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Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks

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Abstract

The primary purpose of this study was to determine if a relationship exists between sense of community and cognitive learning in an online educational environment. Study participants consisted of 314 students enrolled in 26 graduate education and leadership courses taught at a distance using the Blackboard.comSM e-learning system. Study results provided evidence that a significant relationship exists between classroom community and perceived cognitive learning. Online learners who have stronger sense of community and perceive greater cognitive learning should feel less isolated and have greater satisfaction with their academic programs, possibly resulting in fewer dropouts.

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1. Introduction

Distance education is becoming a mainstream instructional delivery system for post-secondary courses and degree programs. Today, student recruitment often depends on the availability of distance education program options (Belcher, 1996; Martin, 1996). Cantelon (1995, p. 5) projects that in the future, “most of higher education will take place off-campus through technological methods of delivery.” Several distance education models are

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presently in use, such as broadcast television, video and audio teleconferencing, and asynchronous learning networks (ALNs)—people networks for anytime, anywhere learning via the Internet.

Research evidence suggests that for many students, ALN programs provide a high level of satisfaction, particularly regarding flexibility of time and place for learning and the emphasis on interpersonal interaction (e.g., [Arbaugh, 2000](#)). However, there remain lingering concerns related to distance education, given the present state-of-art of the technology, course design, and pedagogy. Two issues have received considerable attention in the professional literature. They are the higher dropout rates for distance education over traditional programs (e.g., [Bernard & Amundsen, 1989](#); [Carr, 2000](#)) and the low quality of learning attainment that some educators and some students perceive (e.g., [Abrami & Bures, 1996](#)), despite evidence that suggests distance education can achieve similar or superior results when compared to traditional courses ([Verduin & Clark, 1991](#)). These issues have generated interest among educators concerning the nature of distance learning environments and the learning possibilities achievable through technology. Knowing the problems and overcoming them will be critical to successful implementation of distance education programs in the future.

1.1. Persistence

Persistence in distance education programs can be significantly lower than that of traditional face-to-face programs ([Bernard & Amundsen, 1989](#); [Carr, 2000](#)). [Carr \(2000\)](#), writing for the *Chronicle of Higher Education*, noted that dropout rates are often 10–20 percentage points higher in distance education courses than in traditional courses. She also reported significant variation among institutions; with some post-secondary schools reporting course-completion rates of more than 80% and others finding that fewer than 50% of distance education students finish their courses. There are many interrelated contributing reasons why students drop out of distant programs, such as limited support and services offered at a distance by some schools, large financial commitments, competing student demands such as care of children and other social obligations, changing work situations, dissatisfaction with teaching methods, low learner self-confidence and self-perception, unfamiliarity with the technology used by the distance education program, and student feelings of isolation ([Besser & Donahue, 1996](#); [Bullen, 1998](#); [Cookson, 1990](#); [Tinto, 1993](#)). These factors vary by students and many factors are beyond the control of the school to influence, while other factors can be managed by the school.

In order to improve persistence in distance education programs, schools need to assist students in making the adjustment to learning at a distance by enhancing student satisfaction and commitment. According to [Tinto \(1993\)](#), those students who possess strong feelings of community are more likely to persist than those students who feel alienated and alone. Therefore, one strategy to help increase retention is to provide students with increased affective support by promoting a strong sense of community. Such a strategy has the potential to reverse feelings of isolation and, by making

connections with other learners, to provide students with a larger base of academic support by increasing the flow of information among all learners.

Research provides evidence that strong feelings of community may not only increase persistence in courses but may also increase the commitment to group goals, cooperation among members, satisfaction with group efforts, and motivation to learn (Bruffee, 1993; Dede, 1996; Frymier, 1993; Wellman, 1999). Royal and Rossi (1996) suggest that learners' sense of community is also related to their engagement in school activities, with students higher in sense of community being less likely to report thoughts of dropping out of school and more likely to report feeling bad when unprepared for classes. Additionally, they report that students reporting a high sense of community feel burned out less often at school.

1.2. Purpose

The research findings outlined above suggest sense of community is directly related to a variety of desirable outcomes. However, what is not fully understood at present, and where research is lacking, is the relationship of sense of community to cognitive learning in an online educational environment. If online learners feel a sense of community, it is possible that this emotional connectedness may provide the support needed for them not only to complete successfully a class or a program but also to learn more. If strong sense of community is related to increased persistence as well as to increased learning, then sense of community becomes a foundation upon which to design and facilitate online instruction. Accordingly, the purpose of the present study was to determine if a significant relationship exists between sense of community and cognitive learning in an online educational environment, and if so, to determine the strength and direction of that relationship.

1.3. Sense of community

Despite the existence of a large body of literature on sense of community, there is no universally accepted definition of the term "sense of community." However, the literature contains several useful conceptualizations. For example, Unger and Wandesman (1985, p. 155) define sense of community as "feelings of membership and belongingness and shared socio-emotional ties," while Sarason (1974, p. 157) identifies the characteristics of sense of community as "the perception of similarity to others, and acknowledged interdependence with others, a willingness to maintain this interdependence, . . . a feeling that one is part of a larger dependable and stable structure." Additionally, McMillan and Chavis (1986, p. 9) offer the following definition of community, "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together." These various views of community identify or imply the most essential elements of sense of community: mutual interdependence among members, connectedness, trust, interactivity, and shared values and goals.

Hill (1996) and Rheingold (1991) identified the need for extensive research in a variety of contexts to fully understand sense of community. They believe that the components of community differ from setting to setting suggesting that sense of community is setting specific. One such setting is education, the focus of the present study.

Drawing on the work of McMillan and Chavis (1986), Sarason (1974), and Unger and Wandersman (1985), one can define classroom community as a feeling that members have of belonging, a feeling that members matter to one another and to the group, that they have duties and obligations to each other and to the school, and that they possess shared expectations that members' educational needs will be met through their commitment to shared learning goals. One can, therefore, constitutively define classroom community as consisting of two components: feelings of connectedness among community members and commonality of learning expectations and goals.

Connectedness, the first component, is the feeling of belonging and acceptance and the creation of bonding relationships. This latter element is related to the quality of interpersonal relationships and is frequently labeled in the professional literature as the ethic of caring (Grant, 1988). Connectedness denotes recognition of membership in a community and the feelings of friendship, cohesion, and satisfaction that develop among learners. Once individuals are accepted as part of a nourishing learning community, they develop feelings of safety and trust. With safety and trust comes the willingness of community members to speak openly. This candor is important to a classroom community because with trust comes the likelihood that members will expose gaps in their learning and feel that other members of the community will respond in supportive ways. "When there is trust among people, relationships flourish; without it, they wither" (Preece, 2000, p. 191).

Learning, the second component of classroom community, is the feeling that knowledge and meaning are actively constructed within the community, that the community enhances the acquisition of knowledge and understanding, and that the learning needs of its members are being satisfied. For a classroom community to flourish, members must not only identify with the group but must also internalize at least partial acceptance of the group's values and goals. Learning is the goal and consequently represents an indispensable component of classroom community.

A classroom community can therefore be viewed as a social community of learners who share knowledge, values, and goals. Such communities are weak when members are disconnected with each other because of little interaction, mistrust, competition, the presence of social cliques that reinforce their own identity and exclude others, are recipients of mostly one-way communications, or because members do not share common learning goals or values. Classroom community is strong when learners (a) feel connected to each other and to the instructor, (b) manifest the immediate communication behaviors that reduce social and psychological distance between people (Mehrabian, 1971), (c) share common interests and values, (d) trust and help each other, (e) actively engage in two-way communications, and (f) pursue common learning objectives. However, the question arises, is increased learning an outcome of strong classroom communities?

1.4. Cognitive learning

Educators largely view learning in terms of cognitive change. Previous studies have compared (a) levels of learner outcomes as measured by final grades or (b) course outcomes between distance learning and on-campus students. Verduin and Clark (1991) reviewed 56 studies comparing academic achievement of students in conventional classrooms with that of students in a variety of distance learning programs and found that students using “DE methods achieve similar, if not superior, results when compared with conventional methods of teaching” (p. 213). Dumont (1996) and Hiltz and Wellman (1997) report that student grades continue to be the most prevalent measure of student learning outcomes.

However, using grades to operationalize learning may not always provide the best results. Classroom test grades or final course grades, particularly for graduate university courses, tend to have very restricted ranges, i.e., they tend to reflect uniformly superior achievement, thus limiting their use in any correlation study. Whenever a variable’s range is restricted, any correlation involving that variable will be artificially reduced. Additionally, grades can have little relationship to what students have learned. For example, students may already know the material when they enroll or their grade may be more related to class participation, work turned in late, or attendance than to cognitive learning. Furthermore, grades may not be a reliable measure of learning, particularly for performance tests, as different teachers and even the same teacher at different times will likely not assign grades in a consistent manner. Therefore, using grades as a measure of cognitive learning can be problematic.

Research evidence suggests self-reports can be a valid measure of cognitive learning. Pace (1990) supported the validity of student self-reports of cognitive learning based on research evidence that suggested the consistency of results over time and across different populations. He also found that patterns of outcomes vary for self-reports of learning across majors and length of study in the same manner as was established through direct achievement testing. In a summary of this literature, Corrallo (1994, p. 23) noted, “there is a considerable literature concerned with establishing the validity of student self-reports about cognitive outcomes.” He concluded that self-reports of cognitive gain are indicative of results obtained through more direct forms of assessment. Accordingly, the present study uses a self-report measure to operationalize cognitive learning.

2. Methodology

2.1. Participants

The volunteer rate for this study was 65.69% (i.e., 314 out of 478 students) enrolled in 26 online courses. Males represented 28.66% of participants and the remaining 71.34% were females. The ethnic breakdown was: White, 62.42%; African American, 26.43%; and others, 11.15%. The mean age of the 302 participants who divulged this information was 39.25

(S.D. = 9.45). The ratio of male and female students and ethnicity was approximately equal across all courses. All participants were enrolled in graduate courses offered at a distance during the same semester.

2.2. *Treatment*

The 26 classes examined by this study were delivered at a distance by an accredited private university in the state of Virginia using the Blackboard.comSM e-learning system. This system consists of an integrated set of application tools that are accessible to students via the Internet. These tools fall into four major categories: (a) productivity tools such as calendars, address books, and information services; (b) communication and collaboration tools, the most important of which are discussion boards, e-mail, and group discussion areas; (c) assessment tools such as computer-assisted testing and an online grade book; and (d) content management tools that allow the online instructor to present rich multimedia content, including hypermedia.

All courses were one semester (i.e., 15 weeks) in duration and were taught entirely via the Internet by faculty experienced in online teaching. A total of 17 courses were education courses and the remaining nine courses were leadership courses. The education courses included titles such as School and Community Relations, Foundations of Teaching and Learning, Advanced Human Learning and Motivation, Educational Statistics, Foundations of Distance Education, Multicultural Education, First and Second Language Acquisition, and Technology Integration in Curriculum and Instruction. Leadership courses included Foundations of Effective Leadership, Strategic Vision and Organizational Effectiveness, Ethics and Values in Organizational Transformation, Organizational Strategy, Team Leadership for Organizational Optimization, Organizational Systems for Today's Leaders, Leading People, and The Human Focus of Leadership.

2.3. *Instrumentation*

Data for the study were gathered from (a) the Classroom Community Scale (Rovai, in press) and (b) a self-report measure of perceived cognitive learning (Richmond, Gorham, & McCroskey, 1987).

2.3.1. *Classroom Community Scale*

The Classroom Community Scale relies on student self-reports to measure sense of community and consists of 20 items, such as: "I feel connected to others in this course," "I feel isolated in this course," "I feel uneasy exposing gaps in my understanding," and "I feel that my educational needs are not being met." Following each item is a five-point Likert-type scale of potential responses: strongly agree, agree, neutral, disagree, and strongly disagree. Participants check the place on the scale that best reflects their feelings about the item. Total scores are computed by adding points assigned to each of the 20 five-point items. Items are reverse-scored where appropriate to ensure the most favorable choice is always assigned a value of 4 and the least favorable choice is assigned a value of 0. Therefore, the total possible scores range from 80 to 0, with higher scores reflecting a stronger sense of

classroom community. Similarly, scores for each of the two subscales of connectedness and learning range from 40 to 0. Connectedness represents the feelings of students regarding their cohesion, spirit, trust, and interdependence. Learning represents the feelings of students regarding the quality of their construction of understanding and the degree to which they share values and beliefs concerning the extent to which their learning goals and expectations are being satisfied.

The procedures used to develop the Classroom Community Scale provide high confidence that the instrument is a valid measure of classroom community. Considerable effort was expended to ensure that the concept of community was derived from the professional literature (McMillan & Chavis, 1986; Sarason, 1974; Unger & Wandesman, 1985) and applied to an educational setting. An examination of Classroom Community Scale items revealed that on face value they appear to measure what is needed to assess sense of classroom community in a balanced manner. To evaluate content validity, the Classroom Community Scale was presented to a panel of experts consisting of three university professors who taught courses in educational psychology. Each expert independently rated the relevance of each Classroom Community Scale item to sense of community in a classroom environment as totally relevant.

There is also evidence to support Classroom Community Scale construct validity. Rovai (2002) reported that a factor analysis failed to support the hypothesis of the unidimensionality of the Classroom Community Scale. The direct oblimin rotated solution yielded two highly interpretable factors, connectedness and learning, that accounted for all significant loadings. The connectedness factor accounted for 42.81% of the item variance, and the learning factor accounted for 11.24% of the item variance, thereby yielding a solution that represented over 50% of the data.

Internal consistency estimates of reliability were calculated for the Classroom Community Scale using Cronbach's coefficient alpha. Reliability for the full Classroom Community Scale was .93, indicating excellent reliability. Cronbach's coefficient alpha for the connectedness and learning subscales were .92 and .87, respectively.

2.3.2. Perceived cognitive learning

Perceived cognitive learning was measured by student self-reports of their learning. The instrument employed was first used by Richmond et al. (1987) and has been used in many studies related to cognitive learning since then. Study participants were asked to respond to one question: "On a scale of 0 to 9, how much did you learn in this class, with 0 meaning you learned nothing and 9 meaning you learned more than in any other class you've had?" Since the instrument was a single-item scale, no internal consistency reliability estimates were possible. However, McCroskey, Sallinen, Fayer, Richmond, and Barraclough (1996) reported that test–retest reliability over a 5-day period was .85 in a study of 162 adult learners.

2.4. Procedures

Data were collected during the final 3 weeks of the semester and for 1 week following the semester for each of the 26 online courses sampled in this study so that students

would have substantial exposure to the course about which they were responding. The Classroom Community Scale and the cognitive learning question, along with demographic questions regarding gender, ethnicity, and age were made available to students via an online survey. The researcher sent email to students on a weekly basis during the 4-week data collection period. The e-mail included directions and encouragement for completing the survey.

2.5. Design and data analysis

The present study responds to the following research question: “Is there a relationship between sense of community and perceived cognitive learning in an online educational environment?” A correlation design was used to measure the strength and direction of relationship between variables. Multiple regression procedures were also used to determine how accurately perceived cognitive learning can be predicted by a linear combination of the subscales of the Classroom Community Scale: connectedness and learning. The procedures used for each analysis are described in the Results section below.

3. Results

A total of 314 study participants were measured using the Classroom Community Scale. Means (with standard deviations in parentheses) for classroom community and its two subscales of connectedness and learning were, in order, 57.42 (12.53), 26.51 (7.39), and 30.91 (6.41). Additionally, the mean and standard deviation of perceived cognitive learning were 7.02 (1.65). [Table 1](#) displays descriptive statistics for these variables disaggregated by gender and by ethnicity. [Table 2](#) displays descriptive statistics for each of the 26 online

Table 1
Descriptive statistics by gender and by ethnicity

Factor	Classroom community		Connectedness subscale		Learning subscale		Perceived learning	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
<i>Gender (n = 314)</i>								
Male	55.40	11.99	25.16	7.24	30.24	5.68	6.73	1.63
Female	58.23	12.68	27.05	7.40	31.17	6.68	7.14	1.65
<i>Ethnicity (n = 300)</i>								
African American	58.82	12.04	27.53	7.18	31.29	6.55	7.25	1.46
White	57.73	12.46	26.57	7.51	31.16	6.08	7.04	1.58
Other	54.81	15.30	24.56	7.83	30.14	8.40	6.48	2.32

Total possible classroom community scores can range from 80 to 0, with higher scores reflecting a stronger sense of community. Connectedness and learning subscale scores can each range from 40 to 0 and perceived learning scores can range from 9 to 0.

Table 2
Descriptive statistics by e-learning course

Course	Classroom community		Connectedness subscale		Learning subscale		Perceived learning		n_1	n_2
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.		
1	62.93	10.17	30.20	5.76	32.73	4.71	7.80	0.86	15	20
2	49.19	14.04	22.05	6.63	27.14	8.59	6.00	2.65	21	40
3	56.00	11.72	25.22	6.92	30.78	5.75	6.87	1.46	23	23
4	61.80	8.55	28.20	3.93	33.60	5.38	7.53	1.36	15	18
5	51.81	10.22	23.75	5.54	28.06	5.31	5.94	2.24	16	27
6	63.56	10.05	30.11	5.37	33.44	5.80	7.28	1.67	18	27
7	65.20	8.39	30.67	5.97	34.53	3.60	8.00	1.31	15	20
8	56.60	14.28	26.35	9.70	30.25	7.43	7.20	1.40	20	31
9	56.80	6.46	27.20	3.90	29.60	3.13	7.40	1.34	5	7
10	47.83	16.87	22.67	6.19	25.17	12.04	5.67	2.16	6	10
11	56.38	12.65	25.63	7.71	30.75	6.71	7.38	1.41	8	14
12	51.50	6.31	23.30	4.60	28.20	4.10	6.80	0.92	10	12
13	56.14	6.89	24.86	7.34	31.29	3.04	6.71	1.60	7	7
14	64.23	9.71	32.31	5.19	31.92	5.66	7.46	1.61	13	23
15	53.22	14.10	22.65	8.17	30.57	6.44	7.17	1.37	23	46
16	61.57	6.19	28.29	3.20	33.29	5.38	7.14	0.69	7	12
17	62.33	13.71	30.56	8.31	31.78	5.74	6.78	1.39	9	14
18	48.75	19.28	22.25	11.67	26.50	9.85	6.0	1.63	4	7
19	54.80	22.98	25.60	11.59	29.20	11.97	6.20	2.39	5	12
20	66.50	13.18	32.25	7.41	34.25	6.08	6.75	1.26	4	4
21	42.33	10.97	17.00	5.57	25.33	5.51	5.33	1.15	3	5
22	46.60	6.54	20.60	2.70	26.00	4.18	7.20	1.79	5	6
23	56.20	7.79	23.80	5.59	32.40	4.98	6.00	2.12	5	7
24	62.40	10.66	31.00	5.31	31.40	6.61	7.67	1.18	15	24
25	59.55	12.65	27.00	8.36	32.55	5.69	7.28	1.65	20	27
26	57.73	11.90	26.09	7.32	31.64	5.31	7.23	1.15	22	35

Total number of participants = 314; n_1 = number of participants per course; total number of students = 478; n_2 = number of students per course.

Total possible classroom community scores can range from 80 to 0, with higher scores reflecting a stronger sense of community. Connectedness and learning subscale scores can each range from 40 to 0 and perceived learning scores can range from 9 to 0.

courses sampled by this study. Independent t tests provided evidence that both connectedness, $t(312) = 2.07$, $P = .04$, $\eta^2 = .014$, and cognitive learning, $t(312) = 2.00$, $P = .048$, $\eta^2 = .004$, were higher in females. However, the strength of relationships between gender and both connectedness and perceived learning, as evaluated by η^2 , were weak. There were no significant differences in overall sense of classroom community and the learning subscale by gender. One-way between-subjects ANOVAs revealed no significant differences in any of the four variables by ethnicity. Furthermore, there were no differences in these variables based on course content (i.e., education and leadership).

Pearson product-moment correlation coefficients were computed to determine bivariate correlations among classroom community, the connectedness and learning subscales, and

Table 3

Intercorrelations between classroom community and its subscales and the perceived cognitive learning measure

Scale	1	2	3	4
1. Classroom community	–	.92	.89	.63
2. Connectedness subscale		–	.65	.51
3. Learning subscale			–	.64
4. Perceived cognitive learning				–

perceived cognitive learning. The results are displayed in Table 3. All correlations were positive and statistically significant at the .01 level (two-tailed). A standard multiple regression was also conducted to evaluate how well the classroom community subscales predict perceived cognitive learning. Tests of assumptions were satisfactory. The Durbin–Watson statistic of 2.10 suggested the absence of serial correlation of error terms for adjacent cases. Additionally, an examination of eigenvalues and variance proportions suggested multicollinearity was not a problem. The multiple regression solution revealed that the linear combination of the connectedness and learning subscales were significantly related to perceived cognitive learning, $F(2,311) = 115.68, P < .001$. The multiple correlation coefficient was .65, indicating that approximately 43% of the variance of perceived cognitive learning in the sample can be accounted for by the linear combination of the two classroom community subscales.

4. Discussion

While the two issues of high dropouts and low cognitive learning in distance education programs have frequently been investigated as isolated phenomena, this study suggests that the common factor affecting both dropout rate and cognitive learning may be sense of community in online courses and programs. Increasing feelings of community should not only help reduce feelings of isolation as theorized by Tinto (1993), but should also increase motivation to learn and make available a larger set of resources in the form of other learners who can be called upon to assist learning (Frymier, 1993; Gibbs, 1995). Such outcomes can promote cognitive learning, as suggested by the positive significant relationship between sense of community and cognitive learning found in the present study. Online learners who have stronger sense of community and perceive greater cognitive learning should feel less isolated and have greater satisfaction with their academic programs, thereby resulting in fewer dropouts.

The multiple regression solution revealed that the connectedness and learning subscales were significantly related to perceived cognitive learning. Together, the connectedness and learning subscales explain approximately 43% of the variance of perceived cognitive learning in the sample. However, a positive bias influences the strength of relationship between these variables because of the inclusion of the learning subscale in the analysis. Although the learning subscale does not measure perceived learning, it does measure feelings about the ability of the classroom community to satisfy educational goals. Perhaps a more objective

measure of the relationship between sense of community and cognitive learning is represented by the .51 strength of relationship between the connectedness subscale and perceived cognitive learning. This correlation coefficient suggests that the connectedness subscale explains approximately 25% of the variance of perceived cognitive learning in the sample. Although this strength of relationship is not large, it is significant and one needs to consider that many factors undoubtedly influence perceived learning. Therefore, the influence of any one factor is not likely to be large.

Data analysis revealed no differences in the Classroom Community Scale and its two subscales based on ethnicity and gender, with one noteworthy exception. The mean of the connectedness subscale was significantly higher in female participants than in male participants, suggesting females, on average, felt more connected to the virtual classroom community than did their male counterparts. However, this relationship was weak in the present study. This finding of gender-related differences is consistent with the theory promoted by [Belenky, Clinchy, Goldberger, and Tarule \(1986\)](#) who theorized two paths of normal development in adult learning, which result in two different communication patterns: (a) independent voice—the independent, autonomous, or independent path, which is typical of the majority of men (and some women), and (b) connected voice—the relational, connected, or interdependent path, which reflects the majority of women (and some men). This model suggests that many female students place emphasis on relationships and prefer to learn in an environment where cooperation is stressed over competition. The connected voice nurtures classroom community-building while the independent voice does not.

In a study examining online communication patterns, [Herring \(1996\)](#) found significant differences by gender along the lines identified by [Belenky et al. \(1986\)](#) and theorized that gender-based communication styles, and the power dynamics and biases associated with these styles, carry over into electronic environments. [Rovai \(2001\)](#) also found similar gender differences in his case study of sense of community and gender-related communication patterns of university students enrolled in an ALN course and found evidence to support the hypothesis that students with the connected voice tend to have stronger feelings of community. The threat to community occurs when one or more students use an authoritative tone in online discussions and those students who have a more inclusive style of discourse feel put off and reduce their discussion participation. Consequently, online instructors should ensure equal opportunities for participation by all students. Instructor facilitation techniques such as interjecting an alternative view in a discussion thread and soliciting views from other students, or perhaps even something by way of an offline chat with an aggressive student might be in order. Of additional interest was the finding that female participants, who manifested stronger feelings of connectedness, also felt that they learned more than their male counterparts, reinforcing the notion that sense of community and perceived cognitive learning are related.

5. Conclusions

The Classroom Community Scale, with its two subscales, and the perceived learning measure allow for the study of classroom community to include the hypothesized relation-

ships between sense of community and cognitive learning in an adult population. The present study provides evidence that (a) online graduate students can feel connected to their virtual classroom community, (b) students with stronger sense of community tend to possess greater perceived levels of cognitive learning, (c) female online students tend to have a greater sense of connectedness and perceived cognitive learning than their male counterparts, suggesting that gender-related differences, such as communication patterns may be involved, and (d) ethnicity and course content do not appear to affect sense of community and perceived cognitive learning in an online environment, as expected.

The results of the present study should not be construed to suggest that there is a causal relationship between sense of community and cognitive learning. There may be a presently unknown third variable that is related to both of these variables that explains the relationship. Furthermore, if the relationship were causal, one cannot be sure of the temporal precedence. For example, does stronger sense of community result in more cognitive learning or does higher levels of learning promote sense of community? More study is required using other samples and distance education delivery systems before any definitive conclusion can be made regarding the nature of the relationship of classroom community and cognitive learning. Additionally, research is needed to identify ways in which online faculty can add value to the online learning experience, particularly regarding course design and pedagogy that promote higher levels of sense of community and learning.

This study makes the assumptions that participants in the present study are typical students that participate in online distance education programs and that the instructors, course designs, and pedagogy sampled in this study are representative of online courses. However, these assumptions may not be completely valid. Consequently, the ability to generalize findings beyond the present study is limited because only one university was sampled and the learner characteristics, course content, course design, and pedagogy used by the online instructors in the present study may not be fully representative of other instructors and other settings. Additionally, study results may not generalize to other distance education formats, such as television-based systems. Furthermore, all the limitations associated with *ex post facto* research designs also apply to this study. In particular, the researcher exercised no control over the courses examined in the present study. Finally, the measurement of sense of community and perceived cognitive learning were limited to self-report measures. Other variables that could also be important in studies of community are instructor communication styles, student stages of learning and instructor teaching styles, pedagogy, instructor immediacy, and course content, size, and length. Future research might examine the relationship of these variables to classroom community and identify course designs and pedagogy that promote classroom community in various distant learning environments.

The e-learning environment presents great opportunities and risks. The presence of anytime, anywhere learning via the Internet suggests that online learning can be a popular alternative for many students who do not have the opportunity to attend traditional face-to-face classes or who prefer the independence of this method of education. However, as the novelty effect of online courses wears off, online learners may become less tolerant of poor online course experiences. To be successful, experienced instructors are required that have the

knowledge and skills to elicit student satisfaction. If they achieve this goal, online courses can be inviting and successful learning environments.

According to Harasim, Hiltz, Teles, and Turoff (1995), the online instructor must make the ALN environment feel and function like a classroom, turning the computer screen into a window so that students feel and behave as if they are working together with a group of peers. The instructor's challenge is to create appropriate conditions that support a positive learning experience. A strong sense of community can be created by a combination of facilitation skills, team-building activities, and group interaction.

References

- Abrami, P. C., & Bures, E. M. (1996). Computer-supported collaborative learning and distance education. *American Journal of Distance Education*, 10(2), 37–42.
- Arbaugh, J. B. (2000). Virtual classroom characteristics and student satisfaction in Internet-based MBA courses. *Journal of Management Education*, 24(1), 32–54.
- Belcher, M. J. (1996). *A survey of current and potential graduate students*. Research Report 96-04. Boise, ID: Boise State University. (ERIC Document Reproduction Service No. ED 400 773).
- Belenky, M., Clinchy, B., Goldberger, N., & Tarule, J. (1986). *Women's ways of knowing*. New York: Basic Books.
- Bernard, R. M., & Amundsen, C. L. (1989). Antecedents to dropout in distance education: does one model fit all? *Journal of Distance Education*, 4(2), 25–46.
- Besser, H., & Donahue, S. (1996). Introduction and overview: perspectives on . . . distance independent education. *Journal of the American Society for Information Science*, 47(11), 801–804.
- Bruffee, K. A. (1993). *Collaborative learning: higher education, interdependence, and the authority of knowledge*. Baltimore, MD: John Hopkins University Press.
- Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education* (Revue de l'Éducation à Distance), 13(2), 1–32.
- Cantelon, J. (1995). The evolution and advantages of distance education. In M. H. Rossman, & M. E. Rossman (Eds.), *New directions for adult and continuing education. Facilitating distance education*, vol. 67 (pp. 3–10). San Francisco, CA: Jossey-Bass.
- Carr, S. (2000, February 11). As distance education comes of age, the challenge is keeping the students. *Chronicle of Higher Education*, A39–A41.
- Cookson, P. (1990). Persistence in distance education. In M. G. Moore (Ed.), *Contemporary issues in American distance education* (pp. 192–204). Oxford: Pergamon.
- Corrallo, S. (1994). *A preliminary study of the feasibility and utility for national policy of instructional good practice indicators in undergraduate education*. Contractor Report. National Center for Higher Education Management Systems, U.S. Department of Education, National Center for Education Statistics, 94-437.
- Dede, C. (1996). The evolution of distance education: emerging technologies and distributed learning. *American Journal of Distance Education*, 10(2), 4–36.
- Dumont, R. (1996). Teaching and learning in cyberspace. *IEEE Transactions on Professional Communications*, 39(4), 192–204.
- Frymier, A. B. (1993). *The impact of teacher immediacy on students' motivation over the course of a semester*. Paper presented at the annual meeting of the Speech Communication Association, Miami Beach, FL. (ERIC Document Reproduction Service No. ED 367 020).
- Gibbs, J. (1995). *Tribes*. Sausalito, CA: Center Source Systems.
- Grant, G. (1988). *The world we created at Hamilton High*. Cambridge: Harvard University Press.
- Harasim, L., Hiltz, S. R., Teles, L., & Turoff, M. (1995). *Learning networks: a field guide to teaching and learning online*. Cambridge, MA: MIT Press.

- Herring, S. (1996). Posting in a different voice. In C. Ess (Ed.), *Philosophical perspectives on computer-mediated communication* (pp. 115–145). New York: SUNY.
- Hill, J. L. (1996). Psychological sense of community: suggestions for future research. *Journal of Community Psychology*, 24(4), 431–438.
- Hiltz, S. R., & Wellman, B. (1997). Asynchronous learning networks as a virtual classroom. *Communications of ACM*, 40(9), 44–49.
- Martin, C. (1996). *Institutional research and student recruitment, or how do institutions of higher education know what attracts students to their doors? Market research can help*. Paper presented at the annual forum of the Association for Institutional Research, Albuquerque, NM. (ERIC Document Reproduction Service No. ED 397 744).
- McCroskey, J. C., Sallinen, A., Fayer, J. M., Richmond, V. P., & Barraclough, R. A. (1996). Nonverbal immediacy and cognitive learning: a cross-cultural investigation. *Communication Education*, 45(3), 200–211.
- McMillan, D. W., & Chavis, D. M. (1986). Sense of community: a definition and theory. *Journal of Community Psychology*, 14(1), 6–23.
- Mehrabian, A. (1971). *Silent messages*. Belmont, CA: Wadsworth.
- Pace, C. R. (1990). *The undergraduates: a report of their activities and progress in college in the 1980's*. Los Angeles, CA: Center for the Study of Evaluation, University of California, Los Angeles.
- Preece, J. (2000). *Online communities: designing usability, supporting sociability*. New York: Wiley.
- Rheingold, H. (1991). *The virtual community*: Summit.
- Richmond, V. P., Gorham, J. S., & McCroskey, J. C. (1987). The relationship between selected immediacy behaviors and cognitive learning. In M. A. McLaughlin (Ed.), *Communication yearbook, vol. 10* (pp. 574–590). Newbury Park, CA: Sage.
- Rovai, A. P. (2001). Building classroom community at a distance: a case study. *Educational Technology Research and Development Journal*, 49(4), 35–50.
- Rovai, A. P. (2002). Development of an instrument to measure classroom community. *Internet and Higher Education*, 5(3), 197–211.
- Royal, M. A., & Rossi, R. J. (1996). Individual-level correlates of sense of community: findings from workplace and school. *Journal of Community Psychology*, 24(4), 395–416.
- Sarason, S. (1974). *The psychological sense of community*. San Francisco, CA: Jossey-Bass.
- Tinto, V. (1993). *Leaving college: rethinking the causes and cures of student attrition* (2nd ed.). Chicago: University of Chicago Press.
- Unger, D., & Wandersman, A. (1985). The importance of neighbors: the social, cognitive and affective components of neighboring. *American Journal of Community Psychology*, 13(2), 139–170.
- Verduin, J. R., & Clark, T. (1991). *Distance education: the foundations of effective practice*. San Francisco, CA: Jossey-Bass.
- Wellman, B. (1999). The network community: an introduction to networks in the global village. In B. Wellman (Ed.), *Networks in the global village* (pp. 1–48). Boulder, CO: Westview Press.