Blended Learning in Teacher Education: An Investigation of Classroom Community Across Media

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Abstract

The development of community in educational settings is now recognized as a social and collaborative process that is an integral part of learning. As classrooms and communities extend beyond the traditional four walls, research related to online community development across media is of vital importance to teachers. The study reported in this paper furthers the research on the development of community by investigating how graduate student foreign language teachers develop and perceive community and how these perceptions or developments differ according to medium (chat, discussion board, or face-to-face class discussions). Additionally, it extends the research by bringing the cross-institutional element to the blended learning courses. The goal of the study is to explore and analyze the incorporation of technological tools into blended learning in order to assist other teachers in the creation of collaborative cross-institutional situations. Experience in these situations will assist instructors in modeling such communities for their students so that they will potentially benefit from a well-developed and well-understood sense of community, both with onsite peers and with peers at a distance.

Recent research in educational settings points to a growing emphasis on building communities of learners (Brown, 2001; Palloff & Pratt, 1999; Rovai, 2001; Rovai & Jordan, 2004). This community aspect of learning is now widely recognized as a process that is "socially situated, collaborative, [and] mutually beneficial" (Hall, 2001, p. 45), rather than one centered on individualized learning. Rovai and Jordan (2004) concurred, underscoring the significance of community building in the field of education: "Times are changing for higher education. . . . [From] using technology to expand distance education, to the recognition of the importance of sense of community, we are witnessing a transformation of higher education" (p. 1).

One major change brought about by technology is that communities now extend beyond the classroom and continue to grow virtually by means of new and innovative technologies. Although the social benefits of learning are widely recognized in educational settings, research related to online communities has been conducted primarily in the field of distance education. Indeed, in learning at a distance, issues related to community may surface frequently. However, with the multitude of technological tools available for educators, online community building can take many forms and can occur in a variety of classroom settings.

Recently, researchers have begun to investigate online community development not only in distance education settings but also in hybrid-type courses, which combine features of online distance education with traditional classroom-based learning. These hybrid-type courses are often referred to as blended learning, combining various types of pedagogy with different tools for interaction and discussion. Rovai and Jordan (2004) defined blended learning as a mix of "classroom and online learning that includes some of the conveniences of online courses without the complete loss of face-to-face contact" (p. 1).

In a sense, blended learning courses reap the benefits of both face-to-face and online communities, as they combine the two methods of delivery. In blended courses, a variety of technological tools such as discussion boards, chats, wikis, and blogs can be implemented to facilitate discussion and interaction. Regular use of these tools is important to the development of community and to the promotion of learning and interaction at a distance; such tools, rather than leading to cold and dehumanizing contact, can, in fact, promote a sense of community.

In spite of this growing interest in community development, only a limited number of studies have expanded this research to foreign language (FL) classes and FL teacher education courses. A handful of recent studies (Arnold, Ducate, Lomicka, & Lord, 2005; Arnold & Ducate, 2006; Arnold, Ducate, & Lomicka, 2007; Fuchs, n.d.; Lomicka & Lord, 2007; Lord & Lomicka, 2004) have begun to discuss blended learning in cross-institutional settings. For example, Arnold and Ducate (2006) examined cognitive and social presence in electronic transcripts from students enrolled in FL methodology courses at different universities, for which students regularly used a discussion board to facilitate interaction between campuses. Similarly, Arnold et al. (2005) compared social presence in discussion board transcripts from FL teaching assistants at three different universities. Again, discussion boards served as the online tool to foster interaction and communication among these students.

In Fuchs' (n.d.) case study, she explored computer-mediated discussion between teacher educators and preservice FL teachers located in California and in Germany. In her study, computer-mediated communication projects are shown to be beneficial in fostering preservice teachers' literacy skills. Lord and Lomicka (2004) discussed a cross-institutional collaborative course, its design, and the different tools used to promote the establishment of a virtual community, while Arnold, Ducate, and Lomicka (2007)

investigate the establishment of communities of practice and the use of CMC to facilitate exchanges among teaching assistants from three different graduate seminars, and with experts in the field of FL education/applied linguistics.

Finally, Lomicka and Lord (2007) examined the development and maintenance of social presence in communities of language teachers at two different universities. In these studies, cross-institutional communication provided a public forum for students to gather ideas, share and exchange information, and interact virtually. As they worked together over the course of a semester, both with peers in the traditional classroom and with virtual peers, students' participation and interaction began to give shape to a community of learners.

 The study described in this paper investigates how graduate students in language and linguistic specializations develop and perceive community and how these perceptions or developments differ according to medium (chat, discussion board, or face-to-face class and group discussions). In this investigation, the factors relating to different perceptions of community were also considered. The goal of the study was to explore and analyze the incorporation of technological tools into blended learning in order to assist other teachers in the creation of collaborative cross-institutional situations. Their experiences in these situations assisted them in modeling such communities for their students so their students will potentially benefit from a well-developed and well-understood sense of community, both with onsite peers and with peers at a distance.

Communities and Social Presence

Defining Community

A central component of community is a sense or feeling of belonging to a group. McMillan and Chavis (1986) specified that in a community there is "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 together" (p. 9)**.** A decade later, McMillan (1996) further expanded that definition to propose four dimensions that shape a community of learners:

1. Spirit, the feeling that there is a community and feelings of acceptance and belonging.
2. Trust, the idea that the community members can be trusted.
3. Trade, the feeling that all members will mutually benefit from the community
4. Art, that the community members share an emotional connection.

In a community of learners, as students meet regularly with one another, spirit and trust often manifest themselves automatically. As learners actively contribute ideas and discuss them together, they mutually benefit. Over time, as learners get to know each other, certain emotional connections may develop, thus, facilitating the creation of interpersonal relationships. Building from prior research, Rovai and Lucking (2000, as cited in Rovai, 2001, p. 34-35) adapted these aspects of communities to learning and proposed the following modified dimensions that shape learning communities: spirit, trust, interaction (the feeling that closeness and mutual benefit will come from the interaction with others), and learning (that the community is used to actively construct knowledge and that the educational needs of the members are being satisfied). In today's world, though, these definitions may not encompass the many ramifications of online learning and communities of learners who work together in virtual settings.

Indeed, the idea of community and the composition of its members change as learning moves from the classroom to virtual settings. Russell and Ginsburg (1999) pointed out that online communities are "multidimensional and multilayered," unlike the structure of traditional communities, which tend to be more linear (p. 1). Another influential component of online instruction is social presence, according to Tu (2000, as cited in Glisan & Trainin, 2006). The notion of social presence can be defined as the "degree of salience of the other person in a mediated communication and the consequent salience of their interpersonal interactions" (Short, Williams, & Christie, 1976, p. 65). In virtual spaces, social presence depends upon the way in which people establish a sense of social presence and the extent that online identities are "perceived as 'real' in mediated communication" (Gunawardena & Zittle, 1997, p.8).

In nontraditional environments, members' personalities and emotions are often conveyed through words and symbols, rather than through the physical expressions, gestures, and oral discourse evident in face-to-face work. In addition to establishing a sense of being real, Rovai (2002a) posited that "members of strong classroom communities have feelings of connectedness. They have duties and obligations to each other and to the school and they possess a shared faith that members' educational needs will be met through their commitment to shared learning goals" (pp. 198-199). Rovai (2002c) expanded on connectedness, defining it as the feeling of "cohesion, spirit, trust, and interdependence" (p. 325).

Baym (1995), Reid (1995), and Rheingold (1993) all suggested that developing and maintaining a strong sense of community through electronic media is possible, even considering that distance tends to "reduce sense of community by giving rise to feelings of disconnectedness" (Rovai, 2002a, p. 198). This possibility is of great interest to educators, as the boundaries of classrooms continue to expand beyond the traditional four walls.

The Development of Community

Recent research has addressed community development in educational settings in an attempt to determine how online learning promotes a sense of community for learners. Issues such as extending the community to guests, perceptions of communities, gender, and blended learning have been examined. Some studies have explored community development through extending the community to online guests via discussion boards. For example, Arnold, Ducate, and Lomicka (2007) investigated threaded discussions from pre- and in-service teachers from three teacher methodology classes at two different universities who participated in weeklong virtual discussions six times throughout the semester. The project was designed in three phrases: (a) students researched a particular topic or conducted observations or interviews; (b) students shared their knowledge and research on the topic with each other; and (c) students interacted with a topical expert in the field of language acquisition.

Discussion transcripts were analyzed both qualitatively and quantitatively, noting the frequency of key indicators found in social and cognitive presence and community of practice frameworks. Results of their study suggest that, although students can establish communities of practice through online discussions, corresponding survey responses indicate that these distributed communities of practice were not present in the minds of their members. The findings pointed out that students tended to view their groups more in terms of cognitive collaboration and less as social units, but the transcript analysis revealed a strong social dimension in students' exchanges.

Similarly, Kumari (2001) described a case study in which virtual guests were brought into a graduate seminar through the use of discussion boards. He noted that the collaboration

provided the students with an opportunity to develop their reflective thinking skills, to broaden their horizons, and to advance their learning. Although this community was a short-lived one, its development nonetheless held benefits for the participants. Through discourse interactions, students shared concerns and articulated individual needs while practicing collegiality and professionalism. Students' posts also demonstrated that they engaged in thought, processing, and reflection as they participated in a discursive community.

Other studies attempt to examine perceptions of online communities and their relationship to learning (Ertmer & Stepich, 2005), academic performance and interaction (Picciano, 2002; Rovai & Barnum, 2003), classroom community (Glisan & Trainin, 2006) and social presence (Swan & Shih, 2005). Ertmer and Stepich (2005) examined quantitative and qualitative data from 11 graduate students enrolled in graduate courses at two universities who collaborated asynchronously on a number of projects throughout the semester. The study investigated students' perceived sense of community and perceived learning, as well as their higher order learning skills, as analyzed by the researchers from the online discussion board content.

Students perceived a significant increase in their learning over the course of the semester, which is supported by the evaluations of their discussion board postings. These results suggest an increased quality of learning and critical thinking. Further, the students showed a strong sense of community at the end of the semester. Ertmer and Stepich claimed, "Perhaps what is most important to students is the perception that they can *learn* from the community, whether they feel a strong sense of cohesion with the group or not" (p. 12).

This result is also confirmed by Swan and Shih (2005). In their study, actual interactions seemed to be less important than the participants' own perceptions of presence and interactivity, at least in terms of their self-reported satisfaction with their experience. Picciano (2002) examined the relationship between students' academic performance and their interactions and perceived sense of presence, or community. He found a positive correlation between a sense of presence, or a feeling of belonging, and the perception that students had engaged in a positive learning experience. This finding confirms his previous (1998) research, as well as other work carried out by Rovai (2002a).

To further work on perceptions of online learning, Rovai and Barnum (2003) investigated online communities to determine how these perceptions of online courses were related to the interactions in which they engaged during the course. Specifically, they sought to explore the relationship between active versus passive participation in discussion boards (i.e., frequent posting versus simply reading others' postings) and the construction of community, interaction, and learning. Their participants included 328 graduate students enrolled in 19 online courses. In their study, active interaction was determined by the number of messages posted to the discussion boards each week, while passive interaction was operationalized as the number of times participants accessed the discussion boards each week.

Results show that greater participation, particularly active, on the discussion boards correlated with a higher sense of perceived learning. Therefore, the connection between developing community and perceptions of learning is noteworthy in this study. However, in follow-up surveys, a number of students indicated that they felt they would have learned more if they had taken the course in a traditional classroom setting, and if they had taken the course with the "ideal professor." These differences, according to Rovai and Barnum (2003), suggest that "students view pedagogy as more important to learning than the course delivery system" (p. 69).

Swan and Shih (2005) carried out a study to further explore the relationship between student perceptions of social presence and their satisfaction with online class discussions, as well as to investigate how students project their own presence into these online discussions. A total of 51 volunteer students from four online graduate classes participated in weekly online discussions. In addition to using surveys to assess social presence, the researchers also qualitatively analyzed the discussion board contributions of the five students with the greatest social presence ratings and the five students with the lowest social presence ratings. Their results show that factors such as age may play a part in how well students recognize their social presence online. They also found that "the students perceiving the greatest presence of others in online discussions also consistently projected more of their own presence into them, and that they did so in specific ways – by sharing something of themselves with their classmates, by viewing their class as a community, and by acknowledging and building on the responses of their peers" (p. 9).

As with previous work by Rovai (2001, 2002a, 2002c) and colleagues (Rovai & Barnum, 2003, Rovai & Jordan, 2004), the students in this study who perceived high social presence in their online discussions also indicated that they had learned more from these discussions than those students who perceived a lower social presence.

Unlike the projects exploring perceptions of exclusively online learning, Glisan and Trainin (2006) discussed a pilot study in which they investigated different perceptions of community between online students and traditional classroom students. Their study included 30 participants, 24 traditional students and 6 who had taken online courses. Regardless of the small number of participants, their findings indicated some interesting trends: students tended to like face-to-face classes better than online classes; they felt they knew their professor and classmates (who were more likely to become friends) better in face-to-face classes; and they thought that making friends was important in class. In spite of these different perceptions, though, the grades between the two groups were comparable, indicating that at least some aspects of learning can be developed independently of perceived community.

Among the studies investigating the development of community in online interactions, recent work by Rovai and Jordan (2004) is perhaps most relevant to the present project, in that it deals with blended learning, that is, a face-to-face class that also incorporates computer mediated communication across a distance. Their study sought to examine community in traditional, online, and blended courses, working under the hypothesis that the blended course would evidence the strongest sense of community among its participants. This hypothesis was based on the idea that students would have greater opportunities for interaction in a variety of contexts, which would result in a stronger sense of connection. The participants included 68 graduate students who were enrolled in three different courses (one each of traditional, online, and blended). The study consisted of filling out the Classroom Community Scale instrument (see Methodology section following) both at the beginning of the semester and at the end of the semester.

Pooled pretest and posttest values show that all students experienced increased feelings of community over the course of the semester. However, upon closer examination and after adjusting for course differences in the pretest, the posttests revealed that the three courses differed significantly in their perceptions of community and that the blended course had significantly higher mean ratings for community on both the connectedness and the learning subscales.

Further, course evaluations showed that all the comments made by students in the blended course were positive, generally touting the freedom of the online component, as well as the structure and interaction of the face-to-face sessions. Rovai and Jordan

concluded that blended learning courses embody the changes occurring in education today: less emphasis on delivery and more on the learning outcomes; reaching out to students through technological tools that enable distance education; and fostering a strong sense of community in classes.

The study reported in this paper furthers the research investigating the development of community in blended courses by investigating how students perceived the different aspects of community to be present in various media. Additionally, it extends the research by bringing the cross-institutional element to the blended learning courses. The research questions that guided this study were as follows: (a) How does community develop across different media as compared with face-to-face settings? and (b) What trends are evident in the different components of community (spirit, trust, interaction, and learning)?

Methodology

Participants

Participants included 28 students from two graduate seminars on technology in FL education offered at two different universities. Each seminar was three credit hours and met once a week simultaneously at different locations for 3 hours (face-to-face). Table 1 provides information on the total number and gender of students in each class. Students were enrolled as M.A., M.A.T., or Ph.D. candidates in French, German, English as a Second Language, or Spanish at their respective universities.

Table 1
Class, Number, and Gender of Student Participants

	Total No. of Students	No.of Males	No. of Females
University A	13	2	11
University B	15	5	10
Total	28	7	21

Setting

The two semester-long graduate seminars were taught simultaneously at the two universities and were aimed to acquaint graduate students with the principles and practices concerning the use of technology in language education. The main focus was to explore the connection between second language acquisition theories and the implementation of current Internet and multimedia technologies. Each class met on its respective campus, but at the same time and on the same day for weekly face-to-face meetings. The instructors at the two universities worked together to design the courses, the readings, and the projects, so that complete collaboration existed in all aspects of the classes. The courses consisted of several components:

- Communication: students formed smaller communities through both face-to-face and virtual discussions (chat, discussion boards, class discussions).
- Interaction with virtual guests: students engaged in critical discussion with experts in technology and education.
- Blog/portfolio project: students maintained their own Web sites to document their reactions and growth as teachers.
- Mini-projects: students created activities to apply theory to practice.

- Final project: students designed a research study and wrote a review of literature for their specific project.

Only the communication aspect of this class is described in more detail in this paper, as the interaction and the subsequent development of community is relevant in this study.

Each class of learners met in person weekly and had the opportunity to interact with fellow students. Students were divided into groups of four or five for their face-to-face class groups, in which they carried out in-class presentations, class discussions, and hands-on practice with different technological tools. At the same time, they were also acquainted virtually with students at the other university through their discussion board groups and chat groups, which mixed face-to-face class members with virtual classmates.

Students participated in one of four discussion board groups outside of class. All students were required to post and respond a minimum of three times each to their discussion board during the course of the semester, providing reactions and analyses of the readings or commenting on other aspects of class and the tools used. The discussion board client was hosted by one of the collaborating universities. During class time, students participated in chat groups with two or three other classmates, both face to face and virtual. Chat discussions were carried out using AOL Instant Messenger and focused on furthering issues relevant to the readings and topics covered each week in class. Students spent approximately a third of their time in class (the 3-hour weekly meeting was divided into three parts – 1 hour virtual discussion, 1 hour face-to-face discussion, and 1 hour hands-on training), as well as additional out-of-class time, engaged in virtual communication.

Although students posted regularly to their individual blogs, we did not consider this forum as a community due to the fact that the students, although we encouraged interaction, did not visit or post to their peers' blogs regularly. Therefore, all students belonged to three different class communities during the semester: their face-to-face classroom community, their chat group community, and their discussion board community.

Instruments

Various instruments have been proposed to measure community. Rovai (2002a) analyzed his Classroom Community Scale (CCS) — an instrument with a series of statements regarding community, feelings of belonging, etc., to which students respond to gauge their agreement or disagreement with — for its validity with university students engaging in online course interactions. In its original design the instrument contained subscales for connectedness and learning, and the study addressed the questions of the validity and reliability of the instrument, as well as the factors contributing to single or multiple dimensions of community development. The CCS was found "to be a valid measure of classroom community and both the overall scale and its two subscales possess high internal consistencies" (p. 207).

In other work, Rovai (2002b) further classified the items on this survey and renamed it the Sense of Classroom Community Index (SCCI). In this reanalysis Rovai divided the instrument into four, rather than two, subscales to correspond to the elements of community: spirit, trust, interaction, and learning [a]. In this instantiation, the SCCI still possesses high face validity, and high internal consistency, and it is a reliable measure of classroom community in a group of postsecondary students (Rovai, 2002b). Rovai reported that "resultant coefficients of internal consistency were .96 for the overall SCCI

score, .90 for the spirit subscale, .84 for the trust subscale, .84 for the interaction subscale, and .88 for the learning subscale."

This instrument is used in the present study to evaluate community among this population of participants, adhering to Rovai's instructions for implementation and analysis. The Likert-type survey includes 40 statements, 10 from each of the four areas of community. Sample statements from the instrument include, "I feel that members of this course depend on me" (Trust); "I feel important in this community" (Spirit); "I feel I should help others" (Learning); and "I feel I am encouraged to ask questions" (Interaction).

Participants were asked to respond by selecting the statement (*strongly agree, agree, neutral, disagree,* or *strongly disagree*) that best described their own feelings. Values for these responses ranged from 4 to 0 per response. Therefore, the maximum community rating score for each of the four subscales was 40 (10 questions per subscale), yielding a total maximum community rating score of 160. Higher scores were interpreted as indicative of a stronger sense of community.

The SCCI instrument was used to assess a sense of community in all three interaction media (face-to-face, discussion boards, and chat) at both the midpoint and end of the semester. The survey was slightly modified to reflect the type of medium used (chat, discussion board, or face-to-face), creating a separate survey instrument for each tool (yielding three surveys for each participant to fill out at each testing time). As such, these instruments allowed for an investigation of the development of community as a whole, as well as in the various subcomponents making up a sense of community, in each of the three media employed. In the following sections, results are presented for the different media, as well as for the different elements of community.

Results and Discussion

MidTerm Versus End-of-Term Feelings of Community

A series of paired *t*-tests were performed on the overall community ratings from the two different testing periods for each of the three media. There were no significant differences between the midterm and end-of-term ratings in any of the tests, as can be seen in Table 2.

Table 2
Midterm Versus End-of-Term Combined Community Ratings

	t-value	*df*	Significance
Face-to-Face	1.035	27	$P = 0.310$
Chat	0.286	27	$P = 0.777$
Discussion Board	1.695	27	$P = 0.102$

The similarity between the two testing periods was confirmed by the significant correlations between midterm and end-of-term ratings, as can be seen in Table 3. Note that here and throughout an asterisk (*) indicates significance at or below the predetermined α-level of 0.05.

Table 3
Paired Samples Correlations (Midterm Versus End-of-Term)

	N	**Correlation**	**Significance**
Face-to-Face	28	0.677	*P* = <.001*
Chat	28	0.530	*P* = 0.004*
Discussion Board	28	0.619	*P* = <.001*

These high correlations indicate that the students noting strong feelings of community for a particular medium at midterm were also likely to note strong feelings for that medium at the end of the semester. Given that the overall findings show no significant difference between the testing periods, one can then assume that the end-of-semester survey is representative of the community that developed and sustained throughout the term. Therefore, the remainder of this discussion focuses only on the end-of-semester results.

Community Across Media

The primary goal of this study was to examine if and how community is developed across different media. Table 4 shows the overall community ratings (as averaged by all participants) in each of the three communication styles used during the semester: face-to-face discussions (within each university); Internet chat groups (combining members of each university); and discussion boards (different combinations of members from each university). The maximum community rating possible for any one media is 160, with higher ratings being indicative of a greater sense of community.

Table 4
Overall Community Ratings by Media

Media	**Mean Rating**
Face-to-face	105.5
Chat	107.96
Discussion board	80.89

The sense of community taken as a whole (i.e., combining trust, spirit, learning, interaction) was greatest in the Internet chat groups and lowest in the discussion board groups. The face-to-face class interaction generated similar feelings of community as the chat interactions. A series of paired *t*-tests revealed that the sense of community in face-to-face interactions and chat discussions was statistically indistinguishable (t = -1.006, *df* = 27, p = 0.323), although there were significant differences between the chat and discussion board community ratings (t = 5.690, *df*= 27, p = <.001*) and between the face-to-face and discussion board ratings (t = 5.430, *df*= 27, p = <.001*). A possible explanation for this difference may be that students tended to use the discussion boards for publishing or posting, while true interaction, collaboration, and communication were sparse. The discussion boards tended to be more one sided and resembled a series of monologues, rather than a communicative endeavor by group members. This result parallels work by Larson and Keiper (2002), whose findings show a lack of interaction in discussion boards. Students did not take the initiative to respond to others' postings unless specifically asked to do so.

Community Components

The general trend described in the previous section was also apparent in each of the four components: chat and face-to-face interaction promoted a greater sense of these community components than did the discussion board. Table 5 provides the mean community ratings for each component of the scale, while Figure 1 compares them visually.

Table 5
Community Component Ratings Across Media (Means)

	Interaction	Trust	Spirit	Learning
Face-to-face	27.36	24.89	24.96	28.29
Chat	28.258	26.14	26.14	27.43
Discussion board	19.64	21.57	18.04	21.64

The maximum community rating possible for each of the four subscales (Interaction, Trust, Spirit, and Learning) is 40. In all cases, statistical analyses were carried out using paired samples *t*-tests.
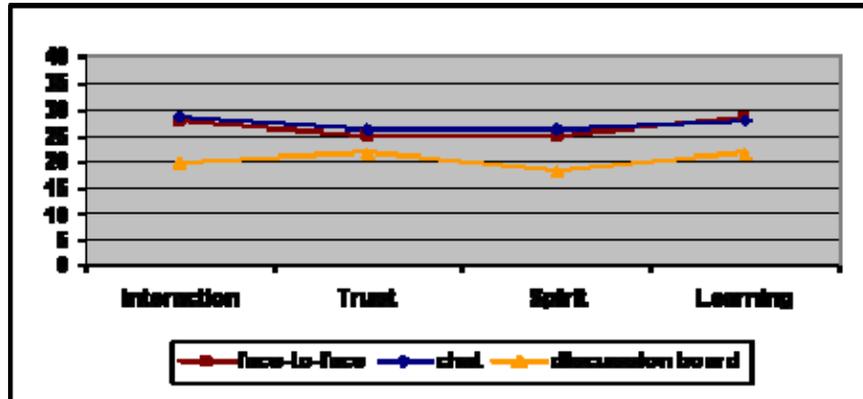
Figure 1. *Community component ratings across media (means).*

Interaction. The interaction component deals with the feeling that closeness and mutual benefit will come from the interaction with others. The surveys revealed that the feeling of face-to-face interaction was significantly higher than that on the discussion board, with means of 27.36 and 19.64, respectively ($t = 5.943$, $df = 27$, $p = <.001*$). Further, the sense of interaction via chat discussions (mean = 28.25) is also significantly higher than on the discussion board (mean 19.64; $t = 6.201$, $df = 27$, $p = <.001*$). No statistical difference was found between the chat and face-to-face ratings. These findings imply that, in terms of students' sense of closeness and benefit in their groups, chat and face-to-face media were instrumental, while the discussion board were less able to promote these feelings.

Trust. The trust component refers to the degree to which members feel they can trust the other members of their community. The same pattern observed for the interaction

component was also found here: face-to-face and chat interactions resulted in a greater sense of trust than discussion board interactions. The difference between the mean face-to-face trust rating of 24.89 and the mean discussion board trust rating of 21.57 is significant ($t = 3.442$, $df = 27$, $p = 0.002^*$); the difference between the chat trust rating (26.14) and the same discussion board rating was also significant ($t = 4.796$, $df = 27$, $p = <.001^*$). These results indicate that the chat and face-to-face media were comparable in terms of trust, while this component was significantly lacking in the discussion board community.

Spirit. Spirit, the third component of community, is the feeling that a sense of community is present and that one belongs to and is accepted by that community. The sense of spirit was again higher in face-to-face interactions than on the discussion board, with mean ratings of 24.96 and 18.04, respectively; this difference was significant ($t = 4.583$, $df = 27$, $p = <.001^*$). Also significant was the difference in spirit ratings between the chat community (mean 26.14) and the discussion board community (mean 18.04; $t = 5.405$, $df = 27$, $p = <.001^*$). These findings again imply that both face-to-face contact and chat discussions generated a greater sense of spirit than contact via discussion boards.

Learning. Finally, the fourth component of community is learning, which refers to how the community is used to construct knowledge actively and the degree to which the members feel the community is satisfying their educational needs. As seen with the previous components, the sense of learning was significantly higher in the chat, with a mean of 27.43, than on the discussion board, with a mean of 21.64 ($t = 4.445$, $df = 27$, $p = <.001^*$). Face-to-face interaction also promoted a greater sense of learning than did the discussion board, with a mean of 28.29; this difference was again significant ($t = 5.536$, $df = 27$, $p = <.001^*$). Thus, as with the previous components, face-to-face and chat interactions appear to have fostered a greater sense of learning than did discussion boards. Although the differences between the chat and face-to-face means were not significant, it is worth noting that only in the learning component did the face-to-face mean exceed that of the chat.

Summary. In all four components, chat and face-to-face interaction promoted a greater sense of community than did interaction via the electronic discussion board tool. There were no significant differences between chat and face-to-face interactions, either in overall ratings or in any of the four components, so these media can be considered comparable in terms of their promotion of community. The face-to-face medium exceeded the chat medium in the learning component, albeit not significantly. The discussion board was clearly the least favored in every respect, and students did not seem to perceive the same sense of belonging in that medium. They engaged in less interaction and trusted the other members less, and they did not feel as if the discussion board was a tool that would help them increase their learning, as compared to the other two media formats.

Conclusion

Previous research has shown that greater participation in a community leads to a stronger sense of belonging in that community (Rovai, 2002b) and that there is a link between sense of community and sense of learning (Picciano, 1998; Rovai, 2002a), which in turn, can lead to greater development of reflective thinking skills (Oliver & Reeves, 1996). Therefore, the promotion of a sense of community in our courses is a goal that teachers, students, and teacher educators should adopt.

The data presented here suggest that not all interaction formats foster the same sense of community among their participants. Previous research (i.e., Bruffee, 1993; Dede, 1996)

has also confirmed that the amount of participation contributed by members is related to the development of community or to their perceptions of community, which could help explain why the students in this study valued the communities they created on their discussion boards less than their real-time (face-to-face and chat) communities. The interaction in synchronous media is more intense and more real to students, as is confirmed by recent research (Thorne, 2003) showing that young people prefer to interact via chat or instant messaging as opposed to older forms of communication such as e-mail and discussion boards. Therefore, simply creating an online forum is not enough; educators must also consider the quantity, quality, and frequency of interaction such a forum is likely to generate.

Although some previous work has found gender to be an important factor in the development of community in that women tend to be more community oriented than men (i.e., Baxter-Magolda, 1992; Belenky, Clinday, Goldberger, & Tarule, 1986; Rovai, 2002c; Rovai & Barnum, 2003), other studies have found no difference by gender (Glisan & Trainin, 2006; Swan & Shih, 2005). In this study, no differences were found in community development based on gender, age, or language background. This finding is encouraging in its indication that any group of learners is capable of creating community, provided that the right media and motivation are present.

With these results in mind, we must now ask ourselves how to promote and motivate community development in our classes. The learners in this study were more likely to develop stronger community bonds when they felt immediately connected to their community members and when they interacted at regular intervals. Other ways to promote community may include attempting to increase feelings of similarity for learner needs, connectedness, friendship and group identity, and reducing the sense of confusion surrounding online discussions (Rovai, 2002b, p. 53).

Further, Swan and Shih (2005) suggested that some students may need to be socialized into online communities, to be "explicitly introduced to concepts of community building and social construction of knowledge, as well as to ways of projecting their own presence into online discussions" (p. 10). In other words, perhaps we need to view community development as an exercise in socialization, as well as a skill to be taught and developed in certain groups of learners.

The two media correlated with higher sense of community (face-to-face and chat) were also those in which students were given specific questions to discuss or topics on which to reflect. Therefore, students may be more willing or able to create community bonds if they are given a specific task rather than asked simply to contribute in an open-ended task. Further research would benefit from examining these different possibilities in the development of stronger communities.

The results of this study confirm that it is indeed possible to develop a sense of community through computer mediated communication tools and that classroom learning is not the only way to achieve strong communities. It has been shown that students felt they were able to develop online communities through chatting that were comparable to the face-to-face relationships they developed in class. In fact, although not evident in the statistical data, some student comments on the survey revealed that students, at times, preferred their virtual communities over their face-to-face communities in terms of learning, interaction, trust, and spirit.

Every institution, every class, and every community member will bring new variables and attitudes toward any community, so the development of any particular community is unpredictable. However, continuing research in this area will be beneficial to teacher

educators by furthering our understanding of the factors more likely to benefit teachers and learners and ways to incorporate those factors in learning situations in all types of communities: face-to-face, online, and blended learning. Future research should continue to study blended learning and investigate new and unique ways to develop communities of learners.

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Note:

[a]Swan's (2006) proposed model for analyzing threaded discussions, while it has not received the same recognition as Rovai's work, consistently recognized the same key elements: "social presence (interactions with classmates), teaching presence (interactions with instructors), cognitive presence (interactions with course content), and interactions with course interfaces" (p. 8).

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