

The Sense of Community as Experienced in Online STEM Courses¹

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Building upon the work of Lev Vygotsky (1978), who determined that social collaborations are instrumental to mental development, researchers have identified many positive benefits for learners who perceive a sense of community within an online learning environment (Bloomberg, 2008; Exter, Korkmaz, Harlin & Bichelmeyer, 2009; Haythornthwaite, Kazmer, Robins, & Shoemaker, 2004; Hew, 2009). Developing a sense of community within a face-to-face classroom can pose a challenge, but for online instructors this task has become even more demanding. The purpose of this qualitative study was to describe the sense of community experienced by graduate level students enrolled in online STEM courses at a large research university. Program participants, identified as either face-to-face or online students, regularly engaged in a variety of virtual interactions delivered via synchronous, asynchronous, or hybrid formats. The investigators conducted interviews to elicit rich descriptions of learner experiences within the online program. The researchers analyzed the transcribed interviews using a constant comparative method to develop molar codes and then categories. The findings of this process revealed the following emerging themes: characteristics of the community; shared goals and values; personal beliefs on the success of the program and the communication mediums utilized; and the role of the professor and coursework. The study concluded with suggestions for program improvements. The recommended enhancements to increase the sense of community experienced by the participants included a program-wide student directory, the use of synchronous software for communication, virtual advising sessions, and the development of a cohort model.

1. INTRODUCTION

Cultivating a sense of community has become an increasingly popular idea in education. Researchers have built upon the work of Lev Vygotsky (1978), who determined that social collaborations are instrumental to mental development. Studies lend support to the many benefits that community affords learners (Haythornthwaite, Kazmer, Robbins, & Shoemaker, 2004). There has also been considerable discussion about theoretical issues such as how to define community (McMillan & Chavis, 1986), classroom learning communities (Rovai, 2002b), and more specifically, online communities of learning (Ouzts, 2006).

Most of these studies involved quantitative methods while only a limited number have been exclusively qualitative in nature (Ke & Hoadley, 2009). The purpose of this particular study is to describe the sense of community experienced by the participants in a graduate online learning program in purely qualitative terms. Research on the topic of online learning is never in danger of being obsolete. As innovations in technology provide for improvements in course efficiency and delivery, our study of online learning must also evolve if our information is to remain current. Only through continued inquiry into the topic can we address the new challenges and learning issues associated with these changes. An investigation into how students perceive their sense of community in this particular setting is a focus. A description of the activities, technologies, and interactions deemed beneficial to students in this environment will also be a topic of elaboration. Finally, the professor's role in this online community will conclude this analysis.

1.1. What is Community?

McMillan & Chavis (1986, p. 9) defined community as "a group of students who share a sense of belonging, a feeling that members matter to each other, and that possess shared expectations, and are committed to shared educational goals." Rovai (2002b) elaborated further on this definition and concluded that sense of community differs from setting to setting and, therefore, is context specific. He suggested the essential elements of building community regardless of geographic location to be mutual interdependence, a sense of belonging, and connectedness (Rovai, 2002b). He defined the classroom community in terms of the four dimensions of spirit, trust, interaction, and learning (Rovai, 2002b). The online learning community, he determined, is then merely an extension of the physical learning community to the electronic one (Rovai, 2002b).

Previous research on online learning has often centered on community, and has revealed the subtle and abstract nature of the phenomena in this specific context. Conrad (2002), studying the influences upon online learning community members' contributions, found that although students had difficulty defining the term "community," they could describe their perceptions of "community building" with relative ease. Her research showed that online community-building activities that did not intentionally lead to increases in knowledge or improved efficiency in task completion oftentimes led students to question the value of community in learning, or to regard it negatively altogether (Conrad, 2002). She found that "dealing with community, and being part of it in participative ways, was deemed by many as inconvenient and taxing" (Conrad, 2002, p. 13).

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Online learning students often describe it as a less personal form of instruction. Rovai (2002a) theorized that students experience a diminished social presence, and fewer social cues online than in a face-to-face classroom. His findings revealed that due to fewer cues in online communication, social presence is lower. Because of this reduction in social presence, students experience a diminished sense of community. Some studies have focused on identifying the rise of community online; still others have aimed to determine the outcomes resulting from its presence. Studies of this nature are of the minority, however. Wallace (2003, p. 269) found that despite consensus about the importance of the development of community, the “literature specifically about online community is ... more likely to illustrate the existence of community than to probe its origins or outcomes.”

Some research identifies the positive impacts a strong sense of community has on participants of online training and learning models. Multiple studies show a positive relationship between retention rates of online program students and their perceived sense of online community (Exter, Korkmaz, Harlin & Bichelmeyer, 2009). Evidence also points to participants’ willingness to share and socialize as two key determinants of the success of online professional development (Hew, 2009). Additionally, research by Bloomberg (2008) stressed the importance of making the online community visible to students in order to facilitate collaborative learning. These benefits must not be generalized to all online communities, however, for it is significant to remember that “no two communities are the same, just as no two people are the same, so it is essential to recognize the uniqueness of each community when identifying determinants of success” (Preece, 2001, p 354).

1.2. Communication Mediums

Communication in distance education settings takes two main forms: synchronous and asynchronous. Asynchronous forms of communication do not require that all parties are present at the same time; there are significant time lapses between collaborators’ initial contact and any follow-up responses. Blog posts, emails, and discussion forums are examples of asynchronous modes of communication. Synchronous communication is any type of direct communication that takes place during real-time. Some examples of synchronous mediums of contact include face-to-face discussions, telephone conversations, video-conferencing, and instant messaging. While there is consensus that some asynchronous communication is necessary, research has indicated the inclusion of synchronous communication as a key component in building a sense of community (McInnerney & Roberts, 2004). The meta-analysis by Bernard et al. (2004) indicated that the use of synchronous communication is, in general, a more effective form of student-instructor and student-student interaction than asynchronous communication. In only a few exceptional cases was asynchronous communication shown to be highly effective

in creating an inclusive and successful online community (Kienle & Ritterskamp, 2007; Poole, 2000).

1.2.1. Asynchronous Online Communication

Asynchronous communication has evolved to include audio or video podcasts, recorded CD-ROMs, wikis, blogs, and learning management systems (e.g., Blackboard). Most instructional delivery for online courses uses some form of asynchronous communication for its scheduling flexibility (Skylar, 2009). Another benefit of asynchronous communication is the quality of the responses. Students are apt to have more serious, productive, and on-task discussions using email or discussion forums than with chat rooms or instant messaging (Honeycutt, 2001; Aitken & Shedletsky, 2002).

1.2.2. Synchronous Online Communication

Technology innovations have enabled individuals to have access to new technologies from their computer, such as Adobe Connect, that use cameras and microphones to provide real-time access to course materials and immediate responses to instructor questions and comments (Skylar, 2009). Skylar (2009) found that if given a choice between asynchronous and synchronous communication lecture courses, most students prefer the synchronous format because of the greater feeling of interaction. A concern for some students may be the lack of flexibility with their schedules because of the requirement to be available remotely at a particular time.

1.2.3. Hybrid Online Communication

Wang and Newlin (2001) found value in synchronous chat rooms for clarifying and expanding upon information in discussion forums and advocate a hybrid approach in which both synchronous and asynchronous mechanisms are available. They found that the slow response time for asynchronous communication led to feelings of isolation between students and their instructor, while the instantaneous nature of online chat allowed persons that were distant from one another to feel more connected (Wang & Newlin, 2001). McInnerney and Roberts (2004) advocated for the use of synchronous communication to develop social relationships among class members to help build trust and reduce isolation.

1.3. The Role of the Professor

Instructor perceptions of their roles and the complex issues involved in a distance-learning environment are critical to the success of an online community. Instructors must adjust to new responsibilities and assume different roles online if they are to establish engaging environments. Therefore, it is important to understand and examine what Zane L. Berge describes as the pedagogical, managerial, social, and technical roles unique to online instructors (2000).

The pedagogical roles of online instructors should facilitate and promote student understanding of critical concepts, principles, and skills. This might include encouraging students to participate in knowledge sharing and building via discussions, engaging students in high-level questioning or inquiry, providing constructive feedback, or by referring students to external resources to obtain further information and/or elaboration of concepts (Berge, 2000).

The managerial roles include the organizational, procedural, and administrative tasks associated with the learning environment. The tasks involve coordinating assignments, managing online discussion forums, and handling the overall course structure. Virtual instructors should define the expectations of online interactions by setting clear agendas and objectives, and establishing procedures and decision-making norms for the online environment (Berge, 2000).

The online social roles require instructors to develop nurturing skills by encouraging participation, providing ample and timely feedback, and recognizing accomplishments. The social function promotes a friendly environment and community feelings to support student cognitive learning processes. To fulfill these duties, instructors must work to develop harmonious relations and a sense of group unity among learners (Berge, 2000).

Finally, the technical role of online instructors is to make participants comfortable with the learning system and software programs used for online courses. Technical tasks include assisting students with technical support issues, addressing and clarifying problems encountered, and allowing students sufficient time to learn new software. When the instructor facilitates a seamless use of technology, learners are able to concentrate on academic tasks. This role decreases for online instructors, as the tools of online learning become more intuitive (Berge, 2000).

Historically, the body of research on online communities has been overwhelmingly quantitative in nature, followed next by mixed method investigations, and then finally qualitative studies (Ke & Hoadley, 2009). Given that community can be defined as a sense rather than a tangible entity, however, qualitative interpretations of student self-reported feelings of online graduate courses seems the most logical approach, and therefore, was the focus of this research study. Our purpose was to gather rich, descriptive data of students' perceptions, and of their sense of community in this particular online context. Investigators also uncovered and elaborated upon the activities, technologies, and interactions deemed by students as beneficial and/or detrimental to learning in this online environment. Finally, the researchers share revealing evidence about the professor's role in the success of the online community.

2. METHOD

In the graduate program of focus for this study, the students were enrolled as either residential (face-to-face) or as distance (online) education students at a rurally located, large research university in the southeastern United States. Students within this program experienced a variety of online interactions including synchronous, asynchronous, and hybrid course formats. Four of the courses, offered within the program and in the current academic year, incorporated a hybrid instructional setting using Adobe Connect software to interface weekly. These courses had a formal "class time" comprised of local students and the instructor of the course that met in a classroom on-campus on the designated day. Online students taking the course attended at the same time and interacted synchronously with the on-campus class using the Adobe Connect medium to communicate. To interact outside of class time on their assignments and group projects, students used synchronous and asynchronous methods of communication including email, Skype (similar to Elluminate, software that allows for video calls over the internet), or the learning management system of the university (software that is similar to Blackboard). In addition, there were three other courses offered strictly online within the program of study using asynchronous methods of instruction. Both residential students and those at a distance enrolled within these three courses. During the academic year, there was only one course offered in a strictly face-to-face format. The diverse online learning experiences of the students in the program made it the ideal program to study, classifying it as a purposive convenience sample.

2.1. Participants

Data collection occurred during a two-week period initiated via e-mail. Due to the sampling method chosen, the researchers sent out electronic invitations to online graduate students interested in participating in a qualitative interview (Patton, 1990). Participants consented by completing a brief online demographic survey before scheduling an online interview via Skype or Elluminate. Six informants participated in the study; five of the six informants interviewed were from the Southeastern United States and one was from the Northeastern US. The informants were all Caucasian females aged 23 to 46 years old. Please refer to Table 1 for further demographic information. As part of the selection process, informants had to be enrolled in the program of study within the last year and have taken at least two online courses (at least one previously and be enrolled in another at the time of the study). This was to ensure that participants had adequate experience with online mediums of instruction.

Table 1
Participant Demographic Information

Participant (Pseudonym)	Gender	Race	Employment Status	Location	Type of Community	# of Distance Courses Taken
1 Nancy	Female	Caucasian	Part-time	Southeastern	Urban	5 or 6
2 Tracy	Female	Caucasian	Full-time	Southeastern	Suburban	3 or 4
3 Sarah	Female	Caucasian	Full-time	Southeastern	Suburban	7 or more
4 Renee	Female	Caucasian	Full-time	Southeastern	Suburban	3 or 4
5 Lucy	Female	Caucasian	Full-time	Northeastern	Suburban	5 or 6
6 Polly	Female	Caucasian	Full-time	Southeastern	Suburban	7 or more
						(2) 3 or 4
			(5) Full-time	(1) Northeastern	(5) Suburban	(2) 5 or 6
Totals	(6) Females	(6) Caucasian	(1) Part-time	(5) Southeastern	(1) Urban	(2) 7 or more

Note. Location is based on where the individual lives within the United States.

2.2. Procedure

Interviews took place in October and November of 2010, and consisted of a standardized open-ended structure (Patton, 2002). The researchers developed the interview protocol and sequenced the questions based on techniques described by Seidman (2006). The interviews were conducted either face-to-face or online using Skype or Elluminate, depending on student availability and preference. Using videoconferencing software to conduct online interviewing enabled researchers to communicate with participants through live video interactions providing access to participants within a wider geographical area (Al-Saggaf & Williamson, 2004). The design of the interviews focused on eliciting rich narratives about the sense of community participants experienced while engaging in online learning environments. All interviews were audio recorded with the permission of the participants. Interviewers used an interview protocol (see Appendix A) to guide the interactions with participants (Patton, 2002).

After completion the interviews were transcribed by the researchers and subjected to open coding, thematic review, and constant comparative analysis. The transcripts were compared using a cross case examination (Patton, 1990). Throughout the stages of the analysis, the researchers wrote analytical memos to document emergent themes, possible categories, methodological questions, and associations between the developing information (Rossman & Rallis, 2003). The initial stage of analysis was open coding, in which topics of overlap were freely generated (Berg, 1989). The detailed thematic analysis was the second stage that followed, in which the researchers conducted a systematic exploration to search for themes within the topics (Boyatzis, 1998). In the final stage, the constant comparative method was utilized to compare themes within emerging categories, to adjust the categories and their characteristics, and finally to define and write the theory (Glaser, 1965; Lincoln & Guba, 1985).

The qualitative approach utilized in this study, facilitated trustworthiness through credibility and confirmability

(Hinchcliffe & Gavin, 2009; Patton, 2002). Credibility refers to establishing the accuracy of the research findings. The researchers addressed credibility using respondent validation allowing participants the opportunity to review their interview transcripts. Confirmability was achieved by crosschecking and verifying the dependability of the findings through data-category checking (Hinchcliffe & Gavin, 2009; Patton, 2002). Once interviews were completed, all six reviewers coded the transcripts separately and came together afterwards to compare their findings. To reduce possible bias introduced by having only one investigator, six researchers conducted the data-category checking and validation process (Lincoln & Guba, 1985; Patton, 2002). Additionally and to ensure research trustworthiness, the developed interview protocol was reviewed by all six researchers concurrently prior to the interview process.

2.3. Limitations

Time, triangulation, transferability, credibility, and participant demographics were methodological limitations of the study. Due to the lack of time, researchers were unable to use multiple types of sources for data collection. Different data sources add validation to participants' self-reported findings (Patton, 2002; Vonderwell, 2002). Additionally, this study addressed the experiences of students within one particular graduate distance program. Therefore, the findings of this study may not apply directly to other programs, as purposive convenience sampling yields a poor rationale and low credibility (Exter et al., 2009; Patton, 1990). There were further credibility issues due to an inconsistency within the interview procedures; one interview occurred face-to-face while all of the others took place online (Seidman, 2006). Finally, previous studies indicate that there are differences in the online communication patterns of males and females (Belenky, Clinchy, Goldberger, & Tarule, 1986; Blum, 1999; Rovai, 2001, 2002a). Females usually identify with a connected voice, which supports a stronger sense of community; place emphasis on a need for relationships; and demonstrate an appreciation for cooperation. Males

typically identify with a separate voice, which is more autonomous and independent. Since the participants within this study were all females, this was a limitation.

2.4. Role of the Researcher

Three out of the six researchers had personal ties to the program of study; two of the researchers were full-time face-to-face students within the program, and the other researcher had taken two face-to-face classes within the program. There were clear benefits to having researchers connected to the program, as it was easier to recruit participants, contact the professors for consent, explain the instructional design of the courses, describe course settings, and understand the experiences and perspectives of the participants involved within the study. There were also disadvantages to having researchers tied to the program; a few of the participants hesitated when responding to the questions, it was more difficult to maintain confidentiality, and there were a few personal relationships between the participants and researchers already established prior to the study. To counterbalance these challenges the researchers practiced reflexivity in order to prevent bias and focused on an interpretive position to better understand and describe the participants' perspectives (Rossman & Rallis, 2003).

3. RESULTS

The analysis of the participant interviews uncovered five key areas that contributed to the sense of community described within the online program of study. Figure one below, depicts these five areas, which include the characteristics of the community, the shared goals and values, participants' personal beliefs on the success of the program, communication mediums, and the role of the professor and coursework. The researchers will present the findings from each of these sections in detail.

3.1. Characteristics of the Community

Based on the interviews conducted, the researchers have found that the members of this online learning community chose to take distance education courses for a variety of reasons. Some believed the online program offered a unique opportunity unavailable within the participants' local community. Others preferred the program because they were not in close proximity to the main campus of the university. Because it was online, they were able to pursue a degree in the program almost entirely by remote means, regardless of their geographic location. Still others chose the online program because they believed it offered more flexibility in regards to time, which made it particularly enticing to working professionals. In addition, many of the participants had personal limitations due to work and family life that prevented them from moving or participating within a face-to-face classroom. Finally, learning style preferences were another justification for pursuing the program online. Some distance education students welcomed online learning as a means to work independently on learning tasks and/or in isolation of others. Participant Nancy commented that, "I feel like a lot of people choose online courses to not... have to have that intense communication and understanding with everybody in the course."

Some of the characteristics that were specific to this online community included collaboration, communication, connectedness, group or social interactions, teamwork, sharing, support, and time restraints. Perhaps what was a unique aspect of this community was that this program was an interdisciplinary one. As students in a graduate level, interdisciplinary program, the participants all had expertise in one or more of the individual disciplines, and yet had a lot to learn from the experiences and expertise of individuals from the other involved fields. This meant that all participants were at once a novice and an expert. This created a mutual sense of need and interdependence among the members of the community. Shared learning goals, as well as, open communication of ideas and expert level

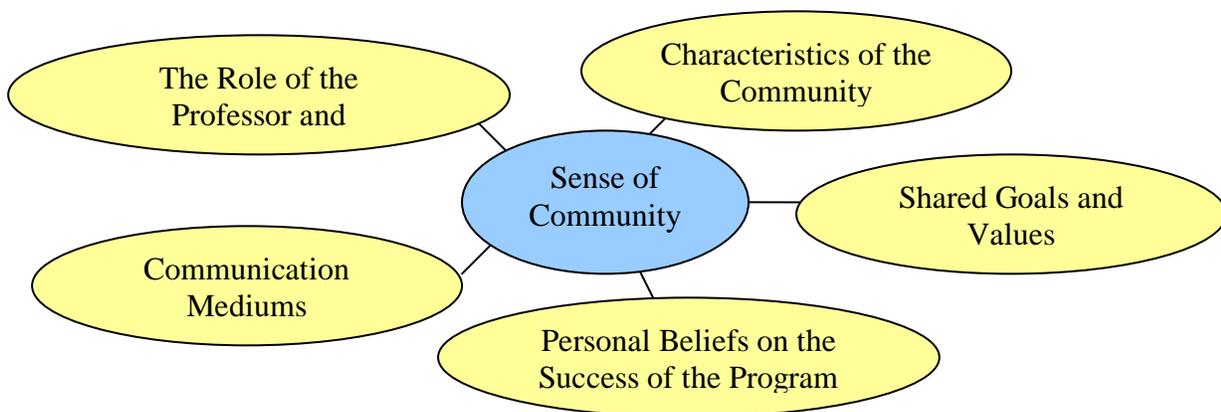


Figure 1. The five keys areas contributing to the participants' sense of community within the online program of study.

knowledge became critical to solving the problems posed in the online team projects. Participant Tracy summed up the benefit of this arrangement best: "...I've met people who are trained in other disciplines... it's really been great to...collaborate with them on projects and other ideas to make myself a better [professional]."

Thus, the definition of what was a sense of community online differed from what would constitute a sense of community in a face-to-face environment simply due to distinctions of the context of learning. Although online community seemed to develop more slowly in this virtual environment, it is important to reiterate that the learning did not occur in "real time:" it was at a time and geographic location that was at the convenience and choosing of the learner. As a result, learners' sense of community from its very beginning moved beyond simple commonalities of time and place to the shared bonds created by common interests, goals, and passions. A sense of community developed more slowly online when compared to a face-to-face course, but the connectedness created was less superficial and, therefore, often lead to deeper learning amongst students of the community. This finding was supported in research by Cameron, Morgan, Williams, and Kostecky who also found that "Students who felt that it was important to develop supportive relationships within their group reported feeling that the members of their groups cared about each other and that working collaboratively with other students resulted in deeper learning" (2009, p. 25-26).

3.2. Shared Goals and Values

The participants within this study described values and goals that were central to them personally and in regards to the group. Overall, there were more shared group values and goals discussed, than individual. This demonstrated the importance of group interactions within this program and community. Collective values common to the group included support, sharing, helpfulness, work ethic, shared personal experiences, optimism, professionalism, passion, respect, teamwork, and motivation. Common group goals shared by this community were to contribute to the online community, and to share ideas on issues common to practice. Across interviews, it became apparent that common passions bound the group together: influencing the greater good, and improving student learning are two such passions.

This sense of like-mindedness and these common passions served to support the participants in unique ways. Perhaps this was because this particular program represented a new and innovative field that existed at only a handful of universities at the time. One participant, Polly, summed it up in this manner: "...there isn't anybody here in my local community, that- at least not that I've met... involved in the theories and methods of [name of program]... [That] have the same passion and motivation as a lot of the people I've met online."

Thus, a sense of community is more likely to increase when learners share similar values and interests, passions,

and motivations towards online learning. Participant Tracy explained how the students in this particular program, "...are usually the more progressive [practitioners], who are willing to try new things and change their own methods to do better, so those are kind of the values specific to those [professionals]..." Research on the topic of online community conducted by Haythornthwaite, et al. similarly concluded that strong interpersonal ties among community members encourage the sharing of resources and information, and lead to the creation of environments that are conducive to collaborative learning (2004).

3.3. Personal Beliefs on the Success of the Program

As described by Preece, no two communities are the same; to determine program success, the unique qualities within a program and the perspectives of its members require examination (2001). All of the study participants seemed to agree that you get out of an online program, what you put into it. All of the participants – with one exception – were satisfied with this online program. Although everyone in the study selected face-to-face interactions as their preferred method of instruction, all but Nancy were satisfied with their level of success and learning that resulted from this online program. Sarah gave a good description of this perspective:

If you want to be a part of [a] community ... you have to do some of those extra things, if you are doing the bare minimum, you are not going to feel like a part of the community... I believe that distance-learning programs are effective, but after it, I do not think that they are perfect... I think that [for] the next one I would certainly do face-to-face.

This demonstrated one opinion within the overall findings that face-to face learning was still the ideal, preferred way to learn, and the most conducive to developing a sense of community when defined in the traditional sense.

Another one of the participants believed that a person's sense of personal independence might relate to their preference of feeling connected to the community. Lucy mentioned that, "online courses may be a bit more difficult for someone less independent... I think if you are pretty independent you can better handle things, [and] the sense of being less connected." Based on this individual's personal, professional, and family life, she was very independent and did not need the same level of community that other students preferred. The lone participant (Nancy) that was not satisfied with the online program did not enjoy the mandated online collaborations. She preferred not to interact with peers and specifically chose online learning for that reason. This corresponds with literature on how individuals identify with a separate or connected voice. Nancy preferred a separate voice, as opposed to the connected voice that supports a stronger sense of community, collaboration, and the development of relationships, which most women usually prefer according to the literature (Belenky et al., 1986; Blum, 1999; Rovai,

2001, 2002a). Overall, learner satisfaction depended upon individual learning preferences, the type of assignment, and the type of engagement medium utilized for assignment completion.

3.4. Communication Mediums

To meet various student needs, learning goals, and the contextual differences of time and place, the professors within the program implemented an array of both synchronous and asynchronous mediums. The consensus among all of the participants was that if the goal was to build the greatest sense of community within a learning environment, face-to-face was the ideal method for instruction. However, based on the reasoning already discussed most of these participants were restricted to online courses; therefore, synchronous methods of instruction were preferred over asynchronous instruction. Tracy discussed her preferences in the following way:

...As far as trying to feel connected to people and have that sense of community, I really do not feel that from email. I would say that I feel that more from the discussion forums and the Adobe Connect meetings we have online. Face-to-face is always the best.

Online classes that focus solely on content coverage and involve routine asynchronous methods were the least satisfying to the learner, the least interactive, and the least conducive to the development of community online. This finding corresponded with Bernard et al.'s discovery that synchronous interactions were overall a more effective method for interaction than asynchronous (2004). Many of the participants believed that the sense of community felt within an online community would grow and change over time with increased interactions; being able to see someone visually and communicate verbally in real-time helped to mature that connection.

Another layer of social hierarchy that was also uncovered within this study demonstrated the importance of student status within the program; a full-time face-to-face student had the optimal sense of community, followed by a full-time online student. The part-time distance education student or a student only taking one course online reported a minimal sense of community within the program. Several of the participants suggested that visits to campus and participation in conferences could greatly enhance the feeling of community providing opportunities to meet colleagues and peers face-to-face. Tracy described what it was like to meet one of her peers, "I saw her at the conferences, and we hung out together, had a couple of meals together, things like that. It was really neat to be able to talk with someone on my team... and to be able to meet with her face-to-face." It was definitely apparent that throughout the online environment, members shared the desire to see each other in order to develop a more personal connection. Sarah made the following point about being in an online community, "Because as humans, I feel part of relationships is that personal interaction and so when you don't have that I think that people can feel left out and unsure about things." This feeling of isolation within

online environments as discussed in McInnerney & Roberts (2004) and Wang & Newlin (2001), suggested that instantaneous responses, synchronous communication, and the development of social relationships helped to alleviate this feeling.

3.5. The Role of the Professor and Coursework

Finally, the participants viewed the role of the professor within an online learning environment to be that of a facilitator. Online students expected the professor to be available, flexible, provide feedback, and be responsive to questions as needed. As a facilitator, the professor, must scaffold interactions in a way that intentionally strengthens the learning community, so participants do not feel isolated. Through carefully designed communication and coursework, professors can control the levels of collaboration within online environments.

One of the key findings of this research was that professors online must make themselves available to the community and/or make their preferred lines of communication with their students apparent. Defining how to communicate with the professor online can help to alleviate student anxieties and provide the formative feedback students need, e.g., about class expectations, participatory response patterns, and assignment quality issues. Participant Nancy shared how not attending to, or establishing lines of student-professor communication, can make online students feel anxious about their work. When discussing this issue in her interview, Nancy talked about how her lack of communication with one of her online professors was affecting her academic progress in a class. She shared that "...emailing, messaging, phone calls have not worked, which has ended up putting me behind...if I don't know how to do an assignment I'm not going to do it and [have] it be wrong and then have to redo it." This also serves to illustrate how students often need positive or constructive feedback from a professor when tasks become particularly taxing or unclear.

To remedy this situation, professors may have to be more proactive in their pursuit of communication with online students. Two participants suggested professors online might implement virtual online office hours into their courses. Participant Renee explained that this would allow students the opportunity to have a "More direct connection or discussion" with a professor if this arrangement was in place. Less aggressive or students leaning towards introversion stand to benefit from this arrangement the most, but even the more "social" or extroverted online learners felt that stronger lines of communication between students and the professor could strengthen courses and the general sense of community felt online.

Based on the interviews within this study and participant opinions, the role of the professor was more passive in this online community than in their face-to-face classes. The professors assumed more of a laissez faire role in the online knowledge construction process than in traditional

classes. Zane Berge (2000) acknowledged the limitations of this approach when online students need prompt feedback, however. He concluded that "...prompt feedback often means that the most effective communication between students and professor occurs in real time, or as close to real time as possible..." Participant Sarah commented that she was on the phone or emailing her professors almost every day. Notice how she very subtly communicates to her interviewer her perception that this is either not the norm, or not desired from her professors when she comments, "...I'm one of those students that asks a lot of questions, as I'm sure that my professors would tell you...I probably spoke to them maybe every other day? Actually, unfortunately for them, so I'm a good question asker."

Our research showed that participants within an online learning community tend not to interact unless they are required to do so throughout the coursework. Nancy admits that, "I've never really gone in detail or in depth with anybody in my courses on any type of information that's not required in a small way." This left the sense of community felt within an online learning program within the hands of the professor. The interviews uncovered that this particular community focused on social-constructivist teaching methods and corresponded with the literature, which demonstrated that community becomes stronger online when centered on process-oriented, constructivist knowledge formation, as learners negotiate their roles and tasks to address learning needs (Cameron et al., 2009). This online community depended specifically on socio-cultural adapted discourse negotiated through shared meanings and interpretations of the coursework (Bruner, 1990).

The methods of communication also played a role in the coursework designed by the professors. Although, there was a lack of spontaneous learning within strictly asynchronous courses, there was a positive side; asynchronous responses offered participants an equal opportunity to share their ideas, while being more scholarly and reflective in their learning. Lucy mentioned that "because you have enough time to reflect and thoughtfully frame your response" she believed the discussion forums might be more beneficial than real-time discussions. Most of the participants did not share Lucy's sentiment; they believed that real-time discussions were more beneficial. Regardless of each individual's preferred learning method, they all seemed to agree with the following comment by Sarah: "I don't think that the sense of community or the technology affected my ability to learn. I think that I still learned, and still... was successful even though it was through distance." This demonstrates that within this online community, the professors were able to design the coursework in such a way that the students were successful in their learning.

4. DISCUSSION

The purpose of this study was to describe the sense of community experienced by the participants in a graduate

online (hybrid) learning program. Participants all seemed to have difficulty with their definitions of community in the online environment initially although they could give several examples of the tools and means used to foster a sense of community. Perhaps this is because, as Conrad (2002) noted, community online is a particularly abstract connection due to its existence, independent of both time and place. Remote means of communication made it a challenge for those involved to develop a strong sense immediately based on traditional definitions. Our research, however, showed that the level of communication oftentimes existed at a much deeper level and enhanced the learning experience when interspersed with face-to-face or real-time contact. Overwhelmingly, however, when sharing their own preferences, participants chose face-to-face delivery as the best method and context to learn the program content.

The particular online program in this study was overwhelmingly project-based and interdisciplinary in nature. Therefore, a mutual sense of need and interdependence among the members of the community was inherent. Team projects required members to work collectively and to apply their individual areas of expertise to accomplish the common learning tasks. Shared goals, as well as, the open communication of ideas and expert level knowledge were critical to solving the problems posed in online team projects. Rovai (2002b) defined the essential elements of community building to be mutual interdependence, a sense of belonging, and connectedness. The mutual interdependence created in the project-based learning of this program provided mutual responsibility among team members and fostered a sense of belonging. The fact that the field of study of the program is still in its infancy also helped to connect these individuals to each other. In summary, although interviewees gave pointed evidence of the existence of community in their interviews, indirect evidence of the nature of the program also showed community intentionally built into the very framework of the online program.

All interviewees spoke favorably about the rigor associated with the level of questioning, learning tasks, and the materials of this program. In fact, many of the more experienced online learners in this program found that the instruction of the two professors involved in this study far surpassed the level of instruction they had received through other online classes. The pedagogical, managerial, and technical aspects of the professor's role as defined by Zane Berge (2000) seemed to have all been satisfied adequately. The professor's social role online, however, was one area that students suggested could benefit from improvement. The consensus was that availability and course feedback, if attended to more frequently, could further increase the sense of community online, and strengthen individual experiences. Possible solutions to these issues were for professors to offer virtual office hours for coursework questions, and online advisory hours to answer general program questions.

As is the case within this study, if female learners make up the majority of the population of an online program and

they prefer a connected voice and stronger sense of community (Belenky et al., 1986; Blum, 1999; Rovai, 2001, 2002a), then professors should intentionally design courses to increase the sense of community. By focusing on how learners construct their knowledge through increased interactions, online collaborations, and careful development of program requirements, the level of connectedness among the learners will increase. Some of the methods suggested by the participants to improve the quality of the program and to increase the sense of community experienced by the participants included face-to-face interactions through school visits and conferences, program-wide advising sessions, introduction activities at the beginning of all courses, the development of a program-wide student directory, and the use of synchronous software for communication. One strategy suggested in the literature emphasized the use of learning cohorts. An example of this model used with online learners at a university in Canada, required students to attend a three-week residency at the start of a program to encourage interdependence and relationship development among the learners within their cohort (Guilar & Loring, 2008).

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6. AUTHORS' NOTE

The data presented within this manuscript stemmed from a course project; co-investigators on that project included Dr. Penny Burge, Steven Boyce, Jessica Prince-Sanders, Heidi Steinhauer, and Jerald Walz.

Appendix A

Interview Protocol

Interview Script:

I want to thank you for taking the time to meet with me today. My name is _____ and I would like to spend our time together talking about your experiences in online learning communities. Specifically, I want to explore your sense of community in the online graduate program you are enrolled.

The interview should take less than an hour and I will be audio taping our discussion, as mentioned in the informed consent. The informed consent form, which you have already signed, was included with the demographic survey.

Your participation in this research is voluntary; you have the right to withdraw at any point of the study, for any reason, and without explanation. The information collected, any records, and reports written up until the point of your withdrawal belong to you.

All responses will be confidential. This means that the research team will read your responses and that we will ensure that any information we include in our report does not identify you as the participant. There are some limitations to confidentiality and I will have to report any disclosure of illegal activities or thoughts of harm to self or others to the appropriate authorities.

Remember, you do not have to talk about anything you do not want to and you may end the interview at any time.

Are there any questions about what I have just explained?

Are you willing to participate in this interview?

(Wait for verbal consent)

Before we get started with the interview questions, I wanted to take a moment to test the audio recorder. I am going to state my full name and I would like you to do the same.

(Test audio recorder)

Interview Protocol

Time of Interview:

Date:

Place:

Interviewer:

Interviewee:

Questions: Five primary questions and five follow-up questions

- 1) How do you define “sense of community”?

- 2) As a participant in an online learning program, what elements of community do you find important and meaningful?

- 3) Describe your experiences regarding your sense of community in the program.
 - a) What values are common amongst community members?

- 4) How often do you interact with your online learning peers and faculty members?
 - a) What types of interaction have you had with peers and faculty members?
 - b) Are you satisfied with your level of interactions with individuals in the program? Why or why not?

- 5) How would you characterize your relationships with peers and faculty members in the online learning program?
 - a) How connected do you feel to your peers, faculty members, and program?
 - b) What are three things your program could do to make you feel more connected?

- 6) Is there anything else you would like to share regarding your experiences in an online learning community?

Thank you again for participating and sharing your experiences. Please feel free to contact me if you have any questions regarding the study. Would it be okay for me to contact you if any questions arise during the analysis of your interview?

Use probes as needed. These include:

- *Would you give me an example?*
- *Can you elaborate on that idea?*
- *Would you explain that further?*
- *I am not sure I understand what you are saying. Could you tell me more?*
- *Is there anything else you would like to share with me?*