Online Students' Attitudes Toward Collaborative Learning and Sense of Community

Article *in* American Journal of Distance Education · December 2019

DOI: 10.1080/08923647.2020.1703479

2 authors:

Ritushree Chatterjee
Iowa State University
5 PUBLICATIONS **33** CITATIONS
SEE PROFILE

Ana-Paula Correia
The Ohio State University
71 PUBLICATIONS **1,566** CITATIONS
SEE PROFILE

American Journal of Distance Education

ISSN: 0892-3647 (Print) 1538-9286 (Online) Journal homepage: https://www.tandfonline.com/loi/hajd20

Online Students' Attitudes Toward Collaborative Learning and Sense of Community

Ritushree Chatterjee & Ana-Paula Correia

To cite this article: Ritushree Chatterjee & Ana-Paula Correia (2020) Online Students' Attitudes Toward Collaborative Learning and Sense of Community, American Journal of Distance Education, 34:1, 53-68, DOI: 10.1080/08923647.2020.1703479

To link to this article: https://doi.org/10.1080/08923647.2020.1703479

AMERICAN JOURNAL OF DISTANCE EDUCATION
2020, VOL. 34, NO. 1, 53–68
https://doi.org/10.1080/08923647.2020.1703479

Routledge
Taylor & Francis Group

Online Students' Attitudes Toward Collaborative Learning and Sense of Community

Ritushree Chatterjee[a] and Ana-Paula Correia[b]

[a]Iowa State University; [b]The Ohio State University

ABSTRACT

Feelings of community increase information flow, cooperation, support, and a sense of commitment toward group goals. Many studies have explored the significance of sense of community and collaborative learning activities in online learning environments. Using a correlational study, the relationship between students' sense of community and their attitude toward online collaborative learning was examined in this study. Results indicate that collaboration and sense of community were moderately correlated. A positive correlation between collaboration and students' sense of community was determined. It was also noticed that the degree of correlation between sense of community and collaborative learning was higher among graduate students than among undergraduate students. Furthermore, a higher degree of correlation existed between a positive attitude toward collaborative learning and the dimensions of sense of community when compared to the correlation between a negative attitude toward collaborative learning and sense of community.

Purpose and significance of the study

There have been many studies regarding the significance of sense of community in online learning environments (DiRamio & Wolverton, 2006; Rovai, 2002a, 2002b; Shen, Nuankhieo, Huang, Amelung, & Laffey, 2008). Additionally, there has been research that explored the impact of collaborative learning activities in online learning environments (Bento & Schuster, 2003; Brindley, Blaschke, & Walti, 2009; Zhu, 2012). However, little has been studied on the relationship between students' sense of community and their attitude toward online collaborative learning. This study aims to fill that gap in the literature by establishing the relations between the two constructs – sense of community and attitude toward collaborative learning. The presence of such a relationship is expected to shed light on how the interplay of collaborative learning and sense of community influence the online learning experience, specifically learner satisfaction and outcome. This study lays a foundation for future research work in this area and informs educators and instructional designers about better online course design to enhance student learning and satisfaction.

The main purpose of this research study was to determine what, if any, relationship exists between students' attitude toward collaborative learning and a sense of community

CONTACT Ana-Paula Correia correia.12@osu.edu Department of Educational Studies, College of Education and Human Ecology, The Ohio State University, 301F Ramseyer Hall, 29 W. Woodruff Ave, Columbus, OH 43210, USA

among online learners in higher education. This study was conducted in a large Midwestern research university. The following research questions guided the study:

(1) Is there a correlation between students' attitude toward collaborative learning and sense of community in online learning environments?
(2) What is the nature of the correlation that exists between students' attitude toward collaborative learning and a sense of community in asynchronous online learning environments?

Collaborative learning

Collaborative learning can be viewed as an umbrella approach to teaching and learning that encompasses the essence of cooperative learning (Laal & Laal, 2012). Laal and Laal (2012) explained that collaborative learning proposes a way of dealing with people that emphasizes individual abilities and contributions. Collaboration is considered a way of life "where individuals are responsible for their actions, including learning and respecting the abilities and contributions of their peers" (Laal & Ghodsi, 2012, p. 486).

In online learning environments mediated by technology, online collaborative tools such as Google Docs, wikis, and discussion boards are employed by instructors to facilitate collaboration among peers (Ishtaiwa & Aburezeq, 2015; Revere & Kovach, 2011). However, these could also be used in a way that supports cooperation rather than collaboration. The attitude of learners toward using these tools plays a crucial role in the success of collaborative activities, which in turn drives collaborative learning (Edmunds, Thorpe, & Conole, 2012; Liaw, Chen, & Huang, 2008). Students' attitudes, both positive and negative, toward online collaborative tools used for peer-to-peer interaction in order to accomplish collaborative activities within an online course are examined in this study.

Educational researchers have taken various approaches to assessing and measuring collaborative learning in online learning environments. For example, Kreijns, Kirschner, Jochems, and Van Buuren (2007) explored the sociability of a computer-supported collaborative learning environment. Researchers studied the ability of this environment to provide a sound social space for collaboration. The study constructed and validated a one-dimensional 10-item sociability scale that measures the sociability of computer-supported collaborative environments. Kreijns et al. (2007) defined sociability as "the extent to which a CSCL [computer-supported collaborative learning] environment is perceived to be able to facilitate the emergence of a sound social space with attributes as trust and belonging, a strong sense of community, and good working relationships" (p.179).

Sense of community

A sense of community is an indicator of success of offline communities in which people interact face-to-face as it has been evidenced by several studies (e.g., Baker & Moyer, 2018; Cameron, Morgan, Williams, & Kostelecky, 2009). Dawson (2006) investigated the relationship between student communication interaction and sense of community. Results showed that college students "and study units with greater frequencies of communication interactions possess stronger levels of sense of community" (Dawson, 2006, p. 153).

This understanding of sense of community as an enabler has, in turn, increased the value of sense of community in the online environment, where it is often termed a sense of virtual community. In the online context, it is defined as "members' feelings of membership, identity, belonging, and attachment to a group that interacts primarily through electronic communication" (Blanchard, 2007, p. 827). Baker and Moyer (2018, p. 16) concluded that "students who were more conscientious and intrinsically motivated had more favorable impressions of online courses." They also found that students who had a sense of community had more favorable impressions about online courses.

Cameron et al. (2009) explored the relationship between social tasks and students' perceptions of sense of community while working as part of an online group. They found limited significant relationships between the different social tasks and students' perceptions. Even though students recognized the value of social tasks, they seemed to be more focus on the group project grade rather than developing a sense of community in the online learning environment. This "might reflect a lack of understanding by the students of the importance of social tasks to successful group project completion" (Cameron et al., 2009, p. 20).

Methodology

This study followed a quantitative approach aimed at investigating the correlation between the two concerned variables, sense of community and collaborative learning, by making use of Pearson's product-moment correlational coefficient. This research was carried out in three stages:

Stage 1: The mini-pilot that intended to test the research mechanics.

Stage 2: The pilot that aimed at validating the data collection instrument.

Stage 3: The main study that investigated the existence of a correlation between the variables studied.

Procedural modifications were made at each stage based on the lessons learned in the previous stage.

Context of the study

The study was conducted in a large Midwestern research university in the United States. The university had six different colleges, each with its respective online programs. However, not every program in every school had a fully online equivalent degree path. The online programs included courses that were offered in both fully online and blended formats.

The fully online courses are typically one semester long and have the same academic rigor and quality as face-to-face courses offered in residential programs. It is assumed that students who participated in this study were representative of U.S. college students taking online classes. BlackBoard Learn and Moodle were the learning management systems used in these programs.

Participants in the study

The participants were expected to be 18 years and older. They were expected to be enrolled in at least one fully online course in the semester during which the questionnaire

was administered. The assumption was made that students' responses would reflect their experience in their respective online courses. Anyone not meeting these two criteria was asked to forgo taking the questionnaire. A total of 396 students meeting these criteria participated in the three stages of this study. The sample size was spread across all fully online courses offered. These courses included collaborative learning activities using tools such as, Google Docs, wikis, blogs, and discussion boards.

All data collected were stored in a password-protected file in a password-protected laptop. No identifying information was collected from the participants, except in the main study. An incentive (drawing for a gift card) was added to increase the response rate. For proper delivery of the incentive, contact information was collected from the respondents in the main study. This information was collected in a form separate from the questionnaire.

Data collection and analysis

Two previously established valid and reliable questionnaire instruments, namely the Sense of Virtual Community Scale (Abfalter, Zaglia, & Mueller, 2012) and the Online Cooperative Learning Application Scale (Korkmaz, 2012), were combined to form one single questionnaire for this study.

The combined questionnaire, named the *Online Sense of Community-Collaborative Learning Combined Questionnaire*, consisted mostly of 26 close-ended questions on a 5-point Likert-scale regarding attitude toward collaborative learning and sense of community. The survey questions were divided into three sections: demographics, online collaborative learning and sense of community (see Appendix A), as follows:

(1) Demographics: Although, demographics is not the primary focus of this study, there were some multiple-choice questions on the participants' academic standing, level of collaboration in their respective courses, learning management system used and their course name and number.
(2) Online Collaborative Learning: There were a total of 16 items that were adapted from the Online Cooperative Learning Application (OCLA) scale. The questions related to feeling of positive attitude toward using of online collaborative tools were followed by the questions of feeling of negative attitude toward using of online collaborative tools.
(3) Sense of Community: A total of 11 questions were adapted from the Sense of Virtual Community (SOVC) scale that fell under the four dimensions of community (Chavis, Lee, & Acosta, 2008), namely, membership, influence, integration, and fulfillment of needs and shared emotional connection.

The chosen rating for the combined questionnaire was a 5-point Likert scale – (1) Never (2) Seldom (3) Sometimes (4) Mostly (5) Always. All the questions were declarative statements where respondents would have to choose their level of agreement with each statement. The questionnaire was administered to the students as a Google form. The above three sections were preceded by a cover message for the participants and the waived consent form. There was one open-ended question included in the survey where the participants could share any thoughts they had regarding collaborative learning and/or sense of community in the online learning environment. Participation in the questionnaire

was voluntary. All of the statistical analysis was performed using IBM Statistical Package for the Social Sciences (SPSS) 22.

A mini-pilot study and a pilot study were conducted prior to administering the survey to the chosen target population. At the mini-pilot stage, the questionnaire was modified based on the feedback received from experts' review and graduate students as part of the focus group. The modifications mainly included giving the questionnaire a novel name, replacing certain words with more appropriate ones and correcting any grammatical errors. At the pilot stage, more questions from the original scales were added and the questionnaire was validated before administering the same for the main study.

Results of the study

For the pilot study, the Cronbach's reliability coefficient is reported. For the main study, demographic data, descriptive statistics, and the Pearson's correlation coefficients are also reported along with the reliability coefficient.

Results from the pilot study

The main goal of the pilot study was to calculate Cronbach's reliability coefficient to support the reliability of the scores generated by the questionnaire used. The reliability test was performed on the 27 items of the pilot study version of the questionnaire.

The items in the questionnaire belonged to two major categories. Eleven items belonged to the sense of community scale and 16 items belonged to the collaborative learning scale. The reliability analysis was performed separately on each of these two categories. The frequency distribution regarding the respondents' classification as well as the degree of collaboration in their respective online courses is also reported as bar charts.

For the purpose of awareness regarding the academic classification of the respondents, the frequency distribution was calculated. There was a total of 100 responses, out of which 63 were undergraduate students, 31 were graduate students, and four belonged to the "other" category.

Regarding the degree of collaboration, 29 students reported a degree of collaboration of greater than 75% or more of the time in their course. The number of students who reported collaboration between 50% and 75% of the time in their courses was 34. Twenty students and 16 students reported a degree of collaboration between 25% and 50% and less than 25% of the time, respectively. There was one student who did not respond to these questions and this was considered as missing data.

The reliability analysis of the questionnaire shows that the Cronbach's Alpha reliability coefficient for internal consistency for the eleven items of the sense of community items was 0.924. The reliability coefficient, Alpha, for the 16 items from the collaborative learning category was 0.942. The overall Cronbach's reliability coefficient, Alpha, for all 27 items was 0.825.

The comparison of the Cronbach's Alpha if item deleted to Cronbach's Alpha reliability coefficient for internal consistency of the questionnaire (0.815) reveals that there was no item whose deletion would result in an increase in the Cronbach's Alpha of all items. Therefore, based on these analyses, it was decided not to delete any items from the questionnaire used in the pilot study for the main study.

Results from the main study

The frequency distribution of the academic classification of the respondents and their degree of classification in their respective online courses(s) was calculated and plotted as bar graphs. Out of the 198 respondents, 125 respondents were undergraduates and 71 were graduates. The rest belonged to the category "other."

The number of respondents with more than 75% of the time in the course spent in collaborative learning was 52. Thirty-seven students had a degree of collaboration between 50% and 75% of the time. Thirty-six students had a level of collaboration between 25% and 50% of the time in their online course. Finally, 72 students spent less than 25% of the time in their online course on collaborative learning.

Although a high reliability coefficient was already established for the questionnaire in the pilot, the reliability analysis was repeated for the main study as well. This is because the value of Alpha is a "property of the scores on a test from a specific sample of testees" (Tavakol & Dennick, 2011, p. 53). Hence, instead of relying on the calculated Alpha for the questionnaire, the reliability coefficient was calculated again for the main study.

Cronbach's reliability coefficient, Alpha, was calculated for the two categories of the questions in the questionnaire to further reinforce the internal consistency of the items in the questionnaire. The reliability coefficient, Alpha, was found to be 0.922 for the sense of community items and 0.910 for the collaborative learning items.

Correlational analysis

A Pearson product-moment correlational coefficient was computed to assess the existence, nature, and strength of the relationship, if any, between collaborative learning and sense of community in an online learning environment. The total score for sense of community and for collaborative learning was computed for each respondent. Using these total scores, the Pearson product-moment correlational coefficient was computed to be $r(198) = 0.672$, $p < .01$. This implied that the scores for collaborative learning and sense of community were correlated and the strength of the correlation was moderate. Furthermore, the correlational coefficient, r, was positive. This meant that the direction of the association was positive and direct, implying that an increase in the score of collaborative learning would mean an increase in the score of sense of community as well.

A scatter plot between the two factors was also plotted for the entire data set (Figure 1). The data points follow an upward trend, which implied that the direction of the association was positive. This meant that if the score for collaborative learning were to increase, the score for sense of community would also increase.

The data set was further divided based on the academic classification of undergraduates and graduate students. This division was purely speculative and made on the basis of the extensive experience as an online course designer. Although maturity of students does play a role (Johnson, 2015; Lawther & Walker, 2001) in online learning, the bifurcation of graduates and undergraduates is an aspect that has not been studied extensively.

A scatter plot and Pearson correlational coefficient were generated between the sense of community score and attitude toward collaborative learning score of each of the respondents for the two aforementioned classifications.

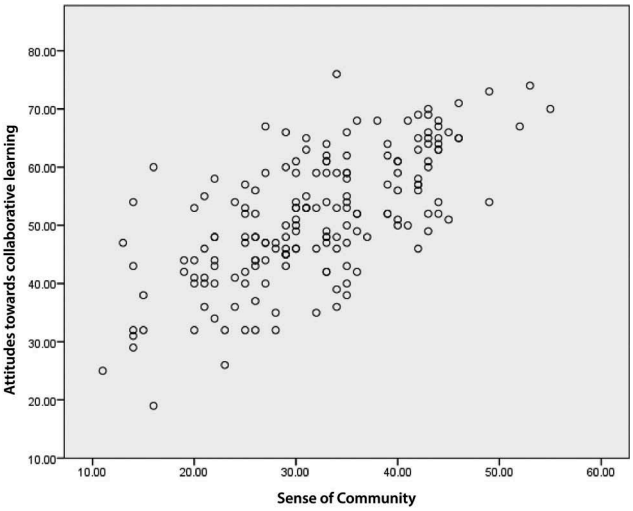

Figure 1. Scatter plot between total scores of each respondent of their attitude toward collaborative learning and sense of community in an online learning environment for all respondents of the main study.

Figure 2 represents the scatter plot of the scores of sense of community and collaborative learning for the undergraduate respondents and Figure 3 represents the scatter plot of the scores of sense of community and collaborative learning for the graduate students. In both plots, an upward trend of the data points is seen, which implies that as one variable increased, the other increased as well. Hence, both plots visually represented a positive correlation between sense of community and collaborative learning.

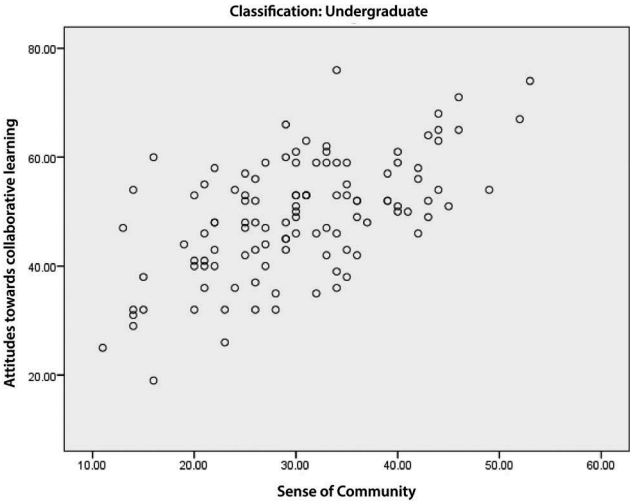

Figure 2. Scatter plot between total scores of each respondent of their attitude toward collaborative learning and sense of community in an online learning environment for undergraduate respondents of the main study.

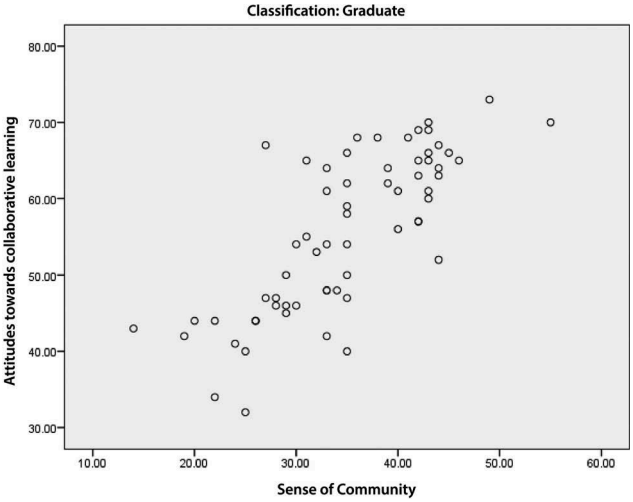

Figure 3. Scatter plot between total scores of each respondent of their attitude toward collaborative learning and sense of community in an online learning environment for graduate respondents of the main study.

The Pearson product-moment correlational coefficient between attitude toward collaborative learning and sense of community for undergraduates was $r(120) = 0.591$ $p < .01$ and that for the graduate students was $r(68) = 0.772$, $p < .01$. This shows a moderate correlation for the undergraduate students compared to a highly strong correlation for the graduate students.

The questionnaire can essentially be categorized into six aspects, items related to positive attitude and negative attitude toward collaborative learning and items that belong to the four dimensions of sense of community as described by McMillan and Chavis (1986). These are membership, influence, integration, and fulfillment of needs, and shared emotional needs. An inter-item correlational coefficient matrix was computed based on the average of the scores in each of these six aspects for the entire data set (Table 1).

Comparing the Pearson product-moment correlation coefficient between the positive attitude toward collaborative learning and the four dimensions of sense of community, a moderately strong correlation was observed, where r varied from 0.618 to 0.656. In contrast, comparing the Pearson product-moment correlation for negative attitude toward collaborative learning with the four dimensions of sense of community indicated that the correlation was low, as r varied from 0.328 to 0.370 (Table 1). Furthermore, it is observed that the *integration* dimension of sense of community is strongly correlated to the *shared emotional connection* dimension of sense of community with the correlational coefficient being 0.723. Similar strong correlation was also observed between *integration and fulfillment of needs* and *shared emotional connection* dimensions of sense of community with the correlation coefficient being 0.787. Hence, there is a clear distinction in the degree of correlation between a positive and a negative attitude toward collaborative learning when compared to the sense of community dimensions. It consists of a comparison of the Pearson coefficient between the positive attitude toward collaborative learning and the four dimensions of sense of community as well as the negative attitude toward collaborative learning and the four dimensions of sense of community. While the former varies from 0.618 to 0.656 the latter varies from 0.328

Table 1. The inter-item correlational coefficient matrix for the six aspects of the questionnaire.

	OCOL+	OCOL−	SOC_MEM	SOC_IN	SOC_IFN	SOC_SEC
OCOL+	1.000	0.474	0.618	0.554	0.565	0.656
OCOL−	0.474	1.000	0.328	0.353	0.324	0.370
SOC_MEM	0.618	0.328	1.000	0.628	0.597	0.685
SOC_IN	0.554	0.353	0.628	1.000	0.699	0.723
SOC_IFN	0.565	0.324	0.597	0.699	1.000	0.787
SOC_SEC	0.656	0.370	0.685	0.723	0.787	1.000

Significant at the $p < 0.01$ level.
OCoL+ = items related to the positive attitude toward collaborative learning OCoL− = items related to the negative attitude toward collaborative learning SoC_MEM = items related to the 'membership' dimension of Sense of Community SoC_IN = items related to 'influence' dimension of Sense of Community
SoC_INF = items related to 'integration and fulfillment of needs' dimension of Sense of Community
SoC_SEC = items related to 'shared emotional connection' dimension of Sense of Community

to 0.370. Therefore, the degree of correlation between positive attitude and sense of community is much higher than the degree of correlation between negative attitude and sense of community. This is further explained in the section below.

Discussion and conclusions

This correlational study aimed at investigating interactions between students' attitude toward collaborative learning and sense of community in online learning environments. Both constructs, collaborative learning (Hrastinski, 2009; Kreijns, Kirschner, & Jochems, 2003) and sense of community (Ke, 2010; Swan, 2002), play a crucial role in establishing and supporting online interactions.

Discussion of results

The results of the study are discussed around the three major findings: (1) students' attitude toward collaborative learning and sense of community are correlated, (2) a positive attitude toward collaborative learning has a higher degree of correlation with sense of community than a negative attitude does, and (3) graduate students have a higher degree of correlation than undergraduates do between their attitude toward collaborative learning and sense of community.

Correlation studies are aimed to clarify the relationships and patterns of relationship among the variables under study (Fraenkel, Wallen, & Hyun, 2019). This study does not intend to make any causation claims, meaning that one event is responsible for the change of the other event. The following paragraphs elaborate on the findings of the study and relate them with existing studies.

Students' attitude toward collaborative learning and sense of community are significantly correlated

The correlational data analysis of the main study indicated a statistically significant Pearson product-moment coefficient of $r(198) = 0.672$, $p < .01$. This implied that a moderate positive correlation existed between students' attitude toward collaborative learning and students' sense of community while taking online courses. The direction of the correlational coefficient was positive, which means that students' attitude toward collaborative learning and students' sense

of community are positively associated. This may imply that when sense of community would increase, that is, students' feeling of connectedness with other learners in an online learning environment where they are primarily interacting via online collaborative tools, then students' attitude toward collaborative learning would also increase.

This result is corroborated in a research study conducted by Swan (2002), who examined interactions in online courses and explored the relationship between course design factors and student perceptions in 73 online courses. The findings showed that student satisfaction, perceived learning, perceived interaction with the instructor, and perceived interaction with peers were all highly interrelated. Specifically, concentrating on their findings on peer–peer interaction, it can be said that students with higher levels of interaction were associated with having higher levels of satisfaction as well. Swan also observed that students who actively interacted with one another developed a greater sense of social presence. Social presence, in turn, is one of the indicators that helps to create a sense of community (Mayne & Wu, 2011).

Conrad (2005) and Gallagher-Lepak, Reilly, and Killion (2009) support the premise that collaborative work among learners is instrumental in building of communities and creating a sense of community among learners, which corroborates the results of the present study. Both collaborative work and sense of community are desirable in online learning and teaching as both these constructs promote interactions between learners. This is further rooted in the social constructivist theory of learning which explicates that learners are not passive receivers of knowledge, but rather participate in their respective construction of knowledge. Furthermore, Ally (2004) stated, "working with other learners gives learners real-life experience of working in a group and allows them to use their metacognitive skills" (p. 31). So and Brush (2008) added, "collaborative learning is a form of learner and learner interaction" (p. 319).

So and Brush (2008) also found a positive correlation between students high levels of collaborative learning and satisfaction in online courses. This meant that students who perceived higher levels of collaborative learning were more satisfied with their distance course. At the same time, the study found that learners with high levels of collaborative learning also had higher levels of social presence. These researchers conducted interviews with graduate students taking a particular online course. The analysis of the interview data revealed three critical factors associated with learners' perception of collaborative learning, social presence, and satisfaction. They were course structure, emotional support, and communication. Based on the previous research, one can say that interaction between learners is one of the key elements of collaborative learning, and that an increase in interaction would enhance collaborative learning as well (Ching & Hsu, 2013; Kreijns et al., 2003). Hrastinski (2009, p. 78) stated that "participation and learning are argued to be inseparable and jointly constituting. That is, if we want to enhance online learning, we need to enhance online learner participation". Students' attitude toward collaborative learning is positively correlated to sense of community, as determined in the present study. As a result, it would be of great interest to the research community to investigate more the kinds of collaborative activities, their efficacies and how they impact student's sense of community in online learning environments.

Positive attitude toward collaborative learning correlated positively with sense of community

By comparison of the inter-item correlational coefficients, it was evident in the present study that the correlation between the positive attitude toward collaborative learning and

the four dimensions of sense of community (membership, influence, integration and fulfillment of needs, and shared emotional connection) was much higher than the correlation between the negative attitude toward collaborative learning and sense of community dimensions. Recall that in this study, the attitude toward collaborative learning was equated to the students' attitude toward using online collaborative tools such as discussion boards, blogs, Wikis, and others.

Edmunds et al. (2012) argued that the "usefulness and ease of use are key aspects of students' attitudes towards technology in all areas" (p. 83). Further, the attitude of learners toward using online collaborative tools is important for the success of collaboration. Liaw et al. (2008) studied web-based collaborative learning systems for knowledge management and proposed five attitude factors that affect the use of such web-based collaborative learning systems; namely, system functions, collaborative activities, learners' characteristics, system acceptance, and system satisfaction. They further investigated the factors that affect learners' acceptance or rejection of online collaborative tools and proposed an acceptance model for realizing learners' attitudes toward web-based collaborative systems.

In light of this existing research and the results of the current study, one may argue that an increase in students' positive feeling regarding the use of online collaborative tools will relate to a greater use of such tools for collaborative learning. Hence, a greater use of online collaborative tools seems to imply an increase in online collaborative learning by the students. This study did not delve into the kinds of collaborative tools available in the online courses examined. This area could serve as a potential topic for further exploration.

Bifurcation of results and findings between graduate and undergraduate students

The data set of the main study was further analyzed based on the academic classification of the participants as undergraduate and as graduate students. It was interesting to note that in both cases, collaborative learning and sense of community were positively correlated. The degree of correlation, however, was higher among graduate students than among undergraduate students. It has been observed that student maturity plays a role in online learning (Johnson, 2015; Lawther & Walker, 2001), although this is an area that needs further research and investigation. Richardson, Maeda, Lv, and Caskurlu (2017) meta-analysis examined student outcomes (e.g., perceived learning and satisfaction) in relation to social presence. Results showed that "social presence may very well predict students' satisfaction and perceived learning" (Richardson et al., 2017, p. 413). In a study with 131 graduate students enrolled in online courses, Rockinson-Szapkiw, Wendt, Whighting, and Nisbet (2016) found that the community of inquiry framework and perceived learning were effective on predicting online graduate students' learning outcomes.

Conclusions

Results showed that collaboration and sense of community were moderately correlated. As the positivity of students' attitudes toward collaborative learning increased, their sense of community increased proportionally. Additionally, the degree of correlation between sense of community and collaborative learning was higher among graduate students than among undergraduate students.

This correlational study gives an educated insight into the interplay of collaborative learning and sense of community in online learning. The variability in the correlation

according to academic classification (graduate versus undergraduate) is a novel finding of this study and can be further investigated to discover more about the variance in sense of community and collaborative learning.

As far as practical implications go, educators and learning designers may need to rethink the design of their online courses to incorporate elements of collaborative learning and strategies to develop a sense of community. Doing so seems to support an increase of learner satisfaction when taking online courses. This seems consistent with Rockinson-Szapkiw et al. (2016) recommendations that "in initial design of online courses as well as online course redesign in graduate educational settings, the CoI [community of inquiry] framework may provide guidelines for the construction of the course" (para.31).

Limitations of the study and directions for future research

A self-reported instrument was used to collect the data about students' level of agreement with the items in the questionnaire. There is always room for interpretation of the constructs that the data collection instrument was measuring.

Employing regression analysis to determine the equation of prediction can further extend this study. Such an equation can help determine the percentage of variability in the dependent variable. This will provide a more definitive insight into the causal effect of the observed correlation between collaborative learning and sense of community.

The variability in the data set according to academic classification is another area that can be further investigated. An inquiry into the factors that affect the motivation levels of graduate and undergraduate students may shed additional light on such variability.

Another possibility is to investigate the students' perceptions of discussion boards, wikis, social networking tools, and Google Docs as supporting collaboration and collaborative learning. Even though instructors may perceive these tools as collaborative in online learning environments, students may perceive these as a way to comply in order to get a good grade in the online course and not necessary as spaces of active online participation.

References

Abfalter, D., Zaglia, M. E., & Mueller, J. (2012). Sense of virtual community: A follow up on its measurement. *Computers in Human Behavior*, *28*(2), 400–404. doi:10.1016/j.chb.2011.10.010

Ally, M. (2004). Foundations of educational theory for online learning. In T. Anderson & F. Elloumi (Eds.), *Theory and practice of online learning* (pp. 3–31). Athabasca: Athabasca University. Retrieved from http://cde.athabascau.ca/online_book/ch1.html

Baker, K. Q., & Moyer, D. M. (2018). The relationship between students' characteristics and their impressions of online courses. *American Journal of Distance Education*. doi:10.1080/08923647.2019.1555301

Bento, R., & Schuster, C. (2003). Participation: The online challenge. In A. Aggarwal (Ed.), *Web-based education: Learning from experience* (pp. 156–164). Hershey, PA: Idea Group.

Blanchard, A. L. (2007). Developing a sense of virtual community measure. *Cyber Psychology and Behavior*, *10*(6), 827–830. doi:10.1089/cpb.2007.9946

Brindley, J., Blaschke, L. M., & Walti, C. (2009). Creating effective collaborative learning groups in an online environment. *The International Review of Research in Open and Distributed Learning*, *10*(3). doi:10.19173/irrodl.v10i3.675

Cameron, B. A., Morgan, K., Williams, K. C., & Kostelecky, K. L. (2009). Group projects: Student perceptions of the relationship between social tasks and a sense of community in online group work. *American Journal of Distance Education*, *23*(1), 20–33. doi:10.1080/08923640802664466

Chavis, D. M., Lee, K. S., & Acosta, J. D. (2008). The Sense of Community (SCI) revised: The reliability and validity of the SCI-2. Paper presented at the 2nd International Community Psychology Conference, Lisbon, Portugal (4–6 June).

Ching, Y. H., & Hsu, Y. C. (2013). Collaborative learning using VoiceThread in an online graduate course. *Knowledge Management & E-Learning: An International Journal*, *5*(3), 298–314.

Conrad, D. (2005). Building and maintaining community in cohort-based online learning. *Journal of Distance Education*, *20*(1), 1–20.

Dawson, S. (2006). A study of the relationship between student communication interaction and sense of community. *The Internet and Higher Education*, *9*(3), 153–162. doi:10.1016/j.iheduc.2006.06.007

DiRamio, D., & Wolverton, M. (2006). Integrating learning communities and distance education: Possibility or pipedream? *Innovative Higher Education*, *31*(2), 99–113. doi:10.1007/s10755-006-9011-y

Edmunds, R., Thorpe, M., & Conole, G. (2012). Student attitudes towards and use of ICT in course study, work and social activity: A technology acceptance model approach. *British Journal of Educational Technology*, *43*(1), 71–84. doi:10.1111/bjet.2012.43.issue-1

Fraenkel, J. R., Wallen, N. E., & Hyun, H. (2019). *How to design and evaluate research in education* (10th ed.). New York, NY: McGraw-Hill.

Gallagher-Lepak, S., Reilly, J., & Killion, C. (2009). Nursing student perceptions of community in online learning. *Contemporary Nurse*, *32*(1–2), 133–146. doi:10.5172/conu.32.1-2.133

Hrastinski, S. (2009). A theory of online learning as online participation. *Computers & Education*, *52*(1), 78–82. doi:10.1016/j.compedu.2008.06.009

Ishtaiwa, F. F., & Aburezeq, I. M. (2015). The impact of Google Docs on student collaboration: A UAE case study. *Learning, Culture and Social Interaction*, *7*, 85–96. doi:10.1016/j.lcsi.2015.07.004

Johnson, G. M. (2015). On-Campus and Fully-Online University Students: Comparing demographics, digital technology use and learning characteristics. *Journal Journal of University Teaching & Learning Practice, 12(1), 1-13.*

Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students. *Computers & Education*, *55*(2), 808–820. doi:10.1016/j.compedu.2010.03.013

Korkmaz, Ö. (2012). A validity and reliability study of the Online Cooperative Learning Attitude Scale (OCLAS). *Computers & Education*, *59*(4), 1162–1169. doi:10.1016/j.compedu.2012.05.021

Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behavior*, *19*(3), 335–353. doi:10.1016/S0747-5632(02)00057-2

Kreijns, K., Kirschner, P. A., Jochems, W., & Van Buuren, H. (2007). Measuring perceived sociability of computer-supported collaborative learning environments. *Computers & Education*, *49*(2), 176–192. doi:10.1016/j.compedu.2005.05.004

Laal, M., & Ghodsi, S. M. (2012). Benefits of collaborative learning. *Procedia-Social and Behavioral Sciences*, *31*, 486–490. doi:10.1016/j.sbspro.2011.12.091

Laal, M., & Laal, M. (2012). Collaborative learning: What is it? *Procedia-Social and Behavioral Sciences*, *31*, 491–495. doi:10.1016/j.sbspro.2011.12.092

Lawther, P., & Walker, D. H. T. (2001). An evaluation of a distributed learning system. *Education & Training*, *43*(2), 105–116. doi:10.1108/EUM0000000005426

Liaw, -S.-S., Chen, G.-D., & Huang, H.-M. (2008). Users' attitudes toward Web-based collaborative learning systems for knowledge management. *Computers & Education*, *50*(3), 950–961. doi:10.1016/j.compedu.2006.09.007

Mayne, L. A., & Wu, Q. (2011). Creating and measuring social presence in online graduate nursing courses. *Nursing Education Perspectives*, *32*(2), 110–114. doi:10.5480/1536-5026-32.2.110

McMillan, D. W., & Chavis, D. M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology*, *14*(1), 6–23. doi:10.1002/(ISSN)1520-6629

Revere, L., & Kovach, J. V. (2011). Online technologies for engaged learning: A meaningful synthesis for educators. *Quarterly Review of Distance Education*, *12*(2), 113–124.
Richardson, J. C., Maeda, Y., Lv, J., & Caskurlu, S. (2017). Social presence in relation to students' satisfaction and learning in the online environment: A meta-analysis. *Computers in Human Behavior*, *71*, 402–417. doi:10.1016/j.chb.2017.02.001
Rockinson-Szapkiw, A., Wendt, J., Whighting, M., & Nisbet, D. (2016). The predictive relationship among the community of inquiry framework, perceived learning and online, and graduate students' course grades in online synchronous and asynchronous courses. *The International Review of Research in Open and Distributed Learning*, *17*(3). Retrieved from. doi:10.19173/irrodl.v17i3.2203
Rovai, A. (2002a). Building sense of community at a distance. *The International Review of Research in Open and Distance Learning*, *3*(1). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/79/152
Rovai, A. P. (2002b). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education*, *5*(4), 319–332. doi:10.1016/S1096-7516(02)00130-6
Shen, D., Nuankhieo, P., Huang, X., Amelung, C., & Laffey, J. (2008). Using social network analysis to understand sense of community in an online learning environment. *Journal of Educational Computing Research*, *39*(1), 17–36. doi:10.2190/EC.39.1.b
So, H. J., & Brush, T. A. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, *51*(1), 318–336. doi:10.1016/j.compedu.2007.05.009
Swan, K. (2002). Building learning communities in online courses: The importance of interaction. *Education, Communication & Information*, *2*(1), 23–49. doi:10.1080/1463631022000005016
Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's Alpha. *International Journal of Medical Education*, *2*, 53–55. doi:10.5116/ijme.4dfb.8dfd
Zhu, C. (2012). Student satisfaction, performance, and knowledge construction in online collaborative learning. *Journal of Educational Technology & Society*, *15*(1), 127–136.

Appendix A. Online Sense of Community-Collaborative Learning Combined Questionnaire

Experience in Online Learning

Please choose your current status.
☐ Undergraduate
☐ Graduate
☐ Other:

Please indicate how much your online course uses collaborative activities.
Collaborative activities involve online collaborative tools such as discussion boards, wikis, social networking tools, Google Docs, etc.

☐ >75% or more of the time
☐ 50% - 75% of the time
☐ 25% - 50% of the time
☐ <25% of the time
☐ Other:

Please indicate your course name and number:

Please choose your Learning Management System.

- BlackBoard Learn
- Moodle
- Other:

Experience with collaborative learning

Instructions:
Select the number that best indicates your level of agreement with the statement.
Online collaborative tools allow opportunities for interactive work with peers. Examples include Google Docs, wikis, discussion boards, and others. [Editor's note: All following questions required respondents to answer on scale: 1) Never, 2) Seldom, 3) Sometimes, 4) Mostly, 5) Always]

Being interactive with peers using online collaborative learning tools increases my motivation for learning.

I enjoy experiencing online collaborative learning using online collaborative tools with my peers.

Online collaborative activity increases our creativity.

I believe that collaborative work can be effective when using online collaborative tools.

Online collaborative activities improve social skills.

I enjoy solving issues regarding collaborative work using online collaborative tools with my peers.

More ideas come up when working collaboratively using online collaborative tools.

Online collaborative tools are very entertaining to me.

I think I have had/will have more successful results as I work collaboratively with my peers using online collaborative tools.

Trying to teach something to my peers using online collaborative tools makes me tired.

Online collaborative tools are not suitable for me.

Your sense of community in an online learning environment

Instructions:
Select the number that best indicates your level of agreement with the statement.
Peers in your online course or peers who are part of your groups/team in the online course form your online learning community. [Editor's note: All following questions required respondents to answer on scale: 1) Never, 2) Seldom, 3) Sometimes, 4) Mostly, 5) Always]

I get important needs met because I am part of this online learning community.

When I have a problem I can talk about it to the members of this learning community.

People in this learning community have similar needs, priorities, and goals.

I can trust people in this community.

Most learning community members know me.

Fitting into this learning community is important to me.

If there is a problem in the community, members can get it solved.

It is important for me to be a part of this online learning community.

Members of this learning community care for each other.

I feel hopeful that this learning community will last beyond the end of the course.

I enjoy being with the members of this learning community.