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Measuring Virtual Community: Using Principles from the Learning Communities Movement to Evaluate Online Courses

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Abstract: While online education shows promise for setting collegiate learning free from the confines of the lecture hall, this new freedom also brings new challenges. For example, drop rates are double for online courses. In an era of declining resources and accountability, high attrition rates are troublesome. One campus initiative, learning communities, has proven successful in confronting attrition problems. Perhaps faculty could improve attrition rates by building a learning community within their online course? This study chronicles an eighteen-month, multi-stage campaign aimed at designing a valid and reliable measure of an “Online Learning Community.” A three-element theoretical construct emerged using a Web-based student exit survey. Measuring community and student engagement should help professors and administrators evaluate online courses and programs.

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Technological advances in computing and communication have the potential to transform higher education in ways that we are only beginning to understand. Traditional conceptions of instruction are being reshaped and altered in fundamental ways as a result of changes in how, when, and where people learn. Online distance education—teaching and learning via the Internet—shows promise for setting collegiate learning free from the confines of the lecture hall. However, along with transformation comes the requisite growing pains and problems.

For example, drop rates for courses delivered via the Internet are higher than the average for traditional classes (Diaz, 2002). Although they vary from institution to institution, and program to program, attrition rates are typically ten percentage points higher in online courses than those of their on-campus counterparts (Carr, 2000). Data from the Dallas Community College District exposed “an 11 to 15 percentage-point difference between course-completion rates in the district’s on-campus courses and those in its distance education courses” (Carr, 2000, p. A39). Another study, from the online MBA program at Texas A&M, showed attrition rates of 21 percent for online courses compared with 14 percent for traditional courses (Terry, 2001). In an era of declining resources and renewed interest in accountability of higher education, high attrition rates are troublesome (Banta, 2002; Burke, 2002).

Senior management on campus, including distance education administrators, tend to talk of online distance education programs in terms of exponential increases in student headcount and the incessant demand for more courses (Green, 2002). The emphasis is on growth and meeting demand, with less attention paid to what is going on in the online classroom (Berge, 1998). Virtual universities and global competition are forcing many higher education institutions into online distance education in order to stay relevant in an Information Age economy (Kirp, 2003). As college and university leaders scramble to find their niche in this market, concerns about evaluation, assessment, and quality are likely of secondary importance on a list of priorities.

The use of learning communities, as a curricular design strategy, has proven successful in confronting the challenges associated with attrition and retention (Cross, 1998; Shapiro, 1998). Because high attrition is associated with online distance education, it stands to reason that learning community principles might be applicable in online courses where students report a sense of isolation and remoteness.

The Phenomenon of Learning Communities

For more than forty years, colleges and universities have experimented with the idea of creating campus programs designed to make certain that lower-division undergraduates would not drop out of school because of the negative experiences often associated with the first year of college (Tinto & Goodsell, 1993; Upcraft & Gardner, 1989). These programs are representative of experimentation and innovation in higher education, with new programs aimed at enhancing student development, improving persistence rates, and humanizing what had become a massive national collegiate system (Astin, 1984; Pascarella & Terenzini, 1980; Tinto, 1987). Innovators in this effort, which began during the 1960s, include Western Washington University, the University of Nebraska, and the University of Michigan. These universities created new programs or “sub-colleges” which incorporated both a cohort structure and an interdisciplinary approach to curriculum design (Smith, 2001).

In 1985, Evergreen State College established a center that has come to be known as a pioneering clearinghouse for research and practical information about learning communities (MacGregor, Smith, Tinto, & Levine, 1999). Since then, important work in the area of student retention, collaborative learning, and learning communities by Smith (1993), Tinto (1995), and others (Gabelnick, MacGregor, Matthews, & Smith, 1990; Smith & Hunter, 1988) marked an important period for growth in the movement. Today, these inventive programs can be found at approximately five hundred institutions across the nation and are used “to address a variety of issues from student retention to curriculum coherence, from faculty vitality to building a greater sense of community within our colleges” (Smith, 2001, p. 1).

Today, learning community programs vary from institution to institution, but most include some or all of the following: (a) an interdisciplinary approach to the curriculum (e.g. blending history and literature courses), (b) team-teaching pedagogical techniques, (c) extracurricular initiatives with a community service focus, and (d) a residence hall component. An interdisciplinary approach to curriculum design is an important ingredient in most learning communities. Gabelnick, et al. (1990) described the basis for an interdisciplinary effort as “students and faculty members (recognizing) courses or disciplines as complementary and connected” (p. 19). Smith (1993) defined learning communities as “intentionally link(ing) together courses or coursework to provide greater curricular coherence, more opportunities for active learning, and interaction between students and faculty” (p. 34).

Indeed, the literature supports the notion that students feel valued and encouraged to participate when a course is structured so that both the professor and other students show interest, share insights, and express ideas (Bruffee, 1993; Dede, 1996; Harasim, Hiltz, Teles, & Turoff, 1995). In the few studies that do examine the dynamics of an online course, results point to a student’s sense of isolation and remoteness as significant barriers to learning via the Internet (Conrad, 2002; Everhart, 1999; Haythornthwaithe, Kazmer, Robins, & Shoemaker, 2000). Consequently, for faculty teaching via the Internet, striving to create community in the virtual classroom should strengthen the bond between students taking the course and make the course material more interesting.

The implication here is that faculty can reduce attrition rates by building a sense of community within their online courses. Few, if any, good measures exist to gauge whether or not important elements of community are present in an online course.

The Study

This project is an eighteen-month long effort to design a valid and reliable Web-based survey instrument (Dillman, 2000) for detecting and measuring community in an online class. The campaign includes several stages. Ultimately, data from this survey instrument and the discussion to follow are intended to make a valuable contribution to a small, but growing, body of knowledge about the quality of online courses. Under the rubric of accountability in higher education today, quality is measured by demonstrating both that college instruction has impact on learning and that faculty use continuous improvement strategies to improve instruction (Welsh & Metcalf, 2003). This study focuses on the second-half of the Welsh and Metcalf measure, efforts to improve online instruction by forming a community of learners. Two research questions arise:

1. What are the identifiable factors that best describe a learning community that have application for online teaching and learning?

2. In what ways would a valid and reliable student exit survey, designed to detect the presence of an online learning community, prove useful to faculty leaders and administrators in evaluating online courses and programs?

A comprehensive, three-fold methodological approach—literature review, expert/practitioner review, and statistical analysis—was used to ensure that the survey instrument has good reliability and validity. This study focused on the ingredients present in the formation of a learning community in an Internet-delivered college course. Detecting and measuring the level of community and student engagement in an online course should help administrators and faculty leaders evaluate online courses and programs. The next section details the results of the data gathering effort of 1,295 surveys over multiple stages, including 709 collected from students completing online courses at the University of Nevada, Las Vegas, the University of Nebraska-Lincoln, and Florida State University in the fall of 2004.

Results

In September of 2003, a pilot survey was distributed to college instructors who teach online. It was intended to pretest and validate concepts for the larger Web-based student exit survey administered at the semester's end in future stages. Forty-seven, out of the 120 instructors surveyed, participated in the first stage pilot (39% response rate). Participants

Table 1. Rankings of survey statements as "most important" by faculty who teach online classes, Stage One pilot.

<u>Rank</u>	<u>Statement</u>	<u>f (freq)</u>
1	Encourage students to share... in discussions and/or postings.	30
2	Course has a "learning community" structure...	25
3	Inspect student writings and postings for evidence of learning...	24
4	Clearly state the purpose, scope, and "do's-and-don'ts" for the class.	18
5	Utilize some method to assess if curriculum is relevant to students.	13
6	Share your own internal processes (ways of thinking) with students.	10
6	Incorporate ideas about ethics, character, and leadership into the course.	10
8	Use group projects to promote collaborative learning.	5

were from all sectors of postsecondary education, including two-year institutions, four-year colleges, and research universities. The instructors were asked to rate the importance of each survey statement to their approach to online teaching. Table 1 shows the results of these rankings. Note that group work ranked last in importance to instructors for building community in the online classroom.

Comments from faculty members who participated in the pilot study were also used to help shape the subsequent student exit survey. A content analysis of the responses was conducted using respondent's comments (Manning & Cullum-Swan, 1994). The qualitative data were then pattern-coded and categorized into themes (Miles & Huberman, 1984) to both support and help operationalize the factors of an "Online Learning Community" framework. Thus, both quantitative and qualitative data from the pilot study assisted in the design of the student exit survey administered over the next four semesters.

During the remainder of 2003 and through 2004, semester by semester, more than 1,200 surveys were collected from students completing an online course. The final stage of data collection, Stage Five in the fall of 2004, was the most comprehensive. At the end of the Fall 2004 semester, a final sample of students was asked to participate in the survey. Students were from three institutions—University of Nevada, Las Vegas, University of Nebraska-Lincoln, and Florida State University—and represented 63 different courses including education, business, social sciences, and others.

Table 2. Breakdown of the Stage Five sample by institution and discipline.

<u>Institution</u>	<u>Education</u>	<u>Business/ Professional</u>	<u>Social Sci. /Other</u>	<u>Total</u>
University of Nevada, Las Vegas	66	76	151	293
University of Nebraska-Lincoln	96	82	39	217
Florida State University	77	62	60	199
TOTAL:	239	220	250	709

Seven hundred nine students out of a total sample of 1,623 participated in the Stage Five survey (43.7% response rate). Participants were either upper-division undergraduates or graduate students. Table 2 shows a breakdown of the sample by institution and academic discipline.

As was the case for each of the previous stages of data collection, exploratory factor analysis was used to determine how responses to survey questions from the Stage Five Student Exit Survey grouped together. Three distinct factors were revealed using the exploratory factor analysis. Results in Table 3 show that five survey questions factored together as Factor One, named "Instructor's Role." The first factor to load explains the most common variance in the data and is the most reliable (Thompson, 2004). The five survey

questions that comprised Factor One were: "Do's-and-don'ts for class were clearly stated," "Student was encouraged to communicate ideas and experiences," "Instructor shared ways of thinking about problems," "Instructor inspected writings for evidence of learning," and "Instructor took role of mentor / guiding student." The reliability measure of internal consistency for Factor One, using the five survey questions, was .794 (Cronbach's alpha).

Four questions factored together as Factor Two, named "Connections," in the Stage Five survey, as shown in Table 3 results. The four were: "Had opportunity to work in a group," "Had opportunity to help other students," "(Student) took leadership role in task/event," and "Interaction between students was important." Cronbach's alpha internal reliability score was .804 for Factor Two. Table 3 also shows that four survey questions from

Table 3. Factor analysis component matrix for Stage Five (N = 709).

<u>Survey Question</u>	<u>Instructor's Role</u>	<u>Connections</u>	<u>Student's Respons.</u>
Q8. Do's-and-don'ts for class were clearly stated.	.696	.055	.157
Q10. Student was encouraged to communicate ideas and experiences.	.575	.380	.165
Q11. Instructor shared ways of thinking about problems.	.770	.159	.081
Q14. Instructor inspected writings for evidence of learning.	.676	.185	.141
Q16. Instructor took role of mentor / guiding student.	.781	.181	.076
Q2. Had opportunity to work in a group.	.079	.830	.026
Q4. Had opportunity to help other students.	.183	.753	.132
Q7. Student took leadership role in task/event.	.174	.751	-.028
Q12. Interaction between students was important.	.259	.742	.106
Q3. It was important to be self-motivated.	-.014	.107	.789
Q9. Student ability to organize/prioritize important.	.254	.116	.730
Q13. Student responsible for their own learning.	.058	-.056	.715
Q18. Student needed to manage time effectively.	.274	.087	.717

Note. Shaded scores show question's factor grouping.

Stage Five clustered together to form Factor Three, "Student's Responsibility": "It was important to be self-motivated," "Student ability to organize/prioritize important," "Student responsible for their own learning," and "Student needed to manage time effectively." The reliability or internal consistency score was .738 for Stage Five's Factor Three. The "total common variance explained" score for this construct, including all three factors, was nearly 60 percent (59.2%). The "Online Learning Community" measure performed reasonably well when checked for consistency and reliability across the institutions, disciplines, and sub-samples. Detailed results for the consistency checks are available on the Web at <http://highereddata.org/stage5tables.pdf> (153K). Based on the detailed results, Table 4 gives a summary analysis of the performance of the quantitative measure as a survey tool. Although the framework did not perform perfectly as a metric or tool when data was disaggregated across institutions and disciplines, it performed reasonably well by achieving overall consistency scores in the high-80 to mid-90 percent range. Moreover, scores for reliability and "total common variance explained" were generally acceptable for most samples and sub-samples.

Table 4. Combined analysis of the consistency, reliability, and variance performance for the "Online Learning Community" measure. (Figures in parentheses represent how many times desired result was achieved out of total possible scores for the category)

<u>Analysis</u>	<u>Factor Consistency</u>	<u>Reliability $\alpha > .700$</u>	<u>Total Var. Explained $> 50%$</u>
Across institutions (see Web Table 4.14)	94.9% (37/39)	77.8% (7/9)	100% (3/3)
Across disciplines (see Web Table 4.15)	97.4% (38/39)	100% (9/9)	100% (3/3)
Across three largest sub-samples (see Web Table 4.16)	92.3% (36/39)	88.9% (8/9)	100% (3/3)
Across all sub-samples (See Web Appendix F)	88.0% (103/117)	66.7% (6/9)	88.9% (8/9)
	—————	—————	—————
TOTAL	91.5% (214/234)	83.3% (30/36)	94.4% (17/18)

Detailed results for the consistency checks are available at <http://highereddata.org/stage5tables.pdf> (153K).

Qualitative Responses from Students. The Stage Five survey invited student comments. Students were asked, "If you have any comments about this online course, please feel free to submit your comments below," and a text box was provided to collect the information off the Web page. One hundred thirty two (132) qualitative responses were recorded. The student feedback was coded based on whether the tone was generally

"Positive" (n = 64), generally "Negative" (n = 40), or "Neutral or Mixed" (n = 28). For example, one of the student comments, coded as "Positive," read:

Excellent use of the 'lecturettes' to tie the subject matter together. Those were invaluable! Liked the way the course was set up (three papers, tests each week, and discussions). Enjoyed the course and learned quite a bit about myself and those I interact with. [286]

In a response coded as "Negative," a student offered this observation:

I was incredibly disappointed with this course. My e-mails went unanswered and many times I needed help that I was unable to get. The tests were far too nitpicky and many times the group discussion postings were irrelevant to the course. By far my biggest disappointment with the course was the lack of feedback I received from the teacher. I really needed some help. [253]

In a "Neutral or Mixed" response, the student typically included both positive and negative comments about the course or offered general feedback about online courses and Internet learning, such as "student interaction is important in a online course."

Mean scores for the survey questions were compared between the two groups, "Positive" and "Negative," using a t-test. Differences between the two groups are given in Table 5. The importance of the results presented in Table 5 is that they give clues to differences between positive or negative student experiences in an online class. Significant differences were found for 16 of the 18 survey questions used in Stage Five. As shown in Table 5, the top five largest differences between the "Positive" and "Negative" groups occurred in questions associated with the "Instructor's Role" factors of the "Online Learning Community" measure. For example, as indicated in Table 4.17, survey question 16, "The instructor often took the role of mentor, guiding me through the course," showed the largest difference in mean scores (1.41) between students who commented positively versus negatively. Other important differences of note, all associated with the "Instructor's Role" factor, were found in question 11, "Instructor shared ways of thinking" (1.01), question 8, "Do's-and-don'ts for class clearly stated" (0.99), question 10, "(Student) encouraged to communicate" (0.97), and question 1, "Expectations for the class clearly stated" (0.95). Another significant difference between the "Positive" and "Negative" groups occurred in a question 2, "Had opportunity to work in a group" (0.94), associated with the "Connections" factor of the "Online Learning Community" measure. Question 2 also had the largest standard deviation scores ($SD_{pos} = .89$, $SD_{neg} = 1.14$) in the survey, indicating differing views and least agreement among students about group work in an online class.

Report for Faculty. Based on feedback from professors who received a faculty report during the earlier stages, a revised and improved faculty report was developed for Stage Five. Once again, the score for each of the thirteen factor in the "Online Learning Community" measure was provided for each class and compared with the average for all courses, however, in this new report, the results were presented in a more concise manner as recommended. Figure 1 gives an example of the Stage Five faculty report. In the example, the course scored a 1.64 for the "group work" factor compared to 3.04 for all courses in Stage Five. Comments were provided for the instructor to provide more explanation of the factors of interest.

Table 5. Survey questions showing differences between Likert scores for students with positive (n = 64) versus negative (n = 40) comments about the online course, rank ordered by largest differences.

Rank	Survey Question (abbreviated)	Mean Likert Score		Score Diff.	Sig.
		Student Comment Positive	Negative		
1	Q16. Instructor took role of mentor-guide	3.30 (.66)	1.89 (.86)	1.41	<.001
2	Q11. Instructor shared ways of thinking	3.44 (.74)	2.35 (.95)	1.08	<.001
3	Q8. Do's-and-don'ts for class clearly stated	3.45 (.62)	2.46 (.84)	0.99	<.001
4	Q10. (Student) encouraged to communicate	3.62 (.52)	2.65 (.92)	0.97	<.001
5	Q1. Expectations for the class clearly stated	3.67 (.51)	2.73 (.91)	0.95	<.001
6	Q2. Had opportunity to work in a group	3.32 (.89)	2.38 (1.14)	0.94	<.001
7	Q14. Instructor inspected writings for learning	3.54 (.50)	2.73 (.96)	0.81	<.001
8	Q6. (Student) had input into goals / expectations	2.68 (.89)	1.89 (.71)	0.79	<.001
9	Q12. Interaction between students was important	3.23 (.78)	2.45 (1.03)	0.78	<.001
10	Q4. Had opportunity to help other students	3.30 (.54)	2.58 (.97)	0.72	<.001
11	Q15. (Course) schedule / calendar provided	3.78 (.52)	3.10 (.98)	0.68	<.001
12	Q7. (Student) took leadership role in task/event	3.05 (.91)	2.55 (.87)	0.50	.018
13	Q17. Introduced self to the other students	3.58 (.59)	3.18 (.73)	0.40	.004
14	Q9. (Student) ability to organize / prioritize	3.73 (.45)	3.35 (.74)	0.38	.001
15	Q5. Ability to work independently was vital	3.73 (.52)	3.41 (.98)	0.32	.017
16	Q18. (Student) needed to manage time	3.78 (.42)	3.53 (.64)	0.26	.015

Notes. Standard deviation score shown in parentheses beneath associated mean score.
 Likert scale (1-4) used: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).
 Q3 and Q13 did not show significant differences between mean Likert scores (Sig. > .05).
 Significance level (Sig.) is two-tailed.

Figure 1. Example of the Stage Five faculty report.

Online Learning Community Survey
2/23/2005
Example course(n = 36)

		All Surveys (N=709)			All Surveys (N=709)			Note if 0.5 SD above or below the mean for all surveys
	Survey Statement	Factor Structure Coefficients	Reliability α	Variance Explained	Mean Scores	SD	Your Course	
Instructor's Role	Q8. Do's-and-don'ts for class were clearly stated.	0.696	0.794	21.2%	3.20	0.73	3.24	
	Q10. Student encouraged to communicate ideas / experiences.	0.575			3.46	0.72	2.86	*
	Q11. Instructor shared ways of thinking about problems.	0.770			3.18	0.84	2.90	
	Q14. Instructor inspected writings for evidence of learning.	0.676			3.36	0.69	3.05	
	Q16. Instructor took role of mentor / guiding student.	0.781			2.91	0.86	2.56	
Connections	Q2. I had the opportunity to work in a group on a project or task.	0.830	0.804	20.4%	3.04	1.06	1.65	*
	Q4. I had the chance to help other students.	0.753			2.98	0.83	1.94	*
	Q7. I took a leadership role in some task or event related to the course.	0.751			2.84	0.93	2.13	*
	Q12. Interaction between students was important.	0.742			3.06	0.92	1.85	*
Student's Responsibility	Q3. It was important to be self-motivated.	0.789	0.738	17.6%	3.84	0.39	3.78	
	Q9. The ability to organize/prioritize was vital.	0.730			3.66	0.54	3.37	*
	Q13. Student responsible for their own learning.	0.715			3.67	0.53	3.63	
	Q18. I needed to manage my time effectively.	0.717			3.73	0.51	3.56	
				Total:			59.2%	
Comments								
Q10. Instructor encouraging students to share ideas and experiences builds community in an online course!								
Scored a bit low on the "Connections" factors								
Q2. My study shows that group work might be a hassle... but WORTH IT in terms of community building/engagement.								
Q4. Students helping other students builds community and increases engagement.								
Q7. Study shows opportunity for leadership role part of building community...merits further research.								
Q12. Student interaction... my study and others show VERY IMPORTANT for building community online.								
Q9. Important for instructor to emphasize student responsibility... merits further research.								

Final Thoughts on the Results. The "Online Learning Community" framework depicted in Figure 2 represents the culmination of an analysis of 1,295 surveys, collected in five stages, from 96 online classes at seven colleges and universities. In some form, the three-factor framework—"Instructor's Role," "Connections," and "Student's Responsibility"—has been tested repeatedly as a survey measure, checking for validity, reliability, and consistency at each stage of development. The construct includes thirteen indicators across the three factors. The "total common variance explained" score for the final version of the construct as depicted in Figure 2 is nearly 60 percent (59.2%).

Figure 2. "Online Learning Community" construct, with three factors and associated indicators.

Factor 1 <i>INSTRUCTOR'S ROLE</i>	Factor 2 <i>CONNECTIONS</i>	Factor 3 <i>STUDENT'S RESPONSIBILITY</i>
<p>How the online course is organized, including: course expectations, virtual classroom rules, and instructor duties.</p>	<p>Participation and familiarity: helping other students, group work, taking the lead, student interaction.</p>	<p>Motivation and maturity: students accountable for own learning, empowered to learn in a manner that works best for them.</p>
<p>1. Instructor took the role of mentor, guiding students through the course.</p> <p>2. Instructor shared ways of thinking about problems and problem-solving with students.</p> <p>3. "Do's-and-don'ts" for the class were provided.</p> <p>4. Instructor looked for course concepts and course-specific vocabulary when grading student writing assignments.</p> <p>5. Instructor encouraged students to share their ideas and experiences.</p>	<p>1. Student had the opportunity to work in a group on a project or task.</p> <p>2. Student had the chance to help other students.</p> <p>3. Student took a leadership role in some task or event related to the course.</p> <p>4. Interaction between students was important.</p>	<p>1. It was important to be self-motivated.</p> <p>2. The ability to organize and prioritize was vital.</p> <p>3. Student needed to manage time effectively.</p> <p>4. Student was responsible for own learning.</p>

The study produced a framework for studying and evaluating online teaching and learning in the context of principles associated with learning communities. The framework has been tested repeatedly for suitability as a survey measure. The emergence of a construct defining a community of learners in an online class, both the qualitative framework and the quantitative measure, is the main finding of the study. Moreover, results from the data analysis also revealed interesting new insights into teaching and learning via the Internet.

For example, data about the factors leading to a negative or positive experience for students, provided in Table 5, should prove useful for online course design. The three factors of the "Online Learning Community" framework depicted in Figure 2, along with their associated indicators, form the basis for the discussion in the next section.

Discussion

The efforts of the five-stage study produced a three-factor "Online Learning Community" construct, a tool designed to detect and measure the presence of community in an Internet-based course. The construct is both a qualitative framework and a quantitative measure. It is a qualitative framework because it seeks to explain complex human phenomena by providing insights into the process of building community in an online course (Creswell, 2002). Moreover, its factors and indicators can be used to support an engaging educational paradigm for online teaching and learning. The quantitative measure is suitable for use as a student exit survey; an instrument resulting from a statistical analysis of data collected from 1,295 participants, including students and faculty members.

The framework presented in this study delineates a set of factors and indicators designed specifically for the context of teaching and learning via the Internet. The major finding of this study is the "Online Learning Community" framework itself, with its associated three factors and thirteen indicators. In the following subsections, each of the factors—"Instructor's Role," "Connections," and "Student's Responsibility"—are discussed in light of the quantitative and qualitative data collected in the study.

Instructor's Role. The instructor's role in the success of a college class, including student achievement and retention, is well documented (Angelo & Cross, 1993; Bain, 2004; Weimer, 2002). Despite the increased and varied challenges associated with distance education, faculty who teach online have essentially the same responsibilities as those teaching traditional classes. This includes guiding students through the course content, supplying consistent and fair feedback on assignments, and apprising students of the latest developments and current events related to subject.

Yet, results from this study show that certain elements of an instructor's normal pedagogical duties are even more important in the online classroom. Students in this study reported that the preeminent factors producing a significant difference between a "positive" or "negative" experience in an online class were associated with the role and duties of the instructor. Perhaps one reason why the instructor's role is so significant in online teaching and learning is that, as designers of an educational experience, they must overcome technological barriers and restrictions on time and place in order to create an optimal educational setting for accomplishing educational goals. If an online course is to be successful, faculty should be willing to reconsider their own role in the process and adopt strategies for maximizing the advantages of technology-mediated pedagogy.

Like any venture, teaching an online class can be done well or poorly, and this has implications for student engagement and building community. Results from this study confirm the research of both Gunawardena and Zittle (1997) and Haythornthwaite, et al. (2000) who found that the most important factor for online education is interaction among participants, including both instructor-student and student-student interaction. Moreover, findings from this study show that the instructor, acting as facilitator, should use strategies to ensure regular interaction occurs in the course. For example, students may complete weekly assignments, perhaps answering questions or problems posted by the instructor on a discussion board. Typically, the responses are publicly posted, thus providing a basis for sharing of ideas and sparking discussion and debate among students. These findings concur

with literature pointing to the sharing of ideas as an important element of teaching and learning in an online course (Egan & Gibb, 1997; Monteith & Smith, 2001).

An ironic aspect of online education is that it can succeed despite the presence of an ineffective instructor (Kearsley, 1999). Because education via the Internet is inherently student-centered, it can be a very powerful form of learning and somewhat immune to teaching deficiencies, especially with a group of highly motivated students. Some of the student comments in this study confirm this. If students form ad hoc groups using the communication capabilities of the courseware—the computer software platform for teaching online—there can be an excellent level of interaction regardless of what the instructor does or does not do. Motivated students share useful information for the course, such as Web sites of interest. Obviously, an online class will be made more enjoyable and worthwhile for students with a first-rate teacher who facilitates well and ensures frequent and meaningful interaction among participants.

Connections. The second factor of the "Online Learning Community" framework, "Connections," measures how students communicate, exchange ideas, and interact with their peers in an online class. There exists ample literature suggesting that classmates who have frequent and meaningful contact with one another benefit from the engagement (Angelo & Cross, 1993; Astin, 1984; Astin, 1993; Campbell & Smith, 1997; Gabelnick, et al., 1990). Student-student interaction associated with "Connections" helps cultivate learning communities and aids students in experiencing the richness of learning. Results from this study are consistent with elements of the "engagement framework" authored by Conrad and Donaldson in *Engaging the Online Learner* (2004, p. 34). In this study and the study by Conrad and Donaldson, frequent and meaningful communication in an online course was found to be more important than in the traditional classroom. Therefore, "Connections" variables should be seriously considered as a course design strategy for classes taught using the Internet.

"Connections" are an essential ingredient for achieving synergy in the virtual classroom. People with little or no experience in teaching and learning via the Internet likely have the misconception that online classes are impersonal and sterile. This myth is normally dispelled once a student starts communicating with others in the class and discovers that an online learning environment can foster rich and personal interaction. Students typically find they are more engaged in the subject matter than in a traditional course because of the depth of discussion and interaction. While student passivity in the lecture hall is commonplace, more active participation is critical in the online classroom.

For example, "Group work," the first of the "Connections" variables, represents an important element of interaction in an online course. For most online courses in this study, students were divided into small groups based upon common interests or complementary skills. Some groups lasted for the entire semester, others for a shorter term, such as for a particular assignment, a unique problem or issue related to a class subtopic, or a single module. Typically, the professor assigns students to groups, but data from this study suggests it may be preferable to have the students themselves determine group membership. However structured, online group activities, according to both student and faculty comments, were quite deliberative and required much effort to organize and manage.

Dividing an online class into project or work groups gives students more opportunity to participate because interaction is not as heavily dependent on one-to-one communication with the professor. Using small groups may actually help an instructor manage a semester workload by ensuring more student-to-student interaction. Most importantly, group work, as a course design strategy, provides students with the opportunity to gain team-building competencies, build management and leadership skills, and experience collaborative

scenarios such as those that exist in the real world. When working in groups in an online class, students learn to negotiate roles for group members, develop priorities and agendas, and cooperate with each other when managing the workload, accomplishing group tasks, and solving problems. This student considers online group work a challenge worthy of a television script from a popular reality series:

Teamwork takes on a whole new meaning in an online environment. Kind of like [the television show] 'Survivor' you form alliances and exchange problems, challenges, and online 'maps' for lack of a better word. [230]

When done well, group projects can be a student favorite, but the professor needs to monitor the process and provide clear guidelines and structure. Several students in the survey responded favorably to group work and group projects. For example:

Being able to work in small groups and interact with other students is vital to the success in any online class. [417]

"Group work" was important when comparing student comments about a "positive" versus "negative" experience with an online course, with nearly one Likert scale difference (see Table 5). Ironically, in the Stage One pilot study, instructors ranked this factor last in importance from a list of eight factors (see Table 1). Throughout the study, "Group work" had the highest variability scores, indicating the least agreement among study participants about the efficacy of this factor.

Student's Responsibility. Online courses provide a convenient and practical option for students seeking more access to educational opportunities; access that perhaps their local community cannot provide. However, learning via the Internet also requires students to assume an active role in the learning process. At the core of the "Student's Responsibility" factor is motivation, maturity, and students being accountable for their own learning. This requires an additional level of student accountability not normally associated with a traditional lecture hall class, with particular emphasis on the associated factors identified in this section including self-motivation, organization skills, and time management.

The emergence of this factor in the "Online Learning Community" framework represents one of the more interesting findings from the study because there is little scholarly literature exploring the relationship between Internet learning and student responsibility. Research by Bender (2003), Rudestam and Schoenholtz-Read (2002), and others (Maeroff, 2003; Paloff & Pratt, 2003) confirm the importance of student responsibility in an online course. Astin (1993) wrote that collaborative learning, with its many similarities to an "Online Learning Community," enhances students' responsibility for learning and individual accountability.

While there are plenty of tips about student responsibility available on college Web sites supporting online classes and programs, there is not much in the scholarly literature on distance education that specifically explores the notion of personal responsibility for learning online. One student respondent from the survey had this comment about online learning and responsibility:

I think online courses are a great alternative especially for people who can't find the time to actually sit down on a regular class. With this, I think it teaches students independence, responsibility, and motivation. [227]

Western Governors University (WGU), a virtual institution founded by the governors of 19 western states, emphasizes taking personal responsibility for one's own learning (Young, 1999). Like the students who attend WGU, this student from the study was willing to take on the responsibility in order to move forward in her academic goals:

I feel that online courses at this university are vital. When there are many 'non-traditional' students who work full time, it gives them and other students an opportunity to take classes that they may otherwise have to wait for a long time to take. [617]

Critics of online distance education say that learning via the Internet cannot be equal in quality to traditional, on-campus classes. While this criticism has its merits for some poorly organized and mismanaged courses, it is certainly possible to learn more in the online context. One business student characterized the online learning experience this way:

This class greatly exceeded my expectations regarding quality as well as the quantity of work required. If anything, I have learned more in this online format than a traditional classroom. [082]

Just as the professor is responsible for designing an engaging and challenging online course, students must assume a majority of the accountability for their own learning. For most classes in this study, it was the student's responsibility to initiate contact with the instructor, especially for questions about assignments and clarification about course concepts.

Conclusion. The dramatic growth of online learning in higher education is prompting the development of tools for studying and evaluating events in the virtual classroom. Tools, such as the "Online Learning Community" framework developed in this study, are important in a "cyber-revolution" that is prompting both students and faculty to approach learning in a way that puts extra emphasis on interaction, communication, and community building via the Internet. However, there exists a complicated dynamic in which technology poses a challenge for both professor and student. Professors are being asked to revisit and alter their pedagogical techniques. All of this change is coupled with a transformation in the learning styles of technology-savvy students in the new millennium. Today's learner appears ready for a shift in course design and delivery because students today possess an amazing level of comfort with the computer. Moreover, in an age of rising student consumerism and expectations, the teaching strategies presented in this study may help bridge the "awkward and growing generation gap between computer-literate young people and their professorial elders" (Kennedy, 1997, p. 269).

A successful course design strategy should include a mix of all indicators from the "Online Learning Community" framework, as this student in the study noted:

I've taken numerous online courses and the instructor feedback was definitely constructive and way above average as far as online classes go. The team projects were more collaborative than just individual contributions slapped together... I'm walking away from this course feeling that I've retained more than in most online courses. The (course management system) features used for this course were easy to follow... This is one of the best online courses I've taken. [699]

This student comment suggests that the possibilities for online distance education are both positive and exciting. Indeed, this mode for educational delivery can help greatly to

address the needs of a growing population of nontraditional learners seeking higher education. It shows promise as a strategic tool for use in a lifelong learning model for education in the Information Age (Breivik, 1998). Higher education administrators see benefit in offering cost-effective classes and academic programs via the Web, helping institutions to compete effectively for students. Online learning is not a fad; it is here to stay. For skeptics, the handwriting is on the wall, "Such technological abilities (and consumer preferences) will force colleges and universities to rethink the delivery of educational programming" (Tierney, 1999a, p. xiv). Peter Drucker expressed his view on learning via the Internet when he commented that "universities won't survive" in their present form and the economic realities of higher education are driving institutions to "deliver more lectures and classes off-campus (via technology)... at a fraction of the cost" (Lenzer & Forbes, 1997, p.129).

Using the Internet to promulgate higher education should have a positive democratizing effect on students, attracting a wide variety of students from diverse backgrounds. The lack of geographic boundaries makes more courses and programs available for more students, including those in rural areas. This medium for learning has huge potential for both frequency and quality of student collaboration, communication, and learning. One student participant in the study summarizes notions of access, communication, and academic vigor in online higher education this way:

The courses that I have taken in an online environment have been extremely challenging due to the high level of course participation required. Graduate coursework is demanding enough on its own, but when one adds the fact that every comment, discussion, project - every interaction with the professor and other students - requires reading and typing, the amount of time dedicated to online coursework is far more significant than most would consider. Online courses are simply not an alternative to those who are seeking an easier way to accomplish a degree. Rather, online courses offer access to universities and professors beyond the confines of other competing demands, such as family or a career. [237]

Innovative pedagogical strategies, such as the formation of online learning communities, can help meet the quality challenge. The "Online Learning Community" construct presented in this study, both the qualitative framework and the quantitative measure, provides one way to ascertain their existence.

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