Promoting Learner-Learner Interactions through Ecological Assessments of the Online Environment

Evelyn S. Johnson
College of Education
Walden University
Minneapolis, MN USA
ejohnso4@waldenu.edu

Abstract

As the number of learners engaging in online education increases, a growing body of literature is developing to recommend best practices for instructors. Typically, these recommendations are oriented to a particular aspect of interaction based on Moore's (1989) extended framework, to include learner-instructor; learner-learner; learner-content; learner-interface interactions, with a recent emphasis on the importance of learner-learner interactions. However, online instructors and learners operate within a complex environment in which many aspects can have a direct impact on the instructor's ability to facilitate learner-learner interactions. If online education providers and instructors hope to successfully adopt practices to promote learner-learner interaction, an assessment of the environment in which they operate to determine appropriate courses of action is warranted. In this article, a tool for examining the learning environment is presented, and implications for practice are provided.

Keywords: collaborative learning; ecological assessment; learner-learner interaction; online education

Introduction

Many theories of adult learning maintain that knowledge is actively constructed through interactions with other learners. Such theories contend that an important element in the learning process is the level and quality of interaction that occurs within a learning community (Garrison & Anderson, 2003; Moore, 1989). Through interactions, learners create new meanings, critically reflect on stated assumptions, and negotiate new learning through consensus (Mezirow, 1998). These concepts of learning are grounded in social learning theory which contends that cognitive processes experienced and observed in social settings are then internalized by individuals (Bandura, 1977; Glaser, 1990). Social learning occurs when a group exposes a learner to new understandings that challenge, extend and complement their current conceptualizations (Glaser, 1990). Examples of instructional models based on social learning theories include collaborative learning (Slavin, 1991) and reciprocal teaching (Brown & Palinscar, 1989). Within both of these instructional models, learning is developed and negotiated through the instructor-facilitated interactions among learners. A key requirement to support learning according to such models is a high level of learner-learner interaction within the instructional environment. A strong body of research supports instructional approaches that promote learner-learner interaction (e.g. cooperative learning; learning communities) as a means of improving student achievement.

At the same time, an increasing number of adult learners are turning to online institutions of higher education (IHE) for advanced degrees and continued professional development. Over 2.5 million people engaged in some form of online learning in the last few years (US Distance Learning Association, 2004). Recent meta-analyses on the effectiveness of online as compared with face-to-face education have

confirmed what has been called the “no significant difference” finding (Zhao, Lei, Yan, Lai & Tan, 2005). This finding implies that when other variables such as the quality of instructor, content materials and course design are held constant, online learning can be as effective as face-to-face education. Despite this finding, there has long been recognition that online learning is subject to one significant, potential shortcoming: the lack of face-to-face interaction, “real-time” dialogue, and opportunities for discussion, which may limit the development of true learning communities.

As the number of learners engaging in online education increases, the available literature to recommend best practices to promote stronger learner-learner interaction is growing. As online education first developed, the focus for instructors was on how to use the technology to transition traditional courses to the online format. Increasingly, best practices for instructors of online courses focus on sets of recommendations to enhance learner outcomes. Typically, these recommendations are oriented to a particular aspect of interaction based on Moore’s (1989) extended framework, to include learner-instructor; learner-learner; learner-content; learner-interface interactions. For example, one recommendation provided to instructors to support stronger learner-learner interactions is to assign learners to small groups in which they can collaborate on group projects (Ko & Rossen, 2004).

Emerging literature identifies some promising practices for instructors to improve the way in which they support learner-learner interaction (see for example, Garrison & Anderson, 2003; Ko & Rossen, 2004; Orvis & Lassiter, 2006). Essentially, these practices focus on the instructor’s role in providing feedback, responding to student inquiries, and providing clear expectations for participating in group work. Other recent areas of focus in the research literature include collaborative and cooperative learning on-line as a way to promote strong learner-learner interaction.

Educational practices, however, are formed and maintained within the context of constraints and these constraints must be understood to propose relevant solutions (Robinson, 1998). Online learning programs operate under a variety of different structures (Zhao et al, 2005). The growth of such a myriad of offerings reflects not only advances in technology, but also the increased need for adults to have more flexibility over the learning process. Online universities are generally populated by non-traditional learners who balance professional, family and social obligations with the requirements of their continuing education. A growing body of literature suggests that some learners highly value the independent and self-directed nature of online learning, and place less value on learner-learner interactions such as collaborative group work (Reisetter & Boris, 2004; Sharp & Huett, 2005). Such findings suggest that a blanket approach to improving online education, such as increasing learner-learner interactions may not be warranted, and that a more comprehensive, individualized understanding of the factors that contribute to positive online learning experiences is needed.

Identifying and understanding problems in education and developing solutions based on research typically focus on one particular aspect of a problem. When promising solutions are discovered, the hope is that the practice will find its way to educational institutions through a variety of models for replicating these innovations (Robinson, 1998). However, many educational innovations fail when the practice is brought to scale, in part because they are adopted without considering the context in which stakeholders operate (Elmore, 1996). Online instructors and learners operate within a complex environment in which many aspects can have a direct impact on the instructor’s ability to facilitate learner-learner interactions. Although specific recommendations such as assigning learners to small groups are important in that they provide guidance to direct the actions of an instructor based on research, distance education programs vary a great deal in content, delivery methods, and learner characteristics (Zhao et al., 2005). These variables, as well as the desired learning outcomes play a role in the design, implementation and ultimately, the effectiveness of various instructional practices. By examining these variables in context, an integrated approach to evaluating the learning context can be incorporated as a fundamental part of instructor development so that the instructor can make appropriate decisions about how to increase learner-learner interaction (Roblyer & Wiencke, 2003; Zhao et al, 2005).

Instructors may improve the level of facilitation by incorporating a more global review of the context in which they operate so they can tailor their actions in ways that address their unique situations. This implies that instructors need to be more reflective about the environment in which they teach if their

attempts to facilitate increased learner-learner interactions are to be successful. The constraints that influence an instructor's ability to effectively facilitate learner-learner interactions may be viewed as a two-tiered system that includes the initial and ongoing faculty development and training the instructor receives, followed by the subsequent course delivery and online environment in which the instructor works.

In summary, both theory and research support the importance of collaborative learning and learner-learner interactions. An increased number of learners are turning to online education for personal and professional development, and the nature of the online environment poses significant challenges to the development of learning communities. Instructors of online courses typically receive little training in how to engage in practices that promote the development of online learning communities, and for some learners, collaboration with other learners may actually detract from the elements of online education that they most highly value. These conclusions led us to ask and investigate the following question: Can an ecological assessment allow an instructor to examine the online learning environment in order to determine how to create opportunities for learner-learner interaction?

An Ecological Assessment

Instructors operate within complex systems that place different types of constraints on their actions and require a broad lens through which they can thoroughly represent the particular constraints under which they operate. When instructors engage in reflective activities that include critical assessments of the learning environment, they can improve their teaching practices in ways that respond to the specific constraints of each course, program and learning community. These constraints include the following:

1. Content/objectives/purpose of interaction. In Moore's seminal writing (1989), the focus on learner-learner interaction was related to a course where the objective was to teach learners how to interact effectively with one another. Similarly, many programs require students to begin with an introductory course that not only teaches them the basics of navigating online courses, but also devotes energy towards promoting collegial relationships. These courses will likely lend themselves well to support learner-learner interaction, and given these objectives, the instructor will come to the course with this orientation. Courses that are focused heavily on content or acquiring a skill such as a statistics/research methods course, may have less focus on learner-learner interaction, and the instructor may focus more on presenting the content in ways that support learner understanding. For example, in a research methods course, learner-content and learner-instructor interactions may take precedence over learner-learner interactions.

2. Course Structure. In general, instructors operate under two different course structures, those with predetermined content, applications and requirements; and those in which the instructor is responsible for meeting objectives but is free to design the course as he/she considers appropriate. Instructors with more latitude over course structure can use the principles for effective learner-learner interaction and implement these procedures at their discretion. Instructors who operate under existing requirements and procedures will need to evaluate the tools at their disposal and consider how they might help develop/promote learner-learner interactions.

3. Program Structure – Learners in an online environment tend to require more time to develop trust, cohesion and shared cognition than those in face-to-face courses (Orvis & Lassiter, 2006), which can determine both the amount and quality of learner-learner interactions. Programs that are degree oriented and assign and maintain cohorts throughout the life of the program will likely have stronger avenues through which learner-learner interactions can be sustained. When online courses occur outside the realm of a program structure (e.g. single professional development courses; students in a degree program not progressing as a cohort) students will not have the benefit of long-term interactions and the instructor will have to devote more energy to develop trust and cohesion early on for learners.

4. Technology. Technological enhancements in online learning delivery systems have greatly increased the potential for increasing communications, and specifically, connecting learners with other learners (Garrison & Anderson, 2003). Nevertheless, many distance education programs still

rely on few or a single medium (generally text based) for course delivery, thus limiting these potentials (Moore, 1989). An instructor rarely has control over the technology available, although she may have control over the elements of a platform (e.g. discussion board, group chat, audio streaming, video/web conferencing) if designing her own course. Recognizing that face-to-face components are often not feasible, tools such as video-conferencing and other synchronous communication tools can effectively create social organizations (Levin, Levin & Chandler, 2001). A recent survey on actual use and preference for technology found that high percentages of instructors do not always use technological tools that can support stronger social networks (Zhao et al, 2003). Even when the technology is present and used however, this is no guarantee that the instructor uses it effectively (Loeding & Wynn, 1999).

5. Learner Characteristics and Needs. Demographics of online universities typically show that the student population consists of non-traditional learners who balance full-time careers, families, and social obligations with the requirements of their continuing education. The flexibility that an asynchronous and self-directed approach to learning provides is highly regarded, and these learners may neither understand nor appreciate the value that increased learner-learner interactions can provide (Reisetter & Boris, 2004).

Other factors include the age, expertise and motivation of the learner (Moore, 1989). Achievement outcomes in distance learning compared to face-to-face learning have been shown to vary depending upon the education level of the learner (Zhao et al, 2005). Learners may not feel confident to express their views and/or to challenge one another's ideas. Because writing is the medium of choice in conveying thoughts in an online environment, a learner with poor writing skills may also be reluctant to contribute to group discussions. Learners with less expertise may feel they have less to contribute than those with more expertise. Finally, research on cooperative learning has consistently demonstrated the need for learners to have clear understandings of the roles they play within the larger group, and what the expectations for fulfilling those roles are. Learners with experience in collaborative learning may be more ready to continue this type of interaction, whereas novice learners may require more support.

6. Instructor engagement and feedback. Arguably, the instructor's most direct role in facilitating learner-learner interaction comes from the quantity and quality of feedback he or she provides. In a recent meta-analysis examining factors that account for effective online course delivery, instructor involvement was the most significant moderator among all the identified factors (Zhao, et al., 2005). Interactions between the teacher and students have been found to affect the quality of student experiences and learning outcomes in online education (Institute for Higher Education Policy, 2000).

While issues of timeliness, tone, and medium (e.g. response on discussion board, emails, announcements) are generally discussed and modeled as issues in faculty training, increasingly, there is an understanding that the quality of the feedback provided has significant impact on developing strong learning communities, in which learner-learner interactions are valued and encouraged. To achieve these desired learning outcomes, the instructor must assume a role that is both structured and systematic, so that the level of communication promotes a community of inquiry (Garrison & Cleveland-Innes, 2005). Instructors establish presence through their feedback, in ways that support both the social and cognitive development of individual learners and the course as a whole. When instructors can provide timely, substantive and individualized feedback they help support the development of a community of inquiry (Garrison & Cleveland-Innes, 2005).

|Based on the review of literature and the factors identified, the author has developed a comprehensive representation of the issue of increasing learner-learner interaction (see Table 1). Essentially, the model outlines the constraints under which an instructor operates and demonstrates the need for a complete representation of these constraints to develop effective solutions.

Table 1. Problem Demand: Increase Learner-Learner Interaction in an Online Education environment.

Constraints on Solution:

Technology	Program Structure	Course Structure	Learner Characteristics	Content
Does the course platform support/include opportunities to engage in learner to learner interactions Group arrangements, discussion boards, chat rooms, document sharing areas	Is the Program structured by cohort, to support sustained relationships among students? Are students in a series of classes or a single, isolated course for professional development	Courses with predetermined curriculum vs instructor developed What are the requirements of the course (what is graded)	Need for flexibility (demographics of students) Learning needs Purposes of enrolling/participating in the course Various student abilities	Nature of content may impact the opportunities for learner-learner interaction
Instructor feedback: 1. What avenues for providing feedback are available to the instructor? 2. Am I promoting social/cognitive/teaching presence through a variety of feedback styles? 3. Is the feedback timely? Substantive (addressing content, specific issues with an application, making connections to course and program content)? Individualized? (relevant and targeted to a specific learner)?				

Solutions: Depending upon the outcome of the analysis, different solutions may be warranted
Consequences: Is learner-learner interaction always the ultimate goal? To what end do we sacrifice other needs/elements?

Using this representation as a foundation, the author developed an ecological assessment tool to guide online instructors through the process of evaluating the context in which he or she operates, identify those variables that impact the ability to develop learner-learner interactions, and subsequently, develop solutions tailored to specific needs. The ecological assessment provides instructors with a structured means of evaluating the specific constraints that either support or detract from opportunities for learner-learner interactions, and is presented in Table 2.

The purpose of this qualitative study was to refine and consider how this assessment might be applied to faculty development training opportunities and ongoing faculty/program evaluations.

Table 2. Ecological assessment tool.

Content	Evaluation	Comments
1. The course content easily lends itself to group assigned projects	Y N U	
2. Learners likely have professional experience relevant to this content area.	Y N U	
3. Content is challenging and requires a strong instructor presence	Y N U	
Overall Comments on content:		

Course Structure	Evaluation	Comments
1. The course content and structure is pre-determined (not instructor developed)	Y N U	
2. Interactive discussion is a requirement of the course (e.g. requirement to discuss with classmates)	Y N U	
3. Group projects/work is a requirement of the course	Y N U	
Overall Comments on course structure:		

Program Structure	Evaluation	Comments
1. The program/degree is a cohort based approach	Y N U	
2. The course is within a program that includes a series of courses (not an isolated, one-time course)	Y N U	
3. The overall goals of the program encourage the development of collegial and collaborative relationships among students	Y N U	
Overall Comments on program structure:		

Technology	Evaluation	Comments
1. The technology and course platform provide multiple opportunities for learners to interact	Y N U	
2. Group chat is possible	Y N U	
3. Document sharing features are enabled	Y N U	
4. Discussion boards are available and used	Y N U	
5. Assignments to smaller groups is possible	Y N U	
Overall Comments on technology:		

Learner Characteristics	Evaluation	Comments
1. The students are at a level of self-directed, independent learning	Y N U	
2. The students require flexibility in their learning environment (e.g. balancing family & work requirements)	Y N U	
3. The students have been taught the skills to interact effectively with one another to support L-L interaction	Y N U	
Overall Comments on student needs:		

Instructor Feedback	Evaluation	Comments
1. The instructor creates mediated presence on the course	Y N U	
2. The instructor provides clear rules of engagement and emphasizes the importance of L-L interaction	Y N U	
3. The instructor uses a combination of social, cognitive and teaching presence as required to support a community of inquiry	Y N U	
4. The instructor provides timely feedback	Y N U	
5. The instructor provides feedback that supports the needs of the students	Y N U	
Overall Comments on instructor feedback:		

Methods

Participants. Three instructors from two different institutions of higher education (IHE) participated in this study. These IHEs include a large (approximately 24,000 students), online university offering graduate level degrees; and a smaller (approximately 4000 students) university offering undergraduate and graduate degrees in online only programs. Within these IHEs, faculty development chairs were asked to identify instructors who had more than one year of experience teaching online. Instructors were asked permission to allow the author access to their courses to determine how an ecological assessment might provide insight as to how instructors could improve the quality of learner-learner interactions.

Procedures. Using the ecological assessment tool (Table 2), the course site was reviewed by the author to determine how effective it might be in informing appropriate courses of action for improving learner-learner interactions.

Results

To facilitate review, a summary of findings for the three courses is provided. The individual reviews highlight the type of information that was collected with the assessment. Following the individual reviews, findings are summarized across courses.

Individual Course Reviews

Course A

a. Content: This course is an introductory course for a master's program in public policy at a large, online university. This 12-week, six credit course introduces students to the university and the Master of Public Administration (MPA) program. The course also prepares students to use the learning platform as well as internet tools, e-mail, web browsers, and techniques of online communication. In addition, skills important for success in graduate education, including a) self- management, b) application of APA writing style, c) use of the online library system, d) scholarly writing, e) ethical applications, and f) critical thinking skills are introduced and applied.

b. Course Structure: 12 week, weekly threaded discussion, individual assignments and one group assignment with a group discussion area. The goal of the assignment was to create, refine and post a group response on a particular policy question. The discussion area was to be used for group discussion, consensus building and drafting, revising and editing the group statement.

c. Program Structure: A sequential, cohort master's program requiring 52 credits of core courses with an option for specialization. Program completion is estimated at 24 months.

d. Technology: The platform used can support asynchronous discussion boards, a document sharing section, and live chat sessions for the whole class or individual groups (no synchronous participation was required for successful completion).

e. Learner Needs: This program has an open enrollment policy (e.g. no GRE is required). For this particular program, learners must have a bachelor's degree from an accredited institution, and professional experience for admission. The majority of students are non-traditional, working professionals.

f. Instructor Feedback: Instructors can give feedback on the discussion board, in an announcements section, on individual applications, via email, and through chat sessions. A specific look at the discussion board designed for group discussion found that the group discussion pages had no instructor input. There were several groups who posted one learner's initial discussion as their final work with no editing, revision or discussion about the topic. Postings other than the one learner's response to the actual prompt included primarily procedural questions (e.g. When is an assignment due?). Further scrutiny of the course showed that this instructor posted numerous announcements (averaging three per week), and posted numerous, but brief replies to discussion boards in other places on the course.

Course B

a. Content: The course is designed to help teachers plan and manage their literacy classroom as they implement the concepts and strategies they have learned throughout a master's degree program at a large online university. This course covers planning, organizing, and managing a balanced literacy program. It examines flexible grouping for differentiated instruction, incorporating literacy across the curriculum, integrating technology, working with parents and paraprofessionals, and pacing instruction.

b. Course Structure: Eight-week course, with a weekly threaded discussion where learners are required to respond to the initial discussion question and then to two of their classmates (on average, students had three responses each week, only one of fifteen students posted an average of four responses), weekly individual assignments are submitted via a dropbox. The instructor scheduled two voluntary opportunities for synchronous discussion during the eight-week course.

c. Program Structure: A sequential, cohort master's program consisting of ten courses.

d. Technology: The platform used can support asynchronous discussion boards, a document sharing section, and live chat sessions for the whole class or individual groups (no synchronous participation

was required for successful completion of this course).

e. Learner Needs: Learners in this course have a bachelor's degree, teacher certification, and have successfully completed nine previous courses in the program. The majority are current classroom teachers.

f. Instructor Feedback: Instructors can give feedback on the discussion board, in an announcements section, on individual applications, via email, and through chat sessions. In this course, the instructor created a voluntary process for peer editing applications, but no learners used this opportunity. A specific example of feedback provided on the regular discussion board to promote and encourage learner-learner interaction includes:

> "I often read helpful responses. N's to B is helpful, respectful, and instructional. As I read it, I knew that I was learning and that others would learn from N, too.
>
> Some day, I hope to hear that a lot of you are teacher-educators as well as teachers. Here is a model response that shows how to do this well. I have read others that are just as wonderful--N lucks out because I never thought to make this idea explicit before."

Here, the instructor pointed out that the learner's response was helpful, which may prompt more learners to read that particular posting more carefully. It may also promote more thoughtful responses to one another as it highlights the fact that each learner has important insights to share. In terms of measurable outcomes however, no further postings from learners were made after this instructor feedback. Possible explanations include that the course structure requires learners to only make three posting to meet requirements; the posting was made near the end of the course week and learners may have already progressed to subsequent discussion boards; learners may not have responded to this specific posting, but it may have encouraged increased activity on subsequent discussion boards (though this hypothesis seems unlikely after review of the remaining discussion boards).

Course C.

a. Content. This course is offered by a small, online university and is offered as both an independent course that may be taken for continuing education credit, or as part of a master's degree program in education. The course introduces students to the proper evaluation of educational and psychological tests and the correct interpretation and use of test results.

b. Course structure. This course is offered over a 16 week time period and is divided into six sections. There are no set timelines for each section, but the syllabus offers guidelines of roughly one-two weeks for completion. At least one post per section on an asynchronous discussion board is a requirement for course completion. Learners submit their work via upload through a designated section of the course platform. No synchronous learning tools are required. Although some Web links and database searches are a part of the course, the primary means through which information is delivered is a textbook.

c. Program structure. This course is part of a master's degree program in education that consists of twelve graduate courses. Although the courses are designed to be taken one at a time, each over a twelve-week period, flexible programming allows students to complete the courses ahead of schedule and move to the next course. Monthly start dates for the courses are available.

d. Technology. The platform supports the use of both synchronous and asynchronous discussion. However, the course and program design requires only one posting per section (in the reviewed course, six postings for one course) on an asynchronous discussion board. Learners submit work in a designated assignment turn-in area on the course.

e. Learner needs. Learners in this course have a bachelor's degree, and most have completed at

least two or three previous courses in the program. In addition to practicing teachers, related-services providers (e.g. speech-language pathologists, counselors) also enroll in this course.

f. Instructor's Feedback. The focus on independent and flexible progress in this program tend to limit the opportunities for instructors to engage more than one student at a time. For example, at the time this review was conducted, three students were enrolled in the course. However, each of the three had different start and completion dates, so that no two students were working on the same section at the same time. Although the instructor at one point drew attention to another learner's posting, the opportunity for the instructor to support learner-learner interaction was limited.

Summary of Reviews.

This review of courses highlights the need for a more comprehensive look at the online learning environment prior to making recommendations to instructors on how to improve and increase learner-learner interactions. For example, the instructor for Course A has many tools at his disposal, yet failed to intervene at a critical juncture in the course (e.g. group discussion boards). The instructor for Course B, however, provides feedback and support that exemplifies many of the best practice recommendations. However, the course structure is such that learners are not required to participate in peer editing, are only required to respond to two classmates each week (and that is all most do), and no synchronous or group work is required. Even when synchronous discussions were offered, learners did not participate. The instructor for Course C is severely limited by both course and program structure to support learner-learner interaction. Even though the technology of the course provides for synchronous discussion, the format of the program and its emphasis on flexibility to meet the needs of working professionals restricts the possibilities for learner-learner interaction or other forms of collaborative learning.

For each course, if stronger learner-learner interaction is a desired outcome, different courses of action would be necessary. The instructor in Course A might need to provide more feedback in the group work areas. The instructor in Course B might consider requiring a group project (if instructors are given the latitude to make such course changes), or restructuring the discussion board to promote small group discussions. The instructor in Course C remains limited by the program design. Therefore, discussion at the program level to consider the value of sacrificing flexibility in program design for stronger learner-learner interaction may be warranted.

Implications for Practice

This review highlights several challenges to determining effective ways to improve interactions among learners in the online setting. Arguably, the main limitation is the difficulty in measuring these interactions and the subsequent impact on learning. One difficulty with measuring learner-learner interaction is that our measurements are limited to what is observable. For example, we may count the number of times learners respond to one another. We may assess the quality of a collaborative assignment and compare it to that of an individually-completed assignment. However, learners may benefit a good deal from one another by reading each other's postings on the discussion board even if they choose not to respond further. Additionally, learners may benefit from viewing interactions between other learners and the instructor. Focus groups, questionnaires or interviews with learners could provide important qualitative information on the impact that the instructors have on supporting the learners' interaction with one another.

Another challenge to promoting learner-learner interaction online is the consideration of its unintended consequences. Online learning may attract people who prefer to work independently; interacting with the content and/or with the instructor may be the preferred learning mode (Sharp & Huett, 2006). One of the courses reviewed here provided such an example, in that the university promotes a flexible time schedule for completion given that the majority of learners are working professionals. This assessment tool can help clarify these issues for further instructor, course and program development.

If however, online IHE's and instructors hope to promote and support stronger learner-learner interaction, these reviews highlight important, possible applications of the ecological assessment tool that include:

- ✓ Instructors and faculty responsible for program/outcomes assessment may use this tool to conduct formative evaluations of their existing programs.

- ✓ By evaluating the context of the course and program, the instructor may find more effective ways to increase learner-learner interaction. For example, a request to a faculty chair to make synchronous chat, group work, and/or peer editing a *required* component of the course may lead to increased learner-learner interactions more effectively than if they were optional.

- ✓ A long term application of this tool could be integration with learner evaluations to determine which elements are most effective depending upon degree, program and/or course structure. One important element of online learning research is that although a variety of models exist, there is no delineation among practices that are effective for different kinds of learners and content areas.

- ✓ Program chairs may use the tool to determine ways in which the program and course structure may be varied to support increased learner-learner interaction.

- ✓ As suggested by the Sharp & Huett (2006), learners come to the online education experience with many different needs. This tool may also be used to focus more on the specific needs of the learners, and the implications those needs carry for the instructor in supporting stronger interaction. For example, an instructor working with less-experienced and more diverse learners, especially those for whom English is not a first language and those who have had a history of negative academic experiences, may use different methods to promote learner-learner interaction than an instructor working with learners in advanced degree programs who have experience of professional and collegial collaboration.

Although this assessment can provide a comprehensive evaluation of the learning environment, challenges to supporting learner-learner interaction remain. As mentioned previously, online learners may value the independent nature and flexibility of an online program, and be unwilling to coordinate schedules to collaborate and interact more with other learners. An increased focus on collaboration to promote learner-learner interaction may support strong learning outcomes, but may do so at the risk of detracting from some of the more practical advantages offered by online education.

Another challenge to supporting learner-learner interaction is that efforts to do so are difficult to measure. Learner-learner interaction is to some extent a latent variable, and measurements of the construct will always be subject to a level of interpretation. Typical measurements include analysis (primarily counts) of discussion board postings, correlations to student achievement, and student self-report of satisfaction with learner-learner interactions. The more elusive goal of determining the long term effects of learner-learner interaction by measuring subsequent changes in behavior has yet to be realized. For example, when the number of discussion board replies to classmates increases from two to three, has achievement increased commensurately?

Research that helps to clarify the variables, behaviors and processes in which instructors engage to support learning in an online environment is important. Translating that research into practice that completely addresses the constraints operating on the instructor in a complex context is critical. Though the work on this ecological assessment tool is limited to a qualitative review of its application, the principles, research and theories on which it is based, may allow program developers, course designers, and instructors to more clearly target the variable of concern and devise appropriate solutions to the development of stronger learner-learner interactions.

Conclusion

Regardless of delivery method, the instructor's role in the education process is a critical determinant of overall effectiveness. Additionally, a strong research base supports the reliance on learner-learner interactions, as well as cooperative and collaborative learning to support higher learner achievement. In

an online environment, one of the key challenges to effective course delivery is providing venues for learners to interact with one another. Instructors need to consider the constraints under which they operate in order to effectively gauge where and in what manner they can support learner-learner interactions. Some of these constraints include the content, course structure, program structure, learner characteristics and the technology. A comprehensive framework of the online learning environment allows instructors and IHEs to consider how best to support their learners and support opportunities for stronger learner-learner interactions.

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References

Bandura, A. (1977). *Social learning theory*. New York: General Learning Press.

Boyer, E. (1991). The scholarship of teaching: From "Scholarship reconsidered: Priorities of the professoriate". *College Teaching, 39,* 11-13.

Brown, A. L., & Palincsar, A. M. (1989). Guided, cooperative learning and individual knowledge acquisition. In L. B. Resnick (Ed.), *Knowing and learning: Essays in honor of Robert Glaser* (pp. 393–451). Hillsdale, NJ: Erlbaum.

Chou, C. (2000). Patterns of learner-learner interaction in distance networks. *World Conference on Educational Multimedia, Hypermedia and Telecommunications 2000*(1), 207-212. Retrieved August 10, 2006 from: http://eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=ED447782&ERICExtSearch_SearchType_0=eric_accno&accno=ED447782

Elmore, R. (1996). Getting to scale with good educational practice. *Harvard Educational Review, 66,* 1-26.

Fulford, C. P. & Zhang, S. (1993). Perceptions of interaction: The critical predictor in distance education. *The American Journal of Research on Distance Education, 7,* 8-21.Garrison, D. R., & Anderson, T. (2003). *E-Learning in the 21st century: A framework for research and practice.* London: Routledge Falmer.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2,* 87-105.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education, 15, (1)*, 7-23.

Garrison, D. R. & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough, *The American Journal of Research on Distance Education, 19(3),* 133-148.

Glaser, R. (1990). The reemergence of learning theory within instructional research. *American Psychologist, 45(1)* 29-39.

Hillman, D C. A., Willis, D. J., & Gunawardena, C. N. (1994). Learner-Interface Interaction in Distance Education: An Extension of Contemporary Models and Strategies for Practitioners, *The American Journal of Distance Education, 8,* 30-42.

Institute for Higher Education Policy. (2000). *Quality online: Benchmarks for success in internet based distance education.* Washington, DC: National Education Association

Ko, S. & Rossen, S. (2004). *Teaching online: A practical guide.* Boston: Houghton Mifflin

LaRose, R., & Whitten, P. (2000). Rethinking instructional immediacy for web courses: A social cognitive exploration. *Communication Education, 49*, 320-338.

Levin, S. R., Levin, J. A., & Chandler, M. (2001, April). *Social and organizational factors in creating and maintaining effective online learning environments*. Paper presented at the annual meeting of the American Educational Research Association, Seattle, WA.

Loeding, B. & M. Wynn. (1999). Distance learning planning, preparation, and presentation: Instructors' perspectives. *International Journal of Instructional Media,* 26(2), 181-182.

McCauley Jugovich, S. & Reeves, B. (2006). IT and educational technology: What's pedagogy got to do with it? *Educause Quarterly, 29* (4) Retrieved December 1, 2006 from http://www.educause.edu/apps/eq/eqm06/eqm0649.asp

Mezirow, J. (1998) On critical reflection. *Adult Education Quarterly, 48* 185-98.

Moore, M. (1989). Three types of interaction. *The American Journal of Distance Education, 3* (2), p 1-6.

Orvis, K. L., & Lassiter, A. L. R. (2006). Computer-supported collaborative learning: The role of the instructor. In S.P. Ferris & S. H. Godar (Eds.). *Teaching and learning with virtual teams* (pp. 158–179). Hershey, PA: The Idea Group.

Reisetter, M. & Boris, G. (2004). What works: Student perceptions of effective elements in online learning, *Quarterly Review of Distance Education*, *5*, 277-91.

Robinson, V. (1998). Methodology and the research-practice gap. *Educational Researcher, 27*, 17-26.

Roblyer, M.D. & Wiencke, W. R. (2003). Design and use of a rubric to assess and encourage interactive qualities in distance courses. *The American Journal of Distance Education, 17*, 77-98.

Russo, T. C. & Campbell, S. W. (2004). Perceptions of mediated presence in an asynchronous on-line course: Interplay of communication behaviors and medium. *Distance Education, 25,* 215-232.

Sharp, J. H. & Huett, J. B. (2006). Importance of learner-learner interaction in distance education. *Information Systems Education Journal, 4*. Retrieved August 10, 2006, from http://isedj.org/4/46

Slavin, R. E. (1991).Synthesis of research on cooperative learning. *Educational Leadership, 48*, 71-82.

US Distance Learning Association. (2004). Distance Learning Link Program. Retrieved November 5, 2005, from http://www.usdla.org/html/resources/dllp.htm

Zhao, J. J., Alexander, M. W., Perreault, H. & Waldman, L. (2003). Impact of information technologies on faculty and students in distance education. *Delta Pi Epsilon Journal*; v45 n1 17-33.

Zhao, Y., Lei, J., Yan, B., Lai, C., & Tan, H. S. (2005). What makes the difference? A practical analysis of research on the effectiveness of distance education. *Teachers College Record, 107*, 1836-1884.

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