

## Building Web based Communities: Factors Supporting Collaborative Knowledge-Building

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*Web based training is utilized by many organizations, yet trainers rate this method of training comparatively low in meeting training objectives. Many trainers indicate that collaboration and communities of practice are key elements in transferring learning to improved productivity. This study examined the role of the development, maintenance and use of Web based communities to increase satisfaction with knowledge gained in college courses. The results indicate that interaction and collaboration, appropriately structured into courses, can foster learning in communities. The study has implications for the development and use of communities of practice to foster continual learning and improved performance in organizations.*

Keywords: Collaboration, Community, Knowledge Building

The World Wide Web has the potential to change the way that training and education are provided. Three out of four organizations employing over 100 workers have used the Web to provide training (Galvin, 2001; Kaupins, 2002). In spite of widespread use, trainers continue to rate Web based training methods comparatively low on meeting training and learning objectives (Kaupins, 1997; Kaupins, 1998; Kaupins, 2002; Newstrom, 1980; and Noe, 1999). Among the reasons given are the inability of the web to provide opportunities for collaboration and problem solving skill development. Collaboration in learning and the building of communities of practice in the workplace is now seen as vital in the development of knowledge workers and in the development of a workforce that is able to continually learn and improve performance (Newman & Smith, 1999; and Smith, P.J. 2003), yet trainers do not see Web based training allowing for collaboration and community building.

Other research indicates that Web based learning has the potential to change the dynamics of traditional training. Rather than the instructor solely establishing the conditions for learning, the learner has the opportunity through listservs, chat rooms, and threaded discussions to influence the social, emotional, and instructional environment (Burch, 2001; Jones & Martinez, 2001; Newman & Smith 1999). These researchers believe this influence can be used to create learning communities. A key factor cited in creating and maintaining an online learning community is interaction with both the social and content dimensions of the course (Palloff & Pratt, 1999; Grubb & Hines, 2000; Carabajal, LaPointe, & Gunawardena, 2003).

If trainers are not convinced that web based training can lead to collaboration and the development of communities and if higher education researchers suggest that learning communities can assist in knowledge development then the factors that might encourage the development of collaboration and learning communities need to be identified. This notion of allowing the learners to influence the conditions of learning, through the development of Web based learning communities or Web based communities of practice, may offer a way to reconcile organizations' desire to utilize the Web for training, the need for the development of communities of practice and trainers' beliefs that Web based training cannot meet learning objectives.

While this study was set in a large midwestern university, the results have implications for trainers who want to promote communities of practice within their organizations and for the development of collaborative problem solving skills. The study focused on several research questions, which were investigated through both quantitative and qualitative methods. The quantitative methods included logistic regression and chi square tests of independence, while the qualitative methods used semi-structured in-depth interviews and focus groups.

The research questions specifically addressed in the study were: (1) To what extent do structure, interaction, degree of distance, or characteristics of the learner affect satisfaction with learning in a distance environment? (2) In what way is learning orientation related to degrees of distance or educational philosophy? (3) How do learners create, maintain, and use a learning community to foster individual and collective learning? The findings for question three have the most implications for trainers and web based training. Consequently, the findings for the first two questions will be presented briefly while the majority of this paper will focus on question three.

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Moore's theory of transactional distance provided a framework for analyzing the development of online communities and satisfaction with knowledge gained during the learning experience. Moore's theory describes the transaction of education or learning as being comprised of dialogue and structure, the levels of which vary from course to course (Moore & Kearsley, 1996). Dialogue is a particular type of interaction that advances learning, while structure reflects the flexibility of the course design in accommodating individual learners' needs (Moore, 1993; Moore, 1991).

## Methods

This mixed methods study included 201 undergraduate and graduate students in nine intact classes at three Ohio universities. Courses were of different length, content, and percentage of online versus face-to-face interaction (variable 'degree of distance' in the study). With the exception of one course, students had no choice as to the degree of distance. Four instruments were administered to collect the quantitative data. They were: (a) Satisfaction Questionnaire, (b) Demographics Questionnaire, (c) Learning Orientation Questionnaire (Martinez, 1996), and (d) the Philosophy of Adult Education Inventory (Zinn, 1983). Both the satisfaction and demographics questionnaires were researcher developed. Participants in the quantitative portion of the study consisted of anonymous volunteers from the nine courses. Consequently, the number of responses to any given survey varied from a low of 69 (response rate of 34.3%) on the satisfaction survey, to a high of 154 (76.6% responding) on the Learning Orientation Questionnaire (LOQ). The Philosophy of Adult Education Inventory had a slightly lower response rate (142; 70.6%), as did the demographic survey (133; 66.1%).

Question 3 (How do learners create, maintain, and use a learning community to foster individual and collective learning?) was answered through qualitative analyses, which consisted of theory driven open coding of comments from 29 learners who volunteered to participate in semi-structured individual or focus group interviews. Coding of the interview transcripts identified nine themes: (a) dialogue, (b) structure, (c) distance, (d) learning, (e) participation, (f) barriers, (g) community, (h) communication, and (i) reasons to enroll/not enroll in online courses. The results were used to link the quantitative and qualitative results in the following ways:

1. The themes of dialog, participation, and communication were used to connect the quantitative data on interaction.
2. The theme of structure was used to connect the quantitative data on course structure.
3. The themes of distance and barriers were used to explain the lack of statistical significance found in the degree of distance and use of technology.

All data for the study were collected between September 2001 and June 2002.

## Results

In examining research question 1 (Do structure, interaction, degree of distance, characteristics of the learner, or the expectations of instructors affect satisfaction with learning in a distance environment?) logistic regression with forward stepwise entry was employed. The dependent variable, satisfaction with knowledge gained, consisted of two categories – high satisfaction or low satisfaction. Structure was found to be highly related to satisfaction with knowledge gained. Interaction was also related, although much less so than structure. None of the other variables (age, sex, level of computer experience, previous web based course experience, learning orientation, educational philosophy, level of education, or degree of distance) were statistically significant. (See Table 1). In other words, if the participants were satisfied with the structure of the course, they were very likely to be satisfied with their learning in the course, and if they were satisfied with the level and type of interaction in the course, they were more likely to be satisfied with their learning in the course.

Table 1. *Results of Logistic Regression*

	B	S.E.	Wald	df	Sig	Exp (b)
Step 1 Structure	5.05	1.5	11.8	1	.001	156.0
Constant	-2.48	1.0	5.7	1	.017	.08
Step 2 Structure	4.20	2.1	4.0	1	.045	66.7
Interaction	0.71	0.4	2.9	1	.088	2.0
Constant	-15.8	8.8	3.2	1	.07	.000

Correlations examined to answer research question 2 (In what way is learning orientation related to degrees of distance or educational philosophy?) were not statistically significant (Cramer's  $V = .15$  for learning orientation and  $.18$  for educational philosophy). The qualitative data again supported this finding as learners reported reasons for choosing level of distance that had nothing to do with their learning orientation or educational philosophy.

Research question 3 (How do learners create, maintain, and use a learning community to foster individual and collective learning?) was answered through the qualitative data collected. Learners provided both a definition of community and a description of how these communities developed and were used to aid in their learning. Becoming a member of a learning community provided a sense of social presence and learners seemed to feel this way across all degrees of distance.

#### *Defining Community*

Respondents indicated that a learning community had for them, the following elements - shared learning goals, a free flow of ideas, and help solving problems from all members of the community. An element of interpersonal connection or trust was also identified as important in attaining a feeling of community.

#### *Creating a Learning Community*

When asked how they went from being individuals to feeling part of the group or team, the most common response can be summed up by one of the interviewees who said, "We had to!" Most of the learners felt that although they were placed into groups, it was the assignments given within the courses, and the process of working together to complete them that were the keys to becoming a cohesive group, and subsequently feeling that they were part of a learning community. In examining responses from interviewees who felt that community did develop in their course, we found this was true across all degrees of distance.

Not all agreed, however, that their course or the group to which they were assigned created a learning community. For those learners who did not feel that their group became a learning community, it often appeared that the individual was unwilling to socialize or did not have an interest in participation in the course.

I just felt like an independent student. I didn't try to get to know anybody except for reading their student intros and also with the teacher. [When the student was asked if she felt like she was alone, she responded:] Yes.

*Structure and community creation.* The learners participating in this study concur with Moore's theory that interaction and appropriate structure aid in learning, and with the notion that social construction of knowledge aids in the formation of learning communities. When the structure of the course requires learners to work together, communities were created and learning was enhanced.

But, that format where you produced a result of your group discussion and compared it with other groups in one way or another I thought improved your learning [she nods]

On the other hand, when learners were not satisfied with the level of structure, learners indicated that there were problems with learning.

They [were] just...not at all structured. There's no set way, no definite... I'm never sure what they want, so when I sit down to do my work, I'm not sure what I should be doing or what they want me to do or if I'm doing it right...Like I said, I like more structure and only one of them (one of the 14 web based courses this learner took) really had...enough (structure) to make it work.

Whether the learners were working together face-to-face or via the web did not seem to make a difference in whether a learning community was created, however learners who had taken both face-to-face and Web based courses believed face-to-face communities developed more quickly.

#### *Maintaining a Learning Community*

Some learners felt that the process of community building began with social interaction and shared goals. Trust that others in the group would do their part and provide assistance if needed was identified as a key element in the continuation of a learning community. Working on the assignments allowed some learners to develop a feeling of trust in their community members. For others, working together on a project or assignment was not sufficient to develop and maintain a learning community.

Communication problems were reported as one reason that learning communities did not develop or were derailed after development began. As evidenced by the following comment, it appears that one sure way to erode

trust among the group is to communicate in ways that would be unlikely in a face-to-face course. Basic courtesy seemed to be lacking from some group members.

I found people to be somewhat impolite, more so than I would expect face-to-face. More challenging in an impolite way than I would expect face-to-face. And that's turned me off. As a matter of fact, the last time I was with my group face-to-face, I said, "I'd like for us to be careful about this as we continue, particularly around the final exam that we're all starting to do as a discussion chat group," because it made me uncomfortable.

Good communication and ongoing interactions were identified as factors that maintained the learning communities that were created.

#### *Using Learning Communities*

The interviews provided evidence that the learning communities that developed and were maintained throughout the courses played an important role both in students' learning and in lessening their feelings of distance from each other. Becoming a member of a learning community provided a sense of social presence. Again, learners seemed to feel this way across all levels of distance. One of the learners in a Web enhanced course summed up the use of a learning community rather well:

It's gotten me more involved. I think just the back and forth between the people – it's kind of funny because when we go to class we don't know anybody's names. On the Internet, during the week when we are having these discussions over the e-mail, we all know everybody's names and there are like little jokes going back and forth but when you get to class you have no idea who you had these jokes with. I think having them (group interactions) online and having everybody post their opinion or their experience has really furthered it (learning), because everybody in that class has some kind of different experience so, therefore, when they do respond to different discussion postings they give further information. They're like, oh well this society deals with this or this society deals with this and if you go to this web page - or this is a great book that concerns that - it gives you a lot more things that are not particularly required for the course, things that I may not actually go and do right now but maybe over the summer when I have time I'll say, oh hey, I remember this guy was talking about this and I need to go look that up and find out more about it. I think that has really fostered more outside learning like without having required it.

These students used their learning communities to enhance their learning. They saw the community as an opportunity to share ideas. Finally, learning communities seem to lower the feeling of isolation for some students.

*Interaction and the use of community.* For the learners reporting that learning communities formed and that they relied on the community for the construction of knowledge, interactions were deep and meaningful. These meaningful interactions also seemed to help maintain the community throughout the course.

I think they (chat, discussions, and group assignments) added value to the learning experience and helped us be connected.

It gives you different notions too, because otherwise you're your own compass unless you get other peoples' feedback, so my experience would have been totally through tunnel vision unless I had inputs coming along the way.

I found it [group interactions] to be very good. We got so much in-depth....

However in some situations, the interaction never reached the depth required to aid learning.

Some people are using it [the discussion board] more as a chat line... than I think for depth of thought issues....

Some of those postings, I ask "what does that have to do with anything we're reading?"

Overall, the learners interviewed felt that the interaction had at least the potential to aid in their learning and to support the development, maintenance and use of learning communities. In addition, they felt that when a learning community did develop through interactions, their learning was enhanced.

### **Conclusions and Implications**

This study began with three questions. These questions were based on research that indicated that given a choice, learning orientation and educational philosophy would make distance education courses more attractive to some students than to others, that structure and the amount of interaction would be related to student satisfaction with the amount of knowledge gained in a course, and that given the opportunity, students would develop and use learning communities.

The first question (To what extent do structure, interaction, degree of distance, or characteristics of the learner affect satisfaction with learning in a distance environment?) offered mixed results. That is, structure and adequate interaction do lead to greater learning, and it is structure that is the most important, while degree of distance and learner characteristics were not related at a significant level. Why interaction was less important than structure to learning may be related to the more limited experiences of both faculty and students with online instruction. On the one hand, faculty (both in general and in this study) typically have more experience designing courses (i.e., creating structure) than at facilitating interaction in the newer, online environment. On the other hand, the students remarked in the interviews that they had some technical and organizational difficulties in the distance environment. Online assignments are more demanding of the student because they must be opened, read, and then (sometimes) responded to. These steps are more time intensive than listening and commenting in class and require at least some technical skill to accomplish. Combining the logistic regression results with the interviews and focus group comments supports the proposition that student experience with online interaction was more varied and that some students had difficulty adapting to the new environment. These difficulties would account for the smaller effect of interaction on satisfaction with knowledge gained.

The data for question 2, (In what way is learning orientation related to degrees of distance or educational philosophy?), were not statistically significant for at least two reasons. First, except for one course, students were not given a choice in how much of the course was online. Thus, nearly all students in this study were taking courses with at least some distance component, regardless of learning orientation or educational philosophy. Second, regardless of learning orientation or educational philosophy, students appear to be flexible and to have eventually adapted well to the online environment. In summary, the results of the quantitative tests indicate that neither learning orientation or educational philosophy, nor whether the course was taught online or face-to-face is related to satisfaction with the amount of knowledge a student gained. What does emerge, however, is that the structure of the course and the quality of interaction is highly related to self-reported student satisfaction with learning.

The third research question investigated how learning communities developed in face-to-face, Web enhanced or Web based courses and whether the formation and use of these communities was instrumental in a learner's knowledge development in the course. We had theorized that interaction would be the most important element in both the development of communities and in the learning that occurred as a result. Surprisingly, structure appeared to be more important to these learners. Without clear guidance, and without adequate explanation of what the interactions were to accomplish and how they were to be used, learners did not find the interactions themselves to be useful as an aid to learning or in the development of a learning community. Even in courses we had categorized as highly structured, there were instances where lack of structure interfered with both the development of community and with learning.

The importance of structure in this group of students' satisfaction with their learning reaffirms the need for instructors to develop clear guidelines and to communicate the purpose of interactions in courses, whether face-to-face or on-line. Specifically, as instructors we need to be clear about what is expected of the student, provide continued support and clarifications throughout the course, and to continue to facilitate the interactions structured into the course. Through these steps we can encourage the creation, maintenance and use of communities as learners engage in the hard work of learning.

The learners developed definitions of community through their own experience with the formation and use of communities that reflect much of the research and the definitions found in the literature. They recognized when the course required them to become a community and when the course got in the way of the development of a community. For those learners in courses where communities developed - and were not derailed by lack of trust, poor communication or lack of guidance by the instructor - this group of learners indicated that the interactions and sharing in the community led to better understanding and fostered further learning outside the course. Chance encounters with two of the interviewees indicate that nearly two years later, these former students are still in contact

with the community that developed during their courses, and are using the other community members as resources in their work.

This study included courses that were 6-10 weeks in length which may be similar to some training programs. We found that communities could and did develop in this short amount of time when there was adequate structure and facilitation by the instructor. Simply asking learners to discuss topics is not adequate. As instructors, we must explain reasons for the interactions and what learners should expect to gain from them. These learner to learner interactions must be monitored by instructors and the instructor must ensure that group interactions remain cordial and constructive. With regard to learning, members of communities told us that learning was deeper when they were involved in a community. These learners explored subject areas further than the course required on their own, related it to their own work and study situations, and discovered more connections to other areas of work or study than learners who did not feel they were part of a community. This depth of understanding and collaborative knowledge building came from dialogue (interactions) among the members and with the instructor, especially when communications were directed more toward community members than to the instructor. In fact, some of these members still meet and use each other as resources. Once developed these communities, or parts of the communities, do continue and members continue to help each other learn and solve problems. It is this aspect of learning communities that leads to what HRD calls communities of practice – a goal of many training programs. The development of these communities then may reduce the need for additional training and reduce costs associated with formal programs. The development of collaborative communities may also increase the non formal learning that goes on within an organization. Dialogue does seem to foster collaboration and problem solving skills.

This study offers some preliminary findings regarding the development and maintenance of online learning communities. Further research is needed to determine the levels and type of structure required for learners of various abilities. In addition, we need to investigate how online interaction might best be facilitated if on-line communities are to be created maintained and used to aid learning. The types of interaction that best assist learners as well as the factors that interfere with the creation and maintenance of on-line communities also require further study.

The findings of this study suggest that Web based communities can be developed and maintained if learners are encouraged to work together and the support for that collaboration is provided. It is through this support that communities of practice can evolve and assist in translating learning into improved performance on the job.

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