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A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses

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Abstract

This paper focuses on two components of a model for online teaching and learning—"teaching presence" and "community". It is suggested that previous research points to the critical role that community plays in academic success and persistence in higher education. Through a review of recent literature it is proposed that teaching presence–viewed as the core roles of the online instructor–is a promising mechanism for developing learning community in online environments. This investigation presents a multi-institutional study of 1067 students across 32 different colleges that further substantiates this claim. An instrument to assess instructor teaching presence ("The Teaching Presence Scale") is presented and validated. Factor and regression analysis indicate a significant link between students' sense of learning community and effective instructional design and "directed facilitation" on the part of course instructors, and highlights interesting differences between online and classroom environments. Alternative hypotheses regarding student demographics associated with variables such as age (the "net generation" effect) and gender are also examined. Despite recent assertions that younger students are or soon will be too sophisticated to "feel at home" in largely text-based asynchronous learning environments, no significant effects were found by demographic differences examined. Recommendations for online course design, pedagogy, and future research are included.

Keywords: Online learning; Community; Teaching presence; Study; Higher education; Learning environments; Inter-institutional research; Community of inquiry model; Classroom community index; Teaching presence scale

1. Introduction

Online teaching and learning have witnessed tremendous growth in recent years, with estimates of more 2.5 million higher education enrollments in complete online courses in the United States (Allen & Seaman, 2004, 2005).

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With such rapid growth in online learning it is crucial that researchers seek to understand how the online classroom impact learners—both socially and academically. Tinto (1997) argues that the classroom is the nexus bridging social and academic integration for college learners—clearly this relationship in the online classroom is also significant for students. Tinto further suggests that what instructors do in the classroom is critical to learners' sense of scholarly "belonging" and ultimate persistence in their academic pursuits. A convincing line of research also supports the critical importance of this kind of community development to overall student success in higher education (Pascarella & Terenzini, 1991; Tinto, 1997) yet questions persist regarding the capacity for fully online environments to support high levels of community (e.g. Brown, 2001; Rovai, 2002a,b). To address some of these concerns, this paper assesses college students' levels of connectedness and learning (a measure of "learning community") in both complete online courses and in classroom-based courses with online components (but not reduced "seat-time", i.e. "hybrid" courses) using Rovai's Classroom Community Index (Rovai, 2002b). The purpose of this study was to investigate the link between "teaching presence" in higher education classroom-based and online learning environments and attendant learner sense of community in these different settings.

2. Background

The conceptual underpinnings for this analysis of community and learning in online higher education environments are derived and adapted from what is known about learning in three arenas. The first is about how people learn generally and is well informed by the work of Bransford et al. (1999). This perspective indicates that good learning environments are learner-centered, knowledge-centered, assessment-centered, and community-centered. Learner-centered environments emphasize the active roles that successful learners play and are designed to allow learners to "own" their learning and to investigate and engage with topics that are personally meaningful. Learner-centered environments are structured to attend to the strengths, goals, interests, and passions of students at the same time striving to emphasize the development of knowledge, skills, and abilities that can transfer beyond the temporal boundaries of the immediate learning experience. Such environments are also focused on assessment in ways that make the learner's thinking visible, so that it can be examined, challenged, and continue to grow. A focus on learner also assumes that they can be helped to strategize about their learning. The community focus in this model suggests that the ways that learning environments are structured, that is whether learner feels secure and comfortable to actively pursue knowledge without fear of unwarranted discouragement or unconstructive judgment, are crucial to their ultimate success.

The second source of conceptual understanding of online learning and community development can be derived from research into higher-education learners specifically. While much of Bransford's work is based on studies of children, a great deal of effort has been made to summarize research on college-age learners. Perhaps the most succinct summary (of more than three decades of investigations) is the seven principles of good practice in undergraduate education offered by Chickering and Gamson (1987). Briefly, this synopsis affirms that good learning environment promote high levels of interaction between students and faculty, time on task, prompt feedback, active roles for learners, a greater emphasis on student cooperation over competitiveness, and a respect for diversity in approaches to learning. These latter three principles again suggest the development of a milieu that fosters a sense of community among learner—joint and cooperative pursuit of educational goals, respect for "cognitive" diversity, and an active role for students.

The third area that provides a conceptual basis for thinking about the importance of online community for learning, and one that applies directly to the online environment, is the more recent work on the concepts of presence outlined in the community of inquiry model (Garrison, Anderson, & Archer, 2000). In this framework the authors propose that a successful community of learners develops as a result of the joint work of instructors and students. This work is evident in the cognitive, social and teaching "presence" that an online course reflects. This paper focuses on the latter of these three forms of presence—the instructional design and organization, facilitation of discourse, and direct instruction that online instructors "do".

These three areas of inquiry converge on the importance of community in effective learning environments. These lines of research are concerned with the development of shared goals, trust, and mutual support–features of high functioning communities–because those characteristics lay the foundation for an effective pedagogy of constructivism—one which values, encourages and sustains productive discourse. It is through effective design of opportunities to fully engage in such discourse that learners can participate in the pedagogical processes that support learning. These processes include the articulation and presentation of current views, the consideration of alternative views expressed in course materials and by classmates and instructors. Ideally these processes also include

opportunities to reflect and re-think previous positions, and the consequent integration of new ideas into existing cognitive structures. At their best, online learning-community models allow participants to actively engage one another in ideas and perspectives they hold to be educationally worthwhile, exciting, and provocative. It is through the design of the learning environment, with an emphasis on shared educational goals, support, collaboration, and trust that these processes can be most effectively and functionally activated. The emphasis on community, shared across such diverse strands of research, reflects recent conceptions of learning that are founded in a "participation" rather than a strict "acquisition" metaphor (Sfard, 1998). The current interest in the development of community in online environments (and traditional environments as well) has arisen from the conceptual change in thinking with regard to what constitutes learning. Sfaard argues that throughout history we have assumed that learning was a matter of accumulation of concepts and gradual knowledge development, as though the human mind was a container, and the learner an owner of an entity called "learning". A dramatic shift in conception of learning has occurred in recent years—as so eloquently stated by Sfaard,

> Learning is now conceived of as a process of becoming a member of a certain community. This entails, above all, the ability to communicate in the language of this community and act according to its norms. The norms themselves are to be negotiated in the process of consolidating the community. While the learners are newcomers and potential reformers of practice, the teachers are the preservers of its continuity. From a lone entrepreneur, the learner turns into an integral member of a team. For obvious reasons, this new view of learning can be called the *participation metaphor*. (Sfaard, p. 6)

While it is beyond the scope of this paper to discuss in detail the complexity and nuance of the ongoing controversy surrounding the acquisition and participation metaphors of learning, the articulation of these distinctions helps to understand why investigations of community in educational research are currently at the forefront. Recent conceptions of learning in either perspective acknowledge the importance of the social means by which learning occurs and through which knowledge is constructed. It is assumed here that both metaphors are needed to understand learning, and that active participation in a collaborative and well functioning community is the coherent mechanism through which knowledge is ultimately developed by the individual.

Research in this area with regard to online environments is ongoing yet limited. One line of inquiry (Rovai, 2002a,b) has been quite productive. Rovai argued that students' sense of connectedness and their knowledge construction develop through participation in supportive learning communities and he developed the Classroom Community Index to attempt to assess whether differences exist between classrooms and online learning environments. The author validated this instrument with a small sample ($n=45$) of students enrolled in online and classroom-based courses. The current study used Rovai's instrument (with a much larger sample) and the varying results are discussed below.

The community of inquiry model (Anderson, Rourke, Garrison, & Archer, 2001; Garrison et al., 2000), from which the concept of teaching presence is derived, reflects and acknowledges the recent construal of learning and knowledge creation. It is argued here that productive "teaching presence" supports the development of higher levels of community among online learners—that goal-directed collaborative interaction known to support a sense of connectedness and active learning can be effectively orchestrated by the three elements of teaching presence: effective design, facilitation, and direction of cognitive and social processes on the part of online instructors. Under the category instructional design and organization in the community of inquiry model the authors include setting curriculum, designing methods, establishing time parameters, utilizing the medium effectively, and establishing group norms via conventions of "netiquette". Another component of teaching presence in the model is facilitating productive discourse. The task of facilitating discourse is necessary to maintain learner engagement and refers to "focused and sustained deliberation that marks learning in a community of inquiry" (Anderson et al., 2001, p. 7). The indicators that reflect discourse facilitation include the identification of areas of agreement and disagreement, seeking to reach consensus and understanding; encouraging, acknowledging, and reinforcing student contributions; setting the climate for learning, drawing in participants, prompting discussion, and assessing the efficacy of the process. Finally the authors also include indicators of direct instruction in their framework for the analysis of teaching presence. These indicators include presenting content and questions, focusing the discussion on specific issues, summarizing discussion, confirming understanding, diagnosing misperceptions, injecting knowledge from diverse sources and responding to technical concerns.

It is argued here that students recognize and can identify when their instructors are satisfying their teaching presence roles and that variations in their sense of connectedness and learning can accurately be modeled based on student

ratings of instructors' teaching presence. In the present study both teaching presence indicators and Rovai's Classroom Community Index are employed to assess this claim in online and classroom environments.

3. Method

3.1. Overview

The goals of this research were to enhance understanding of online pedagogical processes in the service of improving the quality of instruction and learning in a large asynchronous learning environment—thus in many ways this mode of inquiry may be seen as action research. This investigation employed survey research to assess variations in online students' sense of classroom community as it relates to perceived levels of instructors' teaching presence. This was accomplished through the development and implementation of an instrument to measure both learners' sense of connectedness and learning and their perceptions of teaching presence levels. To measure teaching presence, items were devised to assess effective instructional design and organization, facilitation of productive discourse, and direct instruction as described in the community of inquiry model (Anderson et al., 2001; Garrison et al., 2000). This instrument–which is referred to here as the "Teaching Presence Scale" (TPS)–was presented to a random sample of 1067 learners at the end of the fall 2004 academic semester. Validation and measures of reliability of the Teaching Presence Scale are presented below. Demographic information was also gathered to determine their effects on student's levels of connectedness and learning in the online environment. To measure levels of connectedness and learning Rovai's Classroom Community Index (2002a) was used.

3.2. Sample

This paper draws evidence from a random sample of students enrolled in online courses at 32 colleges participating in the program of technology and support processes of the State University of New York Learning Network. In all 2253 students were included in the random sample of which 1067 responded, representing a 47% response rate. Of course, this sample was limited to the students in one state and in one large system—though the system does reflect a diversity of institution types conclusions that can be drawn from this sample are limited. Additionally, the response rate of 47% indicates that these results may not be representative of the overall population of students. Again, caution needs to be applied in interpreting these results. This being said, the sample is fairly well suited to the purposes of this study for a number of reasons. One principle of statistical analysis is that large samples tend to produce more accurate results—with more than 1000 respondents this does represent a large sample. It is also a broad sample, representing online students at many different kinds of institutions, including students learning in community colleges, 4-year liberal arts colleges, technical colleges, and graduate students at university centers–all of various sizes–but all within the same state system, and the same unified online program. Given that the students all used the same online registration system, the same learning management system, had access to the same basic student services (e.g. a single unified student helpdesk), and that online faculty teaching in the system were all required to attend the same training program, many of the potential confounds encountered in cross-institutional research in technology-mediated teaching and learning were avoided.

Respondent demographic information is presented in Table 1. There were 750 (75.0%) females, 250 (25%) males, and 67 unreported. Approximately 40% of the 1067 respondents were between the ages 15 and 25 years, 28% were between 26 and 35 years, 22% were between 36 and 45, 12% were above 46 years old. Over half of respondents were registered as full-time college students and had full-time jobs. Forty-five percent lived less than 30 min drive from campus, 25% were located between 30 min to 1 h, 10% were located between 1 h and 2 h, and 20% lived more than 2 h from campus. The top four reasons for taking online course were conflict with personal schedule (39.6%), family responsibilities (19.7%), course not offered on campus/course schedule conflict (15.7%), and distance or lack of transportation (13.1%). More than 80% of the respondents used what can be termed high-speed internet access either a cable modem, DSL, ISDN, or LAN to access their courses. Eighty eight percent of respondents were complete online students and 12% were "traditional" students. These classroom-based students used the same learning management system as the online students; however, they met in the classroom, using the learning management system as an enhancement or resource rather than a replacement for face-to-face instruction, as was the case with the online students.

Student characteristics have been of interest to a variety of researchers of online environments (see Hiltz & Shea, 2005 for example). The demographics investigated here are of interest because of their potential to impact the students' sense of connectedness and learning—their levels of online "learning community". A number of researchers have hypothesized

Table 1
Demographic information of the participants (n=1067)

	Frequency	Percent	Valid percent
Gender			
Female	750	70.3	75.0
Male	250	23.4	25.0
Missing	67	6.3	
Age			
15–25	385	36.1	38.5
26–35	278	26.1	27.8
36–45	215	20.1	21.5
46–55	108	10.1	10.8
56–65	12	1.1	1.2
65+	2	.2	.2
Missing	67	6.3	
Employment status			
Part-time	250	23.4	25.0
Full-time	562	52.7	56.2
Not employed	188	17.6	18.8
Missing	67	6.3	
Distance from campus			
On campus	34	3.2	3.4
Less than 30 min	411	38.5	41.4
30 min to 1 h	248	23.2	24.8
1 to 2 h	104	9.7	10.4
More than 2 hours	203	19.0	20.3
Missing	171	6.3	
Reasons of taking online course			
Conflict with personal schedule	396	37.1	39.6
Course not offered on campus/schedule conflict	157	14.7	15.7
Distance or lack of transportation	131	12.3	13.1
Family responsibilities	191	17.9	19.1
Interest in technology/internet	38	3.6	3.8
Other	87	8.2	8.7
Missing	67	6.3	
Modem type			
28.8	14	1.3	1.4
33.6	3	.3	.3
56	160	15.0	16.0
Cable modem	373	35.0	37.3
DSL	90	8.4	9.0
ISDN	163	15.3	16.3
LAN	6	.6	.6
Other/don't know	191	17.9	19.1
Missing	67	6.3	
Registration status			
Full-time	518	48.5	51.8
Part-time	482	45.2	48.2
Missing	67	6.3	
Duration categories			
Less than 65	21	1.9	2.0
66 days or more	1022	94.8	98.0
Missing	35	3.3	
Course format			
Online	941	88.2	88.2
Classroom based	126	11.8	11.8

connections between age and levels of satisfaction and engagement with text-based online environments. This line of inquiry suggests that the emergent "net generation" is or will soon be too technologically sophisticated to find the typical, largely text-based, asynchronous learning management systems in use today relevant or useful for their learning (e.g. Dede, 2005;

Manuel, 2002; Oblinger & Oblinger, 2005; Prensky, 2001). Others have reported previously (Shea, Li, Swan, & Pickett, 2005) on research that suggests an association between gender and capacity to establish and maintain social connections (Bostock & Lizhi, 2005; Goldstein & Sadhana, 2004; Shumaker & Hill, 1991; Vandervoort, 2000) which may carry over into online learning environments, and thus considered gender as a variable of possible interest.

It was also hypothesized that distance from campus and reasons for engaging in online instruction might also have a logical connection in regards to potential need for engagement with an online community. For example, students far from campus and the possible social ties that proximity can afford may be eager to establish online connections to others. The same may hold true of students studying online due to, for example, potentially socially-isolating family or work responsibilities, or for students who are part-time. This study also investigated the possible connection between internet connection speed as a barrier to engagement with the online learning setting and community formation. Additionally, the investigation looks at course duration as a contributor to the formation of community online, assuming that courses of longer duration would offer more opportunity for coalescence. Finally differences in levels of learning community between full online courses and courses that were classroom based were examined. In this study, the classroom students used the same course management system (CMS) as the online students used, however, these tools were used only to enhance the classroom—i.e., all instructional sessions were conducted face to face.

Research questions: Does factor analysis indicate that the teaching presence scale measures a coherent latent construct (i.e. "teaching presence")? Do students rate their online and classroom instructors differently on teaching presence (as measured by the Teaching Presence Scale) or on the Rovai Classroom Community Index? Do students ratings of their instructors' teaching presence correlate with their overall sense of connectedness and learning (learning community) as measured by the Classroom Community Index? To what extent does instructors' teaching presence account for variance in students' sense of learning community? To what extent do the components of teaching presence correspond with varying levels of connectedness and learning in online courses as reflected in regression analysis? Do student demographics such as age or gender correspond meaningfully to their reports of connectedness and learning in text-based asynchronous online learning environments? For example, does age contribute meaningfully to a regression equation modeling students' levels of connectedness and learning?

3.3. Measure and procedure

Participants in the study responded to a questionnaire that sought to understand their sense of community in classroom-based and online environments, as assessed by Rovai's Classroom Community Index. Also collected were respondents' ratings of their instructors teaching presence, as measured by items designed to reflect instructional design and organization, facilitation of discourse, and direct instruction as outlined in the teaching presence component of the community of inquiry

Table 2
Item correlations of teaching presence

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Course goals communicated	–															
Course topics communicated	.87	–														
Clear instructions	.82	.81	–													
Due dates communicated	.72	.71	.77	–												
How to participate online	.71	.72	.76	.69	–											
Netiquette	.62	.62	.65	.58	.74	–										
Identified areas of agreement	.62	.64	.65	.57	.70	.69	–									
Sought to reach consensus	.66	.69	.71	.62	.72	.68	.82	–								
Reinforced student contributions	.63	.64	.65	.62	.70	.64	.75	.77	–							
Set climate for learning	.60	.63	.63	.56	.70	.68	.76	.78	.77	–						
Drew in participants	.58	.61	.60	.56	.70	.66	.75	.77	.74	.77	–					
Kept students on track	.63	.65	.67	.59	.73	.68	.78	.81	.76	.75	.83	–				
Presented content and questions	.67	.69	.70	.62	.74	.67	.74	.80	.71	.75	.74	.79	–			
Focused the discussion	.66	.69	.70	.62	.74	.68	.77	.79	.76	.80	.77	.81	.85	–		
Confirmed understanding	.65	.67	.68	.61	.69	.64	.75	.80	.77	.72	.73	.77	.78	.78	–	
Diagnosed misperceptions	.61	.62	.64	.55	.68	.64	.76	.78	.72	.71	.72	.77	.74	.74	.81	–
Injected knowledge	.60	.64	.62	.55	.68	.64	.69	.73	.67	.71	.68	.71	.74	.75	.70	.70

All coefficients are significant at the .001 level.

Table 3
Pattern matrix of teaching presence

	Directed facilitation	Instructional design and organization
Drew in participants	.98	.13
Kept students on track	.94	.04
Set climate for learning	.93	.06
Diagnosed misperceptions	.91	.05
Identified areas of agreement	.91	.03
Sought to reach consensus	.86	−.06
Focused the discussion	.84	−.08
Confirmed understanding	.83	−.07
Reinforced student contributions	.82	−.05
Injected knowledge	.79	−.05
Presented content and questions	.78	−.13
Netiquette	.58	−.27
Course goals communicated	.02	.95
Due dates communicated	.03	.89
Course topics communicated	−.06	.87
Clear instructions provided	−.08	.87

model (Garrison et al., 2000). The Rovai instrument consists of 20 items in two subscales. These subscales measure levels of trust and support or "connectedness" as well as levels of learning. The teaching presence section was designed to measure the instructors' abilities in the areas of instructional design and organization, the facilitation of discourse and direct instruction. This section of the instrument may be useful in that the items are meant to explicate the skills needed to establish learning community in an online environment.

All students were alerted in advance, via email, that they might be selected to participate in the study before data collection began. A prompt to take the survey was programmed to appear at random when students logged on to the course management system to view their online courses. The same procedures were followed with the classroom-based students and they were presented with the prompt when they logged on to view the course website. Students were reminded to take the survey if presented with the opportunity with three follow-up emails sent in 2-week intervals after data collection began. In all, students had 6 weeks to respond.

4. Results

4.1. Factor constructs of teaching presence

A principal component method with direct oblique rotation was applied to examine the factor construct of teaching presence. The item correlations for teaching presence coefficients were greater than .30 which indicates acceptable use of factor analysis (see Table 2).

Two factors were extracted—these are referred to as Instructional Design and Organization and "Directed Facilitation" (the latter refers to a combination of facilitation of discourse and direct instruction in the Garrison et. al. model). The analysis accounts for 78.18% of the variability of the teaching presence construct. The pattern matrix is presented in Table 3.

Table 4
Mean, standard deviation, maximum, minimum and valid number of classroom community and teaching presence

	Mean	S.D.	Maximum	Minimum	*n*
Classroom community (20 items)	50.55	12.95	80	0	1066
Connectedness (10 items)	22.45	6.95	40	0	1066
Learning (10 items)	28.08	7.35	40	0	1067
Teaching presence (17 items)	50.44	14.73	68	0	1063
Instructional and design organization (5 items)	15.96	4.21	20	0	1063
Directed facilitation (12 items)	34.54	10.98	48	0	1061

Table 5
Correlations between class community index and teaching presence

	TCC	C	L	TP	IDO	DF
Total class community (TCC)	–					
Connectedness (C)	.90***	–				
Learning (L)	.91***	.65***	–			
Teaching presence	.76***	.55***	.83***	–		
Instructional design and organization (IDO)	.67***	.44***	.76***	.90***	–	
Directed facilitation (DF)	.76***	.56***	.81***	.99***	.83***	–

***$p<.001$.

4.2. Reliability of classroom community and teaching presence measures

Reliability analysis was applied to examine the internal consistency of the learning community measure and the teaching presence scales. Results indicate the learning community scale and its subscales–connectedness and learning–were satisfactory, measures for Cronbach's Alpha were .93, .91, and .90 respectively. Similarly, the reliability coefficients of the teaching presence scale and its components, instructional design and organization, and directed facilitation were .98, .97 and .93 respectively.

4.3. Descriptive analysis and correlation between classroom community and teaching presence

The score of the classroom community and teaching presence measures were obtained by summing up all items. The central tendency, dispersion statistics and range of classroom community and teaching presence are listed in Table 4.

Pearson correlation analysis was applied to examine the relationship between classroom community and teaching presence. As seen in Table 5, the total classroom community was significantly correlated with total teaching presence ($r=.76$), instructional design and organization ($r=.67$), and directed facilitation ($r=.76$). The connectedness scores was found to be moderately associated with learning community ($r=.65$), total teaching presence ($r=.55$), instructional design and organization ($r=.44$), and with directed facilitation ($r=.56$). The correlations between learning community and teaching presence, instructional design and organization, and directed facilitation were high, with coefficients of .83, .76, and .82, respectively. Additionally, instructional design and organization was correlated with directed facilitation ($r=.83$).

4.4. Difference between SLN online student and classroom-based students

An independent samples *t*-test was used to examine the group difference in classroom community and teaching presence measures between the online students and the classroom-based students. The group sizes for the online students and classroom-based students were 941 and 126 respectively. The test of homogeneity of variance showed no significant differences in total classroom community, connectedness, and teaching presence between SLN and classroom-based groups. There was a difference with regards to the learning community subscale (the Levene statistic was 5.19, $p<.05$). These results are presented in Table 6.

In addition, to address possible issues arising from different groups sizes, 126 cases were randomly selected from the online group of students and repeated independent samples *t*-test. As shown in Table 7, the online students again

Table 6
Mean differences in classroom community and teaching presence between SLN online student and classroom-based student (unequal group size)

	SLN ($n=941$)		Classroom-based ($n=126$)		
	M	S.D.	*M*	S.D.	*t*-value
Total class community	50.62	13.13	50.07	11.60	.44
Connectedness	22.39	7.00	22.86	6.56	−.70
Learning	28.20	7.48	27.21	6.28	1.62
Teaching presence	50.54	14.83	49.70	14.04	.60
Instructional design and organization	16.05	4.21	15.30	4.18	1.87
Directed facilitation	34.56	11.08	34.40	10.26	.16

Table 7
Mean differences in classroom community and teaching presence between SLN online student and classroom-based student (equal group size, $n=126$)

	Online		Classroom-based		
	M	S.D.	*M*	S.D.	*t*-value
Total class community	50.29	11.03	50.07	11.60	1.56
Connectedness	23.00	6.57	22.86	6.56	.17
Learning	29.29	6.14	27.21	6.28	2.66**
Teaching presence	52.12	13.37	49.70	14.04	1.40
Instructional design and organization	16.37	4.00	15.30	4.18	2.08*
Directed facilitation	35.75	9.94	34.40	10.26	1.06

*$p<.05$, **$p<.01$.

reported significantly higher on the learning community subscale ($M_{SLN}=29.29$ vs. $M_{class}=27.21$, $t=2.66$, $p<.01$) and also measures of instructional design and organization ($M_{SLN}=16.37$ vs. $M_{class}=15.30$, $t=2.08$, $p<.05$) when compared to the classroom-based students.

In assessing similar issues Rovai (2002a) examined the relationship between levels of learning community in three college course environments—complete online, blended courses with some reduced "seat-time", and traditional classroom with web-enhancements. The latter category is equivalent to that of the classroom-based students in the study reported here. Rovai reported that the three courses included in his study were selected purposively and were taught by faculty known for their advanced knowledge and skills in teaching. The results reported here reflect scores that are substantially lower than those reported by Rovai (see Table 8), but may be indicative of what can be expected from a more "average" sample of college courses given the differences in numbers of respondents between the two studies.

4.5. Predictive relationship between classroom community and teaching presence

To model teaching presence and learning community formation, a multiple regression analysis was applied to examine the relationship among the learning community measures, the teaching presence constructs, and demographic information. The dependent variable was total classroom community. The independent variables were instructional design and organization, directed facilitation, and the demographic data converted to dummy values which included gender, age, employment status, distance from campus, students' registration status, reason for taking an online course and course duration. Assumptions of normality, linearity, homogeneity, and outliers were checked and 8 outliers were found based on the criteria of 3 standard deviations and thus 1059 cases were used.

Analysis of variance showed that the regression model was significant, $F(21, 930)=77.62$, $p<.001$. The unstandardized betas, standard error, and standardized betas of the predictors are presented in Table 9. Initial analysis indicates that instructional design and organization, directed facilitation, and employment status significantly contributed to the class community measure. The multiple correlation coefficient was .80, indicating that the predictors can account for 64% of the total variance of class community.

Table 8
Mean differences in classroom community between SLN online respondents and Rovai study respondents

SLN study ($n=1067$)	Online ($n=941$)		Classroom-based ($n=126$)	
	M	S.D.	*M*	S.D.
Total class community	50.62		50.07	
Connectedness	22.39	7.00	22.86	6.56
Learning	28.20	7.48	27.21	6.28
Rovai study ($n=45$)	**Online ($n=24$)**		**Classroom-based ($n=21$)**	
	M	S.D.	*M*	S.D.
Total class community	62.29		68.30	
Connectedness	29.29	8.45	32.50	4.85
Learning	33.00	6.20	35.88	3.55

Scores can range from 0 to 40 for each variable with higher scores representing a stronger sense of classroom community.

Table 9
Summary of multiple regression analysis for predicting classroom community in teaching presence and demographic information ($n=1059$)

Variables	B	SEB	β
(Constant)	20.75	6.99	**
Instructional design and organization	.27	.11	.09*
Directed facilitation	.84	.04	.71***
Gender	−.57	.61	−.02
Registration status	.40	.59	.02
15–25 years old	−3.65	5.64	−.14
26–35 years old	−2.99	5.63	−.10
36–45 years old	−3.17	5.63	−.10
46–55 years old	−1.36	5.66	−.03
56–65 years old	−8.36	6.11	−.07
Full-time employment	−1.60	.81	−.05*
Part-time employment	−1.71	.74	−.07*
Less than 30 min driving from campus	1.27	1.54	.05
1 to 2 h from campus	1.17	1.59	.04
30 min to 1 h from campus	.96	1.71	.02
More than 2 h from campus	2.64	1.64	.08
Distance or lack of transportation	−.16	.98	−.01
Conflict with personal schedule	−1.35	1.11	−.04
Course not offered on campus/schedule conflict	−1.43	1.16	−.04
Family responsibilities	−.25	1.07	−.01
Interest in technology/internet	−1.69	1.61	−.02
Course duration (cutoff point 66 days)	.17	1.79	.00

*$p<.05$, **$p<.01$, ***$p<.001$.

Non-significant predictors were excluded in the second regression model. The independent variables were the two components of teaching presence used to predict the total class community measure. Result indicated that this model was significant from zero, $F(4, 980)=399.56$, $p<.001$. The correlation coefficient of .79 indicates that 62% of total variance for class community can be accounted for by measures of teaching presence. As seen in Table 10, for every unit increase in the effectiveness of instructional design and organization, a .31 unit increase in classroom community can be expected. For every unit increase in the effectiveness of directed facilitation, a .83 unit increase in classroom community can be expected. Finally, students having full time employment tend to have a weaker sense of classroom community than the others. Full-time workers reported a 1.61 unit decrease in classroom community relative to students who did not work at all.

5. Discussion and conclusion

A number of conclusions can be made based on these results. There is a clear connection between perceived teaching presence and students' sense of learning community. The respondents to the survey were significantly more likely to report higher levels of learning and community when they also reported that their instructors exhibited more salient "teaching presence" behaviors. In a general sense, when students reported effective instructional design and organization and "directed facilitation" of discourse, as defined by the teaching presence section of the instrument, they were more likely to report higher levels of learning community, as measured by the Classroom Community Index. A majority of the variance in the scores for this measure of learning community can be explained by the students' sense of their instructors' "Teaching

Table 10
Summary of multiple regression analysis for predicting classroom community in teaching presence and distance from campus ($n=1060$)

	B	SEB	β
(Constant)	17.99	1.13	***
Instruction and design organization	.31	.11	.10**
Directed facilitation	.83	.04	.70***
Full-time employment	−1.61	.78	−.05*
Part-time employment	−.93	.68	−.04

*$p<.05$, **$p<.01$, ***$p<.001$.

Presence". In other words, the scores for the combined items representing students sense of trust, collaboration, shared educational objectives, support, and learning can be modeled and predicted from their ratings of their instructors "teaching presence", their skills in the arena of online instructional design and discourse facilitation that are articulated in the Communities of Practice framework (Garrison et al., 2000). For each unit increase reported by respondents on the instructional design and organization component of the Teaching Presence Scale, a .31 unit increase in the Classroom Community Index was evident. Similarly for each unit increase in the "directed facilitation" component of the Teaching Presence Scale, a .83 unit increase was evident in the Classroom Community Index.

This analysis indicates that "directed facilitation" on the part of the instructor contributes more to the equation than measures of effective instructional design and organization and gender differences. This study reveals that a strong and active presence on the part of the instructor–one in which she or he actively guides and orchestrates the discourse–is related both to students' sense of connectedness and learning. This does not discount the importance of good instructional design and organization. Student who reported more effective instructional design and organization also reported higher levels of learning community—the contribution to the regression equation was more modest however. The finding that full-time workers showed a significantly weaker sense of classroom community is important. We need to understand why this is so and how we can address the needs of full-time workers more effectively.

Gaining insight into how to support the development of learner's sense of connectedness and learning will allow us to make intelligent decisions about online course design, pedagogy and faculty development in the service of enhancing the quality of online learning environments. These results, coming from a large and diverse sample across 35 institutions, ranging from community colleges to baccalaureate institutions through university centers, provide some insight into online learning-community development in higher education.

These results add specificity to previous work conducted on the issue of the development of online community (e.g. Shea et al., 2005; Swan, 2002). To understand the educational significance of these results it is useful to recall the components of directed facilitation that contribute to students' sense of connectedness to course participants and to their sense of learning. These facilitating conditions include whether the instructor is seen as drawing in participants, creating an accepting climate for learning, keeping students on track, and diagnosing misperceptions. Additionally, when students feel their instructors are identifying areas of agreement and disagreement and helping to resolve these by looking for areas of consensus the students report higher levels of connectedness and learning. Further when students report that the instructor is reinforcing student contributions, injecting their own knowledge, and confirming student understanding, they are also more likely to report a better sense of learning community as measured by the Rovai instrument.

In addition to the directed facilitation outlined above, student perceptions of effective instructional design and organization also appear to matter in regards to a sense of connectedness and learning. Clear communication of time parameters, due dates, and deadlines contribute to online learning community as do clear course goals, course topics, and instructions on how to effectively and appropriately participate in the course. While similar instructional design components are clearly important to "offline" environments these results suggest that learners sense of connectedness and learning are also impacted by instructor design decisions in online environments—the absence of face-to-face interaction contributes to online learner uncertainty, thus making clear and transparent design increasingly important.

From these results no evidence was found that indicate differences in levels of satisfaction or sense of community that can be attributed to learner characteristics. These results contradict recent observations regarding likely incompatibilities between text-based asynchronous learning environments and the emergent learning styles and expectations of the "net generation" (e.g. Dede, 2005; Oblinger & Oblinger 2005; Prensky, 2001). No evidence was found to suggest that the text-based asynchronous learning environment that was the milieu of this research elicited significantly different levels of connectedness or learning by age, gender, or any of the other demographic distinctions investigated. It may be that the online environment satisfies learners of different backgrounds because it satisfies different needs and expectations. For example, for older learners the convenience and flexibility may be the "relative advantage" while for net-generation learners the text-based online interaction may be familiar and "good enough" for the time being. Additional research is needed in this area.

The comparative analysis of students' sense of community in online and classroom environments is interesting for a number of reasons. It appears from these results, with a large and diverse sample of more than 1000 college students, that some tentative conclusions can be made. Depending on the type of analysis applied, it appears that the students in this study either did not report any significant differences between their levels of connectedness and learning in complete online courses when compared to the classroom or that they reported higher levels of learning in the online

environment compared to classroom students. Given the importance that several strands of research attach to the notion of learning community, these results reflect well on the online learning environment studied here. Online faculty across a wide range of courses and disciplines were able to effectively design instruction and facilitate productive discourse such that a sense of connectedness and learning was established—a level of "learning community" that compared favorably to that established in classrooms that used this same online environment as an additional enhancement. Given that online students also rated their instructors more highly on items reflecting good instructional design and organization, this may not be surprising. Further research is needed to understand why the addition of the online activities for the classroom group did not result in higher levels of connectedness or learning for these students. An initial hypothesis might be a lack of integration between the classroom and online activities—an obstacle reported by others researching in this area. Finally, there is clearly much room for improvement in the online environment studied here given the large differences between the results reported by Rovai (2002a) and those reported here. More research needs to be done to understand how to increase the average level of learning community across both the classroom and online environments in the current study to bring it in line with the much higher scores achieved by the "expert" faculty studied by Rovai.

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Appendix A. Teaching Presence Scale items

A.1. Instructional design and organization

Setting the curriculum

1. Overall, the instructor for this course clearly communicated important course goals (for example, provided documentation on course learning objectives).

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

2. Overall, the instructor for this course clearly communicated important course topics (for example, provided a clear and accurate course overview).

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Designing methods

3. Overall, the instructor for this provided clear instructions on how to participate in course learning activities (e.g. provided clear instructions on how to complete course assignments successfully).

Establishing time parameters

4. Overall, the instructor for this course clearly communicated important due dates/time frames for learning activities that helped me keep pace with this course (for example, provided a clear and accurate course schedule, due dates, etc.).

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Utilizing the medium effectively
5. Overall, the instructor for this course helped me take advantage of the online environment to assist my learning (for example, provided clear instructions on how to participate in online discussion forums).

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Establishing netiquette
6. Overall, the instructor for this course helped students to understand and practice the kinds of behaviors acceptable in online learning environments (for example, provided documentation on "netiquette" i.e. polite forms of online interaction).

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

A.2. Facilitating discourse

Identifying areas of agreement/disagreement
1. Overall, the instructor for this course was helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn.

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Seeking to reach consensus
2. Overall, the instructor for this course was helpful in guiding the class towards understanding course topics in a way that assisted me to learn.

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Reinforce student contributions

3. Overall, the instructor in this course acknowledged student participation in the course (for example replied in a positive, encouraging manner to student submissions).

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Setting climate for learning

4. Overall, the instructor for this course encouraged students to explore new concepts in this course (for example, encouraged "thinking out loud" or the exploration of new ideas).

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Drawing in participants, prompting discussion

5. Overall, the instructor for this course helped to keep students engaged and participating in productive dialog.

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Assessing the efficacy of the process

6. Overall, the instructor for this course helped keep the participants on task in a way that assisted me to learn.

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

A.3. Direct instruction

Present content/questions

1. Overall, the instructor for this course presented content or questions that helped me to learn.

Strongly agree
Agree
Neutral
Disagree

Strongly disagree
I choose not to answer this question.

Focus the discussion on specific issues
2. Overall, the instructor for this course helped to focus discussion on relevant issues in a way that assisted me to learn.

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Confirm understanding
3. Overall, the instructor for this course provided explanatory feedback that assisted me to learn (for example, responded helpfully to discussion comments or course assignments).

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Diagnose misconceptions
4. Overall, the instructor for this course helped me to revise my thinking (for example, correct misunderstandings) in a way that helped me to learn.

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

Inject knowledge from diverse sources
5. Overall, the instructor for this course provided useful information from a variety of sources that assisted me to learn (for example, references to articles, textbooks, personal experiences or links to relevant external websites).

Strongly agree
Agree
Neutral
Disagree
Strongly disagree
I choose not to answer this question.

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