth dimension was dependence; our behavior is equally influenced by our dependence on others and others' dependence on us. The last dimension was appreciation; people want others to notice and appreciate their efforts and achievements. However, mattering can also be a burden (Schlossberg, 1989). For example, diligent elementary school teachers can feel children are too dependent on them and work significantly long hours; this kind of diligence could damage their physical and mental health. Marginality and mattering are two issues at opposite poles; marginality often happens when one walks to a new environment (Schlossberg, 1989) and mattering appears when someone depends on us as mentioned earlier. Exploration of the two issues may help instructors understand their students with diversified backgrounds and the communities they build.

Yamamura and Koth (2018) stated that “contemporary community engagement efforts in higher education focus more on student learning and faculty research than pursuing measurable change on larger social issues” (p. 3) and that place-based initiatives are critical in community engagement. Their statements imply the importance of communities created for student learning and community locations. Third place theory may offer some insights on the community locations; third places are public locations where local residents informally communicate with one another (Oldenburg, 1989). According to Oldenburg (1989), several characteristics of third places are accessibility, neutral ground, leveler, conversation, a low

profile, and so on. To students, coffee shops and bookstores are good third places as the students can converse with each other in a relaxed atmosphere. Technological advances enable students to connect in ways impossible a few decades ago and “blur the line between local and distance space” (Aldosemani et al., 2016, p. 1022). The students can discuss class contents or emotions in casual ways in online third places, such as Zoom calls. As students sometimes do not see body language or facial expressions clearly in virtual third places, serendipitous interactions may not happen. The concept of virtual communities has been evolving for years.

Scholars in a community collaborate to seek new insights and at the same time compete for individual achievements (Palmer, 2002). A community of students may possess similar attributes. Students in a class strive for limited high grades or internship opportunities. However, they can also work together to solve complex problems in team projects or recommend each other to employers for potential jobs. Competition is not necessarily negative; instructors may guide students to achieve better learning through healthy competition in a community. For example, students who achieve high grades can help others review questions in tests; students who get internships can help other network in job hunting.

Virtual Community

Like physical communities, virtual communities may offer safe environments for students’ informal conversations. Denman et al. (2018) synthesize previous studies about virtual groups. Self-regulation skills are necessary for Ph.D. students to complete dissertations. Informal groups are useful for students to learn from others with similar academic and career goals, but the informal groups can be lacking in an online environment. Relationships and conversations with peers are important for students to make progresses in dissertations, but in most online course settings, the relationships and conversations only exist between instructors

and students, not among students. Additionally, as online learners sometimes do not gather for class at the same time and place, building and maintaining a sense of community becomes difficult (Lewis et al., 2015).

Students solve problems, discuss, and validate learning in virtual communities (Lewis et al., 2015). Students may explore contentious issues and understand some pitfalls of their work in virtual communities as their relationship with others can be more personal than professional (Quinney et al., 2008). Online support group relationships can flourish, and colleges and universities have reasons to develop such relationships (Denman et al., 2018). A virtual community not only increases students' knowledge content but also improves their understanding of the contextuality of assessment and decision-making (West, 2008).

Creating a virtual community is initially time-consuming, but the virtual community can be well received by students (West, 2008). For example, designing a virtual third place requires a detailed front-end analysis; the intended audience generally will not automatically use a developed space as designers plan (Aldosemani et al., 2016). However, instructors may not receive sufficient development and support to initiate virtual communities. When instructors question the effectiveness of online classes, how useful can virtual communities be? Even though instructors realize that virtual communities could be a way to improve students' learning outcomes and perceived experiences, several factors, such as workload and time constraints may hinder the instructors from creating the virtual communities (Moodley, 2019). Instructors may want to be aware that "adopting community-centered pedagogy as a strategy in online courses influences knowledge building and collaboration within groups or among peers, involving continuous discussion of the point of views expressed, sharing ideas, resolving ways of thinking, and having consensus" (Lewis et al., 2015, p. 2). An instructor who creates a virtual

community for student learning needs to make the community approachable by students. The instructor may improve graphic user interface, clarify the functions of the virtual community, or initiate policies or rewards to attract students. However, no matter how advanced technology is, students are a key in building virtual communities. A classroom community is strong when students are connected, share common values and interests, trust and help each other, actively engage in communication, and pursue similar goals (Rovai, 2002).

Virtual community members can adopt the following four roles: reader, contributor, collaborator, and leader (Davidson et al., 2019). The 90-9-1 rule indicates that 90% of users online only read or observe but do not contribute, that 9% make small contribution, and that 1% lead most conversations (Davidson et al., 2019). Analyzing roles helps the designers of virtual communities identify characters such as a *rising star* at an early stage (Davidson et al., 2019). However, the creators of virtual communities may not have enough time to identify the roles if the duration of virtual communities is too short. For example, when an instructor designs a virtual community for students taking a course, the community only lasts for a few weeks and disappears when the course is over. In this short period of time, leaders may not emerge quickly enough for the instructor to notice. Additionally, the roles of virtual community members may change over time (Davidson et al., 2019).

Davidson et al. (2019) summarized two types of thoughts about community health. The first one explores how traditional community managers try to engage and retain as many users as possible as churn rates are negative. The second thought views the user churn rate as a natural occurrence of online communities and the growths of virtual communities as more important indicators. In an online class setting, an instructor may want some students to actively lead conversations related to class content and others to view or comment. Too many noises off

topic distract students' attention. If every student tries to think about what content to post, then no one reads other students' post. Conversations online may be shallow and cannot go to next levels. Some introverts may feel pressure to be forced to post online; this pressure could negatively impact students' learning experiences. Contrasting an opposite version, a silent virtual community could be useless to online teaching. "Ignored" users decrease the health of a virtual community and may lead to failure of the community (Davidson et al., 2019). Instructors could purposefully encourage students to participate in a virtual community in a way helpful to learning and keeping an eye on the students' engagement and changing roles.

In this particular Covid-19 period, many people have to study or work from home due to quarantine policies. School personnel have tried to take care of their students' mental health through many activities. Companies encourage employees to participate in virtual happy hours and virtual lunch. Churches organize online events such as bible study in Zoom. Despite these efforts, people still feel forced into isolation. Virtual communities can reduce this sense of isolation and increase a sense of belonging during this time (Sharma, 2020). A sense of belonging is an element of the sense of community (McMillan & Chavis, 1986). In these virtual communities, people talk about fun activities they do at home in a relaxing mood such as painting and room decoration and they listen to others' interesting stories. A sense of belonging is important in helping people remain resilient when adjusting to and recovering from a crisis; although the format of virtual community such as audio or video conferences needs more examination in future research (Frei-Landau, 2020). Several factors, such as technological dimension and community management, can influence sense of community in virtual communities (Yin, 2010). For example, a professor may give only lectures without mentioning a virtual community or may encourage group discussions in the community. Instructors' actions

could impact the sense of community and bring new variables to virtual communities. “The most important lesson is that even with our differences, we are connected by the need to matter and the need to belong” (Schlossberg, 1989, p. 183).

Online Education

Current studies examine online education through various lenses, such as the format. Online courses can be synchronous and/or asynchronous. As most students use fragmentation time to participate in asynchronous online courses, a course’s video time needs to be short so as not to drain the students’ patience (Zheng et al., 2019). However, students can learn based on their own schedules in asynchronous online courses. Additionally, students do not get distractions from classmates and score higher but do not get a sense of community towards interacting, discussing, and sharing ideas in an asynchronous learning environment in the Covid-19 pandemic (X. Lin & Gao, 2020).

Working in online groups seems to encourage interaction but may result in lower effectiveness in completing courses (Zhang et al., 2019). Students’ motivation may decrease due to peer pressure if peers’ online postings are fast and thorough (Druce & Howden, 2017). The increase of emotional engagement, the improvement of a sense of belonging, and the creation of a good competitive environment are critical in online education (Zheng et al., 2019). Instructors may want to not only encourage the interactions in virtual community activities or group projects, but also keep an eye on the effectiveness of the interactions and students’ emotions. Cloud teaching systems may bring better interaction and learning results (Huang & Jin, 2018).

Adult Learning

More than 97% of college students are 18-years-old or older adults (Bustamante, 2019). It is appropriate to consider college as adult education. Adult learning is distinct from child education from various perspectives. As Knowles (1990) said, “Adults come to an educational activity with both a greater volume and a different quality of experience from youths” (p. 59). In Knowles’ model of andragogy (a) adult learners tend to be more self-directed, (b) they have more life knowledge, (c) the time of learning differs from youths, (d) adults learn to solve problems, (e) and they possess more internal motivations (C. Bates, 2009). Compared to children, adults have more life experiences. Adult learning is transformational when they discover insights through earlier experiences; through the reflection of actual experiences, adults can think critically and generalize ideas (Gutierrez, 2018). Instructors of adult students may want to consider the characteristics of adult learning and select a nurturing environment if they aim at enhancing students’ learning experiences and outcomes. Houston and Lange (2018) recommended *global/local* community engagement because they believed the students actively involved in intentional learning and experiential learning would tackle challenges and opportunities in the future better.

Some scholars classify traditional undergraduate students as emerging adults (Arnett, 2016; Graham & Donaldson, 1999; Squires et al., 2018). Unlike the emerging adults, older adult students—above 22-year-old, “use the classroom as a stage to intensify their learning and enhance their interactions with peers and instructors to achieve additional benefits” (Graham & Donaldson, 1999, p. 153). To older adults such as graduate students, classrooms are more than the places just for knowledge transfer as most students do not live on campus.

Adult educators may refer to neuroscience in practice. Swartz (2011) recommended three practical lessons in adult teaching: 1) “looking to neuroscience to help inform the evolving understanding of wisdom, 2) understanding brain plasticity while accepting the limitations of education in changing individual human brains and 3) —remembering that neuroscience is beginning to suggest that adaptation to our current constructed culture may not be wise in terms of long-term social brain survival” (p. 23).

Theoretical Framework

Sarason (1974) defined psychological sense of community as the perception of similarity to others, an acknowledged interdependence with others, a willingness to maintain this interdependence by giving to or doing for others what one expects from them, and the feeling that one is part of a larger dependable and stable structure. (p. 157)

Sarason asserted a sense of community is a foundation for self-definition. McMillan and Chavis (1986) in the initial studies defined sense of community in various ways and measured the elements of a sense of community; the authors assumed the elements contributed equally to an individual’s experience. Although, Sarason (1974) implied some experiences are more important than others.

In addition to the four elements (i.e., membership, influence, integration and fulfillment of needs, and a shared emotional connection), McMillan and Chavis (1986) also introduced sub-elements under some elements and relationship among the four elements. Several scholars have conducted studies (Obsr et al., 2002; Poole, 2000; Rovai, 2001, 2002) and supported McMillan and Chavis’s (1986) hypothesized elements, but these studies tend to be qualitative. Some

elements, such as membership, seem an indelible part of a sense of community, as having a sense of belonging is necessary to have a sense of community (Obsr et al., 2002).

The Four Elements

Membership. The element Membership has five sub-elements: boundaries, emotional safety, sense of belonging and identification, personal investment and common symbol system (McMillan & Chavis, 1986). Membership has boundaries, which means some people belong to a community and some do not. For example, a class of students may form a community. Students not enrolled in this class are outsiders and students who drop the class do not belong to the community anymore. People in a community use language, dress, and ritual to create boundaries to protect their personal space (McMillan & Chavis, 1986).

Emotional safety may be part of security, which protects group intimacy; such security could include physical security and economic security (McMillan & Chavis, 1986). The third sub-element, the sense of belonging and identification, “involves the feeling, belief, and expectation that one fits in the group and has a place there, a feeling of acceptance by the group, and a willingness to sacrifice for the group” (McMillan & Chavis, 1986, p. 10). Promoting a strong sense of community may reverse students’ feelings of isolation, especially to online students (Rovai, 2002). Community members earn memberships through personal investment, the fourth sub-element. Personal investment makes the memberships more meaningful and valuable (McMillan & Chavis, 1986). Both personal investment and return on the investment can be emotional or tangible. For example, a community member may buy a drink for another upset member or support the sad person by sitting next to him or her. In return, this member feels part of the community. When the upset member is happier, he or she could buy this member a drink to show appreciation for the support. The last sub-element, a common symbol

system, “serves several important functions in creating and maintaining sense of community, one of which is to maintain group boundaries” (McMillan & Chavis, 1986, p. 10).

Influence. McMillan and Chavis (1986) conducted research about the influence of group cohesiveness. Cohesiveness and a community’s influence on its members to conform have a positive correlation. Conformity serves as a force for closeness as well as an indicator of cohesiveness; influence is bidirectional, which can come from a community to its members or from the members to the community.

Integration and Fulfillment of Needs. The more ordinary term for integration and fulfillment of needs in sense of community is reinforcement. Some reinforcers are status of membership, success of the community, and competence or capabilities of other members. Individual values shared among community members and the ability of a community to organize and prioritize its need-fulfillment activities are positively related (McMillan & Chavis, 1986).

Shared Emotional Connection. Strong communities offer members opportunities to honor members and to experience a spiritual bond among members (McMillan & Chavis, 1986). In virtual communities, visual and verbal cues may be missing from online members, so they may develop certain ways to express their feelings and emotions; using emoticons is an example (Poole, 2000).

Dynamics Within and Among the Elements

Five sub-elements of membership form a circle in a self-reinforcing way. Community influence on members and members’ influence on community impact each other. Integration and fulfillment of needs has a transactional dynamic. Shared emotional connection equals to contact plus high-quality interaction (McMillan & Chavis, 1986).

The four elements of sense of community can operate in a linear way (McMillan & Chavis, 1986). For example, a group of Ph.D. students form a virtual community. They encourage one another to meet goals and needs. Master students or other Ph.D. students are not members in the virtual community. Through shared Zoom time, the students' emotions connect. This virtual community influences members' dissertation progresses and the progresses impact the community positively.

Other Scholars' Arguments towards McMillan and Chavis's Theory

After McMillan and Chavis's (1986) introduction, the concept of sense of community has generated considerable research and the development of a formal theory. Nowell and Boyd (2010) questioned the limited theoretical lens of the research about sense of community and proposed another theoretical base, a sense of community as responsibility. McMillan (2011) argues that Nowell and Boyd (2010) ignored the sub-elements of the four elements and that they misunderstood the sense of community theory by neglecting or misinterpreting the four elements. For example, although McMillan and Chavis did not mention responsibility in the "membership" element of the sense of community theory in 1986, the sub elements, such as boundaries and emotional safety, implied that members needed to be responsible to protect the community and accept other members. In other words, the statement that the sense of community theory was not responsibility based was false to McMillan (1996). Additionally, the sense of community theory is an empirical theory, not a values-based theory. The theory itself does not improve community participation and engagement. In response, Nowell and Boyd (2010) replied that "people have values and belief systems, and these belief systems may interact with aspects of a community context to evoke a sense of responsibility for a community

to which one belongs” (p. 889). Examining responsibility could set another foundation for future studies (Nowell & Boyd, 2011).

Research has also shown other elements different from those summarized by McMillan and Chavis (1986). Examples of other elements are annoyance, quality of environment, and entertainment and attraction (Obsr et al., 2002). Rovai (2001) reviewed a few studies that suggested the components of community differ from setting to setting; one example of settings is education.

The Fifth Element

Obsr et al. (2002) conducted three studies on sense of community in science fiction fandom. A factor analysis of all the three studies supported the four elements of McMillan and Chavis’s (1986) sense of community theory; additionally, a fifth factor emerged (Obsr et al., 2002).

The factor dealt with conscious identification and awareness of fellow members and was labeled Conscious Identification . . . when comparing the same participants’ psychological sense of community with geographical and interest communities, Identification emerged as more important in the interest community than in the participants’ geographical communities. (Obsr et al., 2002, pp. 127, 129)

From Four Elements to Four Dimensions

McMillan (1996) refined his and Chavis’s (1986) theory by replacing the four elements with four dimensions, which are spirit, truth, trade, and art. The emphasis on spirit shifts from boundary to friendship, which provides a setting for members to be themselves. A community has to be empathetic, understanding, and caring for members to feel intimacy and tell the truth. A “sense of community will be stronger if the community can find ways to juxtapose and

integrate the members' needs and resources into a continuous bargaining process" (McMillan, 1996, p. 320) while a community keeping score is not strong. Connecting all the dots such as spirit and trading to a shared history is a process of art.

Sometimes scholars tailor the four dimensions based on the specific community being studied and the characteristics of the community. Rovai (2001) mentioned another way to theorize the four components, spirit, trust, interaction, and learning of classroom community; the components include all four dimensions in McMillan's (1996) concept of community. Certain aspects of community may change based on settings (Bohus et al., 2005). For example, Rovai (2002) defines the component learning as "the feeling that knowledge and meaning are actively constructed within the community, that the community enhances the acquisition of knowledge and understanding, and that the learning needs of its members are being satisfied" (p. 322). Classroom community has unique settings distinct from neighborhood community. Classroom community possesses

the following characteristics: (a) the setting is the world of education; (b) the primary purpose is learning; and (c) the community is based on a fixed organizational tenure, that is, a set length of the course or program in which members are enrolled. (Rovai, 2001, p. 34)

Later, Rovai (2002) defined classroom community as consisting of only two components: connectedness and learning. Rovai's (2002) definition is more useful from an empirical standpoint as he developed the Classroom Community Scale used by many scholars (Drouin & Vartanian, 2010). The Classroom Community Scale measures sense of community and consists of 20 items such "I feel connected to others in this course".

Scholars have studied and applied sense of community in various academic contexts. Students support and encourage each other in and out of class. However, transactional and geographical distance between students and instructors affects sense of community. The separation may make students feel disconnected and isolated. Several studies have demonstrated the correlation between the sense of isolation and students' dropout rate from distance learning degree programs (Chen, 2018; Pigliapoco & Bogliolo, 2008; Rovai, 2002). Compared to traditional face-to-face education, the distance of online education adds more complexity of developing sense of community in students.

Current Literature Related to Research Questions

Students may receive and respond to a format of education differently. The elements below may impact students' views toward a sense of community.

Demographics and Student Background

Examining students' demographics and background in a community is critical and common in research. For example, the reasons for men's dominance of the third place tradition are women's mothering role, cost incurred in the third places, and no necessity for women to have another third place when men already have one to escape (Oldenburg, 1989). However, male bonding and male territory are both declining as a new marital intimacy emerged (Oldenburg, 1989). Drouin and Vartanian (2010) summarized a few studies and reported women usually feel a stronger sense of community than men do and that graduate students perceive stronger connectedness to their classmates than undergraduate students do. However, "the literature is still inconclusive regarding the effects of gender differences upon the performance, communication behaviors, patterns of interaction, and socialization displayed in online courses" (Lewis et al., 2015, p. 6).

Researchers have found no necessary association between community attachment and mental health problems (Rovia, 2001, 2002; Bohus et al., 2005; O'Brien et al., 1994); however, O'Brien et al. (1994) found a sense of community contributes to personal well-being in rural areas but could not generalize a conclusion as an urban population might reveal different behavior patterns. Gender is frequently studied in the framework of sense of community. Rovai (2001) summarized Baxter-Magolda's (1992) study on college students' ways of knowing and reasoning. According to Baxter-Magolda, female students' and male students' learning behaviors vary: "at the absolute stage the learner sees knowledge as held by an external authority. Females at this stage tend to function as receivers, taking notes and studying, whereas males engage in interaction with the instructor. At the transitional stage females are more likely to engage in interactivity, relying on the opinions of others to help construct their own knowledge. Males, on the other hand, are more likely to use the opinions of others as material for debate. Finally, at the independent stage, females have their own interpretations but value interactivity, whereas males tend to rely on independent processing" (Rovai, 2001, p. 36). Exploring identities such as gender on learning behavior can help understand how to engage students in a community and improve academic outcomes. Female students exhibited a stronger sense of community and made more supportive and inclusive comments to others; whereas male students were more critical and independent (Rovai, 2001). Rovai (2002) justified his previous findings the next year stating female students not only connected more, but also had a higher response rate in his research. Tellhed et al. (2017) summarized a few studies and pointed out that women have higher communal goals such as wanting to help others than men do. However, women tend to have lower social belongingness expectations with students in STEM majors and lower self-efficacy for STEM careers (Tellhed et al., 2017). Unlike Rovai's (2001) research,

Poole's (2000) research revealed that all the students, including both females and males, supported each other when they made comments. In a religious college where "religion is a partner of learning that pushes students and faculty beyond notions of mere church affiliation or historic beginnings within any particular denomination," Bohus et al. (2005) also found no significant gender difference in psychological sense of community scores (p. 21).

Understanding students' demographics could bring instructors insights to build well-engaged communities.

Similar to demographics, students' background, such as their major in college, may also have an impact on their sense of community. Discipline and measurement may influence a sense of community; Drouin and Vartanian (2010) discussed that students have little desire for community in both face-to-face and online classes. They also pointed out that all participants in the survey possessed a psychology background and social science students may desire more interactions and participations. However, a group of graduate students who were K-12 teachers preferred an online community (Poole, 2000). Lewis et al. (2015) detected that students from three courses had a significantly different sense of community even though the students were in the same medical online program, but did not see any significant differences in a sense of community based on gender, native language, or area of practice. Although many scholars have researched students' sense of community and students' gender background contributed to sense of community, little research has explored students' *desire* for sense of community (Drouin & Vartanian, 2010).

Culture is another element of student background. Instructors working on a sense of community may want to observe the environments they are in (M. D. Lin, 2018). For example, students in a Thailand university were relatively passive and never learned how to self-learn due

to Confucian philosophy (Buraphadeja & Kumnuanta, 2011). Forcing the students to practice critical thinking without necessary education could be challenging. Professors in the United States may want to adapt to East Asian students with Confucius values, challenge them by teaching critical thinking, or provide a form of American-Confucian hybrid education, especially when they teach in East Asia such as China and Japan. Even though in American universities and colleges international students from East Asia may be conservative and quiet in class participation or group discussion compared to American students, knowing their cultures and why they behave differently from local students could be helpful for instructors to improve these students' learning experiences.

Students' Perceived Experiences and Students' Learning Outcomes

Shackelford and Maxwell (2012) studied online students' interactions that contributed to a sense of community. The most frequently mentioned items leading to a sense of community were "introductions, collaborative group projects, contributing personal experiences, entire class online discussions, and exchanging resources" (p. 237). Students' senses of community could change as their goals and priorities shift through college life; measuring the change is critical in research (DeNeui, 2003). Rovai (2001) said, "There is a relationship between feelings of community and the flow of information among learners" (p. 45). Rovai (2002) also found a positive relationship among sense of community, perceived cognitive learning, and persistence. A student's sense of community may influence his or her perceived experiences and learning outcomes.

Online communities offer students various ways to communicate; students can select the preferred ways based on their experiences (Poole, 2000). "The Web-based delivery medium did not inhibit the development of the class as a community but contributed to the formation of a

cohesive group” (p. 175). Student-centered classroom activities increase students’ sense of community if teachers know them on a personal level (Bryant, 1999). Strategies, such as facilitating relationships, clarifying expectations, and setting goals, are useful for instructors to build classroom communities (Korinek et al., 1999).

Great student experiences do not mean high student learning outcomes. Some studies hold adverse views toward collaborative group projects (Denman et al., 2018; Zhang et al., 2019). For example, working in online groups may negatively impact the completion of work (Zhang et al., 2019) while other studies’ results are positive. For example, motivation, attachment, and cooperation emerged from an online supporting group (Denman et al., 2018).

Sense of Community on Different Platforms

Scholars have been conducting studies about transferring education theories among various platforms. The transition of learning objects, collaborative learning, and mobile learning theories is technically practical (Koukopoulos & Koukopoulos, 2019). Beutelspacher (2011) examined another three educational theories—behaviorism, cognitivism, and constructivism—in a blended learning platform and held positive views towards the transfer process. T. Bates (2014) pointed out that “theories of behaviorism, cognitivism, and constructivism were all developed outside of education, in experimental labs, psychology, neuroscience, and psychotherapy respectively” (p. 1). Similar to the transfer of adult learning theory, the transfer of a psychological sense of community seems also viable technically. For example, instructors can move group discussion from face-to-face to online easily, but students may not get the same interactions online as in person.

In traditional education on campus, a higher sense of community and more student success usually appear at the same time. For example, levels of psychological sense of

community and students' achievements are positively related on traditional religious campuses (Bohus et al., 2005). The theory of psychological sense of community seems transferrable from traditional education to hybrid education. For instance, Buckley and West (2014) found a sense of community decreased when moving from a traditional course to a blended environment but increased after several iterations of the course. Rovai and Jordan (2004) even found that students had more of a sense of a community in a blended environment than in the other two environments. How *blended* a course is may be critical in hybrid education. Researchers hold different views toward senses of community in wholly online education (Bohus et al., 2005; Buckley & West, 2014; Rovai & Jordan, 2004). The bond of the online group supported the participants from various perspectives (Denman et al., 2018). However, contents and activities may be transitioned to online fully, but scholars are still exploring the efficacy and efficiency of wholly online education.

Faculty members need to decide the format of an online course based on learning outcomes and the complexity of the issues discussed in class (McDaniels et al., 2016). Synchronous learning includes real time interactions among a faculty and students, such as *cold calls* and group presentation; asynchronous learning happens when the faculty and the students are not online at the same time, such as a forum or a discussion board (McDaniels et al., 2016). Content-focused language often appeared in asynchronous courses, while rhetoric was often found in a synchronous environment (Hrastinski, 2008). Instructors may also keep the limitations of the formats in mind. For example, asynchronous interactive tools require time and effort to maintain social interaction; synchronous interactive tools do not provide time for thinking and reflection (Moallem, 2006).

A synchronous online environment produced a strong sense of community, as a live chat room could offset classmates' invisibilities (McDaniels et al., 2016). Moallem (2006) proposed an online education model that combined both synchronous and asynchronous learning systems and found the combination "reduced perceived distance among students and between students and the instructor, resulting in students' perception of sufficient interaction with the instructor and other students" (p. 175). In other words, the synchronous and asynchronous learning systems could work together to improve students' sense of community in online education.

Summary

Chapter 2 expanded adult education, community, virtual community, online education, and the sense of community theory discussed in Chapter 1 and introduced the existing studies about the research questions. At this especial period of Covid-19, more studies about online education and virtual communities emerged as colleges and universities are seeking ways to improve student learning. Chapter 3 includes the information regarding the methodology for this study.

CHAPTER 3

METHODOLOGY

Problem Statement and Research Questions

This chapter introduces the research methodology I used for this quantitative study on the psychological sense of community university students experience in online classes. This approach contributed to new understanding regarding students' sense of community in an online learning context of university coursework. The two major sections of this chapter are participants and procedures; several subcomponents, such as data collection and data analysis, will appear under each section.

All data collection happened in this university. The university has several colleges; each college offers various academic programs. There are around 11,000 students including both undergraduate students and graduate students. About 14% are graduate students. The university is related to a protestant denomination with Presbyterian and Baptist roots. It is located in a major metropolitan area in the southwest U.S. It is a private not for profit institution governed by a board of around 50 trustees who select their own members when a vacancy occurs. The board of trustees set policy and develop a long-term institutional strategy. It is classified as a Basic Carnegie Comprehensive doctoral research institution.

With the study results, I focused on the sense of community within a sample of graduate students enrolling in online class and answered the following research questions:

Q1: Is there sense of community in each college? If yes, are there differences in students' sense of community scores based on the college in which students are enrolled?

Q2: Is there sense of community in each gender? If yes, are there differences in students' sense of community scores based on gender?

Q3: Is there sense of community or satisfaction in students? If yes, is there a relationship between sense of community and satisfaction for students taking an online course?

For Research Question 1, I examined students' sense of community in a program as a whole in the first research question. What course is taught did not matter; the colleges students attended mattered. For example, if a student majoring in higher education took a course in Business School and participated in this study, I classified the student as part of College of Education. Based on the literature, one would expect that students in different academic programs would experience a different sense of community. For Research Question 2, I had three gender categories: male vs. female vs. prefer not to answer. The literature tells me gender may or may not impact sense of community under various contexts. For Research Question 3, from the literature review, a higher sense of community is usually linked with higher satisfaction, I examined the correlation between the two components.

Rationale for the Methodology

Survey research is appropriate when one wants to generalize from a stratified sample of a university to the whole university population. Additionally, 1) survey research can collect data with a decent sample size efficiently; 2) survey research can be used to recruit participants via certain sampling techniques which would help generalize the findings; 3) survey research is appropriate for collecting data on variables with established measurements; 4) stratified random sampling accurately reflects the population studied in this university (Cherry, 2020, <https://www.verywellmind.com/what-is-a-survey-2795787>). In my study, I wanted to have an

idea about sense of community in the whole university with the specific measurements, so chose survey research. Although generalization in this study may not apply to all universities, similar universities can refer to the insights from this study. Additionally, I would like to have a big picture of students' sense of community in graduate students rather than focus on a few individuals. I referred to confidence intervals to ensure a suitable sample size so that the sample can be representative. I utilized survey methodology to address the primary purpose of gaining responses on students' sense of community and satisfaction.

Participants

Details of Subjects

To begin this study, I focused on graduate students as most graduate-level courses are online during Covid-19 pandemic, although usually courses at this university are taught in person. Additionally, graduate students may expect more community life in classrooms rather than other campus locations as they do not live on campus. There may be limited opportunities for graduate students to develop sense of community and student connections and collaborations lead to a strong classroom community (Rovai, 2002). The reason why I concentrated on one institution was to avoid confounding issues. The recruitment started after getting approval from the IRB. The participants were recruited via a blast email recruitment sent to all graduate students in the private university (see Appendix A for email recruitment).

I drew a random sample from a population of graduate students who might have enrolled in online courses in the whole university. The initial target sample was 475, 33% of all current graduate students. I reached out to an administrator of student affairs to distribute a survey to the sample.

Initial recruitment was conducted via a blast of emails on April 15, 2021, with two follow-up reminders one week apart. The data collection was completed on April 29, 2021. Initial recruitment was sent out to a pool of 475, which was one third of all graduate students at the private university. A total of 123 responded to the recruitment and 98 participants consented to participate. The percentage of missing values for each question ranged between 1% and 7%. Because of a small number of records, participants who were from the College of Communication (n = 2), College of Fine Arts (n = 3), and Medical School (n = 1) were aggregated into the “Other” academic program in this set of data analyses.

The final sample included a total of 98 students, 65 were female students (67%) and 31 (32%) were male students. Two students declined to report gender. About 57% of full-time graduate students are women, and 43% men in this university.

As for the distribution of academic programs, 20 students were from the College of Liberal Arts, 28 were from College of Education, 14 were from College of Science of Engineering, 23 were from Business School, six were from Other (College of Communication, College of Fine Arts, and Medical School).

Figure 1 shows the distribution of responses by college and gender. Most responses from College of Education were from female students, while most responses from Business School were from male students.

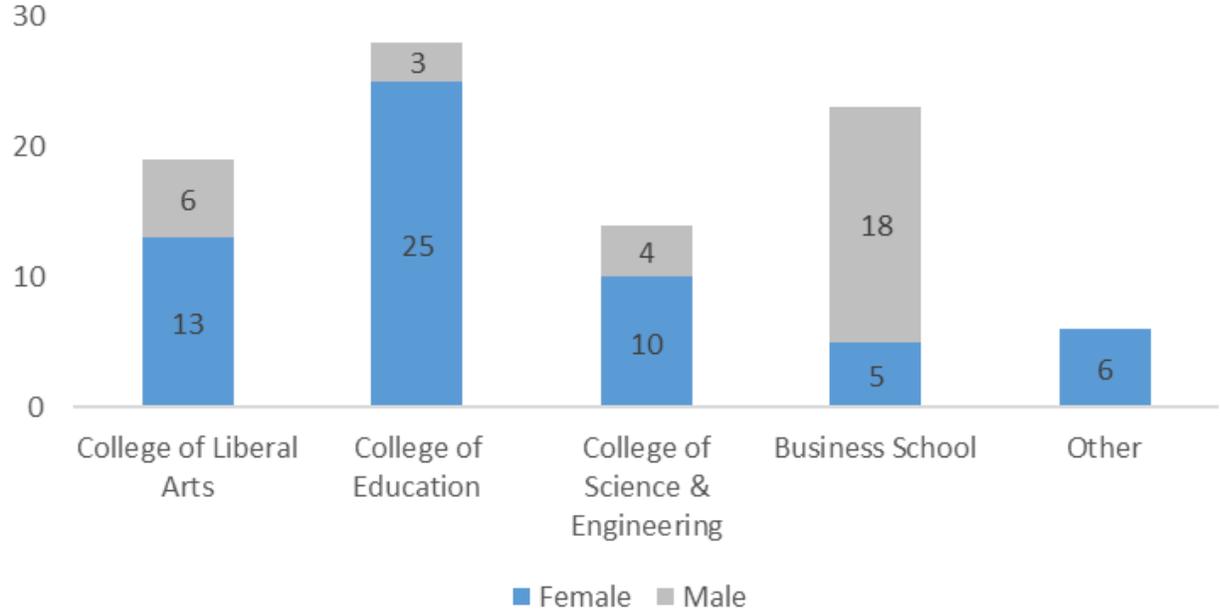
Participant Recruitment

Initial recruitment was conducted via blast email (see Appendix B) on April 15, 2021 with two separate reminders 1 week apart. The data collection was completed on April 29, 2021. Participation was completely voluntary. The students who receive the survey could ignore, partially respond, or answer all questions. Participants indicated consent by completing

the survey. If they did not consent, they simply did not complete the survey. Participants provided consent prior to completing their responses.

Figure 1

Sample Size by College and Gender



Data Collection Procedures

Instruments

The survey (see Appendix C) was created using the CampusLabs Survey Platform survey software. Participants responded to 13 questions, most of which were a 5-point Likert scale. The survey was divided into four parts.

- Part 1: Informed Consent (see Appendix D).
- Part 2: Demographic information. Participants answered two questions asking them gender and college where enrolled.

- Part 3: Sense of community. Participants responded whether they felt they were in a community (yes/no). Participants rated their sense of community in general and each of eight engagement activities (i.e., virtual pre-class chat, in-class discussion, out-of-class virtual group meeting of class members, conversations in social media, such as Facebook groups based on class membership, in-person meeting, team assignment, presentation, and other) on a 5-point Likert scale (5 = *Strongly agree*, 1 = *Strongly disagree*).
- Part 4: Satisfaction. Participants completed one question adapted from Yousef's (2012) study. This question asked participants overall satisfaction with a 5-point Likert-type scale indicating *Strongly Agree* = 5 to *Strongly Disagree* = 1.

Procedure Flow

Recruitment

- Distributed the survey on April 15, 2021
- Sent the first reminder on April 21, 2021
- Sent the second reminder on April 27, 2021

Response Collection

- Monitored responses and replied to students' questions during recruitment
- Downloaded SPSS file after the completion of data collection

Data Analysis

Q1: Is there sense of community in each college? If yes, are there differences in students' sense of community scores based on the college in which students are enrolled?

H₀: The difference in students' sense of community scores based on the college in which students are enrolled is not statistically different from zero.

H₁: The difference in students' sense of community scores based on the college in which students are enrolled is statistically different from zero.

IV: Program, categorical

DV: Students' sense of community score

Analysis: I conducted (1) chi-square tests to explore the differences in the percentage of people responded a "yes" on the sense of community between college affiliations; and (2) the analysis of variance (ANOVA) to examine the differences in the sense of community scores between college affiliations.

Q2: Is there sense of community in each gender? If yes, are there differences in students' sense of community scores based on gender?

H₀: The difference in students' sense of community scores based on gender is not statistically different from zero.

H₁: The difference in students' sense of community scores based on gender is statistically different from zero.

IV: Gender, categorical

DV: Students' sense of community score

Analysis: I conducted (1) Chi-square tests to explore the differences in the percentage of people responded a "yes" on the sense of community between genders; and Chi Square (2) and t- tests to examine the differences in the sense of community scores between genders.

Q3: Is there sense of community or satisfaction in students? If yes, is there a relationship between sense of community and satisfaction for students taking an online course?

IV: Satisfaction score

DV: Student's sense of community

Analysis: I conducted a chose Pearson correlation analysis to examine the correlation between satisfaction and sense of community scores.

I screened all data to ensure assumptions are met. Missing values were no more than 10% for each response.

CHAPTER 4

RESULTS

According to the survey responses, 70 out of 98 participants said there was a sense of community in online classes. The following research questions were answered with the collected data.

Analysis on Research Questions

Research Question 1

Is there sense of community in each college? If yes, are there differences in students' sense of community scores based on the college in which students are enrolled?

Students were asked to rate the sense of community: "Do you feel sense of community in your online course" and "I feel strong sense of community in my online classes" (answers range from *Strongly Agree* to *Strongly Disagree*). A chi-square test was used to examine if there is a difference between academic programs in the percentage of students who report a sense of community in the question, "Do you feel sense of community in your online course." The reason to pick a chi-square test was that the variable under study is categorical. Observations in "Other" college were removed from analysis due to small cell size. That left four colleges for comparison (see Table 1). The results of the chi-square test showed there was not a difference of sense of community among colleges, $\chi^2(4) = 1.71, p = .79$.

ANOVA was used to examine the differences in the sense of community scores between students from different colleges. The scores were from the responses to the question, "I feel strong sense of community in my online classes" (answers range from *Strongly Agree* to *Strongly Disagree*). The results showed there was no significant difference in the sense of

community scores between academic programs, $F(4,85) = 0.76, p = .55$. The mean score of sense of community for students in each program is depicted in Table 2.

Table 1

Responses to “Do you feel sense of community in your online course” by College

College	Yes	No	Total	% of Yes
College of Liberal Arts	15	5	20	75
College of Education	21	7	28	75
College of Science & Engineering	10	4	14	71
Business School	17	6	23	74
Other	3	3	6	50

Table 2

Responses to “I feel strong sense of community in my online classes (answers range from Strongly Agree to Strongly Disagree)” by College

College	<i>n</i>	<i>M</i>	<i>SD</i>
College of Liberal Arts	20	3.35	1.23
College of Education	28	3.61	1.03
College of Science & Engineering	13	3.00	1.29
Business School	23	3.48	1.08
Other	6	3.17	0.75

Post-hoc tests were used to examine pairwise comparisons, but did not yield significant differences (see Table 3). The results of post-hoc tests showed that no two colleges had significant differences in sense of community.

Table 3*Post-Hoc Tests Regarding Sense of Community Among Colleges*

College	Other Colleges	Mean Diff.	Std. Error	Sig.
College of Liberal Arts	College of Education	-0.26	0.33	0.43
	College of Science & Eng.	0.35	0.40	0.38
	Business School	-0.13	0.34	0.71
College of Education	College of Science & Eng.	0.61	0.37	0.11
	Business School	0.13	0.31	0.68
College of Science & Eng.	Business School	-0.48	0.39	0.22

Research Question 2

Is there sense of community in each gender? If yes, are there differences in students' sense of community scores based on gender?

Similar to the analysis on college difference, two tests were used to analyze gender difference. Chi-squared test for the question, "Do you feel sense of community in your online courses," between genders shows that $\chi^2(2) = 2.66; p = 0.265$. This means there were no gender differences on whether or not participants reported a sense of community. Only one student selected "Prefer not to answer" in the gender question. His or her response was not included in the analysis for this research question. Table 4 shows the comparison between genders.

Table 4*Responses to "Do you feel sense of community in your online courses" by Gender*

Gender	Yes	No	Total	% of Yes
Female	47	18	65	72
Male	23	8	31	74

To strengthen the analysis, *t*-test was used to examine the differences in the sense of community scores as only two genders were studied in this question. *t*-test on the question, “I feel a strong sense of community in my online classes” (answers range from *Strongly Agree* to *Strongly Disagree*), between genders justifies that there was no significant difference in the sense of community scores between the two genders, $t(93) = .592, p = .56$. Table 5 shows the comparison between genders in another way.

Table 5

Responses to “I feel strong sense of community in my online classes (answers range from Strongly Agree to Strongly Disagree)” by Gender

Gender	<i>n</i>	<i>M</i>	<i>SD</i>
Female	65	3.45	1.06
Male	30	3.30	1.24

Research Questions 1 and 2

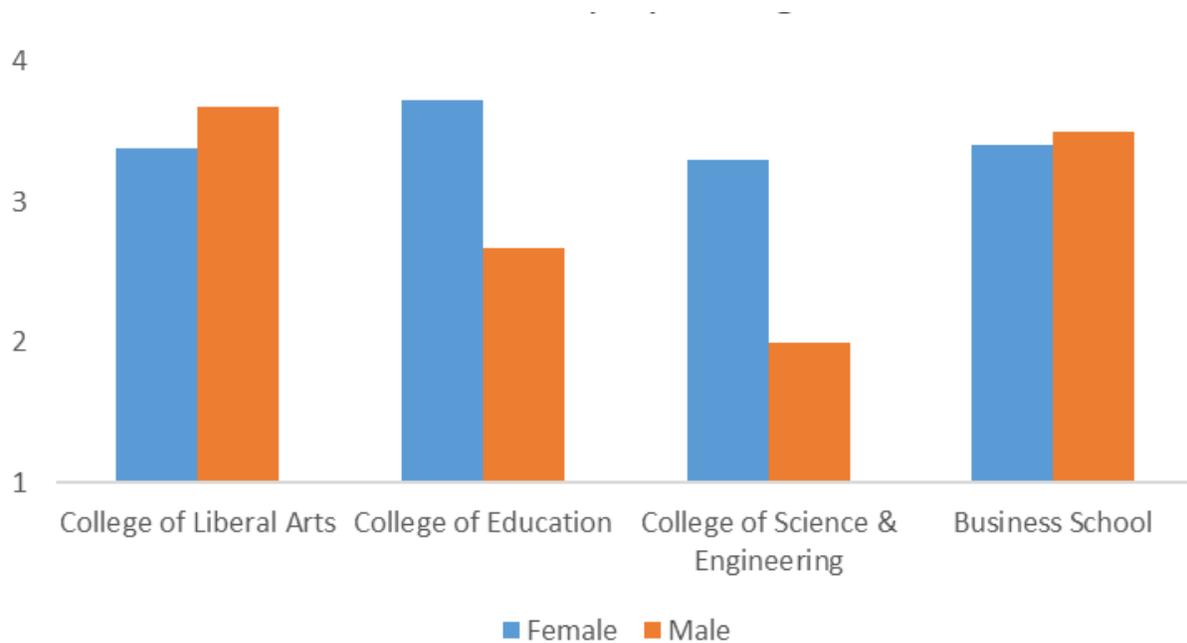
Are there differences in students’ sense of community scores based on the programs students attend by gender? Are there differences in students’ sense of community scores based on gender?

To further explore differences among the colleges and genders, a two-way ANOVA was conducted to examine the main effects of college and gender and the interaction effect between college and gender. The results showed that none of the main effects (college: $F(4, 80) = 1.19, p = .32, \eta_p^2 = .06$; gender: $F(1, 80) = 2.57, p = .11, \eta_p^2 = .03$) or interaction were significant ($F(3, 80) = 1.68, p = .18, \eta_p^2 = .06$).

Although there was no statistically significant interaction effect, Figure 2 exhibits the raw data in colleges.

Figure 2

Sense of Community by College and Gender



Research Question 3

Is there sense of community or satisfaction in students? If yes, is there a relationship between sense of community and satisfaction for students taking an online course?

Preliminary data analyses showed that sense of community (skewness = -0.997) and satisfaction were normally distributed (skewness = 0.608). Thus, Pearson correlation was run.

The correlation between the sense of community perceived during online classes and general online course satisfaction was $r = 0.68, p < .001$. The result indicates the higher sense of community students have, the more satisfied they feel.

Expansion of Research Question 3

Are there differences in students' satisfaction scores based on the college in which students were enrolled?

ANOVA was used to examine the differences in satisfaction scores between students from different colleges. The results showed the differences were significant at $p < .05$ level, $F(4,85) = 3.02, p = .02$. The mean score of satisfaction for students in each program is depicted in Table 6. Generally, students in the College of Liberal Arts had the highest satisfaction and students in the College of Science & Engineering had the lowest.

Table 6

Responses to "As a whole, you are satisfied with your online course(s) (answers range from Strongly Agree to Strongly Disagree)" by College

College	<i>n</i>	<i>M</i>	<i>SD</i>
College of Liberal Arts	20	4.15	0.93
College of Education	28	3.96	1.00
College of Science & Engineering	14	3.14	1.35
Business School	22	3.73	0.94
Other	6	3.00	1.10

Tukey HSD post-hoc tests were used to look at pairwise comparisons. Similar to the analysis on sense of community by college, the analysis of post-hoc tests showed whether any two colleges had significant differences in satisfaction. As Table 7 shows, the difference between College of Liberal Arts and College of Science & Engineering was significant at $p = .05$ level.

Table 7*Post-Hoc Tests Regarding Satisfaction Among Colleges*

College	Other Colleges	Mean Diff.	Std. Error	Sig.
College of Liberal Arts	College of Education	0.19	0.3	0.97
	College of Science & Eng.	1.01	0.36	0.05
	Business School	0.42	0.32	0.68
College of Education	College of Science & Eng.	0.82	0.34	0.12
	Business School	0.24	0.3	0.93
College of Science & Eng.	Business School	-0.58	0.35	0.47

T-test was used to examine the gender difference in satisfaction scores. The result indicates that there was no significant difference in the satisfaction scores between the two genders, $t(93) = .83, p = .41$. Table 8 shows the comparison of satisfaction between genders.

Table 8*Responses to “As a whole, you are satisfied with your online course(s) (answers range from Strongly Agree to Strongly Disagree)” by Gender*

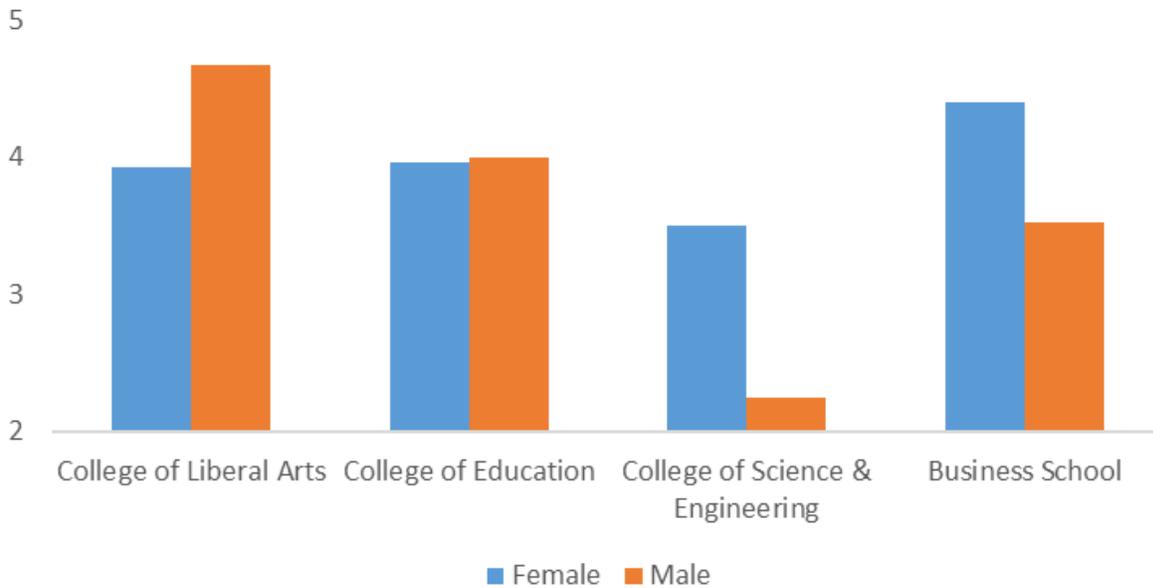
Gender	<i>n</i>	<i>M</i>	<i>SD</i>
Female	65	3.83	1.01
Male	30	3.63	1.22

To further explore differences among the colleges and gender, a two-way ANOVA was used but did not find significant main effects of college ($F(4, 80) = 4.71, p = .002, \eta_p^2 = .19$) and gender ($F(1, 80) = 1.42, p = .24, \eta_p^2 = .02$) or the interaction between college and gender

($F(4, 80) = 2.80, p = .045, \eta_p^2 = .10$). Figure 3 exhibits the raw data of satisfaction by gender and college.

Figure 3

Satisfaction by College and Gender



Additional Analysis

Activities That Developed Students' Sense of Community

Two types of activity questions were in the survey. One type asked students' experiences in seven activities from online education, "How is the sense of community developed for you? (Select all that apply)". Students were able to select one or more activities they engaged in. The other one asked students' view towards these seven activities, for example, "Please select the response that most accurately reflects your level of agreement with each of the following statements. - Virtual pre-class chat leads to sense of community; In-class discussion leads to sense of community..." Students may or may not have participated in the

activities when they had a view during the timeframe of the study; they could answer these questions based on their previous experiences.

Figure 4 shows students' participation in the activities by gender. In-class discussion developed most students' sense of community. In-person meeting and team assignment follow in-class discussion. Figure 5 is another look at participating in activities by college.

Figure 4

Participating in Activities by Gender

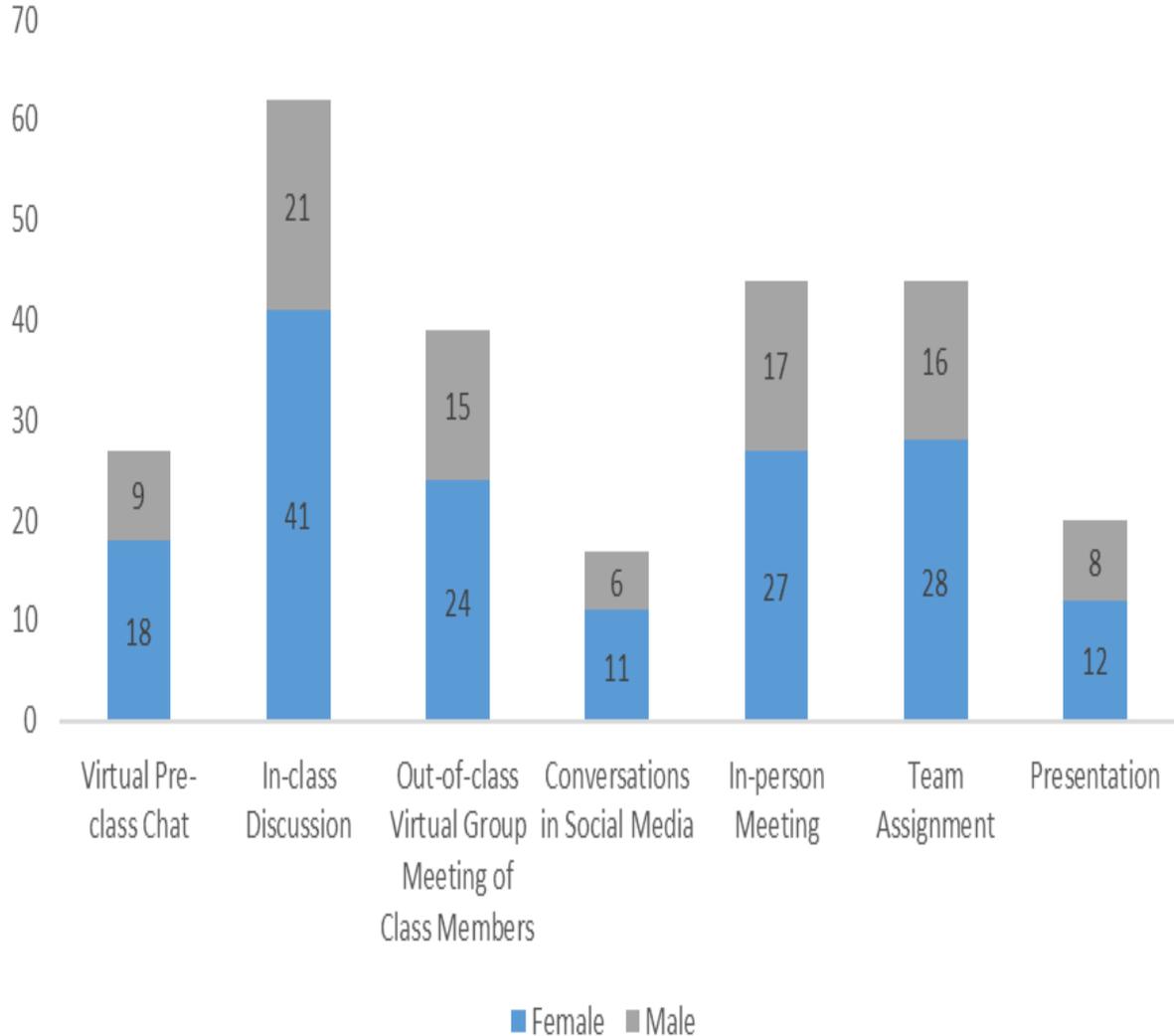
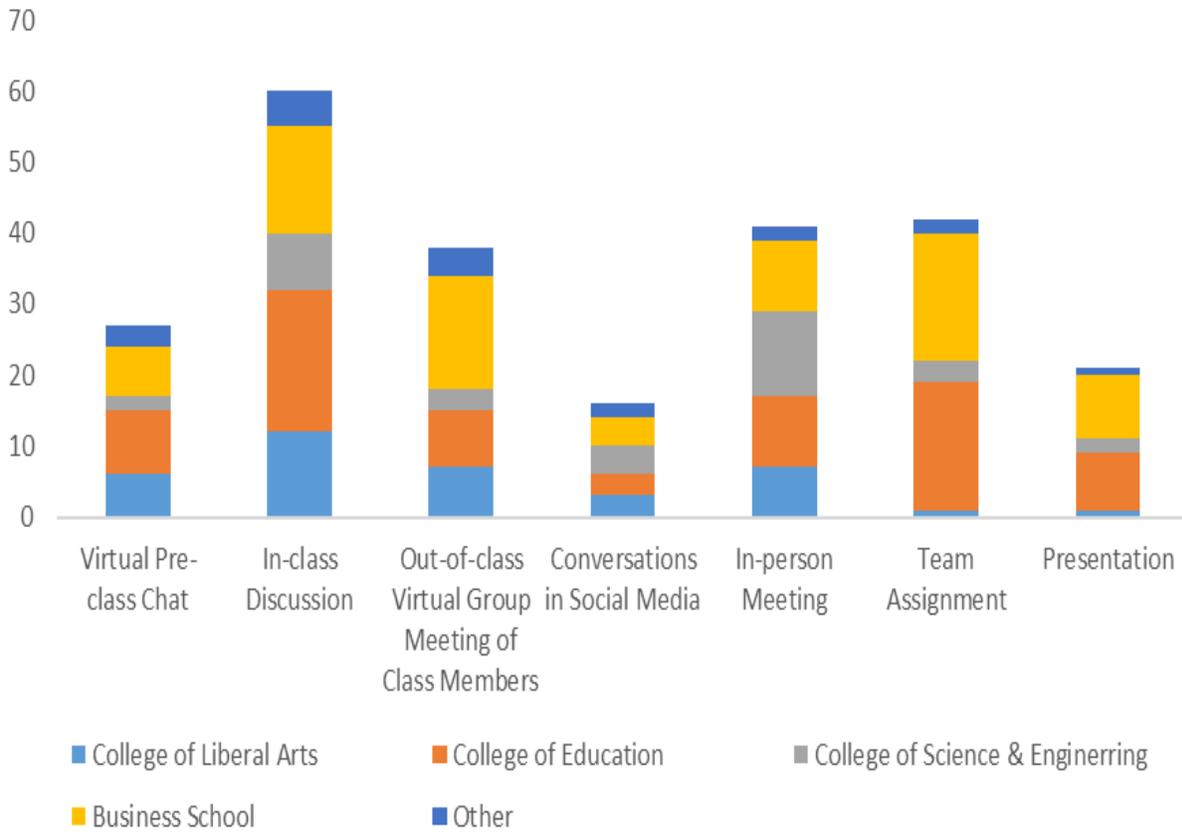


Figure 5

Participation in Activities by College



Students' Views on Activities by Gender

The questions in the survey also asked students' views on various activities regarding sense of community. T-test was used to examine gender difference. There were significant differences between genders in the views on the activity of team assignment—for males: $n = 31$, $M = 4.16$, $SD = .97$ and for females: $n = 65$, $M = 3.66$, $SD = 1.20$; $t = -2.02$, $p = .046$. Table 10 shows the results of all gender differences.

Table 10*Responses to Activity Questions by Gender*

Activity	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	Sig.
Virtual Pre-Class Chat	Female	65	3.52	1.12	-0.735	93	0.464
	Male	30	3.70	1.02			
In-Class Discussion	Female	65	4.18	0.75	0.691	94	0.491
	Male	31	4.06	0.89			
Out-of-Class Virtual Group Meeting	Female	65	3.92	1.04	-1.23	94	0.222
	Male	31	4.19	0.95			
Conversations on Social Media	Female	61	3.49	1.04	0.594	88	0.554
	Male	29	3.34	1.20			
Meeting Classmates in Person	Female	64	4.67	0.64	-0.402	92	0.689
	Male	30	4.73	0.78			
Team Assignments	Female	65	3.66	1.20	-2.02	94	0.046*
	Male	31	4.16	0.97			
Presentation	Female	65	3.12	1.11	-1.246	93	0.216
	Male	30	3.43	1.17			

Note. *The mean difference is significant at the 0.05 level.

Students' Views on Activities by College

ANOVA was used to examine college difference. There were significant differences among colleges in the views on the activities of out-of-class virtual group meeting and team assignment. Table 11 shows the results of all college differences.

Table 11*Responses to Activity Questions by College*

Activity	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>df</i>	Sig.
Virtual Pre-Class Chat	College of Liberal Arts	20	3.90	1.12	1.351	4, 85	0.258
	College of Education	28	3.71	1.12			
	College of Business & Eng.	14	3.07	1.21			
	Business School	22	3.64	0.90			
	Other	6	3.67	0.52			
	Total	90	3.63	1.06			
In-Class Discussion	College of Liberal Arts	20	4.15	0.93	0.793	4, 86	0.533
	College of Education	28	4.32	0.61			
	College of Business & Eng.	14	3.86	1.10			
	Business School	23	4.09	0.85			
	Other	6	4.00	0.63			
	Total	91	4.13	0.83			
Out-of-Class Virtual Group Meeting	College of Liberal Arts	20	4.10	0.85	3.096	4, 86	0.02*
	College of Education	28	3.82	1.06			
	College of Business & Eng.	14	3.50	1.29			
	Business School	23	4.35	0.78			
	Other	6	4.83	0.41			
	Total	91	4.03	1.00			
Conversations on Social Media	College of Liberal Arts	19	3.58	1.12	0.407	4, 80	0.803
	College of Education	26	3.23	1.21			
	College of Business & Eng.	14	3.29	1.27			
	Business School	21	3.52	0.87			
	Other	5	3.60	1.14			
	Total	85	3.41	1.11			

Table 11, Continues.

Activity	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>df</i>	Sig.
Meeting Classmates in Person	College of Liberal Arts	20	4.75	0.44	1.001	4, 84	0.412
	College of Education	27	4.48	0.80			
	College of Business & Eng.	14	4.64	1.08			
	Business School	22	4.77	0.53			
	Other	6	5.00	0.00			
	Total	89	4.67	0.70			
Team Assignments	College of Liberal Arts	20	3.25	1.48	508	4, 86	0.001**
	College of Education	28	4.14	0.89			
	College of Business & Eng.	14	3.43	1.16			
	Business School	23	4.35	0.78			
	Other	6	2.83	1.17			
	Total	91	3.80	1.18			
Presentations	College of Liberal Arts	20	3.05	1.19	2.415	4, 85	0.055
	College of Education	28	3.50	0.92			
	College of Business & Eng.	14	2.71	1.27			
	Business School	22	3.55	1.06			
	Other	6	2.50	1.38			
	Total	90	3.22	1.14			

Note. * The mean difference is significant at the 0.05 level. ** The mean difference is significant at the 0.01 level (2-tailed).

Post-hoc of ANOVA on virtual pre-class chat between College of Liberal Arts and College of Science & Engineering: For College of Liberal Arts: $n = 20$, $M = 3.9$, $SD = 1.12$, College of Science & Engineering: $n = 14$, $M = 3.07$, $SD = 1.21$; $p = .027$. There were

significant differences between College of Liberal Arts and College of Science & Engineering in the views on the activity of virtual pre-class chat (see Table 12).

Table 12

Post-Hoc Tests Regarding Virtual Pre-Class Among Colleges

College	Other Colleges	Mean Diff.	Std. Error	Sig.
College of Liberal Arts	College of Education	0.19	0.31	0.55
	College of Science & Eng.	0.83*	0.37	0.03
	Business School	0.26	0.33	0.42
College of Education	College of Science & Eng.	0.64	0.35	0.07
	Business School	0.08	0.3	0.8
College of Science & Eng.	Business School	-0.56	0.36	0.12

A significant difference was not detected among colleges on the activity of in-class discussion (see Table 13).

Post-hoc of ANOVA on out-of-class virtual group meetings between Business School and College of Science & Engineering: For Business School: $n = 23$, $M = 4.35$, $SD = .78$, College of Science & Engineering: $n = 14$, $M = 3.5$, $SD = 1.29$; $p = .011$. There were significant differences between Business School and College of Science & Engineering in the views on the activity of out-of-class virtual group meetings of class members (see Table 14).

Table 13*Post-Hoc Tests Regarding In-Class Discussion Among Colleges*

College	Other Colleges	Mean Diff.	Std. Error	Sig.
College of Liberal Arts	College of Education	-0.17	0.24	0.49
	College of Science & Eng.	0.29	0.29	0.32
	Business School	0.06	0.26	0.81
College of Education	College of Science & Eng.	0.46	0.27	0.09
	Business School	0.23	0.24	0.32
College of Science & Eng.	Business School	-0.23	0.28	0.42

Table 14*Post-Hoc Tests Regarding Out-of-Class Virtual Group Meetings of Class Members Among Colleges*

College	Other Colleges	Mean Diff.	Std. Error	Sig.
College of Liberal Arts	College of Education	0.28	0.28	0.33
	College of Science & Eng.	0.6	0.33	0.08
	Business School	-0.25	0.29	40
College of Education	College of Science & Eng.	0.32	0.31	0.31
	Business School	-0.53	0.27	0.05
College of Science & Eng.	Business School	-0.85*	0.33	0.01

Significant difference was not detected among colleges on the activity conversations in social media (see Table 15) and meeting classmates in person (see Table 16).

Table 16*Post-Hoc Tests Regarding Conversations in Social Media Among Colleges*

College	Other Colleges	Mean Diff.	Std. Error	Sig.
College of Liberal Arts	College of Education	0.35	0.34	0.31
	College of Science & Eng.	0.29	0.39	0.46
	Business School	0.06	0.35	0.88
College of Education	College of Science & Eng.	-0.05	0.37	0.88
	Business School	-0.29	0.33	0.38
College of Science & Eng.	Business School	-0.24	0.39	0.54

Table 17*Post-Hoc Tests Regarding Meeting Classmates in Person Among Colleges*

College	Other Colleges	Mean Diff.	Std. Error	Sig.
College of Liberal Arts	College of Education	0.27	0.21	0.2
	College of Science & Eng.	0.11	0.25	0.66
	Business School	-0.02	0.22	0.92
College of Education	College of Science & Eng.	-0.16	0.23	0.49
	Business School	-0.29	0.2	0.15
College of Science & Eng.	Business School	-0.13	0.24	0.59

Post-hoc of ANOVA on team assignments (see Table 17) between College of Liberal Arts and College of Education: for College of Liberal Arts: $n = 20$, $M = 3.25$, $SD = 1.48$, College of Education: $n = 28$, $M = 4.14$, $SD = .89$; $p = .006$. There were significant differences between College of Liberal Arts and College of Education in the views on the activity of team assignment.

Table 17*Post-Hoc Tests Regarding Team Assignments Among Colleges*

College	Other Colleges	Mean Diff.	Std. Error	Sig.
College of Liberal Arts	College of Education	-0.89*	0.32	0.01
	College of Science & Eng.	-0.18	0.38	0.64
	Business School	-1.10*	0.33	0
College of Education	College of Science & Eng.	0.71*	0.35	0.05
	Business School	-0.2	0.3	0.5
College of Science & Eng.	Business School	-0.92*	0.37	0.01

Note. *The mean difference is significant at the 0.05 level.

Post-hoc of ANOVA on team assignments between College of Liberal Arts and Business School: for College of Liberal Arts: $n = 20$, $M = 3.25$, $SD = 1.48$, Business School: $n = 23$, $M = 4.35$, $SD = .78$; $p = .001$. There were significant differences between College of Liberal Arts and Business School in the views on the activity of team assignment.

Post-hoc of ANOVA on team assignments between College of Science & Engineering and College of Education: for College of Science & Engineering: $n = 14$, $M = 3.43$, $SD = 1.16$, College of Education: $n = 28$, $M = 4.14$, $SD = .89$; $p = .047$. There were significant differences between College of Science & Engineering and College of Education in the views on the activity of team assignment.

Post-hoc of ANOVA on team assignments between College of Science & Engineering and Business School: for College of Science & Engineering: $n = 14$, $M = 3.43$, $SD = 1.16$, Business School: $n = 23$, $M = 4.35$, $SD = .78$; $p = .014$. There were significant differences

between College of Science & Engineering and Business School in the views on the activity of team assignment.

Post-hoc of ANOVA on presentation between College of Science & Engineering and College of Education: for College of Science & Engineering: $n = 14$, $M = 2.71$, $SD = 1.27$, College of Education: $n = 28$, $M = 3.5$, $SD = .92$; $p = .033$ (see Table 18). There were significant differences between College of Science & Engineering and College of Education in the views on the activity of presentation.

Table 18

Post-Hoc Tests Regarding Presentation Among Colleges

College	Other Colleges	Mean Diff.	Std. Error	Sig.
College of Liberal Arts	College of Education	-0.45	0.32	0.17
	College of Science & Eng.	0.34	0.39	0.39
	Business School	-0.5	0.34	0.15
College of Education	College of Science & Eng.	0.79*	0.36	0.03
	Business School	-0.05	0.31	0.89
College of Science & Eng.	Business School	-0.83*	0.38	0.03

Note. The mean difference is significant at the 0.05 level.

Post-hoc of ANOVA on presentation between College of Science & Engineering and Business School: for College of Science & Engineering: $n = 14$, $M = 2.71$, $SD = 1.27$, Business School: $n = 22$, $M = 3.55$, $SD = 1.06$; $p = .030$. There were significant differences between College of Science & Engineering and Business School in the views on the activity of presentation.

Correlation Between Students' Views on Activities and Satisfaction

Taking a look at the relationship between students' views on various activities and satisfaction, correlation was run on the activities against satisfaction in Table 19. All the pairs have positive relationship, but the correlation is either weak or very weak. The fact that students are experiencing great sense of community does mean they believe one activity can lead to sense of community. For example, 70 students responded that they had sense of community in online education, but only 44 students believed in-person discussion could lead to sense of community.

Table 19

Correlation Between Satisfaction and Students' Views on Activities

	Virtual Pre-Class Chat	In-Class Discussion	Out-of-Class Virtual Group Meeting	Conversations on Social Media	Meeting Classmates in Person	Team Assignments	Presentation
Satisfaction	.343**	.258*	.333**	0.058	0.062	.223*	.305**

Note. *Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed).

A Model

Looking back to sense of community and satisfaction, a model of predicting students' sense of community emerges. This model is a logistics regression model, which predicts whether a student has sense of community with online education by using the information of gender, college, and satisfaction.

First, the variable college is reformatted into four binary variables. Table 20 shows a piece of the reformatted data.

Table 20*Reformatted Data for the Model*

No.	Gender	College	Sense of Community	Satisfaction	Liberal_Arts	Education	Science & Engineering	Business
1	0	1	0	4	1	0	0	0
2	0	3	1	4	0	1	0	0
3	0	3	1	4	0	1	0	0
4	1	8	1	3	0	0	0	1
5		1	0	4	1	0	0	0
6	0	3	0	5	0	1	0	0

Then 80% of the data, 78 records, are randomly extracted into test group. The rest, 20%, 19 records, becomes the validation group. The model is built based on the test group. Later, the model will be used to validate its effectiveness in the validation group.

Tables 21 and 22 show the significance of the whole model and each variable. The whole model is statistically significant at $p = .01$ level; the variable sense of community is significant at $p = .001$ level.

When “Actual” has the value “No Sense of Community” and “Prediction” has the value “No Sense of Community”, the prediction is right. In Table 23, 3 students with no sense of community were predicted as “No Sense of Community”. Similarly, 13 students with sense of community were predicted as “With Sense of Community”. The accuracy is 84.2%.

Table 1*Significance of the Model*

Test	Chi-square	<i>df</i>	<i>p</i>
Likelihood Ratio	21.986	6	.0012
Score	21.047	6	.0018
Wald	17.260	6	.0084

Note. Testing global null hypothesis: BETA = 0.

Table 22*Significance of Each Variable*

Parameter	<i>df</i>	Estimate	Standard Error	Chi-Square	<i>p</i>
Intercept	1	-2.619	0.805	10.576	0.001
Gender	1	-0.057	0.486	0.014	0.907
Satisfaction	1	0.758	0.194	15.329	<.0001
Liberal-Arts	1	0.335	0.612	0.301	0.584
Education	1	0.342	0.552	0.385	0.535
Science & Engineering	1	0.902	0.706	1.634	0.201
Business	1	0.661	0.687	0.926	0.336

Table 23*Confusion Matrix of Validation Group*

Actual	Prediction	
	Not Satisfied	Satisfied
Not Satisfied	3	1
Satisfied	2	13

Summary

The findings for the first research question were sense of community varies slightly among colleges but did not show significant differences of sense of community between any two colleges. The hypothesis for the first question was supported. The findings for second research question indicate there was no significant difference of sense of community between female students and male students. The hypothesis for the second question was supported. The findings for the third research question were students' sense of community and satisfaction have significantly strong correlation.

Looking through the lens of sense of community and students' satisfaction by college and by gender, one can see that these segments show variances. For example, there were no statistically significant differences among colleges regarding sense of community, but students in the College of Education did reveal higher sense of community.

In the next chapter, these results will be assessed for the contribution to the research in online education and how faculty, researchers and industry leaders could utilize this study.

CHAPTER 5

REVIEW AND CONCLUSIONS

Summary of the Study

This researcher used applied research that measures students' sense of community and satisfaction in online courses. Students' sense of community in this study was defined as "a feeling that students are safe to connect with one another and tackle other students' questions and concerns." This definition is a synthesis of previous scholars' research, such as McMillan and Chavis' (1986) theory. The data were segmented by gender and college. The overriding question is whether sense of community exists at the institution. The following research questions served as the guide for this study.

Q1: Is there sense of community in each college? If yes, are there differences in students' sense of community scores based on the college in which students are enrolled?

Q2: Is there sense of community in each gender? If yes, are there differences in students' sense of community scores based on gender?

Q3: Is there sense of community or satisfaction in students? If yes, is there a relationship between sense of community and satisfaction for students taking an online course?

Of the graduate students in this university, 33% were invited to participate in this study. The survey questions included four parts: demographic questions, sense of community questions, one satisfaction question, and activity questions. The satisfaction question was from Yousef's (2012) study and modified to fit in the population.

Discussion

Overall, students scored sense of community at 3.375 on a 5-point scale (5 means strongest sense of community) and had satisfaction of 3.771 (5 means highest satisfaction) on a 5-point scale. Most students reported they had some sense of community and they were somehow satisfied with online courses. However, variances hide in the categories of gender and college.

Gender

According to the survey results, the response rate from female students was higher than the response rate from male students. Of all responses, 68.4% were from female students; the percentage of female students in the graduate student population is 58.4% in this university. Female students seemed more interested in participating in this study, which aligns with Rovai's (2002) findings. In Rovai's 2002 study, most participants possessed graduate degrees; the online course in his study was a graduate level course. The participants in this study were all graduate students who took online graduate level courses. The similarity of population and course level may explain some of the alignment. However, gender differences regarding sense of community was not significant, which echoes Lewis et al.'s (2015) research that there is no conclusion regarding gender differences on behaviors in online courses.

Regarding various activities in online classes, male students believed more than female students that team assignments led to a sense of community. There were various interpretations in the literature. One of them is that team assignments sometimes happen in third places and men have a tradition of dominance of the third place (Oldenburg, 1989). Male students may speak more and tend to drive conversations as they need to achieve something in team meetings. Men are more motivated by achievement-related reasons, while women are more motivated by

social reasons (Williams et al., 2009). However, male students' preference in team assignment did not lead to a higher sense of community in this study. The insights on gender difference in sense of community could help instructors refine their online teaching.

The Role of Faculty on Gender Difference

Knowing gender difference in sense of community should not incur intentional and unintentional gender discrimination when designing activities regarding sense of community. On the contrast, instructors teaching online courses could utilize the knowledge to include as many students as possible in the communities. For example, if male students tend to initiate topics more frequently in a team meeting, the instructor could introduce a rule of rotational leadership so everyone has an opportunity to lead a conversation. Another example is female students with a higher sense of community can share their actions in communities with other female students. From positive experiences, the female students who do not enjoy a community, especially in team assignment, could find possibilities to feel comfortable there. Rovai (2001) pointed out that female students preferred interactions with others in a community. Sharing experiences in team assignment could enhance female students' sense of community. Instructors may want to be overtly cognizant of the issues, especially when their focus is on students' perceived learning. A proper amount of training is probably useful for instructors to understand gender difference and refine their courses. To students, learning gender difference in sense of community can be optional as long as they respect peers and instructors; in other words, students do not have to know that male students believe more that team assignments lead to sense of community. The reason is that students are supposed to enjoy college life and sharpen their expertise; not everyone has to be a scholar and explain the world. If some students want to

explore communities, instructors can share why they design specific activities to improve sense of community, but this additional understanding should not be a burden to students.

College

College difference regarding sense of community was also not significant, although raw data shows that students from the College of Education had the highest sense of community and that students from College of Science & Engineering had the lowest sense of community.

College difference between these two colleges was not significant at .1 level ($p = .109$). With more observations, the difference could be significant as the p value is very close to .1. Usually, students from the College of Education interact frequently through various activities, such as group discussions. Instructors encourage the students to express opinions about class content in and out of class. Although Covid-19 forced students to interact virtually and may decrease their sense of community, they could still find ways to support each other if needed. For example, the students could initiate happy hours with classmates to discuss achievements and obstacles; professors may join the informal conversations to offer guidance in a relaxing atmosphere. Students from the College of Science & Engineering may not have as many interactions as students from the College of Education do, but their sense of community is not significantly lower than students' from other colleges. The reason could be that the pandemic did not affect students from College of Science & Engineering, as their course work was relatively independent. This finding does not echo with Drouin and Vartanian's (2010) research. In their study, a group of students (N=198) with psychology backgrounds, which belong to College of Science & Engineering in this study, had little desire for community in both face-to-face and online classes. The number of observations could account for the result difference between this study and their study.

Additional analysis showed that students from College of Liberal Arts tended to like virtual pre-class chat and that students from the Business School and College of Education liked team assignment, group meetings, and presentations significantly more than students from the College of Science & Engineering did. Students from the College of Science & Engineering expressed significantly less interest in almost all kinds of teamwork regarding sense of community. A social science question may have many indistinctive answers; students may prefer to discuss these answers. A natural science question may have a definite answer, which may not require too many discussions among students.

Similar to gender difference, college difference also provides instructors teaching online courses another angle to review content and activities in the courses. Sometimes, combining these two factors and other factors enables the instructors to design interesting courses and engage everyone in class more or less. As Drouin and Vartanian (2010) stated, “comparing students who do not want sense of community in their courses with students who do and discerning the characteristics that account for the differences in desire may help educators adjust their teaching practices to reach and teach each group of students more effectively” (p. 150).

Satisfaction

In this study, sense of community and satisfaction had a strong positive correlation, which is aligned with some scholars’ research. In Rovai’s (2002) study, the online students who had stronger sense of community in graduate courses should have greater satisfaction with their academic programs. Although students’ satisfaction is associated with many elements, such as course content and instructors’ charisma, building a supportive community could increase students’ perceived experiences.

Students' views towards specific activities that lead to a sense of community had weak correlation with satisfaction. Students' willingness to select preferred activities may not mean their ability to pick the activities. For example, students in the College of Education like group discussions, but an instructor in an online course arranges no discussion but lectures only. The students probably have low sense of community and satisfaction but believe discussions could have led to a sense of community.

Different from sense of community, satisfaction in this study varied across the types of colleges. Students in the College of Science and Engineering had the lowest satisfaction as they did in sense of community. Students in College of Liberal Arts scored highest on satisfaction. The difference between the two colleges was significant at .05 level. Many factors could impact students' satisfaction; expectation on service in the university is one of them. According to Naz et al.'s (2018) study, students from department of chemistry and department of mathematics have more expectations about the services at the university than students from department of Islamiat and department of education do. During the pandemic, limited services such as recreation center could impact students in the College of Science and Engineering more negatively and lower their satisfaction.

The Impact of Covid-19 on This Study

The students in this study would have been in classes taught in person except for Covid-19. The online experience was "not what they signed-up for." We do not know if the students suffered from depression and anxiety, or struggled with limited internet access. When some required courses were only available online, the students who disliked online education probably got dissatisfied in the beginning. I did not collect data to identify this group of students, but the implication is that they may have little desire for a sense of community.

On the other hand, a portion of students may prefer online education as online education can offer more flexibility and study-life balance. The following statement is part of a reject letter from a Harvard graduate program: "...In response to our decision to offer an online degree opportunity, we received an unexpected—and unprecedented—number of applications." Due to Covid-19, Harvard changed the program from in person to online temporarily, which resulted in a significant increase of applications. In this study, a few graduate students with jobs and/or family commitments may be in favor of online courses.

As students are going back to campus, the benefits of studying on campus are under discussion. Drouin and Vartanian (2010) pointed out that in face-to-face classes students expressed significantly more desire for sense of community than online students did. Online education does provide convenience and lower cost to many students, but students can socialize with friends, connect with faculty, and use student services, such as recreation center and libraries, in person on campus. Students do not have to give up the convenience from online courses; they can still use Zoom or Facebook to interact. One could live on campus and have all those benefits while still taking online courses. Going back to campus safely gives students opportunities to engage themselves in their preferred ways and can improve their sense of community. Higher sense of community leads to higher student satisfaction like in this study.

From previous literature, we know that campuses create sense of community and that the pandemic creates isolation. We also know that sense of community can be created online virtually with less facility cost. In this study, sense of community from campus and sense of community from online are not distinguishable.

Implications

Community and satisfaction are two common concepts in universities and colleges. However, it is critical to look beyond the aggregate level of students' sense of community and satisfaction. The variances between gender and among colleges are interesting in this study. Perhaps the most impressive result of this study is the strong correlation between sense of community and satisfaction.

Sense of Community and Online Education

The results of this study provide an opportunity to apply these findings to develop more effective online courses based on the characteristics of students in each college. For example, students from the Business School and College of Education prefer to work with peers. Instructors from these two colleges can refine their ways of teaching by designing more collaborative activities such as group discussion and team presentations in online classes. Through studying in teams, students build bonds with each other and learn from their peers. Although students from the College of Science and Engineering had the lowest satisfaction in this study and online groups may discourage students from completing work (Zhang et al., 2019), instructors and administrators can still explore ways to engage students from the college. For example, senior administrators could initiate group games on campus. Students from the College of Science & Engineering probably take some courses about computer programming or coding; many of them know and like to play online video games. Through the competition in the group, students experience interactions with peers and leadership may even emerge among some students. If a few students do not like to play games, they can produce their own games by coding. Imagine students playing their own classmates' games; they will have a lot of topics to discuss and the topics may last a lifetime. Additionally, the pandemic had much less of an impact on E-Sport than traditional sports like football as E-Sport requires relatively low

maintenance. Audiences do not have to be in a physical place to watch games. The bonds and connections through games may improve students' sense of community and satisfaction. Having said that, the instructors of online courses may need to observe the percentage of students who do not want a sense of community. These students may have low motivation in discussion posts, group meetings, or other interactions with peers. Drouin and Vartanian (2010) summarized a few studies and a portion of the students had little interest in a sense of community.

Online education happens everywhere. Massive Open Online Courses (MOOCs) are free online courses available for anyone to enroll (<https://www.mooc.org/>). By definition, students in MOOCs can locate anywhere globally. A student in the United States taking a negotiation course in Coursera (<https://www.coursera.org/>) could practice negotiations with another student in China through Zoom. The student population in MOOCs are probably very different from online students in a campus. Additionally, these two students may start a course at the same time, but finish it at various times based on their other life commitments. Building a sense of community in MOOCs requires a close look at student interactions and collaboration. A good intention can bring bad results. For example, discussion forums are supposed to link related posts, but dozens of indistinguishable threads make students reluctant to search for similar topics (Mcquire, 2013).

Educators in online education use discussion threads commonly. In this study, a model was built to predict whether a student would have sense of community in online education. To address why students do not feel sense of community, the educators may want to look at students' comments on the discussion threads. Analyzing the conversations in a traditional qualitative way is feasible, but it could take too much time and efforts. To be more agile, the instructor may try new technologies such as natural language process to extract key words from

students' comments, categorize comments, and tackle students' concerns in a quick turnover. Another example is the use of artificial intelligence. Artificial intelligence can collect data, analyze data, and make recommendation. Instructors have limited capacity to collect all information related to sense of community, but artificial intelligence can do this kind of work when properly structured. Utilizing artificial intelligence is not an idea, but a practice. Social Agent Mediated Interaction, an artificial intelligence tool, was developed to improve social contact and emotional engagement for online students by alerting them to interests and backgrounds they share with classmates (Peterson, 2020). As long as instructors keep an eye on security, data privacy and bias, new technologies can improve the sense of community in various ways. Blodgett et al. (2020) studied the bias in natural language process and recommended a few ways to tackle the bias; one of the recommendations is knowing why the system behaviors that are described as "bias" are harmful, in what ways, and to whom.

The artificial intelligence tool could make students feel less marginal (Schlossberg, 1989) through the connection with other students. The students with similar hobbies may influence one another and feel they are members in a community (McMillan and Chavis, 1986).

Graduation, Alumni Networking, and Donations

Undergraduate students' sense of community and satisfaction are also meaningful to explore. Unlike graduate students, undergraduate students are required to live on campus. They may interact with peers more in the library, coffee shops, or dorms after class. Additional interactions could influence a sense of community or satisfaction in both directions. Graduation rates could be linked to a sense of community and satisfaction.

Before or after graduation, alumni connections are helpful in career searches. Friends in college or alumni with great memories can refer job opportunities, even after graduation for

years. Administrators in colleges initiate happy hours for students, invite successful alumni to introduce their experiences, and make other efforts to build connections. The process of building connections can be dry and structural, but alumni who view a college as a community can make the process smoother. This kind of alumni naturally brings up their previous college lives and shares stories with current students and offers constructive advice. In contrast, alumni with dissatisfaction may never want to connect with current students or help them with anything. Networking is probably a hot topic in many undergraduate and graduate business programs.

Students' satisfaction may lead to their future donation. Donations are important to universities and colleges, especially to private ones that do not get public funds. A high level of donations is associated with income, satisfaction, extracurricular experiences, and mentors (Clotfelter, 2001). When staff reach out to alumni for donations, the alumni with a low sense of community or satisfaction may feel donations are none of their business. These alumni probably cannot relate their current resources to previous college lives.

Limitations

This study was conducted in a private, mid-size university. Additionally, only graduate students were invited to this study. The results may not apply to undergraduate students or public universities. As time goes by, especially when Covid-19 is not as severe as currently, students' behaviors may change. Although the results are a snapshot of a specific institution, they can still be valuable for further analysis in other institutions.

If leaders in industry want to utilize the results of this study, they may need to consider more factors related to industry and their organizations. These factors include, but are not limited to, the type of industry, company size, and company culture.

Future Research

The following are recommendations for future research. First, it would be beneficial to conduct the same study in this southern university after Covid-19 to see the change of students' sense of community, especially from the perspective of colleges. While the assumption is that the pandemic negatively impacts students' sense of community, measuring the impact quantitatively is necessary to understand how to tackle upcoming uncertainties. As most graduate student were adult students, they prefer engagement and discussion in classrooms (Graham & Donaldson, 1999). In addition, the measure of sense of community can be expanded to four elements, membership, influence, integration and fulfillment, and shared emotional connection, mentioned in McMillan and Chavis's (1986) theory or other components raised by other scholars. The focus of this study was a "general" sense of community but exploring the elements will bring deeper insights to scholars.

This study happened in a private university. Similar studies in other private or public universities with different demographics may generate inconsistent results. Even though the demographics in this study and other universities are alike, activities to engage students could be different. Connecting dots in all kinds of education institutions to a line helps administrators and scholars understand the big picture of students' sense of community and satisfaction in online education.

Building a holistic view of online students could be another path. In this study, gender, college, sense of community, and satisfaction were examined. Other demographic information such as race and age can be added in future studies. The data of online activities such as log-in and number of posts in forums are another interesting dimension to research. The consistency and difference of a student's behavior in several online courses could tell how the student

gradually adapts to online education. All the data can be quantitative or qualitative. The number of conversations in a class is a variable, and the content of the conversations is as critical as the number. Coding thousands of conversations in a traditional qualitative way is probably too time consuming, but again new technology such as natural language process can be used to get a word cloud or even a theme quickly.

Although student learning outcome is discussed in the literature review, this researcher concentrated on perceived learning but did not touch the learning outcome. Lack of interactions of inadequate interactions of higher education students with peers and instructors can cause students to drop out, according to Tinto (1975, as cited in Rovai & Jordan, 2004). Linking learning outcomes with sense of community gives a broader view of the impact of sense of community.

Last but not the least, employee satisfaction appears in many companies' surveys, but sense of community does not. Community culture is popular in some companies, but sense of community is rarely evaluated. Applying this study in industry could be interesting and reveal new findings.

Concluding Remarks

This study is the start of understanding a sense of community and satisfaction in online education in this southern university. Senior administration needs create an environment in which faculty not only produce online courses of high quality, but also engage students in these courses. In fact, an aggregate number may not reflect the truth; measures in various segments tell a more thorough story. Although the data show that the students with a stronger sense of community tend to be more satisfied, continuous efforts on other factors such as course content

are also key to the success of online education. After all, every single thing can make students drop an online course.

What is the future of higher education? Most people probably take online education into account to answer the question. The video Epic 2020 (<https://epic2020.org/>) tells us one possible future look of online education. Students teach students; a professor who teaches one online course could have more students than another professor does in his or her whole life; students go to Apple and Amazon (or Applezon) to take online courses. Professionals in the education industry may want to keep an eye on online education to adapt the trend or even lead the future of higher education. The professionals are not only faculty involved in online education; other administration such as staff can use the study to provide better service to students; shared governance is another area to apply to this study. Some results about community and satisfaction are useful in industries beyond higher education. As long as there are people, there is a community.

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APPENDIX A: Email to Dr. Angela Taylor

Dear Dr. Angela Taylor,

My name is Chris Chen and I am a Ph.D. candidate working with Dr. Don Mills at ***.

We are conducting a research study about sense of community in ***. I am emailing to ask if you can help randomly distribute an anonymous survey to 20% of graduate students who are taking online courses. The research study is about sense of community in ***. Students will be asked to complete 13 multiple-choice questions. Answering all questions takes about one to two minutes. This survey is anonymous; the researcher of this study will not know students' names or other identifying information. No personal identifying information or IP addresses will be collected. Participation in this study is completely voluntary. Since the survey is anonymous, if students decide to withdraw, the study team cannot link names to responses or delete data. By completing the survey, students confirm that they have read and understand the informed consent and that they agree to participate in this study. There will be no compensation for participation in this survey. Additionally, there are no known risks involved in this research.

If you have any questions, please do not hesitate to contact me (chris.chen@***.edu) or Dr. Mills (d.mills@***.edu).

Thank you for your time.

Chris Chen

APPENDIX B: Recruitment Email from Admin in Student Affairs to Participants

Dear Student,

My name is ***. A doctoral candidate, Chris Chen, is working on his dissertation. His research study is about sense of community in ***. You will be asked to complete 13 multiple-choice questions. Answering all questions takes about one to two minutes. This survey is anonymous; the researcher of this study will not know your name or other identifying information. No personal identifying information or IP addresses will be collected. Your decision to participate in this study is completely voluntary. Since the survey is anonymous, if you decide to withdraw, the researcher cannot link your name to your responses or delete your data. By completing the survey, you confirm that you have read and understand the informed consent and that you agree to participate in this study. Please click below link to see the informed consent; the survey is in the informed consent.

If you have any questions, please do not hesitate to contact Chris (chris.chen@***.edu).

Thank you for your time.

Informed Consent Link (Appendix D) which includes the survey (Appendix C)

Angela Taylor

APPENDIX C: Survey

The purpose of this study is to understand your sense of community in online courses. You will be asked to complete 13 multiple-choice questions. Answering all questions takes about one to two minutes. There is no known risks. This survey is anonymous; the researcher of this study will not know your name or other identifying information. No personal identifying information or IP addresses will be collected. Your decision to participate in this study is completely voluntary. Since the survey is anonymous, if you decide to withdraw, the researcher cannot link your name to your responses or delete your data. By completing the survey, you confirm that you have read and understand the informed consent and that you agree to participate in this study.

1. How do you identify your gender?
 - Female
 - Male
 - Prefer not to answer

2. Which college are you in?
 - College of Liberal Arts
 - College of Communication
 - College of Education
 - College of Fine Arts
 - College of Science & Engineering
 - Medical School
 - Honors College
 - Business School

3. Do you feel sense of community (sense of community is a feeling that students are safe to connect with one another and tackle other students' questions and concerns) in your online course(s)?
 - Yes
 - No

4. In my online classes, I feel strong sense of community.
 - Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree

5. How is the sense of community developed for you?
 - Virtual pre-class chat
 - In-class discussion
 - Out-of-class virtual group meeting of class members
 - Conversations in social media, such as Facebook groups based on class membership
 - In-person meeting
 - Team assignment
 - Presentation
 - Other

6. Virtual pre-class chat leads to sense of community.
 - Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree

7. In-class discussion leads to sense of community.
 - Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree

8. Out-of-class virtual group meetings of class members lead to sense of community.
 - Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree

9. Conversations in social media, such as Facebook groups based on class membership, lead to sense of community.
- Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree
10. Meeting classmates in person leads to sense of community.
- Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree
11. Team assignment leads to sense of community.
- Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree
12. Presentation leads to sense of community.
- Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree
13. As a whole, you are satisfied with your online course(s).
- Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree

APPENDIX D: Informed Consent to Participate in Research

Title of Research: Sense of Community in Online Education

Principal Investigator: Don Mills

[Co-investigators:] Chris Chen

Overview: You are invited to participate in a research study. In order to participate, you must be over 18 years old and a graduate student in an online course.

Study Details: It will only involve completing a short, anonymous survey. The purposes of this study are to examine: (1) differences in students' sense of community based on the college students are from, (2) differences in students' sense of community based on gender, and (3) a relationship between sense of community and satisfaction for graduate students taking an online course. The study will occur during the spring semester 2021. You will be asked to respond to a short survey at the end of the semester asking you to describe your sense of community in your online course(s).

Participants: You are being asked to take part because you are enrolled in a graduate level, online course. If you decide to be in this study, you will be one of approximately 200 participants in this research study.

Voluntary Participation: Your participation is voluntary. You do not have to participate and respond the survey. You will not be identified by anyone as your name, student ID, IP address etc. will not be collected. Your decision to participate or not to participate will not affect your student status, course grade, recommendations, or access to future courses or training opportunities.

Confidentiality: Even if we publish the findings from this study, we will keep your information private and confidential. Anyone with authority to look at your records must keep them confidential.

What is the purpose of the research? This research is designed to determine if students establish are able to establish a sense of community in an online class similar to a community that may occur when students attend an in-person class. You may or may not develop a sense of community. You may develop your sense of community in class or in social media. Our interest is to know whether a sense of community exists and where you feel your sense of community. The results of the study will be used to assist faculty and students to establish academic communities in online educational settings.

What is my involvement for participating in this study? You will be asked to complete a survey to share your experience and have three weeks to complete. The survey is expected to take two minutes to complete.

Are there any alternatives and can I withdraw?

You do not have to participate in this research study. Your response will only be recorded when you click submit. Since the survey is anonymous, the researcher cannot connect participants to responses. If a student decides to withdraw, the researcher cannot remove data.

What are the risks for participating in this study and how will they be minimized?

We don't believe there are any risks from participating in this research that are different from risk that you encounter in everyday life.

There will be no face-to-face interaction, so there is no Covid-19 risk.

What are the benefits of participating in this study?

Although you will not directly benefit from being in this study, others might benefit because it will improve the online educational experience for other students.

Will I be compensated for participating in this study?

You will not be compensated for your participation.

What are my costs to participate in the study?

There are no costs to participate in the study.

How will my confidentiality be protected?

Every effort will be made to limit the use and disclosure of your personal information. Your name and IP address will not be collected. There is no way that the researchers or faculty instructor will be able to identify any individual.

We may publish what we learn from this study. We will not publish anything that would let people know who you are.

Only the study team has access to data. Data collected for this research will be stored in a password protected computer at the College of Education located at the ***.

What will happen to information collected about me after the study is over?

The data will be destroyed after the study.

Who should I contact if I have questions regarding the study or concerns regarding my rights as a study participant?

You can contact Chris Chen at chris.chen@***.edu with any questions that you have about the study.

By completing the short survey in three weeks, you are agreeing to be in this study. You may wish to keep a copy of this document for your records. A copy also will be kept with the study records. If you have any questions about the study after you begin your participation, you can contact the study team using the information provided above.

I understand what the study is about and my questions so far have been answered. My participation in completing the study survey indicates my consent. If you do not consent, simply do not complete the survey at the end of the study.