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Social learning online: A study examining the use of threaded discussions

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Social learning online: A study examining the use of threaded discussions

By

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Dissertation

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Abstract

Colleges and universities are providing access to a broad range of students through online courses. With the increase of enrollment and demand, it is necessary to better comprehend the role and relationship of the tools available within those courses. The primary purpose of this research effort was to explore the factors that affect the overall perceived student sense of community in a threaded discussion aspect of a fully online course delivered at the university level. The researcher investigated compiled through structural equation modeling path analysis with 10 independent variables and perceived sense of community as the single dependent variable. Both the measurement model, defined by the theoretical framework, and structural model were confirmed for goodness of fit. The data indicated that statistically significant positive relationships existed between age, task complexity level, and sense of community. Interaction effects between age and complexity level were discovered and tested to find the task complexity for younger students had the relationships of social ability, student demographics, task complexity, motivation, and student perceived sense of community within the online classroom. The expectation was that these factors would have a relationship with overall sense of community. Samples of participants from two small universities were chosen to take a five-part survey over a two-month period. The results from 229 participants are a positive relationship with overall perceived sense of community. Significant negative relationships existed between social ability, postsecondary level and sense of community. The other variables of gender and student motivation were not found to be statistically significant, but this lack of significance provides interesting implications for theory and research. Further research pertaining to online course tools, tasks behind online discussion forums, and student expectations should be conducted.

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Chapter 1: Introduction and Background

The learning process is primarily composed of two components. The first is defined by the actions of individuals and the second part is created with social interactions. Many times educational research has focused on only the individual actions required for learning to take place. However, studies have shown that learning does in fact involve the mind of an individual as well as social aspects such as scenarios of group conversations or two-member team projects (Salomon & Perkins, 1998). Studies on the social components of the learning process are quite important to educational research and should be explored further.

Learning can happen in any space, even a space outside of a traditional classroom. In a traditional face-to-face classroom, social learning occurs through various social cues, such as eye contact, proximity, physical gestures, and tone of voice (Argyle 1967; Bandura, 1977; Mead, 1934). In higher education it is a way to transmit affirmations and understanding that happen concurrently with the delivery of content by the faculty member (Lee & Busch, 2005). Students use these visual and audible transmissions in a number of ways. Each student will perceive characteristics about his or her classmates through these social cues. This creates a setting to transmit culture, make assumptions, and create judgments (Mischel, 1981). This process of perceiving and judging is part of the group dynamics of the face-to-face classroom. Each student perceptibly transmits his or her own level of experience and understanding. They employ that socially learned knowledge to form bonds with other students of similar backgrounds or interests.

These small groups become part of the larger group which functions almost seamlessly to build a small, cohesive community while the teacher is providing content knowledge. In general, a sense of community is important to the overall student experience;

it has been known to increase the flow of information, create a greater sense of well-being, and establish a willingness for participants to cooperate in group functions (Rovai, 2001). This sense of community is related to the level of social learning in the classroom. Research has shown that the most positive results for this learning achievement to happen are in small tight knit groups or communities (Webb, 1991).

The learning process, social learning, and benefits of community are extremely important to discussions on higher education. However, researchers need to also understand the current issues in higher education. Due to increased demand for a university degree, it is essential for institutions of higher education to provide access to a broader range of students. To reach this larger collection of students, schools have developed programs and individual courses using online format. Thus, schools have seen tremendous growth in enrollment in their online programs in the last ten years (Githens, 2007). Allen and Seaman (2007) concluded as of fall 2006 "Nearly twenty percent of all U.S. higher education students were taking at least one online course" (p. 2). With this increased enrollment, an increased demand for high quality online courses has emerged.

Knowing that social learning is crucial for community-building in the traditional classroom is important for those who will use other modalities of learning, specifically courses offered completely online. The need to provide high quality online courses has caused many instructors to adapt their instructional skills from a traditional classroom environment to the online environment. Within online courses, the social learning atmosphere is quite different from a traditional face-to-face classroom because the traditional audio and visual cues are absent. As the social learning process is very important to traditional classrooms, it may also be important to classes offered by the use of other

modalities.

To help bridge the gap in the social learning process from lack of audio cues, teachers are employing a tool for creating online discussion: the threaded discussion. This is an instrument that allows asynchronous conversation among participants. The purpose of this tool is to allow students the opportunity to interact in an asynchronous format by adding a thread or a response (Dorit Maor, 2007; Waltonen-Moore, Stuart, Newton, Oswald, & Varonis, 2006) to a designated question provided by the instructor or another student (Jin, 2005). Some online educators see this interaction as a way to retain some portion of the lost feeling of community when a course is no longer in the face-to-face format (Baglione & Nastanski, 2006). Other teachers may not fully understand why this tool is valuable, which may lead them to neglect its use. Those who do use it may provide an avenue for students to translate those very important traditional social learning and community building factors into the online asynchronous environment.

In the online course there is an emphasis on a learner-centered environment. The instructor shifts into a role as the facilitator rather than the role of lecturer. The facilitator is responsible for the course as a whole. McCombs et al. (2005) concluded that online facilitators should employ certain learner-centered principles into curriculum design that include social influences on learning, motivational influences on learning, and diversity (as cited in Chang & Smith, 2008). These principles can include curriculum, flow of content, assessments, and other items beyond the threaded discussion forums.

This new role as student-centered facilitator in an online threaded discussion forum provides the instructor the ability to coordinate content and group discussions, and assist

collaboration progress as needed. If the facilitator chooses to participate in the online threaded discussion, he or she may become simply another voice inside each discussion forum. For that reason, there is no specific analysis of facilitator posts. This research explores the internal aspects of a threaded discussion forum.

Statement of Problem

Although online courses fill a need in today's society, they lack some community building advantages of a traditional classroom. Thus, instructors have turned to greater use of instruments like the threaded discussion tool in online classes. Teachers must effectively use online course environments and understand the factors that may influence the overall sense of community. What are the social learning factors and personal needs that drive a student to feel as if they are part of that classroom community? How do teachers in online courses make sure that their students feel a sense of community in an asynchronous environment by making use of the threaded discussion tool?

Purpose

The purpose of this study is to explore the factors that affect the overall student sense of community in a threaded discussion aspect of a fully online course delivered at the university level. Those factors include the demographics of the participants enrolled in a fully online course that include age, gender, race/ethnicity, income level, postsecondary level, and comfort level navigating through online course software. Also, the primary core human need, or motivation type, of each student as a function of those demographics is a factor. The core human need is important to understand because it motivates each student to act or react in specific ways (McClelland, 1961). This research explored the overall social ability of each participant and the level of task complexity to adapt in an online threaded discussion. This

research study takes all of those concerns and explores their relationships to the overall student perceived sense of community.

Significance

This study has significance for many educators at the university level since it can provide an avenue for effective instruction. Teachers will be able to focus on the important factors which impact a sense of community within the class setting, creating a chance to provide an online instructor with information that he or she may not have realized was part of this fast-growing component of education.

This study also helps those who are part of the instructional design process to create more effective lessons, environments, curriculum, instructions, and assessments. They can foster more effective social learning elements, which ultimately enhance the overall use and function of the threaded discussion tool and could lead designers and curriculum experts to develop "best practices" for online learning. This adds to the current body of knowledge describing the importance of "sense of community" in classes. In the last five years, many researchers have been able to show how important sense of community is to students at all levels of education through various modalities (Bollinger, 2004; Bonk, Lee, Maguika, & Liu, 2007; Rovai, 2001; Rovai and Baker, 2005; & Shea, 2006).

Research Questions

What is the relationship between social ability and student perceived overall sense of community in a threaded discussion of an online course? How does personal motivation type and level of task complexity affect sense of community? In addition, how do the student demographics have a relationship to a student's perceived sense of community?

Hypotheses

1. Using path analysis, specific student demographics and motivation type will have an effect on overall student sense of community in a threaded discussion of an online class.

2. Other specific perceived factors of social ability and online task complexity will also have an effect on overall student sense of community in a threaded discussion of an online class.

Definition of Terms

1. Social Learning - People learn through continuous interaction of reciprocal events. They observe the behavior of others. They also learn by observing any outcomes related to those behaviors. This is done by attention (watch model), retention (remember), reproduction (replicate), and motivation (Bandura, 1977).

2. Online Class - A class where students and teacher will correspond solely through their computers and the Internet.

3. Groups - Two or more individuals who influence each other through social interaction (Baron, Kerr, & Miller, 1992).

4. Group Dynamics - Process includes all of the dynamic factors that operate among a set of people and are different from the content with which a group may work (Allport, 1960).

5. Community - A group of people who share common interests, have strong feelings of belonging, and believe that participation in the community will meet their needs (Rovai, 2002).

6. Social Ability **-** Characteristic of people with a skill level to complete a specific task

with an identified tool that represents an experience and perception for each

individual community member. This is identified through two domains in a given

task, which are social navigation for observing and social presence for immediacy.

(Laffey et al., 2006).

7. Affiliation Need - Motivated by the need to obtain interpersonal relationships of a

    friendly and close manner that are harmonious (McClelland, 1961).

8. Power Need - Motivated to make others, from social or personal relationships, behave

    in a different manner than they would have behaved (McClelland, 1961).

9. Achievement Need - Motivated to excel and succeed against a specific set of

    standards through effort and ability (McClelland, 1961).

10. Digital Divide - A gap of technical ability and access to electronic resources between

    certain groups of people (Tucker, 2007).

11. Threaded Discussion - A forum where a specific topic is discussed among students,

    with possible posts from facilitators. Subtopics emerge as students respond to specific

    postings, or "threads." A threaded discussion is an asynchronous group conversation

    with related side conversations (Horton, 2000).

Concept Map

To better explain the research; a concept map was created. Figure 1 below depicts the

overall concepts and their hypothesized connection to the major research questions included

in this study. All items ultimately link to the learning process, specifically the piece that

focuses on the social learning portion.
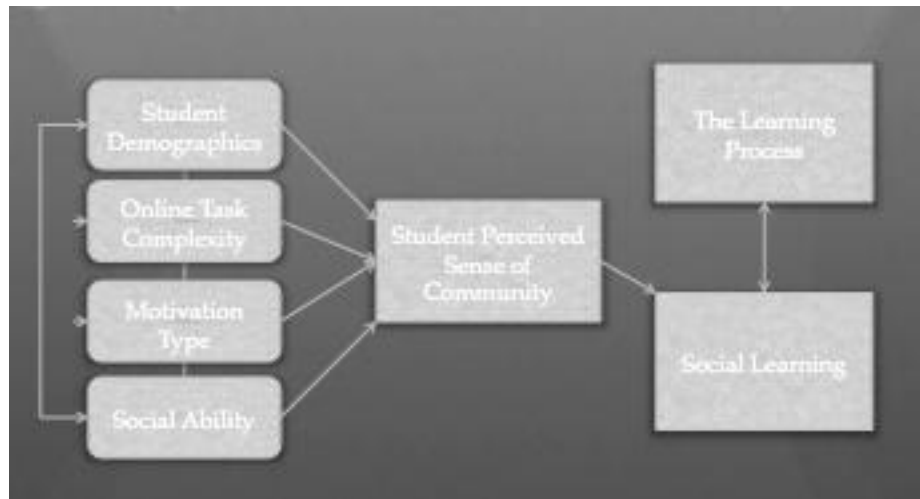
Figure 1. Concept map

Chapter 2: Review of the Literature

A review of literature suggests 5 factors which impact social learning in general or online environments: 1) the sense of community; 2) social ability; 3) online task complexity; 4) core human needs; and 5) understanding which demographic factors are pertinent to online learning.

Social Learning

The theory of social learning suggests that people learn through a continuous interaction of reciprocal events (Bandura, 1977). This theory has proven influential in the field of education as it lends a better understanding of how students obtain knowledge beyond content delivery from an instructor. This concept of social learning promotes a way to transmit affirmations and understanding concurrently with the delivery of content by a given faculty member (Lee & Busch, 2005). In a traditional face-to-face classroom, social learning occurs through various social cues, such as eye contact, proximity, physical gestures, and tone of voice (Argyle 1967; Bandura, 1977; Mead, 1934). Socially learned knowledge can help students to form bonds and create groups of similar backgrounds or interests. This concept has been proven to be a valuable tool in education as schools are centers of social activity, and important learning can come from those social environments (Zins, Bloodworth, Weissberg, & Walberg, 2004). This is extremely important as the number of online courses increases in higher education. A course that is offered without social cues and reactions may lose its ability to provide social learning. These social cues are necessary for social learning to occur and must be considered when discussing online courses and the transfer of learning to students. This is an important concept for the development of online learning. Many educators see the lack of a face-to-face environment as a real shortcoming. Can online, in

fact, be not a negative but a positive for social learning?

Social learning depends on four factors of attention, retention, reproduction, and motivation that need to be present for full social learning to happen, as the learning comes through a student observing events. The design of the asynchronous threaded discussion tool actually incorporates most of these items, and each is taken into consideration for the overall framework.

The "attention" factor is simply the participant paying attention (Moore, 1999). Students participant voluntarily in an online course and begin to read through the various discussion posts provided. The participant is attentive simply by engaging in the class activity. Attention can also involve distraction, that is, being attracted to or distracted from certain scenarios. In the case of the threaded discussion, distraction from or attraction to certain posts in a discussion forum is somewhat controlled, as all threads have the same look. Each participant sees the same size text and font color. The participant viewing the entries in a discussion forum then satisfies attention.

The asynchronous environment lends itself to retention. In relation to social learning, retention is the ability to recall or remember items within the place where behavior will be observed (Moore, 1999). The capability of technology allows each participant to review past discussion postings. Participants could retain information or simply refer to their initial findings. This can be done at any time, making retention possible, as the information is accessible any time a participant needs to review the material to continue his or her participation in the threaded discussion forum.

Reproduction is based on perception and judgment as the observer is expected to repeat an action (Moore, 1999). In this case the repeat action would be to post a response in a

threaded discussion forum of an online course. Participants have observed and retained written statements. At this point of reproduction, the participant can choose to affirm the behaviors presented, verbally deny, or abstain from participation. Posted verbal affirmation and denial are clear and present for the instructor to observe in an online classroom. Bandura (1977) makes it very clear that abstention can be a product of learning even if imitation, or modeling the behavior of classmates, is not present. However, this becomes a challenge in an online classroom as the instructor cannot gauge social cues to understand why a participant would abstain from modeling behavior. Thus, motivation of the participant and other factors must be considered.

Motivation is key to the concept of social learning, according to the theory founded by Bandura, as the participants have to be motivated to act, react, or abstain using this learned modeling behavior (Moore, 1999). As abstention can be a product of social learning; the online classroom creates difficulty in examining which students are motivated to participate in a positive or negative manner. It could be that some choose to abstain based on their knowledge through attention, retention, and reproduction.

Sense of Community

A perceived sense of community is important to students, whether it is in a traditional classroom or in those courses that are taught partially or fully online (Bollinger, 2004; Bonk et al., 2007; Rovai, 2001; Rovai and Baker, 2005; & Shea, 2006). For the purpose of this study, sense of community is defined as a feeling obtained by members of a group who share common interests, have strong feelings of belonging, and believe that participation in the community meets their individual needs (Rovai, 2002). This concept directly relates to the four domains of social learning.

Ertmer and Stepich (2005) revealed that, "It [community] provides the social context in which learning occurs." This context has been studied more in depth to examine beyond a given level of community to specific student perceptions. Through a twenty-participant case study using qualitative and quantitative methods, with the aim of understanding sense of classroom community and interactions of the learners, Rovai (2002) found that, "feelings of community increase the flow of information among learners" (p. 33). Flow of information connects to the social learning domains of attention and retention. Students who engage in these interactions will be attentive to and retain this information.

The authors Palloff and Pratt (1999) found that a sense of community is necessary in order to provide students with successful practice for learning. This practice relates to the social learning domain of reproduction. This study suggests that the actual perceived sense of community from the student may provide greater insight into this space where learning or the reproduction of information can occur, rather than seeking out an overall level of community in the online classroom.

This sense of community has been found to have a relationship with education in regard to overall student satisfaction and persistence. Persistence is most often connected to student motivation that is another domain of social learning. "Those students who possess strong feelings of community are more likely to persist than those students who feel alienated and alone" (Tinto, 1993). Therefore, one approach to help employ high retention rates is to provide students with increased support by encouraging a strong sense of community. Such an approach has the possibility to impact feelings of isolation and, by making connections with other students in this social context, to provide students with a larger foundation of support.

As society has experienced a major influx in technology and education, it is important to understand the sense of community concept and the research discussing it in relation to the online classroom. Picciano (1998) and Rovai (2002) provide a clear link between sense of community in the classroom and the amount of perceived learning in an online classroom (as cited in Ertmer & Stepich, 2005). Through a mixed method study involving 11 graduate students, Ertmer and Stepich (2005) found significant relationships between perceived student learning and the sense of community. Using a much larger sample size of 2036 participants, Shea (2006) finds that "online learning-community models allow participants to actively engage one another in ideas and perspectives they hold to be educationally worthwhile, exciting, and provocative" (p. 37). One other study took place consisting of participants from an online graduate program. In a case study involving 20 participants, the findings showed a significant relationship with student sense of community and learning, affirming the previous evidence (Bonk et al., 2007).

Task Complexity

Task complexity is important to online threaded discussions. As previously discussed, perception can cause an individual to make and change decisions (Berglas & Baumeister, 1993). First impressions can generate many actions and reactions by those involved in the initial meeting (Mischel, 1981). The initial perception begins to set the tone for the entire encounter and possible future encounters. Each participant in any setting has a unique set of characteristics. These characteristics allow the other members in the setting to make perceptions and judgments to create social learning (Argyle, 1967). This process of a give-and-take between perception and judgment uses the social learning domains of attention, retention, and reproduction. Each group member will explore for similar patterns of behavior

to determine if they may share something in common with other parties involved. Each member is absorbing the social cues, processing the information as they understand it, and then returning, or reproducing, his or her own set of cues to build rapport.

The asynchronous setting provides the group participants the ability to read threaded discussion posts. Each participant can then perceive and judge that post and create a group dynamic. There is an example provided in a study by Brown (2001) that expressed,

> As students read others' input, they made conscious or unconscious judgments about each other based on the style, content and/or timeliness of the written messages. Students judged others' intellectual caliber according to the knowledge and understanding shown in the input. If students input their messages just before deadline, others thought it showed that they didn't place a high priority on the class. Writing styles and on-line personalities were also factors used to "judge" each other. (p.28)

This exemplifies the process of perception and judgment that a student has when positioned in an online threaded discussion forum.

In a mixed methods study that involved 35 students in law courses and one educational methods course, it was concluded that through the threaded discussion tool, students were able to exhibit academic, interpersonal, and intellectual responses of social reinforcement (Cox & Cox, 2008). The researchers examined the posts for the type of words that were used and how each was incorporated into the provided discussion topic. The threaded discussion tool was used to establish a cooperative learning environment. It provided social interactions of "encouragement, humor, and empathy," which are signs of group dynamics (Cox & Cox,

2008) that require perception on the part of the reader to judge and respond with those social interactions.

Wojnar and Uden (2005) completed a study finding that trust is a large part of group work and that this can be obtained through online group discussion. This in turn allows participants to more readily share personal thoughts. Cutler (1996) states, "The more one discloses personal information, the more others will reciprocate, and the more individuals know about each other, the more likely they are to establish trust, seek support, and thus find satisfaction" (p. 326). Participants are able to perceive a safe environment through reading the words of other participants in a given group online threaded discussion.

Defining the perceived stage of online threaded discussion task complexity is extremely important to understanding the participant's perception of level of interaction, tasks behind the discussion threads, level of rapport between participants, and level of application of learning. Carabajal et al. (2003) and McDonald and Gibson (1998) discuss task complexity in relation to online learning (as cited in Waltonen-Moore et al., 2008). This could be a key component to understanding the perceptions that take place in online threaded discussions. Task complexity was the topic of a much more robust study. Waltenon-Moore et al. (2006) found that within threaded discussions, participants pass through five stages of online group development, or better understood as task complexity. Their research study, analyzing transcripts from 239 discussion forums of 18 participants, found that learners consistently moved through the stages of task complexity development (Waltonen-Moore et al., 2008). Task complexity begins with hesitations with technology to eventual reliance upon classmates for support while trying to understand content that they could apply in real life situations (Waltonen-Moore et al., 2008).

The five distinct stages of online task complexity are identified as 1) Introduction; 2)

Identification; 3) Interaction; 4) Involvement, and 5) Inquiry (Waltonen-Moore et al.,

2008). Each stage is defined by various characteristics. The basic introduction stage is

where personal background information is shared. An example of a task at the Introduction

level may require only one response, by the participant, to a posted discussion question by

the instructor. It will not require the participants to move away from emotional verbiage

and first person statements. Task complexity, proceeding through the stages of

identification, interaction, and involvement, finally progresses into the inquiry stage where

participants seek opinions of their peers as well as "give-and-take" among the participants

(Waltenon-Moore et al., 2006). The highest Inquiry level has higher complexity as it will

expect the student to synthesize and analyze course material. It also requires active

engagement with multiple participants and providing responses rooted in research more

than personal reactions. Each stage is determined by perceptions of all participants as they

see the group discussion in its entirety. This is an observation of the tasks of the group and

not necessarily the actions and reactions of the individual participant. These actions by

participants exemplify analysis of and reaction to written responses based on how they

were perceived when read by the participant.

Core Human Needs (Motivation Type)

For the purpose of this study, the core human need (affiliation, power, or achievement)

satisfies a type of motivation differentiating the participants (McClelland, 1961). Bandura's

specific theory of social learning does not refer to a level of motivation. It simply gives the

researcher a reason to seek student motivation. Students need to be motivated to utilize that

fourth domain of motivation that is associated with social learning. For purposes of this

research, McClelland's Theory of Needs assumes that individuals have multiple main needs functioning within each participant. It also allows for greater individual differences of the participants, all relating to overall motivation type.

Other researchers have chosen to focus on the findings of other motivation theories. Vroom, Maslow, and Herzberg are often connected to motivation. Vroom's Expectancy Theory is based on outcomes. This theory posits that an action is based on the probability that a need will be fulfilled. This need "Results from conscious choices among alternatives whose purpose it is to maximize pleasure and minimize pain (Richards, n.d.)." Essentially it provides that a "good" performance would result in a reward desired by the individual. A large underlying assumption with this theory is that the instructor would have to do some investigation beforehand. If the teacher had students who enjoyed encouraging words more than some sort of bonus point, how could the instructor best build a task with a reward that would produce the desired response? The problem with this is that the instructor would want to discover the intrinsic and extrinsic needs before class begins to best employ a reward or benefit that will encourage a positive performance from a student.

On the other hand, Maslow created a model in which a person must meet an individual need before moving to a higher level on the hierarchy of needs (Huitt, 2001). The problem with this is that it can be extremely hard to determine what need deficiencies may or may not exist. It also assumes that a person's behavior is influenced by a single need instead of multiple needs like those posed by McClelland. There is also no specific action that results from every individual trying to fulfill a need at each point of the hierarchy. In addition to those theorists, Herzberg designed a two-dimensional model consisting of satisfiers related to what a person does and dissatisfiers that relate to the person's environment (Gawel, 1997).

This theory relates to satisfaction, which may not actually be directly correlated to motivation.

The Theory of Needs suggests that each human has three core human needs: achievement, power, and affiliation (McClelland, 1961). Although a person will have all three needs, *one* of those needs is dominant in each individual and causes increased influence on their behavior. A person will make a decision based his or her dominant need (McClelland, 1961). As motivation is one of the four main constructs of social learning, measuring motivation type may help to understand the impact on students and their overall perceived sense of community.

The need for achievement is one that is aligned tightly with Maslow's Hierarchy, specifically relating to the self-esteem and self-actualization levels (Training House, 1990). There are three main characteristics of a person with a high need for achievement. First, that satisfaction is obtained from engaging in the act, not the reward that may follow (Braden, 2000). Second, that the individual involved will desire to have a large degree of personal responsibility for solving a challenge presented (Braden, 2000). Last, that the person with a high need for achievement will generally set goals that involve risk calculation and attempt to avoid a high degree of risk (Braden, 2000). This is not the type of need that produces a high desire for monetary gifts associated with tasks, but one that creates a strong need for regular feedback to gauge achievement outcomes.

The need to affiliate is different, as the participant would choose to be in a role with more prestige and not necessarily a greater demand for excellence (Braden, 2000). This need is represented by a desire to have a low level of responsibility with problem-solving. Another characteristic of the need for affiliation is the drive to obtain satisfaction from

others rather than from completing a specific task (Braden, 2000). This satisfaction may also come from completing tasks provided by others that may result in compliments about performance rather than general feedback. This is the type of need that may result in choices based upon the people and desire to conflict less with those people in a given situation.

The need for power can be categorized as either personal or institutional. A participant may be driven to influence others or organize many efforts toward one goal (Braden, 2000). The characteristics of this need entails less flexibility, competitiveness, and seeking prestige over performance. This individual may be skeptical of the skills of others. The need for power should not have a negative connotation as it can be used effectively to achieve the goals of both individuals and groups in a positive manner.

To look at learning in an educational setting, it may be assumed that the main motivation for a student is for mastery of a goal, or achievement. However, students in higher education may have goal differences or difference in purpose for enrolling a program. They may enroll to obtain a degree for skill improvement, to network with others in their field, or to grow in knowledge for the purpose of obtaining a career with higher prestige. Huitt (2001) states, "In life success, it seems critical that individuals have all three types of goals [mastery, performance, and social] in order to be very successful." McClelland's needs fit well with those overarching goal types. Mastery is related to achievement, performance is related to power, and social is related to affiliation. Due to these relationships, it is necessary to explore each of these needs separately for a full understanding of the relationships being observed in relation to overall student perceived sense of community.

Social Ability

This concept of social ability draws from the body of research in social theories of Vygotsky, Bandura, and Dewey. Social ability in a computer-mediated format has been regarded in research as a combination of similar people, a specific task, and an identified tool that together represent an experience and perception for each member (Laffey et al., 2006). It can be broken down into two separate pieces, social presence and social navigation. It upholds that "Participating in a social unit provides meaning to experiences and engagement in the world and provides shared perspectives and resources for sustaining engagement in the activity" (Laffey, Lin, & Lin, 2006, p. 164). Essentially it is a measure of the relationship between the participant, the tasks at hand, and the provided online tool. Through the ability to have these social connections, learning is achieved. This may also satisfy an innate need to belong, or desire to complete a task that requires additional resources, that is motivating a participant's social ability (Laffey et al., 2006). Thus, social ability tends to connect to three major constructs of social learning in the online environment. Attention, retention, and reproduction are involved in the modeling process of social learning that may be impacted by the participant's level of social ability.

Researchers in media studies have studied social presence and how it is considered a key component to overall social ability. In a course taught online this presence is measured through the concept of immediacy to measure the perceived social comfort (Laffey et al., 2006). It can be simplified to a sense of "being there" or having that feeling of being with other participants (Laffey et al., 2006). In other words, is the student attentive to the provided activity? In achieving social presence, the participants gain a comfort level to openly engage other students and the instructor or in other words, be attentive to the interactions of

themselves and others. Low social presence has been regarded by some as a barrier to establishing rapport in an online classroom (Bonk et al., 2007). Specific social presence questionnaire items refer to level of comfort and social feelings perceived by the participant through interaction with others.

In conjunction with social presence, researchers have decided that the other key component is considered social navigation. This refers to the ability of the participant in an online classroom to understand the actions of others and proceed with his or her own actions accordingly (Laffey et al., 2006). The participant would read and learn patterns of behavior from other online students and act in accordance with those patterns. This connects directly to the social learning constructs of retention and reproduction. Can the student retain the information provided and then reproduce a specific behavior? The specific questions measuring social navigation ask the participant about the actions of other class members. They also ask the participant to think about his or her own specific actions in relation to other students.

Student Demographics

Based on previous research, this study examined age, race/ethnicity, gender, socioeconomic status (SES), education level, comfort level with online course software, and the specific stage of online task complexity. The research shows that these items must be measured to eliminate possible interaction effects that may modify the effect of an independent variable on the dependent variable. Specifically there are concerns about inequities among types of participants in an online classroom. The actual survey items can be found in Table 1 in the appendix.

Studies have shown that there is a new "digital divide" defined by social demographics.

This divide has previously been understood as the gap between those who use technology and those who do not. With advancing technology and the increase in access to that technology, a new measure of the divide has emerged. The definition now considers the digital divide as a gap of technical ability along with access to electronic resources between certain groups of people (Tucker, 2007). It is important to understand that many factors are involved in determining this gap. Barzilai-Nahon (2006) provides that the new measure of this digital divide should encompass the scope of "affordability of access relative to other expenditures" as well as "socioeconomic factors, including age, education, geography, race, and language" (as cited in Tucker, 2007). For purposes of this study, the geography and language of students was controlled, as all were native English speakers located within the state of Michigan.

Race/Ethnicity

Many families of ethnic backgrounds are disproportionately poor, and the type of area in which they reside, urban or rural, may be tied to the overall SES (Kadel, 2006). A study entitled *A Nation Online: Entering the Broadband Age* found that Internet users were 65% white and not from ethnic origin (as cited in Kadel, 2006). Those students in categories other than Caucasian may not have the same ability to access resources. This could influence a student's ability to pay attention, retain information; or even reproduce an action or behavior.

Knowing all of this, it is hard to separate participants based on their placement along the digital divide without looking at both access via SES and ethnicity. In education, ethnicity is important to how students learn. Sonia Nieto expressed her views at an education forum; explaining that learning styles and interaction encounters may differ among students of ethnic backgrounds and that this is of importance to teaching practices (Harvard, 1997).

Knowing that students of various ethnicities could have varying levels of capability with technology as well as with learning styles, it is necessary to measure these levels in order to account for any interaction effect. If there were an overwhelming number of Caucasian students who have reported a strong sense of community, the possible very low sense of community that could be tied to another race/ethnicity would not be discovered.

Age

Age must be measured, as a wide age gap may cause an interaction effect within the data analysis. If age is not measured, it could mask an interaction that is truly taking place. This could be quite valuable. In the past there may have been an assumption that older adults would be on the less able end of this digital divide, as they may not have had as much use for or desire to learn how to use new technology. If older students are not as technology focused or engaged, it may create a hardship for their ability to be attentive and retain information in an online threaded discussion.

It has been found that computer users over the age of 56 are increasing their use of the Internet (Githens, 2007). As the younger generations of avid computer users grow older, this percentage will then increase. Githens (2007) also reported that using the computer for online learning helped to "increase the ability of older adults to maintain education activities and social networks." (p.5) However, this percentage does not fairly represent the poor and less educated older adults. In fact, all of those who are less educated or poor need to be recognized. If only the very young and much older students have a strong relationship to sense of community, it could mask the effect by showing an insignificant level of relationship.

Gender

Gender plays a role in the cognitive and social learning aspects of any student, and it

must be measured to eliminate any interaction effect in the data analysis. Allport (1954) expressed that the mind of a person needed to use categories to sort information. As a label, gender is a simple way to group male and female individuals to process information. Men are typically labeled as the standard and women are then considered the deviant, playing into all sorts of behaviors like self-defeating, stereotyping, or self-fulfilling (Cross & Markus, 1993). The behaviors of men and women can be influenced by reinforcement that is positive or negative; depending on the given gender role (Lott & Maluso, 1993). Since there can be great differences in interaction and response, it is important to measure gender in an online discussion. The social learning domains of reproduction and motivation may be compromised if gender is not considered based on these possible differences in interaction and response.

In a study of 15 graduate online students, it was found that female students were more likely to provide supportive comments throughout their entire response (Davidson-Shivers, Morris, & Seiwongkol, 2003). Rovai (2001) found that male participants would provide discussion posts that were of a more impersonal and assertive nature, while women provided praise and support. To add to that, Rovai and Baker (2005) examined 281 online course participants and found female students to have a stronger sense of community and overall perceived learning. In a study by Shea (2006) it was found that female students felt less social isolation than male students, suggesting that gender makes a difference in overall sense of community. A measurement may show that those of a specific age have a strong relationship to community. If gender is measured it could show that men of a given age and women of a specific age have varying degrees of sense of community, which is valuable information to teachers attempting to foster this atmosphere.

Socioeconomic Status

The SES level of a given participant can most commonly provide a comparison level among different groups of people. This measurement is needed as it may cause an interaction effect that would otherwise mask an important relationship. In this case, SES would help explain the ability to afford as well as access resources. A student with frequent access to newer resources, such as home computer, may very well be able to fulfill the social learning domains of attention and retention in a manner much more conducive to their education than a student with insufficient resources.

This status has been labeled as one main cause of the digital divide (Kadel, 2006). SES is important to the concept of the digital divide, as research has been provided to show that Internet use is related to the total cost of access and income (Guillen & Suarez, 2005). Students who live in areas of high poverty may have a school with computers, but not access to a home computer, which has been linked to higher test scores (Judge, Puckett, & Bell, 2006). The low SES areas may indicate there is computer access; however, those computers may be less powerful and much older than in the area with a higher SES (Kadel, 2006). If SES is measured, it could show that participants from a specific economic status have varying degrees of sense of community, which is valuable information in future course design.

Postsecondary Level

The gap of access and money only widens as students move through the levels of education. In higher education this is a progression from undergraduate status to graduate status. A measurement to determine academic standing must be used to eliminate any interaction effect. If a graduate student's experience in higher education makes his or her

ability to pay attention and retain information greater than that of an undergraduate student, this should be measured. Above and beyond that consideration, this demographic may also interfere with the student's level of comfort using online course software. In addition, some completely online graduate programs could become more popular. That level of student may feel much more comfortable functioning and navigating within the online course. Also, the aforementioned SES and education connection leads this study to consider the level of college in which each participant participates. Davis (1948) noted that students of high SES could do as well in school with students of lower SES who were at least two grades ahead of the high SES students. With technology, many advances to bridge that gap have taken place.

However, even with access to computers, students in areas of low SES will use the technology to hone more remedial skills, where the high-SES students will engage in lessons to increase critical thinking skills (Kadel, 2006). As interaction effects with SES and comfort could occur, this level of education should be measured. Each participant was considered either an undergraduate or graduate student in an online course. The possible relationship with sense of community and student academic standing should be measured. If graduate students have a stronger relationship than undergraduate students, this should be measured to provide explanation and future research.

Comfort Level

Based on the previous research, it could be believed that the current body of literature assumes that the online students have access to technology and are able to function at the same level of comfort within the online environment. Based on research by Brown (2001), the experienced students tend to have more time to expend toward an online

course than those students with less online experience. However, a specific amount of completed courses could not be defined to identify when a participant felt comfortable enough to be considered experienced. Does this experience level directly mean that this type of student could pay more attention or more easily fulfill the social learning domain of reproduction?

The influence of technology in education has become much stronger. It would benefit this study to understand the comfort level of each participant. When drawing on other research, Shea (2006) did not find a significant impact from previous student experience. Participants were asked to rate their level of comfort functioning and navigating within the online course from not comfortable at all to very comfortable. Neither research study went beyond experience using technology to explore whether or not the participant was truly comfortable with the online course software. They may have had other indicators showing great ability to use technology, but this would not eliminate an interaction effect. This would be caused by those participants who had a higher degree of comfort functioning and navigating through the online course software than those with a lower degree of comfort.

Chapter 3: Methodology

Introduction

This research explores the factors of overall participant social ability, student demographic information, type of motivation, and the level of task complexity to adapt in an online threaded discussion. The purpose of this study was to explore these factors that affect the overall student perceived sense of community in a threaded discussion aspect of a fully online course delivered at the university level.

Delimitations

The convenient sample of participants was collected at a specific time from courses offered at two small, private universities in southeast Michigan. This may not be representative of the population if the study were replicated at a later time. The results may not be representative for other schools in the same type of general population with more diversity. Thus, generalization of this study may only pertain to students enrolled at small, private colleges in southeast Michigan.

Internal validity items must also be well thought-out as this is a convenient sample. These are location, instrumentation, maturation, implementation, and history. The participants come from two small, private universities located in Michigan. The assessment, or survey, has multiple choice and Likert Scale responses. This limits the possible difference in interpretations of the results, which lends itself to limiting the bias of the data collector. The length of the study was complete at the time of testing through an online survey. This provided a specific time in a given semester so no threat of aging would arise. The survey was available through the Internet for the convenience of each participant; therefore, lost results would be limited. The surveys were administered from the same third party survey

provider to decrease collector error.

One overarching general problem with survey collection is that participants may figure out which variables are being measured and respond accordingly. For implementation, the online courses being used in the survey were taught by a specific group considered to be experienced faculty. A threat to the internal validity is that surveyed participants could come from online classes of varying disciplines. One student might be more technology oriented, making the students involved more advanced than a random student in an online course offered at either small, private university. One other threat to internal validity could be the attitudes of the participants. As for mortality concerns, this survey was not deployed until the end of the drop and adds period for a course. Populations of students who enroll, but do not persist, are important to current research. This important population may have been missed due to the time of data collection. In addition, when given the survey tool, the participants may have felt that some questions seemed similar and redundant. It could have caused the participants to fail to complete the survey or result in information that was not thoroughly and adequately considered by the participant.

Path Analysis

Path analysis is a subset of Structural Equation Modeling (SEM) to establish a set of relationships (Garson, 2008a). This type of analysis requires a specific model to be identified. The software for this method was provided through AMOS (Analysis of MOment Structures), distributed by SPSS Incorporated (Garson, 2008b). A SEM path model analysis of specific student demographics and other specific perceived factors with student sense of community, as well as student needs and social ability, was undertaken using the AMOS statistical program, Version 17. SEM was selected as a statistical method because of its

numerous advantages over standard multiple regression. This includes a more flexible approach to assumptions, allowing interpretation even with the subject of multicollinearity. It uses confirmatory factor analysis, the ability to provide appealing graphical modeling, and testing models in a broad sense rather than coefficients individually.

The path analysis model relates the independent variables and the dependent variable. The single arrows represent exogenous variables on the dependent variable, sense of community. The use of double arrows is to indicate relationships between pairs of exogenous variables. Arrows are also connected to error terms. Through this process, the hypothesized causal paths are created. This means that the connection strength represents that response of the dependent variable as a unit change when all other variables are held constant (Garson, 2008a). Each path is calculated to have a standardized regression coefficient, also called beta weight or path coefficient. This is more commonly referred to as the effect of an independent variable on the dependent variable shown in a given graphical model.

Instrument

The instrument used in this study was a survey developed by the researcher containing five parts consisting of some tools provided by other researchers. A pilot study was conducted to check for consistency, perception of questions, and overall usability of the third party survey manager. A summary of the pilot study can be found in Appendix A.

One section of the instrument was provided to better understand the student demographic data. A section to measure the level of student perceived task complexity followed this. Another section incorporated the "Social Ability Tool" to measure overall student social ability in an online classroom. The third section focuses on each student's Personal Inventory of Needs. It measured the core human need or motivation type of each

participant. The last section measured each student's overall sense of community using the Classroom Community Scale (CCS) (Rovai, 2002).

Student Demographics

The student demographic data being measured coincides with the demographics that currently make up the aforementioned "digital divide." Respondents to the survey chose from finite options provided based on the demographics needed. These are all noted in Table 1 of Appendix C.

Task Complexity

Participants were provided various options related to actions that a student might perceive as happening among the group. Each participant chose one or more options from the five categories that coincided with each of the five stages of online task complexity. Again, the specific options are noted in Table 1 of Appendix C. All of this was used to compile a full understanding of factors and eliminate any interaction effects that could occur based on the previous research.

Social Ability

The Social Ability Instrument (SAI) consisted of 20 questions that use a seven-point Likert Scale (Laffey et al., 2006). These are noted in Table 2 of Appendix C. Each respondent had choices ranging from "very true" to "not true at all." The tool provided a result of overall social ability by measuring for the respondents' ability to maintain a social presence, social navigation skills, and connectedness (Laffey et al., 2006). This questionnaire was provided to participants near the end of their online course.

Motivation Type

The Inventory of Personal Needs was used to measure each participant's individual core

need. This was done using the Personal Needs Inventory survey tool. It contained 20

questions for each participant to respond with three choices each (Training House, 1990).

The respondent was given the option to rank the order of strength in which they agree. The

inventory provided the researcher with an interpretation guide to best understand the results.

Using this guide, the researcher could identify the strengths of the three core human needs of

each participant (Training House, 1990).

The actual questions comprising the Personal Inventory of Needs are listed in Table 3

of Appendix C along with the Scoring Key Table 4 and Interpretation Guide. The directions

provided (Training House, 1990) were given as:

This exercise is designed to give you insights into your personality and how

your needs influence your motivation. The next two pages contain 20 sets of

statements. In each set of three statements, you are to decide which one you

most agree with, which you **next most** agree with, and which you **least** agree

with. Place a number in the box preceding each statement to indicate your

extent of agreement, as follows:

3—you **most** agree with the statement.

2—you **next most** agree with the

statement.

1—you **least** agree with the statement.

You will probably find it easiest to read the three statements first. Select the

statements you **most** and **least** agree with and enter a 3 and a 1. The remaining

statement then receives the 2. You will be entering your responses in the

boxes in front of the statements.

When each participant completed this inventory, there were 60 responses for a total of 120 points given, if three designates the highest level of agreement and one represents the lowest (Training House, 1990). Participants assigned a numeric rank in each of the three boxes for each of the 20 questions. In an online version of this tool, the participant would still assign the value items in order of "most agree" to "least agree" without using a writing utensil. Each item with "most agree" was provided the point value of three, and the single point was associated with the least of the statements.

Sense of Community

The last portion was used to measure the overall dependent variable, sense of community. Overall sense of community was measured using the Classroom Community Scale (CCS). The CCS is a 20-question survey using a five-point Likert scale ranging from "strongly agree" to "strongly disagree" (Rovai, 2002). There is no option for a participant to choose to indicate that a specific question is not applicable. The information on overall classroom community is provided along with the possibility to measure two subsets of information, participant perceived learning and connectedness.

The actual items within the CCS are provided in Table 5 in Appendix C. Adding the weights assigned to all 20 questions provided in the CCS give the overall score. Some of the questions are weighted to give the most points to the category of "strongly agree" where others may have that category with the least number of points. It has a maximum of 80 and a minimum of zero, where the larger number shows a stronger sense of classroom community per participant (Rovai, 2002). The ability to generate a score for the two subsets, connectedness and learning, is possible by adding the weights of certain responses from the

CCS. In this case each subset would have a maximum score of 40 points and a minimum of zero, where the larger number shows a stronger sense of the given subset (Rovai, 2002). The directions for participants to respond to the CCS are quite basic to follow. According to Rovai (2002):

> **DIRECTIONS:** Below you will see a series of statements concerning a specific course or program you are presently taking or recently completed. Read each statement carefully and place an X in the parentheses to the right of the statement that comes closest to indicate how you feel about the course or program. You may use a pencil or pen. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, place an X in the neutral (N) area. Do not spend too much time on any one statement, but give the response that seems to describe how you feel. **Please respond to all items**.

In the case of the CCS given through an online survey, the participant chose a box with his or her mouse instead of physically marking a section with a writing utensil. The scoring instructions for the CCS are located in Appendix C.

Description of Participants

For a range of variability, the researcher decided to acquire as many participants as possible with an estimated goal between 300-400. The final number of participants was 229. The researcher decided that using more than one institution might help generalize the findings to a greater population as more schools are using online education. For this study, two small (i.e., total student enrollment below 5000 students), private universities located in the southeast region of Michigan were used. Each offers online classes and utilizes only one course management system (CMS). They are considered Institutions A and Institution B.

Procedure

The timeline for this study was two months in length, from January through March of 2009. As the online courses used in this survey came from more than one institution, the data sets were obtained at a combination of times. The courses for this study began and ended at various weeks and also gather for different lengths in each semester. The surveys were distributed near the end of each course, usually the final two weeks. The courses surveyed ended in the months from January through March of 2009.

At Institution A, it was necessary to complete the Human Subjects Review process defined by that institution. This was completed in January 2009, granting permission for the researcher to collect data from any students enrolled in online courses at that given institution. Each teacher was informed that his or her students were being contacted when a link appeared inside his or her online course in the final weeks. This link was also sent simultaneously in an email message to those instructors and students. It included instructions for each student to follow for supplying the necessary data. The directions were input by the researcher with the appropriate administrator rights to enter the appropriate CMS that houses the chosen online course. Students had the option to participate or opt out of participating in the survey.

At Institution B, the researcher was provided a list of email addresses from the Assistant Vice President of Academic Services with permission from the Provost and Institutional Research Director. The list contained the number of current students who recently completed or were nearing the completion of an online course. The researcher was able to send mass email messages to those students with the appropriate link, instructions, and explanation of the survey in order to collect data.

For both institutions the survey link was available for two weeks from the date of the initial email or link provided in the online classroom. A total of 1955 links were provided to students filling seats in online courses. Students may have received the link more than once if taking more than one online course during the noted timeline. Each student was directed to a third party survey manager to complete the instrument compiled by the researcher. All participants were directed to take the survey only a single time. Each student was given an informed consent form stating that participation in the study was completely voluntary and there were no risks anticipated as a result of participation. They were also informed that participation in this study would have no direct benefit to them. It was also acknowledged that information obtained in the study would be kept confidential. Participant responses were assigned a random code number on the survey, unlinked to any personal information. As a result, the data sets collected were anonymous, even to the researcher collecting data.

Chapter 4: Data Analysis

Introduction

The method of structural equation modeling path analysis is done in two parts. First the measurement model looks to specify observed and unobserved variables. It serves as a form of confirmatory factor analysis with error terms connected to their respective variables. The second portion is to develop a structural model that displays the direct effect arrows between variables. This can be used to identify relationships and variance. When combined, the two models create the full model of path analysis.

Data Analysis

The survey results were downloaded from the third party survey manager. No missing information was noted or identified for the researcher. The data sets were imported into a comma-separated value file through a Microsoft Excel program file. Then data sets were organized, saved, and entered into SPSS for factor analysis, examining the distribution of variables and searching for any outliers in the data. Once the major variables were calculated and/or defined in SPSS, the information was entered into AMOS. The AMOS program requires the researcher to create a visual representation of the path model desired. In the AMOS graphics manager, the visual representation takes shape. Then the file manager holding SPSS data is used. Using AMOS the researcher must assign a variable from the data set to a variable in the visual representation. An analysis of the data is then created. The output provided correlations and regressions of the input data. It was also used to examine any indirect effects.

Descriptive Results

The population of students from both small universities is similar. Table 6

summarizes the basic demographic information collected. The majority of participants were

between 36-45 years of age (30.13%). Female respondents were also quite abundant

(69.43%). The most frequent income bracket from participants was noted between $25,000-

$50,000 (28.38%). The postsecondary level measured undergraduate (59.83%) students made

up a large portion of the sample surveyed. The most commonly reported comfort level was

Very Comfortable (54.59%). Caucasian (86.03%) participants were the overwhelming

majority.

Table 6

Frequency table of student demographic information

Demographic	Institution A	Institution B	Total	Percentage %
Age				
18-25	33	19	52	22.71%
26-35	26	24	50	21.83%
36-45	32	37	69	30.13%
46-55	22	25	47	20.52%
56-65	3	6	9	3.93%
Prefer Not to Answer	1	1	2	.87%
Gender				
Male	45	24	69	30.13%
Female	71	88	159	69.43%
Prefer Not to Answer	1	0	1	0.44%
Income				
Less than $25,000	18	17	35	15.28%
$25,000-$50,000	36	29	65	28.38%
$50,000-$75,000	22	16	38	16.59%
$75,000-$100,000	20	21	41	17.90%
Over $100,000	11	13	24	10.48%
Prefer Not to Answer	10	16	26	11.35%
Postsecondary level				
Undergraduate	81	56	137	59.83%
Graduate	36	56	92	40.17%
Comfort Level				
1 Very Comfortable	69	56	125	54.59%
2	3	2	5	2.18%
3	16	16	32	13.97%
4	23	30	53	23.14%
5 Not Comfortable	5	8	13	5.68%
Prefer Not to Answer	1	0	1	0.44%

Ethnicity

Asian/Pacific Islander	3	4	7	3.06%
African American	8	7	15	6.55%
Caucasian/White	102	95	197	86.03%
Hispanic	3	2	5	2.18%
Native American	0	2	2	0.87%
Other/Multiracial	0	0	0	0.00%
Prefer Not to Answer	1	0	1	0.44%

The types and levels of motivation for participants were also measured. Table 7 summarizes the motivation-related information collected. The majority of participants reported moderately high achievement motivation (65.9%). The majority of participants reported somewhat low affiliation motivation (53.7%). The majority of participants reported moderately high power motivation (71.2%).

Table 7

Frequency table showing level of each motivation type reported by participants

Motivation Type	Between 20-30	31-40	41-50	51-60
Achievement	1	59	151	18
Affiliation	88	123	16	2
Power	0	64	163	2

The perceived participant task complexity level noted some interesting information. Each student chose specific identifiers that they perceived happened among the group members in the threaded discussion portion of their online course. The chosen items that fell into a given category the majority of times established the overall category in which the participant was placed. Figure 2 summarizes the number of respondents in each level of task complexity collected. The majority of participants reported perceptions of achieving the outcomes of inquiry stage online task complexity (34.06%).
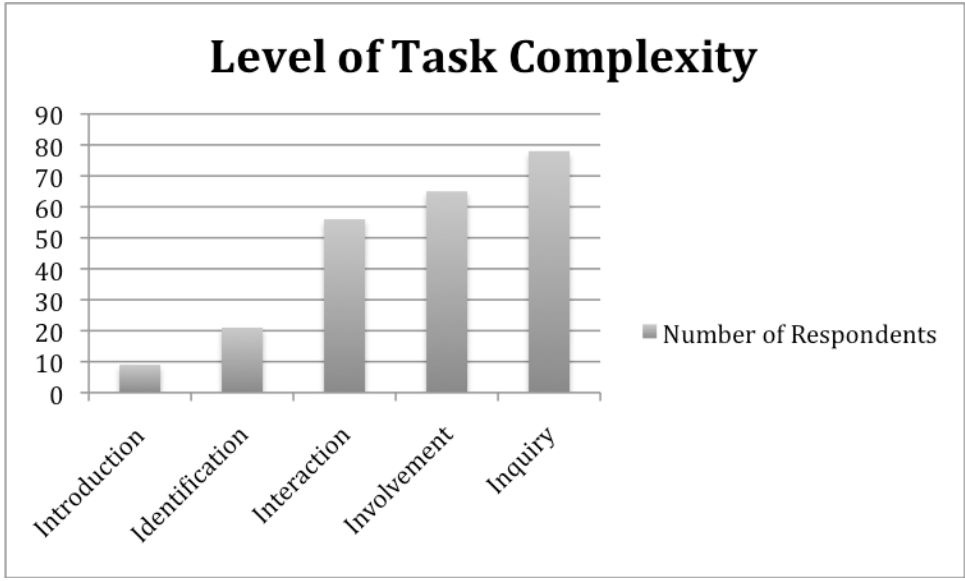
Figure 2. Level of task complexity reported by respondents

Perceived social ability level was obtained from each participant. Based on initial factor analysis findings, it was determined that all components were so closely related that perceived social ability would be collapsed into one single variable for the path analysis calculation. Two items were removed based on their extremely low level correlation. The collapsed factor analysis component matrix for the single social ability variable is listed in Table 9. Table 23 in Appendix C shows the initial factor analysis with all four closely related components.

Table 8

Factor analysis component matrix for social ability

Component	
SA13	.669
SA18	.714
SA1	.666
SA2	.634
SA3	.672
SA4	.677
SA5	.630
SA6	.695
SA7	.767
SA8	.686
SA9	.836
SA10	.816
SA11	.784
SA12	.727
SA14	.673
SA15	.659
SA17	.655
SA20	.797

Table 10 summarizes the collected information of perceived participant social ability in standard deviations from the mean. The majority of participants reported a perceived social ability level of -1 and 0 standard deviations below the mean (36%).

Table 9

Frequency table of participant social ability standard deviations

Social Ability	Number of Respondents
Between -2 and -1	41
Between -1 and 0	83
Between 0 and 1	70
Between 1 and 2	22
Between 2 and 3	12
Between 3 and 4	1

The perceived sense of sense of community was obtained from each participant.

Participants accumulated overall values between 0 and 80 to determine their perceived scale

of sense of community. Table 11 summarizes the collected information of perceived

participant overall sense of community. The majority of participants reported moderately

high levels of perceived sense of community (51.1%). As with social ability, a factor analysis

was conducted on student perceived sense of community. This was conducted based on the

literature review and sub-component measurements possible with the CCS tool. Table 24 in

Appendix C shows the factor analysis into all three components, primary and two

subcomponents, although only the main variable of sense of community was specifically

addressed in this study.

Table 10

Frequency table of participant sense of community

	Between 0-20	21-40	41-60	61-80
Level of community	1	52	117	59

Meeting of Assumptions

When working with SEM, researchers must understand that many models may seem

adequate to be provisionally accepted into the body of knowledge. This can create

uncertainty, so each researcher must be especially specific when choosing a model. There should be a theoretical basis when building the structural model with the SEM software. In this case the chosen software was AMOS. Based on the aforementioned purpose of the study and review of the literature, a theory-based hypothesized model was created. The directional arrows provide that sense of community is the dependent variable with all others as exogenous variables in the model. The theorized model shows variables that possibly affect sense of community while controlling for all others. Figure 3 shows a visual representation of the hypothesized connections of the SEM path model variables.
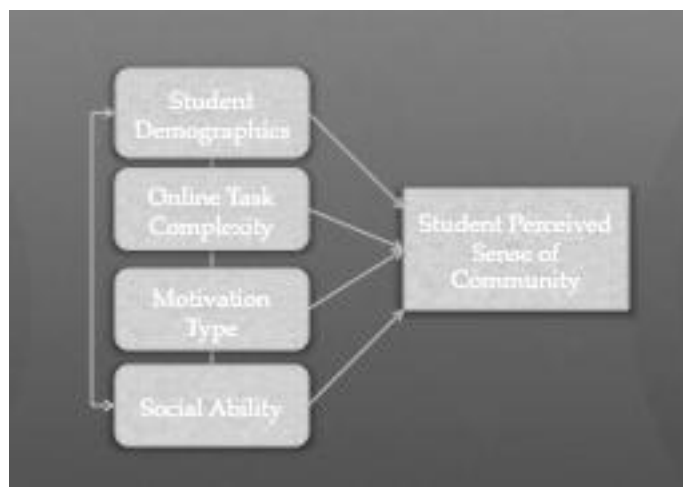
Figure 3. Structural equation path model of online student characteristics affect on overall student sense of community.

The first major assumption associated with SEM centers around sample size. The need is for a "reasonable sample size" that no single researcher has defined to be an exact number for multiple regression. It is a generally accepted measure of sample size to be at least 50 more than eight times the number of variables. With SEM, Mitchell (1993) and Stevens (1996) found that the sample size should be 10 to 20 times the number of variables (as cited in Garson, 2008). However, Bentler and Chou (1987) found that in perfectly normal

distributed cases, a researcher might have five cases per parameter (as cited in Structural equation, n.d.). This gap in the number of cases per parameter is determined by the data collected. If the data sets are flawed in some way, it is best to have a larger sample size. Loehlin (1992), Hoyle (1995), and Kling (1998) all found that total sample size is expected to be over 100 cases and preferably at least 200 cases (as cited in Garson, 2008). The sample size is also in jeopardy if the researcher is going to use a Likert scale with more than four response options. At this point it is expected that the researcher will have a "reasonably large" sample size. According to Kline (2005), a sample size that is reasonably large for SEM would contain more than 200 cases.

This study used 11 variables creating the minimum need for 138 participants if adhering to the rule of least 50 more than eight times the number of variables. If relying on 10 to 20 times the number of variables, 110 to 220 would be required. As this study did use Likert scale responses with more than four options, having more than 200 participants was ideal. This specific research study yielded 229 participants meeting the "reasonably large" category and necessary assumption required to calculate regressions in the path model.

Dummy variables were used to code any categorical data. If there are cases where dummy variables are linked together, the path analysis could generate an error. To correct this, all of the dummy variables should be in broad-ranging blocks. This is so there is not attempt to find a covariance between dummy variables that were broken into small blocks. In this study, all dummy variables were represented as a single-block variable in the path model diagram to satisfy the recursive assumption.

Another assumption of SEM is that the data sets being entered are complete or that any incomplete data have been approached in an appropriate manner. In the case of

missing data points, the missing information could be deleted or the missing data can be replaced with the mean of that variable (Structural equation, n.d.). If data were missing in five percent or less of random cases, list-wise deletion of those cases would be acceptable (Structural equation, n.d.). The researcher may have a hard time understanding whether the missing data points were actually random. Also deletion could result in loss of overall statistical power. In this specific data set, all data sets were complete. There were no missing data sets in the calculations used in the path model to satisfy this required assumption.

Anther underlying assumption includes "continuously distributed, with normally distributed residuals" (Structural equation, n.d.). As the maximum likelihood estimation (MLE) is most commonly used in SEM, and it requires normal distribution, SEM must also require normal distribution. If there is non-normality in the variables, the Chi-square value may be inflated, eventually leading to a Type 1 error (Garson, 2008). All variables were checked for normal distributions. The variable of ethnicity showed little variability, so it was dropped from the analysis. In addition, there were no outliers in the data set, thus, no outliers will be discussed along with the implications for their inclusion or exclusion.

SEM requires that the researcher should have an over-identified model and should avoid a model that is just identified and under-identified (Garson, 2008). Identification is needed in SEM as part of the structure if the analysis is to happen. Proper identification of each equation in the model is required to produce a set of reasonable results. The saturated model is considered just identified as it measures all possible parameters. Under-identified models tend to prevent goodness of fit tests. This research study shows ability to meet goodness of fit tests. There is also a difference between the default model and the saturated

model verifying that is not considered just identified and the assumption of model identification is achieved.

The last SEM assumption is based on multicollinearity. Kline (2005) states, "Multicollinearity occurs when intercorrelations among some variable are so high (e.g. >.85) that certain mathematical operations are either impossible or unstable because some denominators are too close to zero." (p. 56) This might happen if a researcher were examining two variables that were actually measuring the same thing. At that point the researcher could decide to eliminate one variable from measurement. The AMOS software provides an error message to the researcher if multicollinearity issues arise. In this study no error message was encountered; indicating that the assumption of multicollinearity was satisfied.

Hypothesized Model

The hypothesized structural model was depicted based on the research and theoretical framework. This model specifies the relationships between the variables and relationships to student perceived sense of community, also known as the observed endogenous variable. Since this model is the initial attempt to explain any influences on sense of community, all possible paths are drawn. This would then be considered a fully recursive model using unidirectional arrows to the dependent variable. Figure 4 shows the fully hypothesized model. In this model there are ten independent variables and one dependent variable. The variable for ethnicity was removed from the model, as the data analysis in SPSS did not show enough variability. The independent or observed exogenous variables were age, gender, income, postsecondary level, group level, comfort level, affiliation, achievement, power, and social ability.

Bravender Path Model
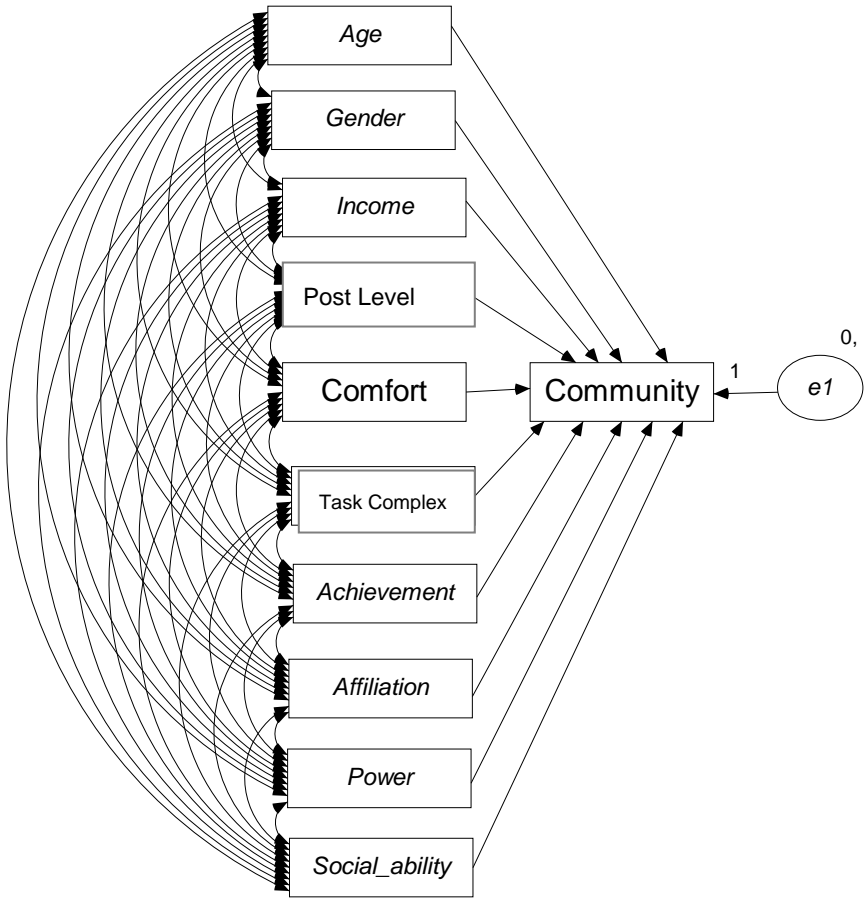
Figure 4. Hypothesized Bravender path model.

The purpose of this model was to first confirm the structure of the proposed variables. It was used to confirm the variables in a structural equation path analysis of the hypothesized model. This preliminary structural equation analysis was run to refine the hypothesized model into a modified final model. Table 11 shows the regression weights of all exogenous

Table 11

Hypothesized Bravender path model regression weights

	Estimate	S.E.	C.R.	P
Community <--- Postsecondary Level	-4.414	1.257	-3.513	***
Community <--- Task Complexity	1.199	.585	2.048	.041
Community <--- Achievement	-.034	.267	-.127	.899
Community <--- Affiliation	-.232	.302	-.767	.443
Community <--- Power	-.070	.345	-.203	.839
Community <--- Social ability	-8.612	.670	-12.847	***
Community <--- Income	-.051	.432	-.118	.906
Community <--- Gender	-1.628	1.262	-1.290	.197
Community <--- Comfort	-.227	.417	-.544	.586
Community <--- Age	1.786	.552	3.237	***

variables in the hypothesized model. Four areas of significance are noted by the critical ratio (C.R.) in the table.

If the critical ratio is >1.96 for a listed regression weight, it is assumed that it is significant at the .05 level. A *** represents significance at the .001 level. Table 12 shows the standardized regression weights in the path analysis for all independent variables. Regression weights are sometimes known as beta weights or path coefficients. In the hypothesized model, the significant critical ratio of exogenous variables occurred with postsecondary level, group level, social ability, and age. These were also the variables with the highest path coefficients.

Table 12

Standardized regression weights in the path analysis

		Estimate
Community <---	Post Secondary Level*	-.160
Community <---	Task Complexity*	.092
Community <---	Achievement	-.012
Community <---	Affiliation	-.090
Community <---	Power	-.019
Community <---	Social ability*	-.633
Community <---	Income	-.006
Community <---	Gender	-.056
Community <---	Comfort	-.024
Community <---	Age*	.156
Variables with statistically significant critical ratios		

Once each significant regression weight was determined, the researcher proceeded to adjust the hypothesized model to test for model fit. In the revised path analysis model, the non-significant unidirectional arrows were removed. Thus, only significant variables were provided with unidirectional arrows in the modified model. Figure 5 depicts the revised model prior to any analysis calculations.

Bravender Path Model
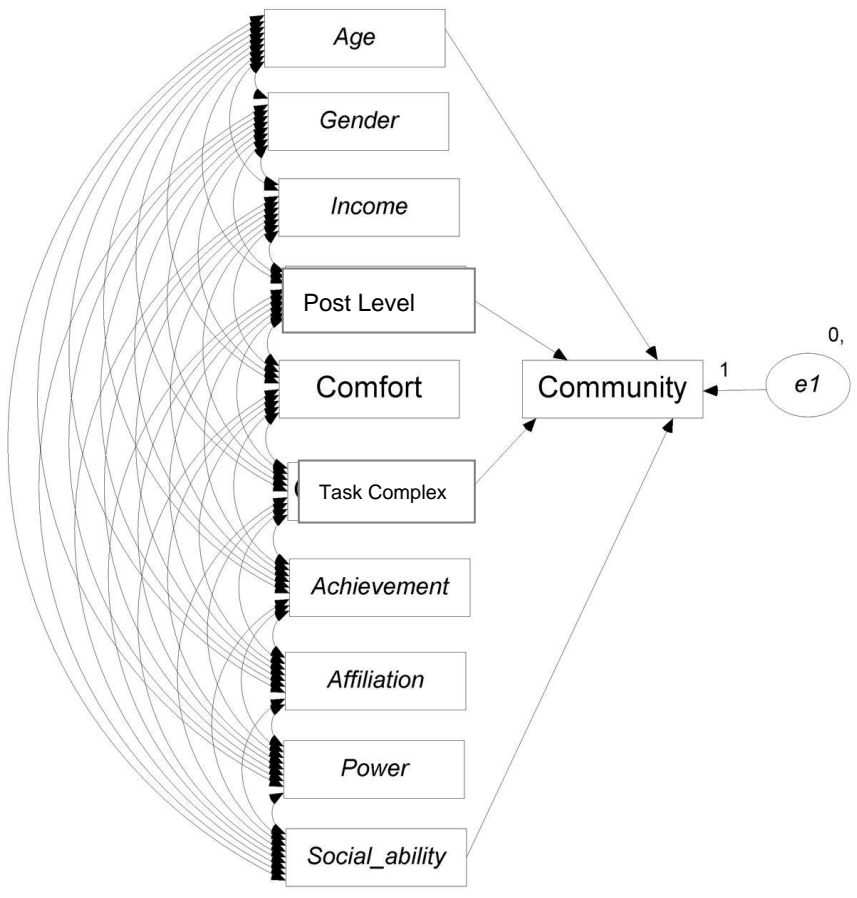
Figure 5. Revised Bravender Path Model

The purpose of this model was to first confirm the full model of the proposed variables.

Table 13 shows the regression weights of all exogenous variables in the revised model.

Following that, Table 14 shows the standardized regression weights of the modified model.

Table 13

Modified Bravender path model regression weights

		Estimate	S.E.	C.R.	P	Label
Community <-	Postsecondary level	-4.566	1.258	-3.629	***	par_1
Community <-	Task complexity	1.238	.585	2.117	.034	par_47
Community <-	Social ability	-8.407	.633	-13.285	***	par_48
Community <-	Age	2.009	.504	3.985	***	par_49

Table 14

Modified standardized regression weights

			Estimate
Community	<---	Postsecondary level	-.165
Community	<---	Task complexity	.095
Community	<---	Social ability	-.618
Community	<---	Age	.175

As expected, the critical ratio produced was >1.96 for the exogenous variables of

postsecondary level, group level, social ability, and age. The significance of the variables

increased, but the largest increase occurred with the variable for age. Figure 6 depicts the

revised model with the analysis calculations. The product displays regression weights for the

connected variables.

Bravender Path Model
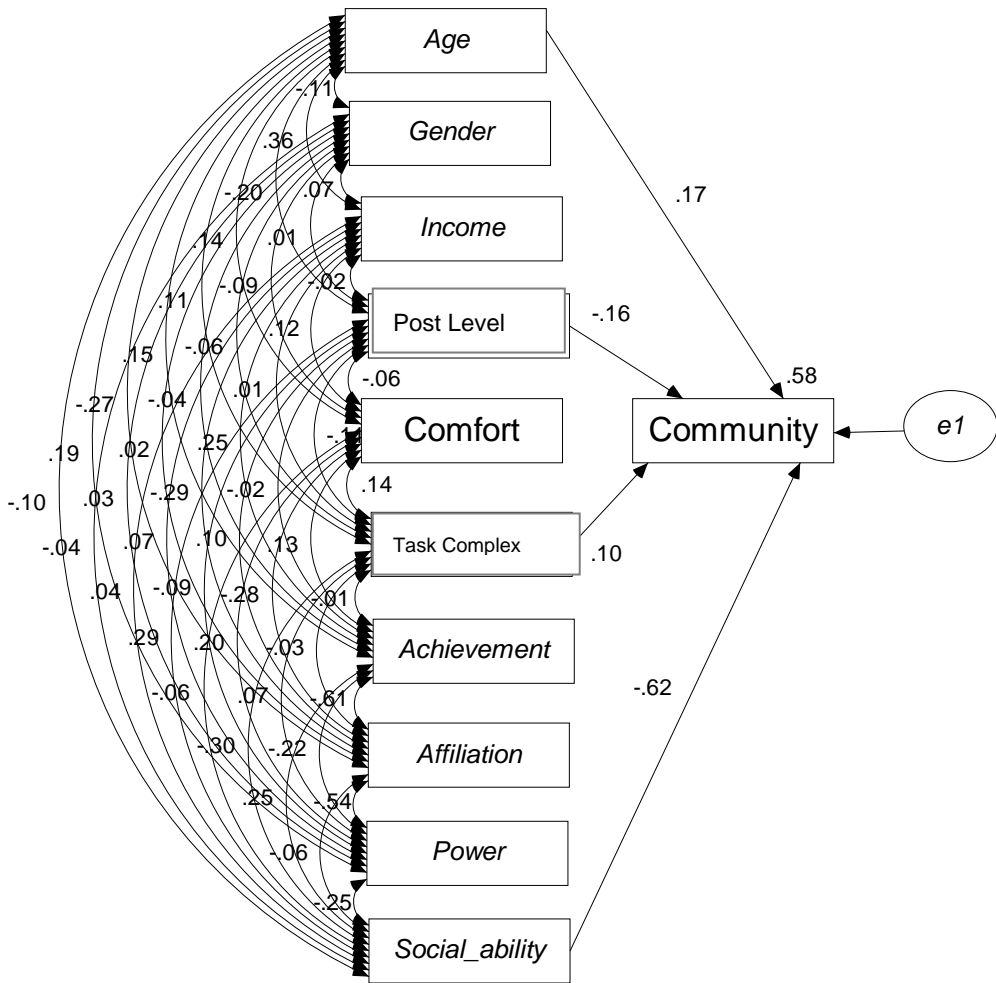
Figure 6. Revised Bravender path model visual output with calculations

The variables of postsecondary level and social ability had inverse relationships with

overall student perceived sense of community. The postsecondary level variable determined

if a student was considered at the graduate or undergraduate level. This model shows a small

negative coefficient that indicates an inverse relationship to student perceived sense of

community. That is to say that as the postsecondary level decreased, there was a higher

perceived sense of community reported. Social ability had a very high negative coefficient

reported. As the reported social ability of the participant was lower, the level of participant

community rose.

The variables of age and group level had positive regression coefficients reported in the path analysis calculations. It shows a small positive relationship with age of participant. That is to say that as age increased, the perception of student overall sense of community also increased. Participants recalling their discussion forum tasks defined the group level. Each chose responses that depicted their level of engagement and responsibilities using the threaded discussion tool to devise overall group level. This ranged from the basic introduction stage where personal background information is shared to the inquiry stage where participants seek opinions of their peers. The reported small positive coefficient represents a higher level of perceived sense of community as a participant moves into higher stages of task complexity.

The structural hypothesized model created a full saturation of parameters. The non-significant parameters were eliminated, resulting in the confirmation of significant unidirectional regression weights. The next phase of SEM path analysis examines the full output once those significant weights are produced. Calculations from the data set were analyzed so the revised path analysis model could be tested for model fit.

Model Fit Summary

The model fit is essential in path analysis. Significant regression weights in poor fit models are not indicative of any useful meaning. AMOS produces a model fit summary to give a goodness of fit evaluation for the model at hand. This portion is considered testing the measurement model, which tells the researcher if the model should be accepted or rejected. If accepted; the researcher will accept the analysis calculations and then interpret the information.

Currently there is no specific list of fit tests that is required of path analysis researchers. AMOS produces more than 20 fit tests indicated in the output options section. The text output of the model fit summarizes the most well known goodness of fit tests. In this study, a specific set of those tests will be examined. Each model test produces three categories: saturated, independence, and default models. As previously mentioned, the saturated model is the complete explanatory model, also known as just identified, with all possible directional arrows included in the model. This would be visually represented in the hypothesized model before any directional arrows are removed. The independence model makes the assumption that all variables are measured at zero, or the opposite of the saturated model. The default model is the researcher's proposed model. This model would ideally fit between the saturated and independence models listed in the AMOS output text.

The model chi-square goodness of fit test is the most common test. The goal for the researcher is to have a value >.05 and indicate no significance in the default model. Table 15 displays the three model outputs for the chi-square goodness of fit test. It shows a *p* value of .675, which is >.05, confirming a value that is not significant. As it is not significant; this is a good fit according to the requirements for the chi-square goodness of fit test.

Table 15

CMIN model chi-square test output

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	71	4.013	6	.675	.669
Saturated model	77	.000	0		
Independence model	22	848.977	55	.000	15.436

With the chi-square test there can be a higher likelihood of committing a type II error with larger sample sizes. To assist with this dilemma, the measurement of Hoelter's critical N is taken. This measures if the sample size is sufficient. The ideal result in the default model at

the .05 level is that N would be >200 and N must be no less than 75. Table 16 shows

Hoelter's critical N output. The result for the default model is that there is an adequate

sample size at both the .05 and .01 levels based on the ideal situation.

Table 16

Hoelter's critical N output

Model	HOELTER .05	HOELTER .01
Default model	716	956
Independence model	20	23

Information theory goodness of fit measures are also needed in model comparisons.

The Akaike Information Criterion (AIC) compares the various models. The lowest level of

AIC depicts the best-fit model in those comparisons. Table 17 shows the AIC measure

output. This provides that the lowest AIC value is associated with the default model. The

result is another confirmation that the goodness of fit test is in favor with the researcher's

modified model.

Table 17

Akaike Information Criterion measure

Model	AIC
Default model	146.013
Saturated model	154.000
Independence model	892.977

Every researcher must understand goodness of fit tests, places to easily commit

errors, and comparing models. Beyond that, the researcher benefits from comparing the

default model with an alternative, or null, model. The text outputs for these models are listed

below in Table 18. The Comparative Fit Index (CFI) assumes that there is no correlation with

any latent variables. The goal is to be as close as possible to a value of one as possible, to

assume an especially good fit. The Normed Fit Index (NFI) is often considered an alternative

to the CFI. The goal is to achieve as close to a value of one as that finding would represent a

perfect fit. Anything over .95 is considered respectable for any researcher. Table 18 shows

the results of the default, saturated, and independence models. The default CFI equals one

and the NFI result is .995, showing that either model test shows a very good measurement of

fit.

Table 18

Goodness-of-fit tests comparing the given model with a null or an alternative model

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.995	.957	1.002	1.023	1.000
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Just like sample size can cause an unforeseen error, degrees of freedom can be an

issue for the researcher. The Root Mean Square Error of Approximation (RMSEA) is

sometimes called "discrepancy per degree of freedom." This tool measures for lack of fit

when each degree of freedom is considered. A great model fit is a RMSEA value of less than

or equal to .05. Anything equal to or less than .06 is generally considered acceptable for the

research study. Table 19 displays the RMSEA text output. It displays a value of .000, which

is less than the .06 needed to consider the findings a good model fit. It also exceeds the great

model value desired.

Table 19

Root mean square error of approximation output

Model	RMSEA
Default model	.000
Independence model	.252

The revised structural model provided significant unidirectional arrows, and the measurement model showed various measures of fit for the default model that were considered very good. Both items indicate that the SEM path analysis presented is statistically sound meeting the basic necessary requirements for a proposed model.

Tests for Interaction Effects

Once the full model was developed and tested for goodness of fit, the next step taken presented tests for interaction effects. This was done in a number of steps. First, latent interaction variables were created. They were selected by examining the significant variables in the fully developed model. Two significant variables were multiplied together to create new cross-product variables and then added to the SPSS data set. Although not shown as significant, the gender variable was included in the test for interaction effects as a precaution from the vast amount of research indicating that gender can be a likely factor for interaction effects. Five new interaction latent variables were created: 1.) social ability * group level; 2.) social ability * postsecondary level; 3.) group level * gender; 4.) group level * age; and; 5.) social ability * gender. Table 20 depicts the regression weights of the new set of variables with those that were considered significant in the full model. The significant cross-product variables are noted as group level * age, and social ability * group level. It is noted that in the test for interaction effects, the variable of social ability did lose significance.

Table 20

Regression weights of model considering interaction effects

		Estimate	S.E.	C.R.	P
Community <-	Postsecondary level	-4.507	1.227	-3.673*	***
Community <-	Task complexity	4.814	1.479	3.254*	.001
Community <-	Social ability	-5.814	3.421	-1.699	.089
Community <-	Age	6.114	2.121	2.883*	.004
Community <-	Social Ability * Gender	1.751	1.238	1.415	.157
Community <-	Group * Age	-1.042	.516	-2.020*	.043
Community <-	Group *Gender	-.197	.300	-.656	.512
Community <-	Social Ability * Postseconday Level	1.321	1.152	1.147	.251

Significant critical ratios

Once the significant cross-product variables were determined, another set of models was created. The variable "age" was deleted from the path analysis model and the data file used in AMOS. The SPSS data file was split into two new files now labeled as Low Age and High Age. Low age participants were considered under the age of 36, and high age participants were 36 years of age and older.

The new split data files were added to AMOS and new models were created from each new data file. Each of the two separate age models was analyzed to examine the relationships of postsecondary level, group level, and social ability on student perceived sense of community. Figures 7 and 8 depict the visual output of the conceptual diagrams for the competing structural models. Each includes the standardized regression weights or path coefficients between the connected observed variables.

High Age Model
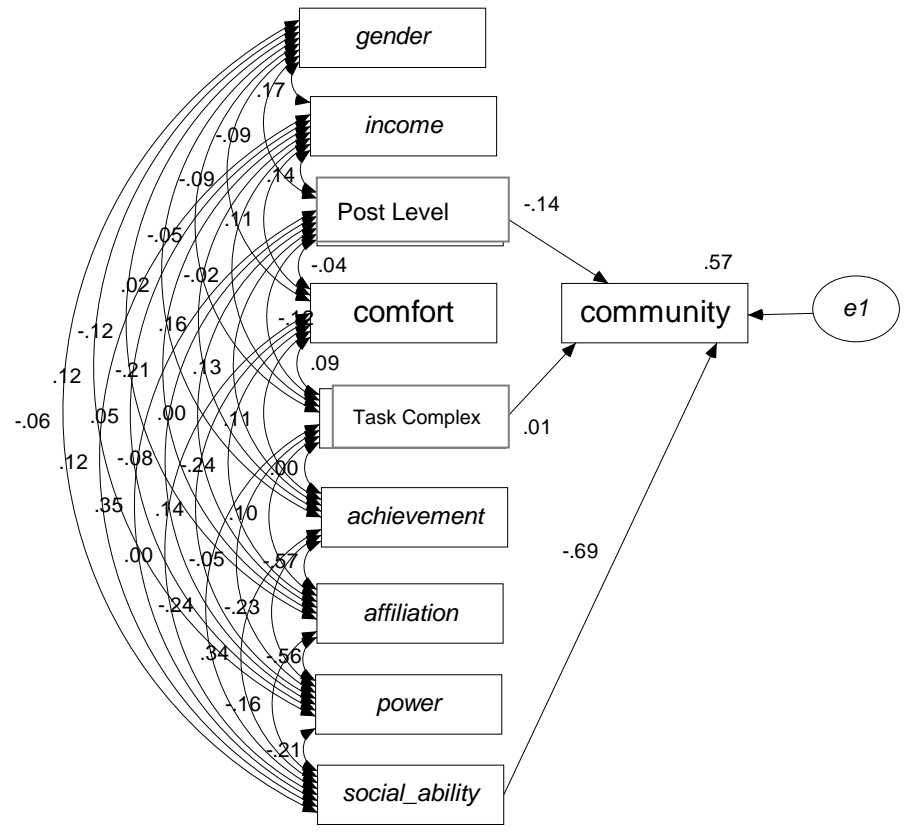
Figure 7. High age path model
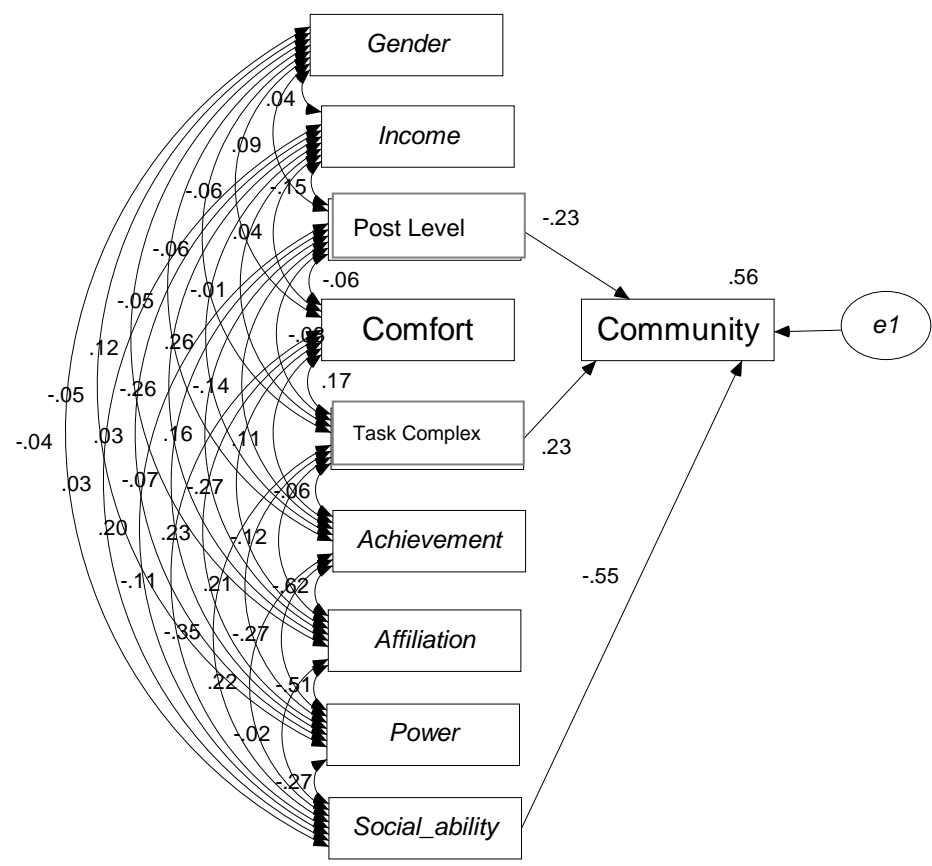
Low Age Model

Figure 8. Low age path model

The weights and other group information are noted in Table 21. This changed the sample

sizes in each split file to less than 229. The new minimum suggested number of participants

would be 90 based on the generally accepted rule of using ten times the number of variables

listed in the model. In both cases, the sample size was at least ten times the revised number of

variables in the data set meeting that necessary assumption.

Table 21

Comparison of regression weights and standardized regression weight estimates

	Low Age N=104	High Age N=125
Community←Postsecondary Level		
Critical Ratio	-3.404	-2.303
p	***	.021
Estimate	-.227	-.144
Community←-Task Complexity Level		
Critical Ratio	3.317	.153
p	***	.878
Estimate	.231	.009
Community←Social Ability		
Critical Ratio	-7.790	-10.766
p	***	***
Estimate	-.553	-.691

The critical ratio and *p* value for both age groups show significance for postsecondary level and social ability on the dependent variable of student perceived sense of community. Only the low age group had a significant critical ratio and *p* value for task complexity level on the dependent variable.

The low age group reported a small positive regression weight for task complexity level and sense of community, suggesting that as task complexity level of low age participants increases, so does the overall perceived sense of community.

As the measurement model and goodness of fit must both be measured in SEM path analysis, Table 22 shows the comparison of the goodness of fit model summaries produced after checking for interaction effects. Both groups of participants reported non-significant chi-square values meeting the necessary goodness of fit measurement. The Hoelter's critical N was more than adequate at the .01 level for both age groups, confirming the assumption needed. This was also the case for the AIC, NFI, and CFI measurements. The low age group

achieved an acceptable RMSEA measurement, while the high age group achieved a great fit

measurement.

Table 22

Goodness of fit comparisons for interaction effect models

	CMIN	Hoelter .01	AIC	NFI	CFI	RMSEA
Low Age	8.040	216	140.149*	0.979	0.994	0.057
High Age	3.016	692	132.503*	0.993	1.000	0.000

*Lowest AIC model in goodness test

The data analysis procedure started with a hypothesized model that was developed

from research and the review of literature. The data files were created in SPSS to consolidate

the information for each specific variable in that model. In AMOS the hypothesized model

was tested. Then that model was modified to create the full structural equation path analysis

model. This was tested for the measurement and structural models that ultimately led to the

examination of goodness of fit measures. Then the full model was tested for possible

interaction effects. From that, two separate models were created to further investigate the

exogenous variables that had significant unidirectional arrows to the dependent variable

student perceived sense of community. Each measurement model was created and model fit

summaries were compiled. The AMOS results show acceptable findings for the goodness of

fit tests measured. All requirements were met for the model and results to be accepted as

sound findings to enter the body of knowledge.

Chapter 5: Discussion, Implications, Recommendations, and Conclusions

Introduction

Social learning and community building happen in the traditional classroom, which is important for individuals who participate in courses offered entirely online. Being conscious that online courses fill a need in today's society but lack some community building advantages of a traditional classroom has generated increased use of instruments like the threaded discussion tool. This research study took all of those concerns and explored factors with possible relationships to the overall student perceived sense of community. The researcher addressed the following hypotheses:

1. Using path analysis, specific student demographics and motivation type will have an effect on overall student sense of community in a threaded discussion of an online class.

2. Other specific perceived factors of social ability and online task complexity will also have an effect on overall student sense of community in a threaded discussion of an online class.

Discussion

Results and modifications from the initial hypothesized model suggested that motivation or personal student needs of achievement, affiliation, and power were not considered distinct variables. This was also the case for the student demographics of SES, gender, and comfort level with the online course software. The path analysis did generate the result that the factors of age, level of task complexity, social ability, and postsecondary level have a significant relationship to overall student sense of community in a threaded discussion of an online class.

Hypothesis one was partially confirmed to express that only the student demographics of age and postsecondary level presented a relationship to overall student perceived sense of community. The other demographics and motivation type did not a relationship to the dependent variable. Age of participant was measured and found to be significant. It had possible interaction effects in the hypothesized and modified path analysis models that data sets were split to account for any of these effects. Postsecondary level of participant was measured and found to be significant.

Social ability was the variable that represented the presence and navigation of a student in an online course who is missing the traditional non-verbal cues provided in the face-to-face learning environment. In this research study, the second hypothesis was confirmed, indicating that there is a significant relationship, although negative, between social ability and student perceived overall sense of community in a threaded discussion of an online course.

In further support of the second hypothesis, level of online task complexity had a significant relationship to overall student sense of community for a student younger than 36 years of age. This was noted through the interaction effect with the age variable. The task complexity variable was rooted in the type of task behind the use of the threaded discussion tool. Participants were able to decide if the group discussion forums progressed through basic to more advanced stages of development that included analysis and synthesis of information rather than basic personal reflections.

Implications for Theory

Sense of Community

A moderately high overall student-perceived sense of community was reported. This

is very interesting as it shows a level of importance that is founded in the research. It also raises a set of questions. Did this perceived sense of community naturally exist, or was it developed? Did the teachers or assessment do something to cause this sense to be at this level? Did a specific discipline play a role? Was there a desire to seek a sense of community that was some overarching factor in this sample?

There are educators who see the lack of a face-to-face environment as a real shortcoming and believe that this shortcoming could affect student learning in online courses as they inherently lack face-to-face visual cues. In fact, the review of literature suggests these social connections derived from the social learning process bring together students as a group of people to form a community of learners. Beyond this study, research suggests a connection to overall student-perceived sense of community. More current research posits that "Participating in a social unit provides meaning to experiences and engagement in the world and provides shared perspectives and resources for sustaining engagement in the activity." (Laffey, Lin, & Lin, 2006, p. 164) In this research study; four variables had statistically significant relationships to overall student perceived sense of community. This study confirms that social ability in an online classroom does in fact affect perceived sense of community. The factors of postsecondary level, age of student, and level of task complexity impact this community.

Social Ability

There are significant implications for social learning theory, based on this research study, on social ability and community in the asynchronous environment. With statistically significant regression weights, the findings of this study show that social ability has a strong negative connection to student perceived sense of community. The interesting implication

from this research is that as social ability increased, the overall perceived sense of

community decreased sharply. All instances support the literature that this concept can be

measured in online classrooms through the components of presence and navigation otherwise

known as social ability. It also supports the research of Picciano (2005), Rovai (2001), and

Brown (2001), reporting that these social interactions have a strong connection to overall

sense of community in a classroom.

The theory behind social ability posits that there are at least two subcategories of

navigation and presence. Based on initial factor analysis findings, it was determined that all

measured components were so closely related that perceived social ability had to be

collapsed into one single variable for the path analysis calculation. This is extremely

important to the social ability research, as no distinct set of subcategories could be

determined. All were so closely related that only one factored item for social ability was used

in this study. In this particular study, the assumption that social ability will have separate

categories for navigation and for presence was simply unfounded, and more research may be

needed to determine if the concepts being measured are too closely related.

The implications to theory of social ability are much like that of postsecondary level.

To what extent do students who come to an online threaded discussion with high social

ability have a different set of expectations than those students with a low level of ability? Do

students with high levels of social ability demand more? Is social ability present from

students at the lower levels? If it is not present, do those socially able students adjust their

perception of overall sense of community? It may be easier for students of low social ability

to perceive a sense of community as they may be more engaged in the specific tasks and

requirements of the threaded discussions. By the end of the online course these students may find their perception of sense of community gradually increased.

Task Complexity

A plethora of studies have concentrated on the interaction of participants in a group. Each group member of an online threaded discussion forum will search for similar patterns of behavior beyond content to determine if they may have something in common with other group members. Each participant of the group also assesses the learning tasks associated with the threaded discussion. Defining the perceived stage of online threaded discussion task complexity is extremely important to understanding the level of interaction, tasks behind the discussion threads, level of rapport between participants, and level of application of learning. The five distinct stages of online task complexity are identified as 1) Introduction, 2) Identification, 3) Interaction, 4) Involvement, and 5) Inquiry (Waltonen-Moore et al., 2008).

The descriptive results were unexpected as most students reported observing the two highest levels of task complexity. This may very well represent the entire population, but as neither institution collects those data sets, the information is not currently available. This is interesting if those institutions may be providing ways to develop students with, or the ability to recognize, high task complexity in online threaded discussions before students enter the online classroom. This may also speak to the type of student who enrolls at either institution.

The results from this study provide evidence that students identify with varying levels of online task complexity in a threaded discussion. Beyond that is evidence of a positive significant relationship to student perceived sense of community. Participants who reported the higher levels of task complexity were those who felt the discussions contained numerous posts that included a level of analysis and synthesis of the material. Participants 36 years of

age and older reported information with no significant effect on task complexity when considering overall perceived sense of community. This is an extremely important implication concerning research of task complexity and non-traditional students as non-traditional students are considered older.

As participants younger than 36 years of age associated themselves with the higher levels, their overall perceived sense of community increased. These instances support the largest research study by Waltonen-Moore et al., professing that online task complexity happens, can be measured, and matters in the online threaded discussion forums (2005). This also confirms an effect on overall sense of community. This could implicate level of task complexity affecting other parts of online classrooms. This research lends itself to support new theoretical approaches examining discussion forums in hybrid courses.

Age

The review of literature suggested that a number of student demographics should be measured or controlled for in this study. The main purpose behind the literature was to address any possible interaction effects. In addition to group level, as age of participant increased so did student perceived sense of community. In the models designed after evaluation of any interaction effects, younger participants presented a stronger significant relationship of group level on sense of community. That is to say that younger students had a stronger positive relationship as group level increased and the sense of community increased. This was much stronger than that of older students, so an important interaction effect was identified.

The general results show a normal distribution of ages at both surveyed institutions. The largest percentage of a given age range was with the students of 36 - 45 years of age.

Based on conversations with both institutions, this was expected to be representative of the population.

Research on age determined that in the past there may have been an assumption that older adults would be on the less capable end of using technology such as that employed in an online classroom. On the opposite side, younger students may excel in online classrooms due to their frequent and constant access to newer, more capable technologies. In this study it was confirmed that age should have been measured as it has a relationship to sense of community as well as interaction with perceived levels of task complexity. The interesting result is that there was an unexpected effect. As age in the online threaded discussion increased, so did sense of community. This confirms that difference in age had an effect; however, it was the opposite effect that may be assumed if older students in previous research are less capable of functioning in an online classroom. Implications for theories pertaining to younger students shows that although this demographic may have more eagerness and frequent access to technology, this may not have any influence on their overall perceived sense of community or other non-technical variables within an online course offered at the university level. For the older students, it could very well imply that lack of skill requires more attention to the other factors in an online course, pushing older students to pay closer attention and engage more in activities that relate to overall sense of community.

A very important implication concerning age is the research connected to traditional and non-traditional students. The non-traditional student is generally considered older in age. Are students actively seeking a sense of community as they age? Is sense of community more of a priority after gaining specific life experiences? Is a desire to be in a group of people with similar interests something that happens as a student grows older? This research study

supports the idea that a difference in age does affect overall student-perceived sense of community that has already been determined as an extremely important piece of the learning process.

Gender

The general results show many more female participants at both surveyed institutions. Based on conversations with both institutions, this was expected to be representative of the population.

The review of literature strongly suggested that gender could play a very significant role in a research study where sense of community is considered. This particular research suggested the opposite. Even when checking additional intervals for possible interactions, no gender issues arose. This suggests that theories of gender effects may not be generalized to online threaded discussion forums or online classes in general. This may be due to the lack of visual gender identification that is readily available in a traditional classroom. It may also be shaded by the influx of many unisex names. There may not be any difference, or students may not perceive a gender difference if they are not completely presented with absolute visual or printed verification of participant gender.

SES

The general results show that the largest percentage was with the students making $25,000-$50,000 annually. Based on conversations with both institutions, this was expected to be representative of the population. It was interesting to note that 10% of the sample currently obtains over $100,000 annually, which is more than double the annual income of the majority of participants. This brings up an interesting discussion of the specific discipline these higher income students are currently studying or their motives for being enrolled.

Levels of SES have been found to provide a difference in past research studies. More specifically, the lower income levels could mean less access to resources, thereby creating some sort of interaction effect among groups of participants. According to the path analysis presented, no such difference was found. This implies that this divide may not apply in the virtual world of online threaded discussions. As posts and responses are asynchronous, students of all income levels can invest more time into writing style and grammar. This eliminates access issues as all participants have access to the same tools when creating posts. It may indicate that verification of differing SES levels in the online arena is eliminated or at least difficult.

Postsecondary Level

The general results provide more participants in the undergraduate level, but both are representative of the population. Based on conversations with both institutions, this was expected to be representative of the population. Both schools have more undergraduate students than graduate students.

The role and ultimate goals of graduate students may differ from those of undergraduate students, thus creating possible issues when measuring for overall student perceived sense of community. This study provided support to the current body of literature and theories that there are significant implications when considering student postsecondary level. This specifically pertains to sense of community in the asynchronous environment. With statistically significant regression weights, the findings of this study provide that postsecondary level has a small negative significant relationship to student perceived sense of community. As with age, this presents interesting implications for theory. This shows that as

students move from undergraduate status to that of graduate, they actually find lower reported perceptions of sense of community in an online threaded discussion.

Implications for theory as it pertains to postsecondary level are extremely interesting. Research provides that a difference exists with the different student status. Knowing this, one may assume that graduate students are more engaged and should easily associate themselves with high levels of sense of community. On the other hand, graduate students may come to an online class with differences from those of an undergraduate student. Graduate student goal differences for obtaining a degree in this format may be different. If those play a role in the student-perceived sense of community, it could add a negative opinion to the graduate student. Then the end of the course could very well encounter diminished levels of perceived sense of community. On the opposite side, the undergraduate student may have fewer expectations or desires in an online threaded discussion, thereby making the perception of overall student sense of perceived community much more attainable and recognized.

In addition to goal differences, it is possible that a socialization issue is also present. In a traditional four-year university, the undergraduate students are thrown into orientation activities and social functions at any given time. This increases a desire for students to be in role-alike groups and indicates that peer bonding is something to be desired. Traditional graduate students do not encounter this same process of socialization. It may be that schools assume that graduate students will seek and achieve community through group interactions as happened at the undergraduate level. Schools may not even consider that community may matter, or should matter, to graduate level students. This is important to current research studies focusing on the orientation process of graduate students.

Comfort Level

The general results indicate that the majority of participants were very comfortable navigating and functioning with the course management software. This may very well represent the entire population, but as neither institution collects that specific piece of data, the information is not currently available. This is interesting if those institutions may be providing ways to develop students with training prior to entering the online classroom. This may also speak to the type of student who enrolls at either institution if they come to the online classroom with the necessary skills or desire to function and navigate well within the software provided.

Comfort level in navigating and functioning in an online course could have presented an issue based on the literature. Some researchers found this to be a problem, where others did not. This specific study confirms the previous research that comfort level was not an issue. It did not have any significant effect on student perceived overall sense of community. This creates some interesting implications for theorists who promote pre-course orientations or training with course management systems to eliminate comfort issues. If no issues were found in this study, those theorists may need to adapt their findings.

Race/Ethnicity

As race/ethnicity was not normally distributed, it was dropped from the structural model calculations. However, this demographic should not be dropped from considerations for practice. Literature shows that there could be an impact of race/ethnicity (Harvard, 1997). This study primarily drew information from one specific ethnic group and did not affirm or dissuade any theories that ethnic groups may be more communal by nature. Although this study did not find statistical significance of race/ethnicity on overall perceived sense of

community, the research should not be discounted. The non-significance was due to non-normality instead of an actual negative finding. In doing so, this study actually sheds some light on previous research that more study is needed with underrepresented groups.

In addition to a review of race/ethnicity of participant, it may be beneficial to understand if there is a difference with native-born or foreign-born participants. These groups would further provide information on race/ethnicity in a global sense. Other implications with this demographic could be that schools for specific populations may make a difference if the study is recreated. It may confirm the current research that those groups would in fact be significant with sense of community when the variable is normally distributed.

Motivation Type

The descriptive results were unexpected, as most students reported high levels of power motivation. In this study of 229 participants, it was revealed that over 70% of the students reported a moderately high motivation type of power. This was a much greater percentage than achievement or affiliation. Speculation may cause one to rethink the goals and objectives of each student. As economic times have changed, the goal of students may be much more power-oriented. Theories on participant motivation may need to be reexamined to better understand the external forces shaping students today versus those when the theories and research studies were first conducted.

The second highest type of motivation reported was achievement, which is much more expected based on literature and theory of students attending educational institutions. As it was conducted at educational institutions, one may assume that the participants have higher levels of achievement orientation than of power. The lowest level of motivation was reported as affiliation, which was extremely fascinating. As threaded discussions involve

active participation; it may also have been assumed that an online student had higher levels of affiliation than power. The threaded discussion tool is built to provide interaction and social connections, yet students still reported this highly social type of motivation as their lowest type of core human need.

This may very well represent the entire population, but as neither institution collects those data sets, the information is not currently available. This may also speak to the type of student who enrolls at either institution or those who are recruited. It may also relate to current studies on attrition rates in the early weeks of online courses. As this survey was not deployed until the end of the drop-and-add period, it may have missed a population of students who are important to current research. It should be noted that students with a strong motivation by affiliation may have been enrolled in the surveyed course but withdrew prior to the survey.

Personal student motivation needs are considered important in the review of literature. The type of motivation of a given participant may affect their overall actions, reactions, and perceptions in an online course. This research study did not show any significant relationship of student motivation type on overall sense of community.

Implications for Practice

This research study provides several contributions to the understanding of factors that contribute to student-perceived sense of community in threaded discussions of an online course provided by an institution of higher education. It is clear that this field of online education is allowing colleges to reach students at broader ranges in proximity to college campuses. Students are being exposed more often to the advantages of classes offered via the Internet instead of in a face-to-face, traditional brick-and-mortar, four-walled classroom.

Practitioners should be aware of these findings and what implications it could have on their own teaching and curriculum design practices.

Age

Age has proven to be a significant factor in student-perceived sense of community in threaded discussions. It also has proven to be significant when age is divided into groups. This is a wonderful knowledge for instructors of online courses, especially those who require repeated use of the threaded discussion tool. Instructors and instructional designers will want to be very aware of how they word posted discussion questions. It may be beneficial simply to survey the students at the beginning of the class to see if there is any age gap as no immediate visual representation of age happens in a completely online course. It may be appropriate to ask for self-disclosure in an introductory threaded discussion. A teacher may not specifically ask for age to be provided but could ask a question that allows the teacher to infer the general age range of the students in that given class.

On top of seeking out specific age information, a teacher will want to carefully examine the verbiage used in the actual threaded discussion forum. It should use terms and definitions that are familiar to all age groups or would be equally straightforward for any age student to comprehend what is being asked. If a specific term is used, and this term is necessary for content purposes, the instructor may want to provide further definition or explanation to accommodate the needs of the age range of students participating in that specific threaded discussion.

Instructors will also want to make sure that responses from young and older age groups will produce opportunities for the anticipated learning outcomes with each age group. This may require the instructor to specifically ask the participants to provide relevant

personal experience information in the required responses. This will also provide context clues to the instructor about age of students in the discussion forum as well as obtain a better understanding of the ability to connect practical experience with synthesis of material. The large, overarching assumption is that knowing that the audience will react in different ways matters when compiling the assessment plan.

Postsecondary Level

Postsecondary level having an effect on overall sense of community is extremely valuable to teachers in online courses that use the threaded discussion tool. Understanding the demographic of students and how likely they are to report a high perception of sense of community could affect practice. Each instructor or curriculum designer should think carefully about each task and the set of expectations prior to its beginning. In addition to this, instructors who teach classes with students of both undergraduate and graduate status may want to better define expectations at the beginning of tasks. This provides a common understanding of what each classmate is to provide and expect to be provided.

It may also be appropriate to plan a discussion forum asking the entire class to develop a plan to conduct for individual participation and management of the specific course. Instructors may even want to incorporate the opinions and views of graduate students in the assessment process. The external forces and life experience driving the persistence of each graduate student may prove to be essential in overall participation and eventual sense of community with this specific group. These tactics will draw out the goal differences that exist among graduate students and help provide the instructor to possibly assess the initial desire for community for each student.

Other Student Demographics

No specific significance was found with gender, income, student motivation, and comfort level. Is it still appropriate to consider those demographics in the design of threaded discussion forums? It may be beneficial for those involved in curriculum development to keep an open mind with planning. Assessment planning could benefit instructors who are aware that some literature suggests that a difference could be presented between these groups of students. It may be beneficial to develop threaded discussions specifically for women or men and let the groups view the responses for comparison. It may be an interesting practice to consider the level of comfort a student has when specific tasks in an online course are to be completed. Those with higher levels of skill or comfort might be best placed toward the end of an online course when students have had more time to increase their level of comfort. In general, discovering the motivations for each student may help the instructor in classes that are shorter than the traditional semester calendar. It could provide some insight to the class for the instructor.

Task Complexity

Task complexity in an online threaded discussion plays an important role in the overall perception of student sense of community for students under 36 years old. Posing questions in an online threaded discussion forum that encourage that highest level of task complexity can be a difficult to achieve. Some online instructors may not even consider this topic at the moment. Based on this research study, it is also extremely important that instructors devote time and thought to this process. When posing a question, the instructor should consider if a given question will push students to provide responses that include course content, personal opinion, openness, application of concepts, and the synthesis of

material. The instructor should also consider if these factors will happen when a student replies in a given threaded discussion forum. The questions should also promote students to create numerous reply threads.

Practitioners should also use this information for threaded discussion rubric development, considering assessment techniques, and faculty training of online threaded discussion forums to improve instruction. If specific attention is paid to providing guidelines to encourage high level of task complexity, the students younger than 36 years of age will report a greater sense of community. The rubric should guide students to provide responses that include course content, personal opinion, openness, application of concepts, and the synthesis of material as well as numerous response posts. In addition, this may help the creation of more measureable levels of development for groups.

Social Ability

In this study, social ability proved to have a great significance to overall perceived sense of community, or the place where learning occurs. This suggests that practitioners truly have to be considerate of the task, providing students a way to feel present and easily navigate amongst each other. Students who present high levels of social ability reported very low levels of sense of community. These socially able students could enter the online threaded discussion forum and expect a level of participation or ability from the other members of the course. If those expectations are not met, a highly socially able student may get frustrated; and that leads to the overall low sense of community.

The instructor should attempt to create an environment that is consistently underlined by activities, language, and opportunities to foster social ability within the class dynamic. This could include team curriculum development, reassessing assignment descriptions and

rubrics, or even researching current trends in online course development for tools specifically related to fostering this ability.

With the threaded discussion tool for assessment, it would be appropriate for an instructor to pose questions to small groups of students. This would force interaction by all parties, and the more socially able students could get more in depth introductory and response posts. It may also be a place where the highly socially able student could have a leadership role. The instructor could assign student discussion moderators to engage other students and push the discussion forward.

However, the threaded discussion tool may not be the only ideal place for students who report high levels of social ability. These are students who can be immediate and attentive within the computer-mediated environment. Teachers may find it useful to employ other tools for optional use with this specific group of students. Maybe the socially able students would benefit from use of a blog or journal area. This space could be private and used between the teacher and student or simply for the student to use for personal gain. Above and beyond use of other tools, teachers might find the use of offline activities to help engage the students with high levels of social ability. This could be an interaction with the instructor based on course content. It could be using an outside social networking application. The idea is that the teacher could provide highly socially able students with an outlet to fulfill any expectations of the class that would help increase overall reported sense of community within this group.

Educational Leadership

This study provides great insight into student level interactions in online courses that utilize the threaded discussion tool. It lends itself to great ideas for future research and

modifications to current practice. This study is also applicable to educational leadership

programs offered at institutions of higher education. Colleges and universities that hold

online and hybrid courses in educational leadership will benefit from this study through an

increased understanding of what factors affect the sense of community. Tying the research in

the online threaded discussion to student needs and persistence could prove extremely

valuable for market research, affinity by students, and retention, which is a cost benefit to the

institutions as a whole.

This study certainly provides an avenue for discussion on technology pedagogy. This

concept moves beyond traditional pedagogical discussions to incorporate active discussion

that relates to this widespread increase of online courses. This discussion may also interest

faculty who have been previously against the use of threaded discussion forums or even

faculty who have resisted online courses as a whole. Seeing the findings rooted in research

with implications for practice can help engage that resistant faculty in further discussion and

ultimately acceptance of this form of education. Gaining acceptance from faculty may also

connect to university-wide acceptance at a level more in depth than one related to marketing

and financial gain.

Suggestions for Future Research

Studies may be done to examine the effects of community on retention, satisfaction

levels, and attrition. There are few research studies that move farther back to explore the

factors that may affect or impact that overall student sense of community, let alone those that

affect the perceived sense of community in a class offered through the online modality. As

this study had its inherent delimitations, more research should be conducted to explore

possible replication of this study with fewer limits or challenges. The body of literature can

always be expanded to confirm the current research and provide new avenues for discovery. This is necessary as the education world is getting closer with huge leaps in technological advances to allow education to reach the masses.

While this study covered many variables that are relevant to student-perceived sense of community in online courses at small private universities in Michigan, there are others that were not included in the study due to the access or data limitations. These variables include, but are not limited to, a wide variability in race/ethnicity of student participants, larger sample size, any possible teacher demographics, and exposure to extremely negative and positive attitudes about online courses.

This research provides a clear avenue to suggest that more studies must be conducted on those factors having significant relationships with this extremely researched and documented topic of sense of community. This is especially important to those places where traditional non-verbal cues are prevalent. Further studies are needed to assemble the following information or goals. Examples of these suggestions for future research are as follows:

1. Conduct studies for scholarly opportunities to collect data that allows for the discovery of the variables not provided in this study due to data or access limitations using the similar framework of structural equation path analysis model. These possible future studies may provide a better picture of the factors that can affect sense of community in other institutions. Examples of these possible variables include attendance and participation levels. This also may include type and use of rubrics or other online assessments used in the classroom. Additional possible variables are specific academic discipline, institutional culture, and technology training of students

prior to class.

2. Conduct further studies that include rubric development, assessment techniques, and training for assessment of online threaded discussion forums to improve instruction. This may help the creation of more measureable levels of academic achievement or assurance that groups reach the highest levels of online task complexity in threaded discussion forums.

3. Determine the responsibility or role of facilitator in college-level threaded discussion forums for any implications to student sense of community. This could explore interaction, participation, or lack thereof on the role of facilitator. This could also include the student perception of the facilitator

4. Examine any restructuring of online programs or course designs that implicate increased or diminished use of the threaded discussion tool.

5. Research studies that explore non-instructional variables related to threaded discussion forums. Examples include current economic shifts that may change attitudes for enrollment and student specific non-academic goals.

6. Explore the transmission of institutional culture. This could include level of student preparedness as required by the organizational structure of a given college or university prior to beginning a course offered completely online that utilizes the threaded discussion tool.

7. Study the overall levels of community and motivation for a specific student. It could even spill over to those aspects from the instructor's point of view.

Conclusions

This study has significance for students, faculty, and course designers at the

university level. Teachers are informed regarding factors that can affect a student's perceived sense of community within the online class setting. This creates a chance to provide an online instructor with information that can be vital to student participation and aspects to consider when creating or assessing threaded discussions. This study also helps those who are part of the instructional design process to gain more knowledge for the same purposes or even with faculty training. The evidence can lead designers and curriculum experts to develop "best practices" rooted in theory and quantitative analysis for online learning as they relate to use of the threaded discussion tool.

The current body of knowledge describing the importance of "sense of community" in classrooms is broadened as it provides insight into those factors that can have a significant relationship to how a student perceives a personal level of community amongst peers in an online course. This all suggests further research is needed to solidify findings and expand the research to more variables for colleges and universities to become better equipped in providing high quality online courses to the broad range of students who are now able to access education via the computer.

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Appendices

Appendix A: Pilot Study

In order to present a solid survey for research on overall sense of community in an online classroom, a pilot study was conducted. Participants were asked for voluntary participation to preview the survey located in Appendix B. All participants had experience taking at least one online class that used the threaded discussion tool.

A total of 30 participants completed the pilot study. They had each taken at least one online course offered at an institution of higher education within the last three years. Each had varying experiences using the threaded discussion tool. Each participant was given the survey using two different third party survey managers. Each was asked of his or her preference in survey managers based on ease of use. Beyond that each participant was asked to note any unclear statements, verbiage, and other phrases that may not directly comply with their experiences.

Reports concluded that SurveyGizmo was the most appropriate third party survey manager for use in this research study. In addition no major edits were made to the overall survey provided in Appendix B. Only typos and errors in grammar were adjusted in the actual text of the survey.

Appendix B: Figures
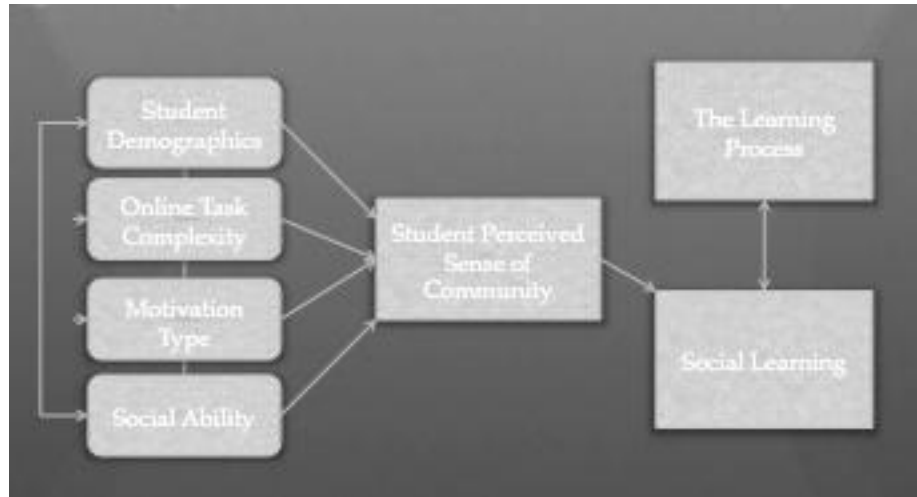
Figure 1. Concept map
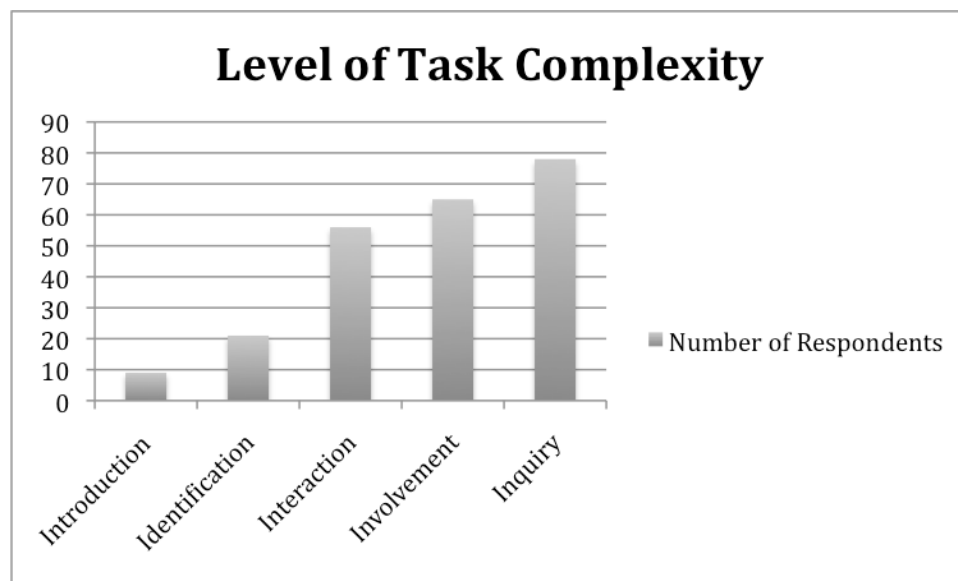
Figure 2. Level of task complexity reported by respondents

Figure 3. Structural equation path model of online student characteristics affect on overall

student sense of community.
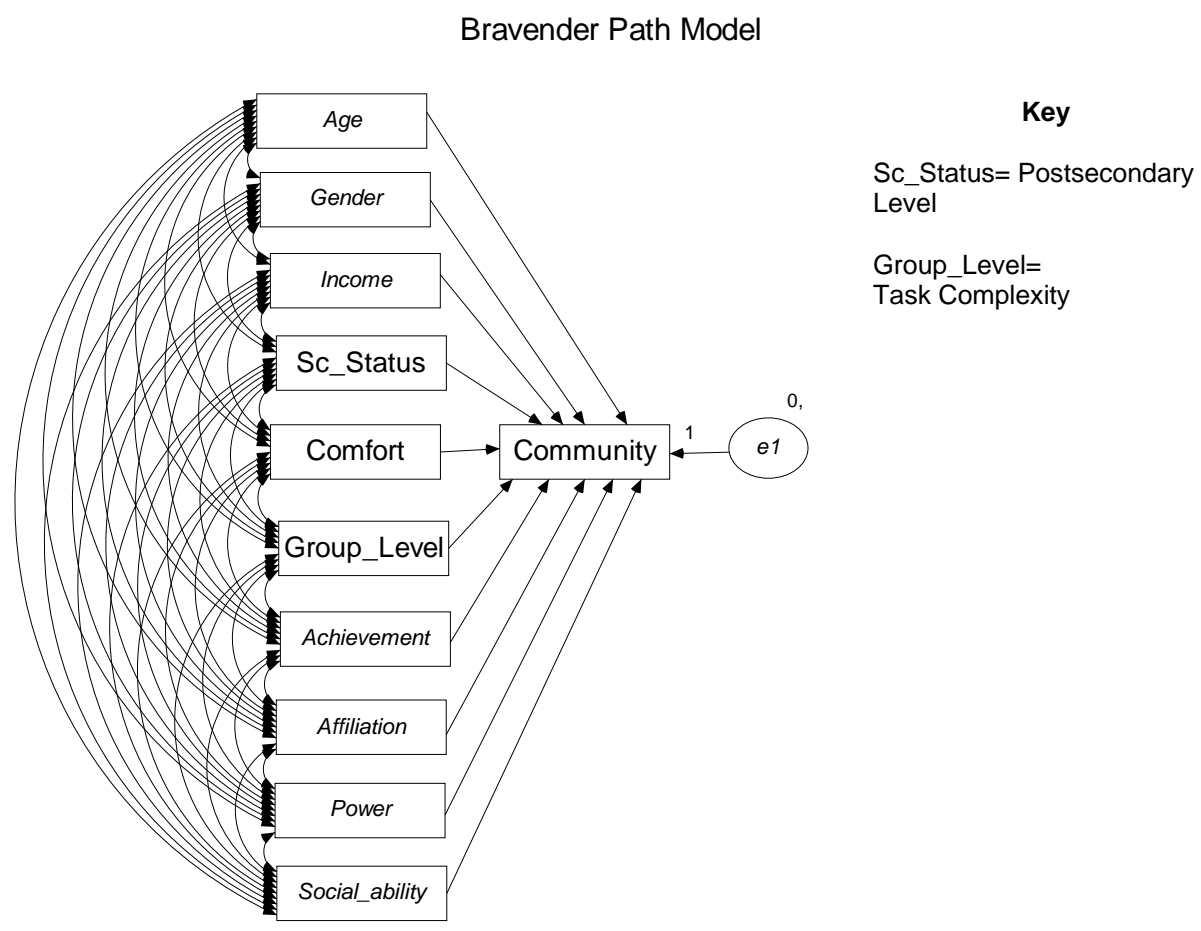
Figure 4. Hypothesized Bravender path model.

Bravender Path Model

Figure 5. Revised Bravender path model
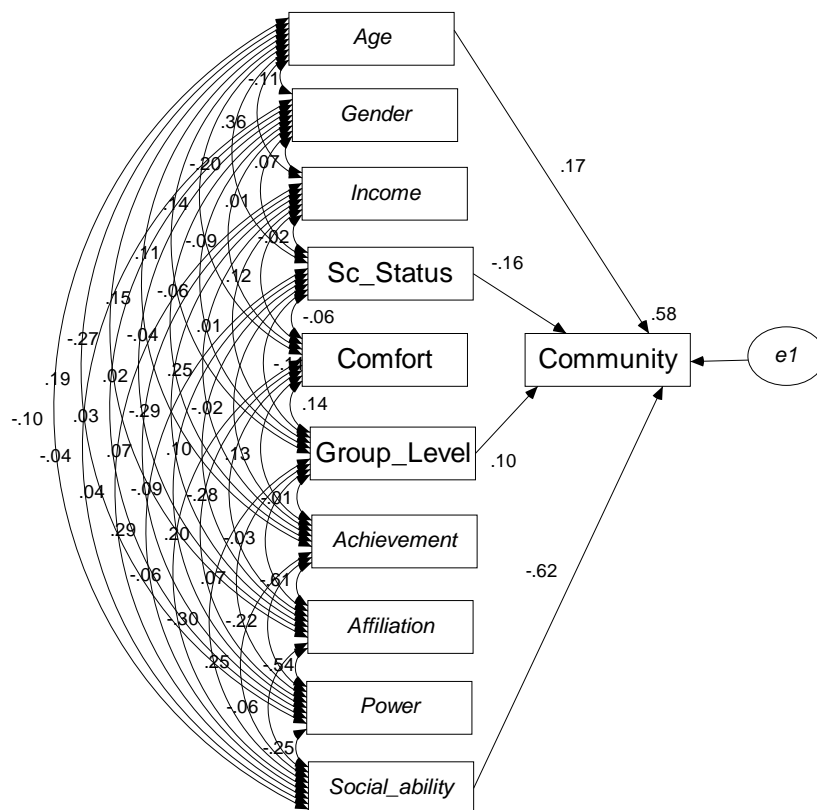
Figure 6. Revised Bravender path model visual output with calculations

High Age Model
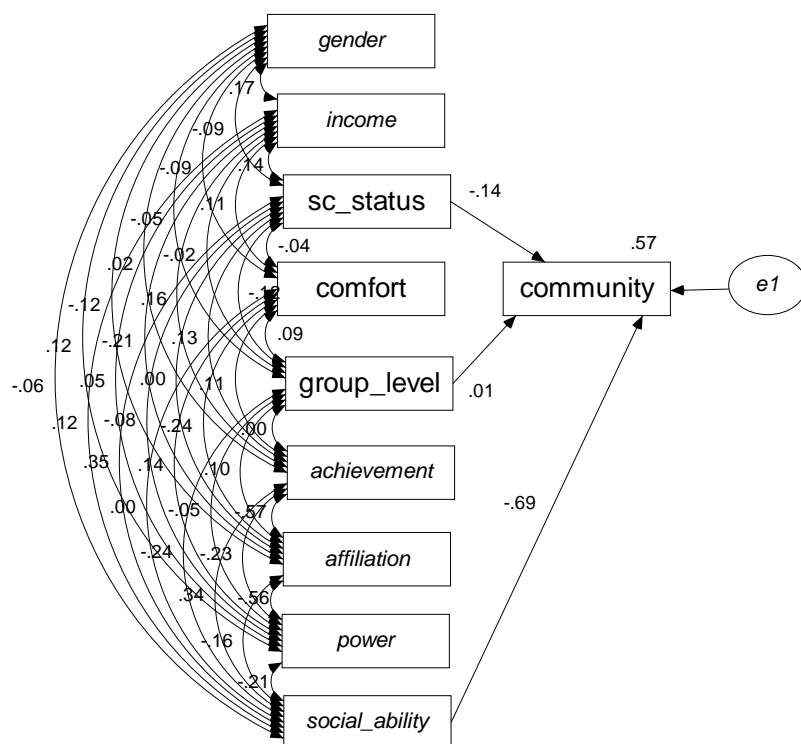
Figure 7. High age path model
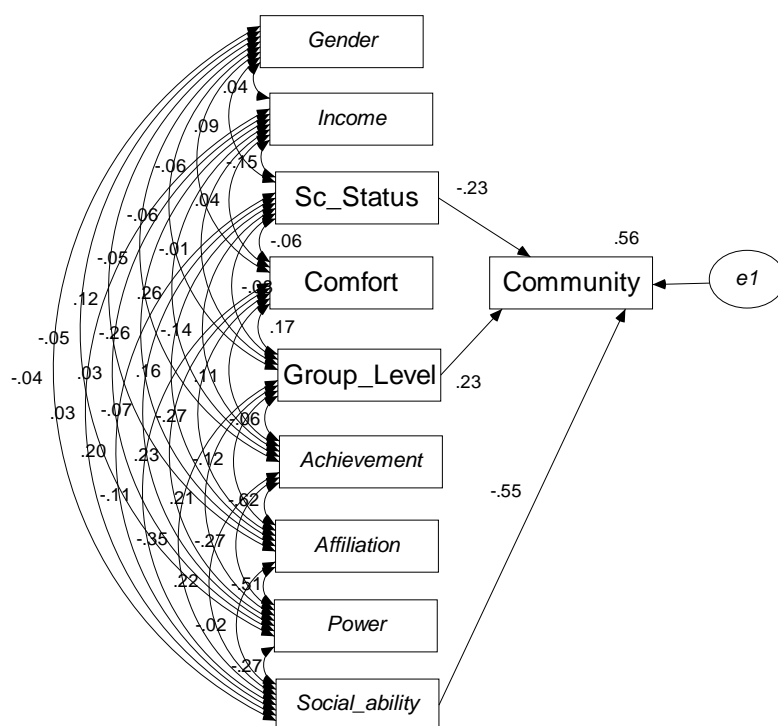
Low Age Model

Figure 8. Low age path model

Appendix C: Tables

Table 1
List of student demographic and task complexity questions

Student Demographics						
What is your gender?	Male	Female				
What is your race/ethnicity/race/ethnicity?	African American	Asian	Caucasian/White	Latin American	Native American	Other
What is your age?	18-25	26-35	36-45	46-55	56-64	64 + above
What is your household income?	Less than $25,000	$25,000-$50,000	$50,000-$75,000	$75,000-$100,000	More than $100,000	Prefer not to answer
What is your current level in school?	Undergraduate Student	Graduate Student				

	No replies to other students or the instructor	Read the posts of other students or instructor without replying to any posts.	Typically reply once to a post of a specific classmate.	Reply once to posts of many classmates	Posting numerous reply threads to multiple students in response to their posts.
Think about your overall experience with threaded discussions in the last online course in which you participated. Which item in each row most depicts your experience in the threaded discussion section of your online course?	Content of posts did not reflect the course material. Posts referenced feelings of enthusiasm or frustration.	Content of posts directly referenced course material (textbook, supplemental materials).	Posts included course content as well as personal experiences that related to the course content.	Posts included course content and sought guidance and opinions from other classmates. Atmosphere was one of trust, comfort, and respect.	Posts included course content items and sought the opinions of other classmates in regards to specific course material.
	Messages were stated in first person. (I, My, Me) Disclosure of information included items about personal/professional backgrounds.	Connections were made with other the instructor and/or other classmates. Language sounded inclusive. (Like the rest of you)	Tentative rapport was developed with classmates.	Interaction with classmates was interactive, cooperative, collaborative, and cohesive. Appreciation was expressed.	Discussions are balanced with active give-and-take among classmates.
	Expectations by classmates were expressed in posts.	Classmates expressed thoughts or feelings that seemed to be acknowledged by others.	Posts expressed self-imposed goals for learning.	Knowledge and comprehension was expressed with concepts and questions about the course material.	Posts showed a level of analysis and synthesis of the material. Posts seemed guided by a desire to apply learning to real life situations.
What is your level of comfort navigating and functioning within the	Very Comfortable 1	2	3	4	Not Comfortable at all 5

online
course?

Table 2
Social Ability Instrument questionnaire

	Not True						Very True
1. The online interaction among participants (instructor, mentors & students) seemed personal	1	2	3	4	5	6	7
2. When I logged on I was interested in seeing what others were doing or had done	1	2	3	4	5	6	7
3. My interactions with the instructor and mentors were sociable	1	2	3	4	5	6	7
4. My interactions with other students were sociable	1	2	3	4	5	6	7
5. The actions of the others (instructor, mentors & students) in the course were easily visible in our online system	1	2	3	4	5	6	7
6. I felt comfortable participating in the online group activities	1	2	3	4	5	6	7
7. I trust others in this course	1	2	3	4	5	6	7
8. I felt comfortable expressing my feelings during this past week activities	1	2	3	4	5	6	7
9. I feel connected to others in this course	1	2	3	4	5	6	7
10. I felt like I was a member of a group during the course activities	1	2	3	4	5	6	7
11. Actions by other members of the course usually influenced me to do further work	1	2	3	4	5	6	7
12. Knowing that other members of the course were aware of my work influenced the frequency and/or quality of my work	1	2	3	4	5	6	7
13. Knowing what other members of the course did helped me know what to do	1	2	3	4	5	6	7
14. The actions of the instructor or mentors in the course influenced the quality of my work	1	2	3	4	5	6	7
15. The actions of other fellow students in the course influenced the quality of my work	1	2	3	4	5	6	7
16. I was concerned that the group activity threatened my ability to do well on the assignment	1	2	3	4	5	6	7
17. Interacting with the instructor or mentor helped me accomplish assignments with higher quality than if I were working alone	1	2	3	4	5	6	7
18. Interacting with classmates helped me accomplish assignments with higher quality than if I were working alone during this online course	1	2	3	4	5	6	7

19. Group activities help me learn more efficiently than if I were working alone	1		2	3	4	5	6		7
20. The ways people interacted in the course was a good fit for the way I like to learn	1		2	3	4	5	6		7

Table 3

Personal Inventory of Needs questions

Question #	Response Options		
1	People need to know their strengths and weaknesses and need frequent feedback about how they are doing.	Good teachers realize that success depends on their ability to develop close personal relationships with their students.	An effective teacher inspires students to be good followers since success depends heavily on this.
2	One way to destroy a-student's motivation is to add or remove members of his/her work group.	It is more important to be a strong teacher, effective at influencing students, than to be popular with them at all times.	I don't enjoy engaging in situations where I have little or no control over the outcome.
3	It is more important to have congenial fellow students than to have a say in setting work goals and performance standards.	When students lose interest in their work, it is often because they lack clearly defined, challenging goals.	It is very satisfying to give students assignments and then teach them how to do complete their work.
4	I like to argue for my point of view, even when others attack it.	Feeling liked and wanted by others is one of the greatest rewards of being a good student.	Students want to know what goals and standards they are expected to achieve, and what the consequences are.
5	I don't get enough feedback on how well I am accomplishing my goals.	A good teacher enjoys training and coaching students, since this helps to improve performance.	During a performance appraisal, I'm more interested in knowing how the teacher feels toward me than I am in discussing what I've done right or wrong.
6	For a teacher to compromise with students is dangerous because it leads to loss of authority.	The effective teacher has high standards and encourages students to do better than they thought they could.	If your teacher and your fellow students don't like you and don't enjoy being around you, then it is impossible to be effective.
7	People like to try new and different classes rather than to continue doing the same thing.	The greatest thing a student can achieve is to be liked by the teacher and fellow students.	A successful teacher is one who instills a sense of responsibility and respect in students.
8	Being accepted and liked by members of the work group is one of the most important traits of success.	I like to be looked up to, asked for my opinion, and regarded by others as a leader.	I like to solve puzzles or problems that other people have difficulty with.

9	If I had a chance to take a better class elsewhere, I would miss the people here and the friendships I've developed.	I get a lot of personal satisfaction from accomplishing things that have not been done before.	The effective leader enjoys being responsible for making decisions.
10	It is the teacher's job to help students grow in confidence, respect, and desire to follow.	A congenial climate and warm relationships are the hallmarks of a well-run organization.	People are anxious to better their performance and to set new standards of achievement.
11	It is important for me to be successful in whatever I undertake; I do not like to lose at anything.	If I were to have some of my authority taken away, I would love face and might very well dropout.	Successful students are characterized by their ability to build strong interpersonal relationships with other students.
12	I enjoy working in clubs and groups where I can help people formulate goals and give them leadership.	I enjoy meeting difficult challenges and then setting even more difficult ones to achieve.	I would be very unhappy in a school where I was not working alongside persons whose friendship I value.
13	To me a goal is not challenging unless there is some question as to whether or not it can be met.	The school should have more outings and social activities so that we can get to know one another better.	The greatest authority one can have is the authority of competence; it often makes a person more effective than the teacher.
14	There are many people enrolled here whose friendship I value very much.	In any organization, there is an informal organization chart of people who are the real ones who get things done.	I can accomplish a lot on my own and do not like to be held back by team efforts or collaboration.
15	If I were acknowledged over the students I now work with, I would be very concerned that their feelings toward me might change.	If my education here began to lose challenge and become routine, I might begin to look elsewhere.	Although much that I accomplish is done without credit or recognition, I enjoy knowing how much impact I had on the results.
16	People need to know their strengths and weaknesses and need frequent feedback on how they are doing.	Feeling liked and wanted is one of the most satisfying rewards of being a good teacher.	A successful teacher is one who instills a sense of responsibility and respect in students.
17	The productivity of a work group depends heavily on having members who get along well with one another.	A good teacher knows when to persuade and when to give orders, since both are useful in influencing students.	I like to solve puzzles or problems that other people have difficulty with.
18	It is more important to have congenial fellow students than to have a say in setting work goals and	The effective teacher has high standards and encourages students to do better than they thought they could.	The effective leader enjoys being responsible for making decisions and influencing others to go along with them.

performance standards.

| 19 | I like to argue for better ways of doing things, and to persuade others to improve. | The greatest thing a student can achieve is to be liked by the teacher and fellow students. | People are anxious to better their performance and to set new standards of achievement. |
| 20 | I would like to get more feedback than I now have on how well I am accomplishing my goals. | I like to be looked up to, asked for my opinion, and regarded as someone who can influence others. | Successful students are characterized by their ability to build strong interpersonal relationships with others. |

Table 4
Personal Inventory of Needs scoring key

Question #	POW= Power	ACH= Achievement	AFF= Affiliation
1	ACH	AFF	POW
2	AFF	POW	ACH
3	AFF	ACH	POW
4	POW	AFF	ACH
5	ACH	POW	AFF
6	POW	ACH	AFF
7	ACH	AFF	POW
8	AFF	POW	ACH
9	AFF	ACH	POW
10	POW	AFF	ACH
11	ACH	POW	AFF
12	POW	ACH	AFF
13	ACH	AFF	POW
14	AFF	POW	ACH
15	AFF	ACH	POW
16	ACH	AFF	POW
17	AFF	POW	ACH
18	AFF	ACH	POW
19	POW	AFF	ACH
20	ACH	POW	AFF

PERSONAL INVENTORY OF NEEDS

A Self-Assessment Exercise
This exercise is designed to give you insights into your personality and how your needs influence your motivation. The next two pages contain 20 sets of statements. In each set of three statements, you are to decide which one you **most** agree with, which you **next most** agree with, and which you **least** agree with. Place a number in the box preceding each statement to indicate your extent of agreement, as follows:

3—you **most** agree with the statement.
2—you **next most** agree with the statement.
1—you **least** agree with the statement.

You will probably find it easiest to read the three statements first. Select the statements you **most** and **least** agree with and enter a 3 and a 1. The remaining statement then receives the 2. You will be entering your responses in the boxes in front of the statements.

After you've entered a number in all 60 boxes, turn to the following page and score yourself. Another section titled **Scoring and Interpretation** will help you to analyze your scores and gain insights into your needs and how they influence your motivation and your behavior.

PERSONAL INVENTORY OF NEEDS

Interpreting Your Scores

Now that you've completed the Personal Inventory of Needs, you are ready to interpret the results. This exercise is based on three needs that exist in each of us and that have a strong bearing on our effectiveness and our happiness at work: the need to achieve ("ach"), the need to affiliate ("aff"), and the need for power ("pow"). These needs are explained in the pages that follow.

Each of the 20 sets of statements contained three items—an "ach" statement, an "aff" statement, and a "pow" statement. On your Answer Sheet, the word "ach," "aff," or "pow" appears beside each box. To score your responses, follow the procedure described below.

1 Begin with the "ach" boxes, and add up the numbers that you recorded in the 20 "ach" boxes. Enter this total in the big "ach" box at the bottom of the page.

2 Repeat Step 1 for the 20 "aff" boxes and enter your total score in the "aff" box at the bottom of the page. Then do the same for your 20 "pow" responses.

3 If you have added correctly and have not omitted any responses, your three scores in the boxes at the bottom of the page should total 120 when added together. That is, you assigned one 3, one 2, and one 1 (for a total of 6) to each set of statements. And 20 sets times 6 points for each comes to 120.

4 If your total does not add up to 120 points, repeat steps 1–3. However, we suggest that you circle the word to the right of each box as you add the scores. By so doing, if your total in Step 3 falls short of 120, you can see if you omitted any scores.

What does each score mean? The highest possible score (strongest possible need) is 60 and the lowest possible score (weakest possible need) is 20. Thus, the relative strength of each of these three needs as they affect you is determined by where your score falls in the range between 20 and 60. If all three needs were the same strength, you would have a score of 40 on each. A score between 40 and 60 is thus above average, while a score between 20 and 40 is below average.

Obviously, the question "what is a good score?" is irrelevant. Different types of jobs, assignments, and organizations draw on different needs. You and your manager are in the best position to interpret the needs of your present job and assignment, and to discuss future assignments in light of the insights obtained from this Personal Inventory of Needs. If you plan to share your scores with your manager (spouse, close friend, etc.), then we suggest that both of you read the pages that follow.

Table 5
Classroom Community Scale items and responses

Classroom Community Scale	Strongly Agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly Disagree (SD)
I feel that students in this course care about each other	(SA)	(A)	(N)	(D)	(SD)
I feel that I am encouraged to ask questions	(SA)	(A)	(N)	(D)	(SD)
I feel connected to others in this course	(SA)	(A)	(N)	(D)	(SD)
I feel that it is hard to get help when I have a question	(SA)	(A)	(N)	(D)	(SD)
I do not feel a spirit of community	(SA)	(A)	(N)	(D)	(SD)
I feel that I receive timely feedback	(SA)	(A)	(N)	(D)	(SD)
I feel that this course is like a family	(SA)	(A)	(N)	(D)	(SD)
I feel uneasy exposing gaps in my understanding	(SA)	(A)	(N)	(D)	(SD)
I feel isolated in this course	(SA)	(A)	(N)	(D)	(SD)
I feel reluctant to speak openly	(SA)	(A)	(N)	(D)	(SD)
I trust others in this course	(SA)	(A)	(N)	(D)	(SD)
I feel that this course results in only modest learning	(SA)	(A)	(N)	(D)	(SD)
I feel that I can rely on others in this course	(SA)	(A)	(N)	(D)	(SD)
I feel that other students do not help me learn	(SA)	(A)	(N)	(D)	(SD)
I feel that members of this course depend on me	(SA)	(A)	(N)	(D)	(SD)
I feel that I am given ample opportunities to learn	(SA)	(A)	(N)	(D)	(SD)
I feel uncertain about others in this course	(SA)	(A)	(N)	(D)	(SD)
I feel that my educational needs are not being met	(SA)	(A)	(N)	(D)	(SD)

I feel confident that others will support me	(SA)	(A)	(N)	(D)	(SD)
I feel that this course does not promote a desire to learn	(SA)	(A)	(N)	(D)	(SD)

Scoring Key – Classroom Community Scale

Overall CCS Raw Score

CCS raw scores vary from a maximum of 80 to a minimum of zero. Interpret higher CCS scores as a stronger sense of classroom community.

Score the test instrument items as follows:

For items: 1, 2, 3, 6, 7, 11, 13, 15, 16, 19
Weights: Strongly Agree = 4, Agree = 3, Neutral = 2, Disagree = 1, Strongly Disagree = 0

For items: 4, 5, 8, 9, 10, 12, 14, 17, 18, 20
Weights: Strongly Agree = 0, Agree = 1, Neutral = 2, Disagree = 3, Strongly Disagree = 4

Add the weights of all 20 items to obtain the overall CCS score.

CCS Subscale Raw Scores

CCS subscale raw scores vary from a maximum of 40 to a minimum of zero. Calculate CCS subscale scores as follows:

Connectedness Add the weights of odd items: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

Learning Add the weights of even items: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Table 6
Frequency table of student demographic information

Demographic	Institution A	Institution B	Total
Age			
18-25	33	19	52
26-35	26	24	50
36-45	32	37	69
46-55	22	25	47
56-65	3	6	9
Prefer Not to Answer	1	1	2
Gender			

	Male	45	24	69
	Female	71	88	159
	Prefer Not to Answer	1	0	1
Income				
	Less than $25,000	18	17	35
	$25,000-$50,000	36	29	65
	$50,000-$75,000	22	16	38
	$75,000-$100,000	20	21	41
	Over $100,000	11	13	24
	Prefer Not to Answer	10	16	26
Postsecondary level				
	Undergraduate	81	56	137
	Graduate	36	56	92
Comfort Level				
	1 Very Comfortable	69	56	125
	2	3	2	5
	3	16	16	32
	4	23	30	53
	5 Not Comfortable	5	8	13
	Prefer Not to Answer	1	0	1
Race/ethnicity				
	Asian/Pacific Islander	3	4	7
	African American	8	7	15
	Caucasian/White	102	95	197
	Hispanic	3	2	5
	Native American	0	2	2
	Other/Multiracial	0	0	0
	Prefer Not to Answer	1	0	1

Table 7

Frequency table of participant motivation information

Motivation Type	Between 20-30	31-40	41-50	51-60
Achievement	1	59	151	18
Affiliation	88	123	16	2
Power	0	64	163	2

Table 8

Factor Analysis Component Matrix for Social Ability

Component	
SA13	.669
SA18	.714
SA1	.666
SA2	.634

SA3	.672
SA4	.677
SA5	.630
SA6	.695
SA7	.767
SA8	.686
SA9	.836
SA10	.816
SA11	.784
SA12	.727
SA14	.673
SA15	.659
SA17	.655
SA20	.797

Table 9

Frequency table of participant social ability standard deviations

Social Ability	Number of Respondents
Between -2 and -1	41
Between -1 and 0	83
Between 0 and 1	70
Between 1 and 2	22
Between 2 and 3	12
Between 3 and 4	1

Table 10

Frequency table of participant sense of community

	Between 0-20	21-40	41-60	61-80
Level of community	1	52	117	59

Table 11

Hypothesized Bravender path model regression weights

	Estimate	S.E.	C.R.	P
Community <--- Postsecondary level	-4.414	1.257	-3.513	***
Community <--- Task complexity	1.199	.585	2.048	.041
Community <--- Achievement	-.034	.267	-.127	.899
Community <--- Affiliation	-.232	.302	-.767	.443
Community <--- Power	-.070	.345	-.203	.839
Community <--- Social ability	-8.612	.670	-12.847	***

Table 11
Hypothesized Bravender path model regression weights

	Estimate	S.E.	C.R.	P
Community <--- Income	-.051	.432	-.118	.906
Community <--- Gender	-1.628	1.262	-1.290	.197
Community <--- Comfort	-.227	.417	-.544	.586
Community <--- Age	1.786	.552	3.237	.001

Table 12
Standardized regression weights in the path analysis

			Estimate
Community	<---	Postsecondary level	-.160
Community	<---	Task complexity	.092
Community	<---	Achievement	-.012
Community	<---	Affiliation	-.090
Community	<---	Power	-.019
Community	<---	Social ability	-.633
Community	<---	Income	-.006
Community	<---	Gender	-.056
Community	<---	Comfort	-.024
Community	<---	Age	.156

Table 13
Modified Bravender path model regression weights

	Estimate	S.E.	C.R.	P	Label
Community <--- Postsecondary level	-4.566	1.258	-3.629	***	par_1
Community <--- Task complexity	1.238	.585	2.117	.034	par_47
Community <--- Social ability	-8.407	.633	-13.285	***	par_48
Community <--- Age	2.009	.504	3.985	***	par_49

Table 14
Modified standardized regression weights

			Estimate
Community	<---	Postsecondary level	-.165
Community	<---	Task complexity	.095
Community	<---	Social ability	-.618
Community	<---	Age	.175

Table 15
CMIN model chi-square test output

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	71	4.013	6	.675	.669
Saturated model	77	.000	0		
Independence model	22	848.977	55	.000	15.436

Table 16
Hoelter's critical N output

Model	HOELTER .05	HOELTER .01
Default model	716	956
Independence model	20	23

Table 17
Akaike Information Criterion measure

Model	AIC
Default model	146.013
Saturated model	154.000
Independence model	892.977

Table 18
Goodness-of-fit tests comparing the given model with a null or an alternative model

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.995	.957	1.002	1.023	1.000
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 19
Root mean square error of approximation output

Model	RMSEA
Default model	.000
Independence model	.252

Table 20
Regression weights of model considering interaction effects

	Estimate	S.E.	C.R.	P
Community <--- Postsecondary level	-4.507	1.227	-3.673	***
Community <--- Task complexity	4.814	1.479	3.254	.001
Community <--- Social ability	-5.814	3.421	-1.699	.089
Community <--- Age	6.114	2.121	2.883	.004
Community <--- Social ability * gender	1.751	1.238	1.415	.157

Table 20
Regression weights of model considering interaction effects

	Estimate	S.E.	C.R.	P
Community <--- Group *Age	-1.042	.516	-2.020	.043
Community <--- Group * Gender	-.197	.300	-.656	.512
Community <--- SA_School	1.321	1.152	1.147	.251
Community <--- SA_Group	-1.913	.370	-5.166	***

Table 21
Comparison of regression weights and standardized regression weight estimates

		Low Age N= 104	High Age N= 125
Community	Postsecondary level		
	C.R.	-3.404	-2.303
	p	***	.021
	Estimate	-.227	-.144
Community	Task complexity		
	C.R.	3.317	.153
	p	***	.878
	Estimate	.231	.009
Community	Social Ability		
	C.R.	-7.790	-10.766
	p	***	***
	Estimate	-.553	-.691

Table 22
Goodness of fit comparisons for interaction effect models

	CMIN	Hoelter .05	AIC	NFI	CFI	RMSEA
Low Age	8.040	162	140.149*	0.979	0.994	0.057
High Age	3.016	518	132.503*	0.993	1.000	0.000

*Lowest AIC model in goodness test

Table 23
Initial Factor Analysis for Social Ability

	Component			
	1	2	3	4
SA13	.668	.361	.284	-.056
SA18	.727	.342	-.136	-.145

SA19	.558	.275	-.343	-.036
SA1	.656	-.301	.195	.172
SA2	.631	-.134	.086	.005
SA3	.666	-.368	.147	.414
SA4	.670	-.424	.253	.088
SA5	.621	-.319	.078	.246
SA6	.698	-.250	-.275	-.086
SA7	.762	-.244	-.021	-.388
SA8	.686	-.280	-.126	-.227
SA9	.830	-.090	.043	-.248
SA10	.813	-.112	.001	-.199
SA11	.785	.244	.108	-.148
SA12	.722	.327	.303	-.049
SA14	.676	.162	-.213	.510
SA15	.657	.508	.236	.023
SA16	-.165	.095	.745	.083
SA17	.663	.273	-.301	.483
SA20	.806	.061	-.163	-.097

Table 24

Factor Analysis Component Matrix for Community

	Component		
	1	2	3
C10a	.574	.422	-.249
C11a	.659	-.490	-.089
C12a	.639	.427	.178
C13a	.679	-.487	-.135
C14a	.630	.192	-.365
C15a	.271	-.428	.268
C16a	.712	.004	.464
C17a	.611	.116	-.483
C18a	.629	.528	.227
C19a	.623	-.464	-.052

C1a	.645	-.577	-.067
C20a	.658	.474	.227
C2a	.658	-.168	.393
C3a	.736	-.499	-.064
C4a	.485	.514	.194
C5a	.713	.163	-.348
C6a	.520	.115	.610
C7a	.705	-.450	.023
C8a	.456	.421	-.276
C9a	.737	.347	-.244