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CHAPTER 24

INTERACTION ONLINE

A Reevaluation

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Instructors commonly assume that the successful online course must replicate its live counterpart by including a variety of interactions among student, instructor, and computer. Given the changing lifestyles prompted by an evolving Internet, an increasing student need for autonomy, and student learning styles, highly interactive courses may not necessarily be the best online approach. In this article, I review research dealing with interactive environments, present the results of my own interaction study, and propose an integrative approach for the use of interaction that sees it in light of the increasing integration of the Internet into students' daily lives.

In order to conserve resources and provide additional options and opportunities for students, many universities provide salary or course-reduction incentives for instructors to convert at least one section of their courses for distance delivery via the Internet. The need to provide these incentives stems from the general skepticism that a computer environment can ever replicate the live class. In early conversions from live to online environments, the general consensus was that, for online courses to be suc-

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cessful, that is, for them to have student experiences and outcomes equivalent to those of live courses, the online environment must replicate the live class as much as possible (Coppola, 2005; Gilbert & Moore, 1998). And because classroom instructors often believe that the live class is the right way, or, as Wagner (1994) puts it, "the real thing" (p. 9), they attempt to duplicate the experience online by providing written lectures, tests, and quizzes, class discussions, in-class exercises, and collaborative projects. As a result, incorporating a variety of interactions among students and instructor has become an expected feature of the online classroom.

Berge (1999) presents a perhaps representative argument for the incorporation of interaction into Web-based Internet courses. Though recognizing the widely held belief that high levels of interaction are desirable, he acknowledges the lack of evidence supporting the use of interaction for improving the quality of learning for distance-education students. Referencing instead studies of student satisfaction and persistence, and arguing that interaction is "central to the *expectations* of teachers and learners," he concludes that "interaction will continue to be seen as a critical component of formal education, regardless of whether there is research showing a direct link to increased effectiveness" (p. 5).

As a result, the process of converting live courses to Internet offerings often involves trying to figure out how to preserve the same kinds of experiences online as in the campus classroom by forcing technology to conform to traditional environments (Wagner, 1994, pp. 8-9). Consequently, instructors attempt to provide the multiple forms of interaction usually found in the live class. Even courseware developed since 2000 has modeled itself after its brick-and-mortar ancestors.

In a recent article in the *Quarterly Review of Distance Education*, Reisetter and Boris (2004) shed a different light on the place of interaction online. Their study of graduate student perceptions of effective online practices found not only that these students emphasized the importance of student-instructor interaction, but also that, contrary to widely held belief, students devalued peer interaction, somewhat uncharacteristic for graduate students. They suggest that students' preferred mode of learning online content may have "less to do with the dynamic of a learning community than it does with learning course content well on their own" (p. 289) and call for a reconsideration of online learning communities and the extent to which this type of online interaction is needed.

In this article, I try to respond to this request. After describing the forms of interaction available to the Internet instructor, I review the literature showing the traditional consensus that a variety of interactions is essential to success in online courses. I next present a number of research studies questioning the necessity of providing such variety and offer my own study as another example. Pointing out the effects that rapidly evolving technology has had on students' daily lives, I propose an integrative approach to online interaction and offer two suggestions for a realistic approach to incorporating interaction into distance education courses.

FORMS OF INTERACTION

Although support for online interaction has been commonplace, the exact meaning of the term *interaction* varies from one research study to the next. The review of research by Bannan-Ritland (2002) has described the many, varied, and sometimes contradictory definitions of interactivity used by researchers. Hirumi (2002), on the other hand, has attempted to put these definitions in perspective by proposing a framework to describe the interrelationship among the various types of interaction.

Consequently, I begin briefly by defining the term *interaction* as used here. For my naming convention, I have adopted the common practice of focusing on the main players, that is, instructor and learner. But I use two terms, *peer* and *student*, to identify the learner in order to distinguish the more authoritarian relationship implicit in student-instructor interaction. In addition, because an entirely different dynamic occurs when students interact to share thoughts in open discussion as opposed to collaborating for a grade, I use the term *collaborative group interaction* to refer to the latter. Therefore, the term interaction as used in this article is meant as a general term for a variety of interactivities: (1) student-instructor; (2) peer-to-peer; (3) peer-to-peer-to-instructor (as, for instance, in discussion board threads); (4) collaborative group; and (5) interaction with technology.

STUDIES SUPPORTING HIGHLY INTERACTIVE ENVIRONMENTS

In recent years, learning models have emphasized the necessity of social interaction in completing the learning process (Garrison, 2000; Gilbert & Moore, 1998; Swan et al., 2000; Tu & Corry, 2002). In fact, since the late 1990s, when distance education began its rapid rise on university campuses across the country, there has been much published research documenting the importance of collaborative interaction and learning communities in providing successful online experiences for distance education students, so much so that both peer and instructor collaboration is generally a "given" in distance education (see Hillman, Willis, & Gunawardena, 1994, p. 31).

After analyzing a number of studies on interaction published in the 1990s, Arbaugh (2000) concludes that "instructors need to emphasize

each of the three dimensions of interaction [that is, student-instructor, peer-to-peer, and interaction with technology] within their Internet-based courses and develop methods to facilitate them" (p. 15). In another, more comprehensive survey of research into interaction during the 1990s, Roblyer and Wiencke (2003) find, among other things, that social variables enhance interaction in distance courses and that collaborative experiences enhance online student engagement. As a result, their resulting rubric for assessing interaction in distance courses privileges student-student and group collaboration. Perhaps as a result of these and similar studies, the Council of Regional Accrediting Commissions released in March 2001 its guidelines for evaluating distance education courses. Among its recommendations, the Council set interactivity standards higher than for the traditional classroom, such that online courses have to be "more interactive" than their live counterparts (Carnevale, 2000). Among the values the Council felt essential in distance education is the concept that "learning is dynamic and interactive, regardless of the setting in which it occurs" (Council of Regional Accrediting Commissions, 2001, p. 2).

Mabrito (2001) followed the council's lead, focusing on what he termed "collaborative interactivity" by promoting various forms of online discussions and collaborative activities to "more closely simulate the face-to-face classroom experience" (p. 86) by enabling both student-instructor and peer-to-peer interaction. Although Benbunan-Fich and Hiltz (2003) find no significant differences in the perception of learning by students in undergraduate information systems courses regardless of the presentation mode, the researchers did see significant relationships between learning perception and the amount of student-instructor and group interaction for online courses. The researchers conclude that "measures of collaborative learning and active participation online ... [are] strong mediators of the outcomes of online courses" (p. 310). Lee and Gibson (2003) report similar results in a content analysis of asynchronous communication in an online graduate education course. Group, peer-to-peer, and student-instructor interaction were all important in developing self-direction—that is, "taking control and responsibility for one's own learning" (p. 185). Northrup (2002) has found that her online graduate students prefer to have interactive elements that simulate a campus-based class.

STUDIES QUESTIONING THE VALUE OF HIGH INTERACTIVITY

Although it has generally been assumed that interaction in all of its forms is an essential component of distance courses, it should be noted that Moore's popular classification did not assume learner-learner interaction

a "given" in every situation (1989). And some more recent studies have begun to shed a different light on interaction in online education. Mehlenbacher, Miller, Covington, and Larsen (2000) posit that a student's learning style may determine the amount and forms of interaction required for success online. In particular, reflective learners may be hindered by synchronous interactions, interactive Web interfaces, and other instantaneous environments that do not "necessarily facilitate reflection or a careful examination of all the materials and tasks" (p. 177).

Perhaps highly interactive environments for everyone may not be the answer. Studying two contrasting Internet-based course designs, one a presentational or independent study design and the other an interactive design that involved both student-instructor and peer-to-peer interaction, Cook (2000) found that either design is acceptable, depending on the outcomes desired. Students in both designs achieved "multiple literacies" and "produced rhetorically effective, competently written documents" (p. 108).

Despite the positive findings for peer-to-peer and group interaction by Benbunan-Fitch and Hiltz (2003), the perception of group collaboration by students in fully online modes was the lowest of the modes studied (p. 307). Concluding their study, the researchers called for more research into the effects of collaborative learning, adding that "collaborative learning in online courses is a complex construct whose effects on outcomes are not always consistently positive" (p. 310). Swan et al. (2000) also reported negative findings regarding collaborative work: the more students' grades depended on collaboration, the less students thought they learned. Hawisher and Pemberton (1997) have documented students' negative reactions toward collaborative postings, and Thurmond, Wambach, Connors, and Frey (2002) found similar dissatisfaction among students participating in team/group work. Although Berge (1999) supports interaction in Web-based instruction, he acknowledges that inappropriate methodological approaches may lead to "loss of the student's attention, boredom, information overload, and frustration" (p. 9). Given such mixed messages, MacKinnon (2002) rightly concludes that interactivity is no panacea for online courses.

In fact, Palloff and Pratt (1999) describe successful online students as more introverted, intrinsically motivated, and self-disciplined than typical students, a characterization that more aptly fits the reflective learners described by Mehlenbacher et al. (2000). Collins (1996) describes the major costs of high interactivity: "a lack of thoughtfulness by the student because things move fast, and a lack of problem finding and construction by students because everything they do is responsive to some situation" (p. 352). He suggests instead a mixture of highly interactive and less interactive environments. And, in fact, the benefits Collins attributes to

high interactivity, that is, immediate feedback, motivation, and employment of different skills and strategies, may all be accomplished in a highly interactive student-instructor environment (see Moore, 1989).

A STUDY OF STUDENT ATTITUDES ABOUT INTERACTION

When I first began teaching online courses in 1997, I assumed that my Internet class needed to replicate the activities I had found successful in live versions of the class. However, based on my own 8 years of teaching in this environment and on my research into my students' attitudes and preferences, I now believe that online courses need not, of necessity, include a variety of interaction, as shown in the study described below.

During summer 2004 and 2005, in an attempt to determine the importance of interaction in my Internet courses, I experimented with the delivery of four summer sections. The courses were sections of our undergraduate service course in technical communication, which consists primarily of a proposal and technical report, in addition to a number of other smaller assignments, including memo and instruction writing. I created two versions of the course: an interactive section and a self-directed section in which required interaction was kept to a minimum. I taught two sections of each version that summer.

In addition to some individual assignments, the interactive sections consisting of 31 students incorporated a variety of forms of interaction including peer-to-peer and peer-to-peer-to-instructor interaction, as well as two major collaborative projects. Students were given weekly overviews and assignments, which were customized to that particular section. Applying the rubric proposed by Roblyer and Wiencke (2003) for assessing interactive qualities, this section had high levels of interactive qualities for the social/rapport-building and instructional design elements. Interactivity of technology resources had moderate qualities only because teleconferencing was not available.

In contrast, the self-directed sections had low to minimum interactive qualities for the three interaction elements. In these sections, which consisted of 28 students, all weekly overviews, assignments, and quizzes were made available the first day of class. The primary interaction was via e-mail between student and instructor, although students were asked to post discussion-board messages consisting of the drafts of their two major assignments. However, there was no interaction among students for the drafting. The purpose was to make available student examples for the class to review and to enable students to read instructor comments about each of the drafts.

To gather information about the student population taking the courses and to understand the effectiveness of these versions, I gave students the following two surveys: (1) an 11-question demographic questionnaire that solicited information about students' computer experience; prior experience with technical documents; educational preferences; and employment status, distance from campus, and age range; and (2) an end-of-semester opinion questionnaire to determine students' satisfaction with the course and their attitudes toward interaction. The response rates were between 85% and 100% for all eight surveys.

I obtained the following class profiles from the demographic questionnaires. This was the first Internet class for between 40% and 50% of those responding; most of the rest had taken one or two other online courses. Almost all students had prior experience with the courseware. Approximately two thirds of the students worked full time, a fourth part time. A somewhat smaller percentage of the self-directed students lived close to campus and were slightly younger than those from the interactive section. Because the questionnaire results for both sections were very similar, differences in students' attitudes toward either the course or interaction do not appear attributable to the demographic features surveyed.

When asked about their attitudes toward interaction, students in the interactive sections responded by a two-thirds margin that peer-to-peer interaction was more difficult online; yet they split about evenly as to whether or not participating in class discussions (that is, peer-to-peer-to-instructor interaction) and student-to-instructor interaction was more difficult online. However, regardless of the amount of class interaction, all but five, or approximately 90%, of the 55 respondents from all sections combined were satisfied with the course, despite the fact that two thirds of them said they preferred working on their own, rather than interacting with others. At least with these sections of students, it does not appear that the amount, or even presence, of a variety of forms of interaction played a significant role in student perceptions about the success of the course. This study at least does not appear to support the thesis that providing a variety of forms of interaction, that is, to replicate the campus class experience, will give students a greater sense of security and presence, thus giving them a more satisfying, and consequently more successful, experience. In fact, 60% of those responding (range = 50% to 83%) preferred Internet courses without student interaction, whether it be peer-to-peer or group collaboration (response rate = 55%, $n = 59$).

Finally, regarding interaction with technology, survey results of students' experience with, usage of, and attitudes toward technology mirror more recent studies refuting any significant influence of technology on the successful completion of online courses. Most students considered themselves at least average computer users, and between 50% and 60%

labeled themselves as "above average." The wide variety of Internet activities, from e-mail to chat rooms, videoconferencing, and instant messaging, and the frequency of usage, seem to verify students' self-classifications. When asked about the influence technology had on the course, three-fourths of the students felt that the quality of the course was unaffected by its being taught online. Likewise, the majority of students believed that the course was neither more difficult (65%) nor took more time (81%) than if they had taken it on campus. However, self-directed students were somewhat more evenly split when asked about the time involved: 72% said that time was not a factor, in contrast to 89% of students in the interactive sections—a logical contrast given the nature of self-direction. These results add to the evidence that most students are now comfortable with electronic environments and do not need online experiences that replicate either the campus classroom experience or the interactive methodologies associated with live courses.

TWENTY-FIRST CENTURY TECHNOLOGY AND ATTITUDES

What are the reasons for the contradictions in research findings concerning the need for a variety of interaction in distance courses? Because of the many personnel, time, and budgetary constraints in conducting human-subject research within educational contexts, published research in distance education commonly analyzes outcomes based on student opinion questionnaires, which may be easily obtained without significant administrative overhead. For instance, of the 27 research studies I reviewed on the topic of interaction published since 2000, 75% of them rely—many almost exclusively—on student preference and/or opinion surveys in drawing conclusions about their data, just as I have here. So to answer the question about the changing nature of research into interaction as a central component in the distance class, one must look at the evolution in the way the general public views and uses the Internet because student perceptions will naturally be affected by students' attitudes about and usage of distance education's primary delivery medium. Reisetter and Boris (2004) argue that the "effects of technology in computer-mediated communication" (p. 289) may be responsible for the changing nature of group interaction, but I suggest that evolving technology forces us to reconsider our overall implementation of online interaction.

Twenty-first century attitudes and behaviors are evolving at an exponential rate, as shown by the following facts and events.

1. Internet connectivity continues to rise, up from 33% of the population in 2000 to 68% in 2005 (Miniwatts Marketing Group, 2006).
2. An increasing number of homes have upgraded to high-speed broadband cable and DSL lines, 53% of home-Internet users in 2005, up from 35% in 2003, according to the Pew Research Center Internet Project (Horrigan, 2005), with the rise expected to continue (Miniwatts Marketing Group, 2006). Consequently, Internet access is now more efficient and reliable than ever before for millions of Americans. Even for those who cannot afford this more expensive mode, there is more often than not high-speed access at universities and businesses.
3. Wireless mobile technology now allows instant access to the Internet via Internet cafes, and the technology is now evolving not only to create both free and subscriber Internet hotspots across an entire city (see jiwire.com), but also to interconnect these hotspots among cities. Called WiMAX, this new wireless technology enables fiber-optic and microwave broadband connections over long distances and may be the answer to enabling high-speed Internet access in rural areas across the country. Even without this technology, rural adoption of broadband is still increasing, with the gap between rural and nonrural cut in half within the last 2 years (Horrigan & Murray, 2006).
4. In addition, increasing numbers of people consider the Internet an important information source; see, for instance, the declining television news ratings, thought to be caused at least in part by the Internet (Project for Excellence in Journalism, 2004). The video streaming of news clips and events is now a commonplace substitute for television news stories. Consumer surveys in 2005 by JupiterResearch found that 50% of online adults use the Internet for their daily news ("Internet Growing," 2005). Note also the rise of the blog phenomenon in the past year as the latest Internet news source. By mid-July 2005, Wired News reported about 12 million blogs, with 10 more created every second (Penenberg, 2005). By early 2006, the blog search engine Technorati was indexing over 27 million of them.
5. Sales of information appliances, that is, Internet-capable handheld devices like PDAs and cell phones, have risen exponentially in recent years. Worldwide PDA sales increased 25% to 3.4 million, just for the first quarter of 2005 (Lemon, 2005). eTForecasts, a market research and consulting company, projects communications sales, a category dominated by Web-enabled cell phones, to grow

from over 10 million in 2002 to 65 million in 2008 (eTForcasts, 2003).

6. E-commerce continues to expand far beyond the online shopping malls that first appeared in the mid 1990s. More services than ever are available online, among them major consumer services like banking, bill-pay, and long-distance telephone.
7. The multimedia use of the Internet for work and play continues to evolve: with the continued expansion of high-speed Internet, videoconferencing will eventually become commonplace in the home; and the release of first-run movies on the Internet now seems practical.

Considering recent technological change, Garrison (2000) wonders if distance education theory has "kept pace with new, affordable applications of communications technology and the changing educational needs of a learning society" (p. 2). Although his answer is to privilege transactional theories that adopt collaborative approaches, is this answer simplistic?

The point is that our mental model of the Internet does not envision a specific place and time, and does not have the physical restrictions associated with a traditional classroom. The Internet is a technology that has increasingly pervaded our lives and will continue to do so, and the primary demographic leading this evolution is the younger population, our major student audience. Not unexpectedly, a Pew Internet Project survey found the most active group of Internet users to be between ages 12 and 29 (Fox & Madden, 2005).

Consequently, today's students often see the opportunity to take a class on the Internet as a means to integrate their learning experiences into their daily schedules, not the other way around. Student preferential surveys, including my own, support this view. Online students consistently say that they have chosen this mode of instruction because they believe it will save them time and will be more convenient for them (Arbaugh, 2001; Johnson, 1999, p. 166). Many students opting for online courses are nontraditional students who must manage full- or part-time jobs and families. Consequently, attending traditional courses at specific times and places, especially those in which the formation of collaborative online communities is a priority, is problematic for them. Commenting on changing student demographics, Kanuka (2001) describes an even more radically different university student: "Many adult learners view themselves as customers, rather than students, and demand readily accessible learning services that are tailored to their needs" (p. 51).

AN INTEGRATIVE APPROACH TO INTERACTION

Roblyer and Wiencke (2003) have commented that interaction has "come to be considered a sine qua non for successful distance courses" (p. 77). But exactly what kind of interaction should instructors strive for? This new twenty-first century lifestyle requires that we take a different approach to incorporating interaction into the distance education experience—referred to here as an integrative approach—by incorporating interaction into the seamless interface that is evolving between twenty-first century technology and people's daily lives. Today's students need course materials, assignments, and instructors that are easily accessible on the fly whether by workstation or handheld device, whether at home or in the office.

It also means that issues related to interaction with technology have faded into the background, even though the implementation of technology has not. Although studies prior to 2000 often found student comfort with and/or use of technology an important factor in the success of or satisfaction with the online course (Scott & Rockwell, 1997; see also the meta-analysis by Allen, Bourhis, Burrell, & Mabry, 2002), recent studies have not found similar associations (Stein, Wanstreet, Calvin, Overtoom & Wheaton, 2005; Swan et al., 2000), most likely because of students' increasing familiarity with computers and the Internet, although some cite the results as evidence of adaptive structuration, where technology becomes subservient to users' adaptations of it (Poole & DeSanctis, 1990). In any event, whether or not an online class can use videoconferencing, video streaming, Macromedia Flash presentations, and Java applets depends largely on connectivity speed, rather than on technological expertise—most of these interfaces now function seamlessly.

Thus, an integrative approach to interaction suggests that instructors consider how to integrate interactivity such that it accommodates students' needs. Given students' evolving attitudes and experiences with the Internet and technology, and the mixed results of research into online interaction, here are two suggestions that provide a more accommodating approach to online interaction.

Student-Instructor Interaction as the Only Required Interaction

Despite the conflicting research surrounding peer and group interaction, and the diminishing need to assist students with technology, one type of interaction continually rates high in online research studies: student-instructor interaction. Certainly, busy students, for whom the online

class is only one part of their Internet existence, need guidance through the course and assurance that they are progressing successfully. In this type of environment, social interaction may no longer be considered the primary means through which learning evolves.

The study by Swan et al. (2000) of 264 online courses offered through the SUNY Learning Network finds only three factors contributing significantly to the success of online courses—one of them student-instructor interaction. The researchers conclude that "an instructor who interacts frequently and constructively with students" (p. 379) is important to course success. The study by Arbaugh (2001) of online MBA students also finds student-instructor interaction a predictor of student learning. Instructor immediacy behaviors, such as use of personal examples and humor, encouragement of student ideas, and calling students by name, were found to be important factors in the study's findings (pp. 44-46). Only instructors can provide the encouragement, guidance, and reassurance that online students need to be assured they are progressing successfully. Volery (2001), studying the factors contributing to the success of online learning, found that instructor-student interaction is critical for course success to the extent that today's technology cannot substitute for an effective instructor. However, the researcher suggests a role change from lecturer to "learning catalyst," that is, as an enabler who can empower students to "discover their own learning" (p. 90). Grady and Davis (2005) use the concept of scaffolding to show the many ways instructors function as catalysts. Most recently, Stein et al. (2005) have identified the importance of "instructor-initiated interaction in the form of guidance and encouragement" in overall student satisfaction (p. 115).

A variety of communication opportunities, both traditional and Internet, enable instructors to integrate student-instructor interaction into distance courses. Telephone access, live office hours, online office hours in a chat room or via instant messaging, and e-mail are all ways to provide multiple means of access for students.

Different Versions of Courses With Varying Degrees of Interaction

The influential theory of transactional distance proposed by Moore (1991) supports the concept of offering a variety of course formats to distance students. Theorizing that variations in the amount of dialogue (that is, instructor-student interaction) and structure (that is, the course design) influence psychological and communications gaps, he concludes that "much care should be given to determine both the structure of the program and the nature of the dialogue that is sufficient and appropriate for

each set of particular learners and, ideally, each individual learner," that is, according to the amount of autonomy each learner has (p. 5). A number of recent studies support his theory. For instance, in a study of seven Web-based courses, Thurmond et al. (2002) find not only that students prefer a variety of ways to assess learning, but also find it to be the strongest predictor of student satisfaction. Allen et al. (2002), in reflecting upon the results of their meta-analysis of 25 student-satisfaction studies, suggest the "need for diagnosis [of student learning style] or providing a course in multiple formats" (p. 92).

And as I argue here, the use of the Internet as the primary distance delivery mode also requires a different, more integrative approach to interaction, one that offers more than one version of the same course, varying the amount and variety of online interaction accordingly. Experienced instructors will find that, once these versions are set up, they are no more time-consuming to teach than the traditional approach because, where one version may require more of an instructor's attention, the other requires less.

We know the importance of interacting with others in the workplace, but students see things differently. Unless we can accommodate their own needs as well, the resulting dissatisfaction will likely reduce the chances for effective learning outcomes. The challenge then is to find a middle ground where we provide interactive opportunities while still accommodating students' needs. Here are three possible ways to accomplish this goal.

Versions for Self-Directed and Interactive Learning Styles

Research into the influence of learning styles on online student success may be a key to determining the kinds of required online interaction. In the mid 1970s, as part of a research project to test his theories about distance learning, Moore (1984) studied the influence of cognitive styles on student learning in independent study environments, finding a positive relationship between field independence and distance study. Field-independent students typically are self-directed, prefer self-evaluation, are task oriented, and are less affected by social stimuli. Harrison and Bergen (2000) likewise describe successful online students as self-motivated and independent.

As part of a more recent study comparing learning in Web-based versus conventional courses, Mehlenbacher et al. (2000) included a learning styles inventory questionnaire as one means of comparing student performance in the two course designs. The researchers found that learning style did affect student performance. Reflective learners preferred environments that encourage reading to learn and act, as opposed to highly interactive interfaces, whereas reflective global learners more readily

understood instructional goals and course content, thereby decreasing the amount of student-instructor interaction. In a similar approach, studies by Irani, Telg, Scherler, and Harrington (2003) and Soles and Moller (2001) suggest a relationship between success in distance education and students' personality traits, such as extrovert, introvert, sensing, and thinking. The meta-analysis by Allen et al. (2002) notes that any given population of students may contain those with learning styles that favor distance education, while others prefer face-to-face environments. Like Mehlenbacher et al., Aragon, Johnson, and Shaik (2002) found online students to be more reflective, and additionally found them to prefer abstract conceptualization (learning by thinking) (p. 236). While they report no significance difference in the learning styles of their live versus online students, the use of online lectures to conduct the distance course certainly played a role in the outcome. Students encountering the same type of instructional methods would likely use similar learning strategies.

Versions for College-Age and Nontraditional Students

Although college-aged students, particularly those on small or rural campuses, may find online learning communities attractive, non-traditional students, especially those with families and full-time employment, will not be able to devote the time required for multi-level interaction. As the number of nontraditional students continues to rise due to economic and societal pressures and the need for retraining (Turner, 2003), universities will need to find ways to integrate this growing student population into online courses.

Graduate and Undergraduate Versions

Of the 25 recent research studies I reviewed for this article, 18 (72%) used graduate students as subjects. Graduate seminar courses, for instance, tend to be more theoretical than undergraduate courses. Consequently, peer-to-peer-to-instructor interaction may be necessary for encouraging the exploration of ideas and knowledge building that comes only through the development of a learning community. For instance, the syllabi used by Palloff and Pratt (1999) to describe their approach are examples of such courses. Many such graduate courses are highly interactive, whereby students may experience the dynamic, ephemeral nature of communication (Zachry, 2005). That research tends to show a preference for interactive learning may be the result of the large number of studies using graduate students as their subjects.

The study by Kanuka (2001) is particularly relevant here because it compares both graduate and undergraduate students' perceptions of the same subject matter taught by distance. The study found that undergraduates had a much greater need for "structure, motivational techniques, and guided study" (p. 65) than graduate students and concludes that, for Web-based learning, dialogue (interaction) and structure are most effective when matched with students' "needs and ability to be autonomous learners" (p. 69). A more recent study of both undergraduate and graduate student satisfaction by Stein et al. (2005) echoes this finding. Researchers concluded that the amount of course interaction should be fluid so that "autonomous learners can identify their learning needs" (p. 116).

CONCLUSION

This reevaluation of interaction online provides a contemporary perspective of how extensively online interaction in all its forms can be used. Informed by 25 of the most recent studies into interaction online, and including an additional study of its own, it is an up-to-date review for instructors and researchers wishing to explore the options that interaction offers. More importantly, however, it informs the body of research into interaction online by placing this research into the broader context of twenty-first century technology and the students who use it, providing insight into the sometimes conflicting research into the amount of interaction required for successful online instruction. The question is not whether highly interactive environments are educationally sound but rather whether the context in which distance education is delivered affects the amount of interactivity needed. In describing the state of twenty-first century technology and its relationship to today's online learners, the article offers a realistic set of options for integrating varying amounts and types of interaction into today's online courses, while at the same time recognizing the importance of interaction in the learning process.

If the integrative approaches to interaction online as described in this article are adopted, distance-education researchers are among the beneficiaries. The wide array of evolving electronic technologies provides researchers the means for designing numerous studies to assess the technologies that best help instructors accomplish the goals of effective teaching and learning in the twenty-first century. In fact, Levin (2002), considering the exponential evolution of electronic technologies, envisions higher education by the year 2020 as a "seamless integration" between learners and their electronic environment, which at least for introductory courses may consist largely of interaction with computer-based intelligent systems. In the meantime, this integration is beginning to take various forms. For instance, a number of universities are now encouraging the instructor to integrate iPods into the classroom by enabling downloads of course content ("Rural," 2006). In particular, XML

technology with single sourcing and dynamic content delivery may be the most promising means to provide limitless ways for learning, customized for multiple learning styles. RSS technology may be yet another means for pushing course information to students in real time.

However, the greatest beneficiaries of the integrative approaches advocated in this article are the students who strive to pursue their educational goals online. By providing students different versions of courses with varying degrees of interaction, instructors will more likely ensure that online students have a positive, rewarding experience. As Fahy and Ally (2005) suggest, if instructors do not allow students to participate according to their individual styles and preferences, "the requirement for online interaction may ironically become a potential barrier to learning" (p. 19). Consequently, the calls by Levin, Levin, and Waddoups (1999) for multiple ways of learning online and by Kanuka, Collett, and Caswell (2002) for flexibility in adapting methodologies that accommodate learner autonomy seem sensible.

Still, as numerous authors point out, not all students can be successful online. Some students will continue to need the reinforcement that comes only from meeting and working with people face to face, thus the recent rise in popularity of hybrid courses—that is, at least until technology makes commonplace videoconferencing, the interactive leveler that has the greatest potential to replicate the various forms of classroom interaction without the pitfall of artificiality. As a result, the future holds much in store for us as we explore the various ways that modern technology may facilitate effective interaction online.

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CHAPTER 25

ONLINE LEARNERS' PREFERENCES FOR INTERACTION

Pamela T. Northrup

The purpose of this study was to investigate types of interactions that students perceived to be important for elearning. Interaction attributes studied in this investigation included content interaction, conversation and collaboration, intrapersonal/metacognitive skills, and need for support. This study was an initial investigation of learner perceptions of online interaction. Data were collected through the administration of the Online Learning Interaction Inventory (OLLI) to 52 graduate students in an online masters program. Online learners reported that flexibility (M = 4.65, SD = .74) and convenience (M = 4.13, SD = 1.14) were the two primary reasons why they selected to learn at a distance. Indicators of interaction were noted in each of the four interaction attribute areas. However, the idea of self-regulating learning (M = 4.58, SD = .72) and having timely feedback from the instructor (M = 4.48, SD = .64) was reported as most valued by participants.

Interaction has been defined from many perspectives. Most simply stated *interaction is engagement in learning* (Hillman, Willis & Gunawardena, 1994). It is agreed that interaction must be designed into an instructional

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program and that it is an important variable for online learning. Berge (1999) suggests that interaction is important to learner satisfaction and that it assists in maintaining student persistence in courses. With retention in online learning programs being as low as 50% in some cases and course completion rates in traditional courses at 10-20 percentage points higher than in online courses (Carr, 2000), learner satisfaction is a key variable. With interaction being a component of overall student satisfaction, interaction should be considered when trying to increase retention in online courses. However, from the online learners point of view, too much interaction may be perceived as busywork and lead to frustration, boredom, and overload (Berge, 1999); while too little interaction may result in student isolation. Both are considered frustrating and a balance has to be found.

The term interaction has been classified using many frameworks and taxonomies over the years. The most notable is Moore's (1989) communications framework classifying engagement in learning through (a) interaction between participants and learning materials, (b) interaction between participants and tutors/experts, and (c) interaction among participants. Interaction between participants and learning materials may take many forms and may be as simple as a student logging onto an online course and reading the weekly text. Or, it may be more complex with students engaged in an individual WebQuest (Dodge, 2001). Interaction between participants and experts likely would include participant to instructor dialog over an assignment communicated via email, chat room, or some other asynchronous method. Moore's third classification, interaction among participants may include collaboration among teams of online students discussing the problem of the week through a threaded discussion or on a group listserv. All three of the classifications of interaction are very open-ended, allowing for much flexibility in the design of engaging, interactive online learning.

Another approach to classify interaction is Gilbert and Moore's (1998) approach, dichotomizing it as content or social interaction. Content interaction is always directed at attaining the specific learning outcomes or goal of the instruction. Although a broad category, the notion is that any type of interaction directed at achieving instructional success would be classified as content interaction. Social interaction on the other hand provides opportunities for peers to connect in non-task specific conversation (Northrup, 2001a). At least initially, this should be intentionally designed into the course. As a course evolves, this type of dialog will continue on its own. By the very nature of social interaction, learners will be able to directly foster content interaction (Liaw & Huang, 2000). Typically both content and social interactions are interwoven into highly interactive online courses.

Sorting through interaction frameworks to determine the most appropriate interactions for given learning outcomes is difficult at best. Northrup (2001a) provides a set of interaction attributes that can be used to select strategies and tactics to facilitate online interaction. The attributes encompass levels of content interaction, types of dialog through communications and collaboration, levels of student self-directedness, and types of support for the learner anytime, anyplace.

With most research on interaction focused on classifying the types of interactions or building frameworks from which designers would select appropriate interactions for given learning outcomes, it seemed apparent that there should be an upper and lower limit to the types of interactions used for a given set of instruction. Additionally, with *student perception of interaction being complete* as such an important variable for ongoing participation in the course (Zhang & Fulford, 1994), the relationships of student perception to the attributes of interaction should be considered.

PURPOSE OF THE STUDY

The purpose of this study was to investigate the types of interactions that students perceived to be important for online learning. The interaction attributes investigated included content interaction, conversation and collaboration, intrapersonal/metacognitive skills, and need for support. Also investigated were reasons why learners were taking online courses. It was presumed that students taking courses for convenience, flexibility, or preference would likely be more pleased with interaction in online course than those required to take an online course because it wasn't offered on campus. This study was an initial investigation of learner perceptions of online interaction. Data were collected through the administration of the Online Learning Interaction Inventory (OLLI) (Northrup, 2001b).

METHOD

Participants

This study consisted of 52 graduate students in an online masters program in instructional technology. Thirty-four of the students were female and 18 were male. Participants ranged in their experiences with online learning with 14 students in their first online course, 24 have taken 2-4 online courses, 10 have taken 5-8 online courses, and 4 have taken 9 or more online courses. The majority of students (27) were in the 36-50-age range, with 18 students in the 26-35-age range. The remainder of the stu-

dents were under the age of 25 (5 students) or over the age of 50 (2 students). Students were selected to participate in this study based on where they were in the program of study. Intact classes of students were selected from two courses at the beginning of their online learning sequence and two courses at the end of their online learning sequence.

Instrumentation

The instrument used for this study was the Online Learning Interaction Inventory (OLLI), with a reliability coefficient of .95. The OLLI focused on the four interaction attributes of content interaction, conversation and collaboration, intrapersonal/metacognitive skills, and need for support. Each of the attributes of the OLLI were designed around the indicators for interaction (Table 25.1).

The OLLI was divided into six sections with a total of 50 items. Section 1 dealt with demographic information. Section 2 included five questions on reasons why students selected to take an online course. Section 3-6 addressed each of the interaction attributes and were rated on a five point Likert scale with 1 representing strongly disagree to 5 representing strongly agree. Section 3 dealt with *Content Interaction*. There were 13 items relating to the indicators of content interaction. Section 4 addressed *Conversation and Collaboration* with 14 items relating to the indicators of interaction. Section 5 addressed *Intrapersonal/Metacognitive Skills* with 7 items relating to the indicators of interaction. Section 6 addressed *Support* with 7 items relating to the indicators of interaction.

Procedure

The Online Learning Interaction Inventory was pilot tested with 26 students during the semester prior to implementation of this study. Students from two online classes in the masters program in instructional technology were sent a detailed email stating that the purpose of the OLLI was to test the instrument and to gather information about interaction and online learning. Students selected for the pilot test were in their last sequence of courses in the online program. Students had one week to complete the online instrument. Based on the pilot study, some items were reworded, two demographic identifier questions were added, and the classification of interaction attributes were clustered from five to four areas. In the pilot study, collaboration and communication were individual attributes. When updating the instrument, collaboration and communication were clustered into one attribute.

Table 25.1. Indicators of Interaction

Variable	*Indicator*
Content interaction	Level of structure
	Level of pacing
	Learning from multiple mediums
	Learning using interactive strategies
Conversation and collaboration	Peer relationships
	Participation in learning community
	Peer discussion
	Teaming
	Peer tutoring
	Feedback from peers
	Feedback from instructors
	Learning using interactive strategies
Intrapersonal/metacognitive	Self-monitoring of progress
	Structure of embedded cognitive strategies
	Posted times for getting online
	Instructor encouragement/guidance
	Advance organizers
	Notetaking guides
Support	Timeliness of responses
	Mentoring
	Tutorials
	Peer tips
	Corresponding with instructor

In the current study, students from four online classes were sent a detailed email stating that the purpose of the Online Learning Interaction Inventory (OLLI) was to gather information to continue to make the online courses and the program more appropriately interactive. The email indicated that data would be reported and used as research as well as be used for formative evaluation purposes. Students were provided with the URL to take the OLLI online. In two of the four courses, the OLLI was posted as a weekly assignment. In the other two courses taking

the OLLI was optional. Students were provided with one week to complete the 50-item instrument.

Data Analysis

Data were analyzed by item using frequency, means, and standard deviations to report areas of interaction that are perceived to be valuable or a hindrance to success for online learning. Research questions for the study are as follows:

- Question 1: Why do students learn online?
- Question 2: What interaction attributes do students perceive as important for online learning?

RESULTS AND DISCUSSION

Data collected from the OLLI were analyzed by attribute, with frequency, means and standard deviations reported. Reported first will be responses from the first research question related to students learning online. The second research question related to the interaction attributes will be reported by each of the four interaction attributes.

Learning Online

Learning online is related to the first research question, *Why do students learn online?* The majority of students selected to take online courses for convenience ($M = 4.13$, $SD = 1.14$) and flexibility ($M = 4.65$, $SD = 1.33$). Most of the students reported that they could attend school even if the course was campus-based ($M = 3.58$, $SD = 1.58$), indicating that many of the students lived close enough to the campus to take campus-based courses. Only 12 students (23%) reported that it would be impossible to take the course if it were not offered online.

Interaction Attributes

There are four interaction attributes related to the second research question. Attributes included content interaction, collaboration and conversation, intrapersonal/metacognitive strategies, and support. Responses are included by attribute for the following research question: *What interaction attributes do students perceive as important for online learning?*

Content Interaction

In general, it appears that students agree that interacting with the content is important to their online learning experiences. Overall, they report that they like partially individualized courses with some instructor direction ($M = 3.77$, $SD = .85$). Participants also reported a desire to interact with content delivered via audio-narrated online presentations ($M = 3.65$, $SD = 1.22$). Interacting with innovative instructional strategies also was reported to be important to their online experience. Strategies such as case studies ($M = 2.83$, $SD = .92$); structured games ($M = 3.10$, $SD = 1.11$); and readings followed by online discussion ($M = 4.56$, $SD = 1.09$) were all rated popular with participants. Interestingly, participants expressed strong frustrations about being required to participate in too many interactive assignments in a weekly segment of the course ($M = 4.08$, $SD = 1.06$).

Interacting with the content is a major component of an online course and the primary location where new knowledge, skills, and abilities are presented. Typically instruction online is presented as instructor-centered or student-centered. Both are appropriate given the learning outcome and topics of the course content. Students in this study seem to prefer a variety of techniques, yet seem to feel most comfortable with the "feeling" of a traditional class. With the highest reported perceptions of positive interaction in the areas of audio-narrated presentations and readings text followed by discussion. The lecture itself (the audio-narrated presentations) can provide a foundation for other attributes of interaction including conversation, collaboration and informal discussion.

Conversation and Collaboration

Results of the interaction attribute of conversation and collaboration indicated that participants rely on their peers and their instructor in forming and maintaining the online learning community. The majority of participants ($M = 4.94$, $SD = 1.06$) reported that it is essential to build a community of learners in the online environment. Participants reported liking to discuss ideas and concepts with peers ($M = 4.00$, $SD = .71$) and also perceive that sharing information with peers is important ($M = 3.83$, $SD = .71$). In relationship to teaming, participants reported that working in teams was difficult for them ($M = 3.08$, $SD = 1.19$) and that once a team is formed, they prefer to maintain the same team for the entire semester ($M = 3.62$, $SD = 1.05$). In terms of innovative instructional strategies for interacting online, participants reported liking online debates ($M = 3.04$, $SD = 1.12$) and posing questions to experts ($M =$

4.02, $SD = 1.02$). Students weren't as receptive to the idea of posing as the guest presenter in class ($M = 2.71$, $SD = 1.18$). Finally, in terms of feedback from the instructor, participants reported that it is important to them ($M = 4.35$, $SD = .76$) and that the instructor should make every attempt to provide some kind of feedback to them at least two times per week ($M = 3.77$, $SD = .85$). Interestingly, participants reported that it was unnecessary for instructors to provide feedback on a daily basis ($M = 4.25$, $SD = .84$).

Promoting collaboration and conversation online is an attribute of online learning that participants considered important. Overall, forming the community of learners, collaborating with peers, and getting feedback from the instructor were the most highly rated indicators of this attribute. Given that groups of students do not just become collaborative because they are assigned together (Johnson & Johnson, 1994) means that designers and instructors should provide clear expectations for collaboration online.

Interestingly, note the positive responses on innovative instructional strategies. The variety of strategies presented within the confines of a course appears to yield positive perceptions among students. Providing both synchronous and asynchronous conversation and communication online can extend learning and at the same time motivate the learner (Sherry, 2000).

Intrapersonal/Metacognitive Skills

Analysis of items related to intrapersonal/metacognitive skills suggest that self-directedness and embedded cognitive strategies designed into the online learning environment are perceived to be important to participants. Participants reported that it is important to monitor their own progress each week ($M = 4.58$, $SD = .72$). With regard to embedded cognitive strategies, participants reported that it is important to have structured times that assignments are due ($M = 4.33$, $SD = .83$), to have an advance organizer to assist them through the assignments each week ($M = 4.10$, $SD = 1.00$), to provide graphical representations of the steps that should be taken to complete assignments ($M = 3.96$, $SD = 1.31$), and to have note-taking guides to accompany audio-narrated presentations ($M = 4.04$, $SD = 1.12$).

Overall, self-regulating one's own learning is an important aspect of online learning. Not only do students need to monitor their progress in an ongoing fashion and adjust their strategies for learning based on their progress, they also need to maintain a time management schedule in order to complete online learning activities in the allotted timeframes. To assist and guide learners through online learning, strategies like advance organizers and graphical representations are used to guide the learner through assignments, while note-taking guides and posted times for assignment due dates are also included.

Support

Results indicate that support is also a key attribute in the success of online learning. Designing online learning with a solid support system in place enables timely responses to questions, mentoring, tutorials, and tips from peers. This support system may very well provide a foundation for successful learning. Participants report that timeliness of response ($M = 4.48$, $SD = .64$) is a major indicator of support. Most participants reported also that having a mentor in place to provide assistance is also important ($M = 3.52$, $SD = 1.35$). Participants also reported that having tutorials available as needed ($M = 3.12$, $SD = 1.55$) will assist them in performing tasks such as being in a chat room, posting to a threaded discussion, etc. And no surprise, participants report that when the technology doesn't perform as intended, they are extremely frustrated ($M = 4.17$, $SD = 1.15$).

Overall Perceptions of Interaction

Overall, participants provided the reasons why they chose to take courses online. They also rated items in each attribute of online interaction as important to their success as online learners. The top reason for taking a course online was the flexibility ($M = 4.65$, $SD = .74$) followed closely by convenience ($M = 4.13$, $SD = 1.14$). With regard to the interaction attributes, Intrapersonal/Metacognitive had the most highly rated indicators with self-monitoring of individual progress ($M = 4.58$, $SD = .72$) rated at the highest frequency. The support attribute also rated at the top with timely responses by the instructor ($M = 4.48$, $SD = .64$) rated as the number two indicator of an interactive online course. Table 25.2 notes the frequency, means, and standard deviations of the top rated indicators for each of the four interaction attributes of online learning. Although indicators exist in each of the interaction areas, the idea of self-regulating learning and having timely feedback from the instructor was reported as most valued by participants.

CONCLUSION

In conclusion, it is agreed that interaction should be designed into online instruction. It is also agreed that interaction is an important variable for learning, primarily because it is important to learner satisfaction and

Table 25.2. Means and Standard Deviations of Reported Interaction on Highly Rated Attributes and Indicators

Attribute	*Indicator*	*M*	*SD*
Content Interaction	Mixture of individualized	3.77	.85
	And guided activities		
	Learning from Audio-	3.65	1.22
	Narrated presentations		
Conversation & Collaboration	Peer Discussions	4.00	.71
	Sharing ideas with peers	3.83	.71
	Teaming with same partners	3.62	1.05
Intrapersonal /Metacognitive	Monitoring own progress	4.58	.72
	Structuring online time	4.33	.83
	Advance organizers	4.10	1.00
	Notetaking guides	4.04	1.12
Support	Timeliness of response	4.48	.64
	Corresponding with instructor	4.25	.84
	Peer tips	3.87	1.07

Note: 1 = *strongly disagree* to 5 = *strongly agree.*

motivation (Berge, 1999). In this study, online learners echo the importance of interaction by requesting interactive elements in their online experiences. Participants in this study are still most comfortable with the idea of simulating a campus-based class online, as reflected in their statements regarding the desire for instructors to use online audio-narrated lectures, provide note-taking guides, and discuss learned experiences in some type of online conversation. Although their comfort is with the "known," they still favorably rated using more innovative strategies in the online environment including case studies, debates, role-plays, and gaming. The foundation of the online learning environment however, included the notion of solid student support and self-directedness. Participants strongly stated that the need for timely responses from peers and from their instructor was of utmost importance. They also indicated that it was essential for students to self-monitor their progress for survival in the online course.

This study was an initial investigation into the perceptions of online learners' interaction needs. Future studies should consider other variables that may affect the individual learner, the learning environment, and instructional strategies that may be most appropriate for specific learning outcomes.

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