Creating Student Interaction within the Educational Experience: A Challenge for Online Teachers

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Abstract: The purpose of this article is to look carefully at the design and development of online courses, and identify significant issues surrounding the creation of interactivity among and between students and the instructor. With the rapidly expanding online movement, many educators are faced with teaching in this new environment and yet have had little experience to inform their practice. The article provides support for educators as they begin to create courses for an online environment. The challenges include a necessary reconceptualization of the design process, including evaluation, and a new role for educators as they begin to create courses for an online environment. The challenges include a necessary reconceptualization of the design process, including evaluation, and a new role for educators. Most importantly, each educator has to provide opportunities for student to student and student to instructor interaction. The authors identify issues, provide suggestions, and offer specific strategies to begin educators' efforts at successful use of the online educational environment.

Resume: Le but de cet article est d'etudier de pres la conception et 1'elaboration des cours en ligne et de relever des questions d'importance relatives a la creation de l'interactivite entre les etudiants et l'enseignant. La croissance rapide du nombre de cours en ligne oblige plusieurs enseignants a s'adapter a ce nouvel environnent educatif, sans qu'ils aient pour autant l'experience necessaire pour le faire. Cet article vient a I'appui des enseignants qui debutent dans la creation de cours en ligne. Parmi les defis lies a une telle demarche, l'on retrouve la necessite de repenser le processus de conceptualisation, y compris l'evaluation, ainsi que l'adoption d'un nouveau role par les enseignants. Cependant, le defi le plus important que chaque enseignant doit relever est celui de creer des occasions d'interaction entre etudiants d'une part et entre les etudiants et I'enseignant d'autre part. Les auteurs soulevent des questions, fournissent des suggestions et offrent des strategies precises pour aider les enseignants a reussir leur exploitation de l'environnement educationnel en ligne.

Introduction

Telecommunication networks are changing teaching and learning as evidenced by the increase of online educational offerings. Many institutions are feeling pressure to join the information age by offering online courses, yet most faculty and administrators feel ill prepared to do this. It is important to consider ways to assist educators as they begin to design online courses, particularly as many educators are being encouraged to join the trend and students are beginning to expect access to new models of learning.

The purpose of this article is to look carefully at online courses and identify significant issues in their design and development. The authors have many years of experience in studying various types of distance learning, and also in teaching online and place-based courses. We have noted the ubiquitous use of technology causing societal and cultural changes. Additionally, the use of computers, telecommunication, and other emerging technologies allow educators to design instruction in ways never before possible. The ideas in this article draw upon those experiences and on discussions undertaken with instructors, potential instructors, and students of online courses. Many of the issues and ideas discussed here regarding design for the online classroom centre on the changing roles of students, teachers, curriculum, and even the institutions of higher education themselves. These are some of the themes that permeate the discussions and experiences of online teachers daily.

Before any decisions can be made about delivery or instructional methods, each instructor must make pedagogical decisions about the fundamental goals and purposes of a course or program. When creating an educational experience, the salient questions have always been, "What are the instructional and personal goals of this course for all students?" "What is the purpose of this course?"

These are questions that all educators must ask themselves when designing traditional courses, and for the most part, they have become comfortable doing this. How does this activity change in the online environment? The level of interaction within any educational experience may vary by subject, goals, personalities, and other attributes. Yet all educators have their own ways of determining the levels of understanding and engagement of their learners. In what ways are these different or adapted to the online environment? The specific pedagogical concerns to be addressed in this article include the identification of learning goals, recognition of philosophical changes necessary to teaching online and changes in the teachers' role, evaluation of student and instructor, and creating interactivity within learning activities, between teacher and student, and among the students.

With the shift from face-to-face classrooms to online classrooms, there is a greater need for activities that engage the learner (Strey & Benjamin, 1996). Because in our opinion, it is this last factor that is central to all other pedagogical decisions in the online classroom, interaction is highlighted in this article. While the language and examples used here are from higher education, the principles are the same whether in K-12, the business, government, or non-profit training sectors.

Perspectives

A large institution recently moved into the online environment in a substantive manner. It devoted energy and resources to encourage, support, and teach using a groupware package that allowed faculty to place part or all of their courses on the World Wide Web (web). During a discussion of this experience at the end of its first term, faculty described their success and frustrations, and shared anecdotes.

One attendee asked the group to consider the changes in pedagogical constructs and the relationships between and among the students. Suddenly the faculty group became silent. They finally admitted that they did not know how to discuss, characterize, or even think about the ways their teaching had changed.

This story led the authors to consider that our educational community needs to begin a dialogue about the changes that may exist in teaching online courses. The literature reports an increasing number of courses and degrees delivered entirely through Computer Mediated Communication (CMC). Some of these courses are traditional subject matter courses - often undergraduate work. In some circumstances the technology is only a repository, and merely holds the materials (Boston, 1992) and in others there is evidence that the technology itself assists in a paradigm shift so that it becomes the environment for learning (Dede, 1995).

Historically, good teachers in the place-based classroom responded to students in a variety of ways. Without thinking about it, if glazed looks appeared on students' faces, an experienced teacher would have strategies to remediate the situation. It is something that experience teaches and is often just tacit knowledge. It is possible that many teachers adapt to the online environment with similar automaticity. To the extent a method or activity works or does not, the online teacher adjusts accordingly. How do we explicate, discuss, and share that which we do in the online environment? Laurillard (1996) describes a "Conversational Framework" for academic learning, and differentiates between the "discursive level" (where the teacher articulates the subject matter and the student joins the dialogue) and the "interactive level" which she says is

> .. .the level of practice, representing the way the student acts in the world, or at least in a world constructed by the teacher such that their interactive activities will give them experience of the theory in action. Here the teacher sets a task, the student acts, the world responds to their action, and the student can modify their action in order to better achieve the goal of the task. (Laurillard, 1996, N. P.)

Principles of instructional design indicate there needs to be alignment among the content of a course, the instructional goals and objectives, the evaluation, and the practice activities in which students are encouraged to engage (Yelon & Berge, 1988). Given this framework, it becomes important that the designer/teacher uses instructional methods and strategies that promote student activity that correspond to the goals for each course. More specifically, a question becomes, how do we create interactivity between and among our students who are geographically separated? This article focuses on the specification of ways to create interaction with the content, between learner and instructor, and among learners, as one key in the process of instructional development within an online learning environment.

Changes to Teachers ' Philosophy and Roles

It is evident that certain pedagogical, organizational, and institutional issues must be considered before beginning to teach an online course. The creation of interaction, however, draws specifically on pedagogical issues and on all the experience and skills of the instructor in designing the framework for the course,

the activities, and the assignments to support and encourage the communication patterns among and between all participants. One instructor, who uses online components in all his classes and recently planned an honours seminar to be taught substantially online, stated, "I begin with two premises. First, active learning is a good thing. Second, bringing students into frequent contact with class peers, and world wide peers, promotes active learning. Basically my experience has been that electronic communication promotes active learning" (Smith, personal communication, 1994).

To work toward changing models of teaching and learning is important. It takes courage to move away from the idea of classroom lectures of stable content, delivered by expert teachers to students who are homogeneous, passive recipients and who work alone as they learn. Technology such as networked access to worldwide information, electronically-mediated collaboration with other people, multimedia, and powerful computer simulations permit learning environments where students are encouraged to explore and learn in teams, where there is sensitivity to the diversity of students, and which positions teachers and other experts as mentors, guides, and collaborators in learning new and ever-changing content. Certainly there are barriers to technologically-rich learning environments: copyright issues, faculty reward structures, high front-end costs, training, equal access, student support, administrative challenges, technical issues, and faculty resistance, to name a few. But the major barriers to the use of technology involve the culture of our institutions and people within them. The type of structural changes required in facilitating these changing roles are those that carry the most resistance to change (Berge, 1996).

Berge (1996) identified the following changes to teachers' roles. Teachers or the functions teachers perform are:

changing from oracle and lecturer to consultant, guide, and resource provider

become expert questioners, rather than providers of answers

provide structure to student work, encouraging self-direction

shifting from a solitary teacher to a member of a learning team

changing from the teacher having total autonomy in the classroom to activities that can be open, observed more broadly, and assessed by more persons

changing from total control of the teaching environment to sharing with the student as fellow learner

placing more emphasis on sensitivity to student learning styles

seeing the teacher-learner hierarchy breaking down

Along with these changing roles and functions of teachers are concomitant changes in students' roles. Perhaps the most notable is the change from the students as passive receptacles for "hand-me-down knowledge" to students as constructors of their own knowledge. Further, all this is occurring within an environment that emphasizes acquiring more effective and efficient individual and collaborative learning strategies.

Designing the Online Environment

The course designer may choose to redesign an existing course, or create a new course, but it is unwise to simply transport an old course to this new medium. The structure of the course, the planning for educational and personal needs, and the teacher's role, all must be re-conceptualized. It is clear that if active and constant striving for independent learning must take place, then the designer will have to determine what actions will promote this type of learning. Further, from adult learning theory we know that authentic learning, relevant materials, and negotiated assignments are required to ensure the participation, engagement, and action necessary to meet these goals.

For example, consider how an instructor typically determine the students' level of engagement in a classroom setting. Such activities as eye contact with individuals, requiring students to turn in weekly papers, and arranging small group discussions with accountability to the larger group, all can help as indicators of engagement. In what ways can the online instructor similarly check for student engagement? Could private e-mail on a regular basis offer information on each student's understanding? Would a team approach be more useful? Each student might have a partner with whom to discuss and question, then be required to create a reaction to the "discursive level" of the course.

Development of an online educational environment is not a trivial task, and it is important to realize the amount of time it takes to design an effective online learning experience. Wiesenberg and Mutton (1996) identified three major challenges for the designer to consider: increased time for delivery of the course (they estimate two or three times what is necessary for a traditional course), challenge of creating a community online, and encouraging students to become independent learners. They also reported less interaction than expected from participants of an online course. Additionally, Gottschalk (1996) suggested following a specific development process before taking a traditional course and putting it online. These include design, development, evaluation, and revision. A teacher or designer does not necessarily need to start with course objectives, move through decisions about objectives and then content and finally evaluation in a linear fashion, but all these elements must be aligned at some point for effective instruction.

Let's explore an alternative path to designing a topic in a course. Imagine there is a particular assignment that has proven useful and authentic for the learners and the instructor in a previous classroom or that a colleague has described. This might be creating a small project, identifying specific content, reacting to a scenario, or synthesizing activities. The instructor must consider how this could work in an online experience. Would specific materials be available to individual students, with the students then required to compile, share, and work together? Would the activity require students to work independently gathering resources and then present them online to the rest of the class? Should students take turns having the responsibility for organizing and leading a discussion? It is through thinking and

re-thinking the interaction with the content and other persons that the students will receive, that an important element of online course design emerges.

Evaluation. The nature of online teaching requires the instructor to rethink the evaluation process as well. The evaluation component must be ongoing and continual, so that just leaving everything to one midterm and a final paper would put everyone at a disadvantage. It is important that the instructor become familiar with each student's work, and the only way to accomplish that is clearly through many instructional activities. Additionally, without visual cues the instructor might not be aware of a student's confusion or total misunderstanding of subject matter or of assignments.

The feedback loop is also essential in both directions. One of the most significant difficulties for faculty is acknowledging the possibility for them to make revisions. It would not be unusual for this trial and error evolution to take a few iterations. Certainly the feedback from the learners would be important in this process. In order to obtain information from the learners, it is often wise to identify specific times during the course when students fill out an anonymous questionnaire regarding their progress. (Note: anonymity is difficult in an online environment, so technical staff may need to offer suggestions for your particular setup). Some faculty have included one question per week to require students to consider various aspects of the content, interaction, and affective components of the online environment.

As essential as it is for the instructor to gain understanding of the learners' perspectives, it is important that the instructor's feedback to the learners be timely, specific, and authentic. All educators have learned the necessity of giving students information about the quality of their work, but in the online environment this is especially true. It is also significant to note that the manner of responding to learners' work is consequential. Online communication has a reputation for exaggerating sarcasm and heightening misunderstandings: this is not the time for vague or subtle comments, and getting confirmation from the student that the comments were understood should be part of this ongoing communication pattern.

Asynchronous or Synchronous Learning. The instructor is going to need to decide whether to have the course interactions occur at the same time (synchronously) or in the time/place independent manner (asynchronously), or some combination of the two. While we acknowledge our bias toward using an asynchronous communication channel, both modes have advantages and disadvantages. For most tasks that require thought and reflection, the synchronous model may not be very useful. If the group consists of more than 3 or 4 persons, individuals report frustration with synchronous communication in keeping track of what others are typing and also being able to type their own contributions. Frequently, one person who can type very rapidly is able to dominate the real-time conversation. Also, the timing may not be viable or convenient for all participants. If a synchronous mode is chosen, then very careful structures, advanced organizers, and monitoring are essential. Still, there are teachers who find synchronous

communication very helpful online, especially in building a sense of community among students, and when seeking immediate feedback, or simply to allow for more informal discussions.

Creating Student Interactivity in an Online Environment

Everyone is likely aware that the amount of interactivity might vary widely in a traditional course. Consider that learners interact with the content, the instructor, and with other learners (Moore, 1989). While the potential exists for many types of interaction, some courses on campus are basically one instructor who lectures while the students try to take notes. The online environment offers some possible ways in which desirable interaction might occur within these categories of interaction.

It is easy to consider how students can interact with the content in a variety of ways. However, as in most areas of learning, self regulation and active participation are essential. The instructor might require discussion on topics of the course, or have students post comments upon various readings for others and provide information about global resources that have been investigated. Having access to the instructor's personal notes and pertinent questions can often focus the readings. Students can also post other artifacts of their work (drawings, web pages, slides) that demonstrate their conceptualizations.

The instructor and each individual student are likely to create their own preferences for how interaction occurs. Electronic mail has supported interaction for some time, but the instructor might improve the use of e-mail through considering the suggestions of Laurillard (1993). She describes four ways of supporting interaction with learners in an electronic environment. These include a need for discursive language in order to understand each other's conceptions; adopting an adaptive perspective, so that the focus shifts as each student's needs shift; authentic activities for students to demonstrate their understandings, and reflection on the student's work.

Student to student work that is collaborative in nature requires another level of consideration. A learning activity may be designed to support the learning objectives, such as groups of learners solving a problem, creating a simulation for others, designing a product, or completing a task. These activities may or may not carry a mandatory requirement and the groups may be self selecting or may be created by the instructor. Some instructors have each member of the class post the type of project they would like to do, and also list something about their work style (e.g., individuals who are comfortable finishing at the very last minute may not work well with those who wish to be finished a week ahead of time and be able to devote energy to revision, or students who wish to talk about a project only after midnight might clash with someone who prefers to work at 6 AM).

Historically, teachers and designers have emphasized the need to create interactivity between student and content, and between students and the instructor. Use of such techniques as study questions to help guide textbook readings, and

impromptu questioning during lecture has been effective to varying degrees as incentives for students to interact with content and teacher. The technologies used today in the online classroom promote an emphasis on discussion and interaction among students as well.

Creating Successful Online Interaction Among Students

Blumenfeld, Marx, Soloway, and Krajcik (1996) state:

> The effects of group work depend on how the group is organized, what the tasks are, who participates, and how the group is held accountable. Teachers must consider the purposes in designing group work and address potential problems of process if group work is to be successful, (p. 37)

The literature is replete with factors that affect the success of collaboration (Forum Corporation, 1996, 1997; Guzdial, etal., 1997; Hamm and Adams, 1992; Hendrix, 1996; Huszczo, 1990; Larsen, Mclnerney, Nyquist, Santos, and Silsbee, 1996; Lipnack & Stamps, 1997; Parker, 1994; Scholtes, 1998; Uhlfelder, 1996) including: the goals or tasks of the team, the talent and competencies of the team members, leadership and roles within the team, the ability of the team members to effectively plan together, trust, the ability of the team members to communicate effectively in all their internal and external interpersonal relationships, and the need for an active reinforcement systems for sustaining teamwork. Rather than a detailed or exhaustive description of each of these factors, below are listed examples in the three areas that the instructor has the most direct control over when designing online collaborative work: the tasks, promoting an environment of trust, and creating an active assessment and reinforcement system for sustaining teamwork.

Tasks. From one set of research activities Schrum, Fitzgerald, and Luetkehans (1997) found that some activities are logically completed collaboratively (brainstorming, identifying the problem, choosing the place to begin, designing a solution, and testing out that solution) and others for which groupware and collaboration are not particularly useful (constructing and writing documents). Those creating such projects would be wise to structure activities with organizers and frameworks that encourage learners to explore ways in which the tools actually enhance their work.

Giving learners control and support for self-determination of appropriate uses will accomplish the goals more successfully. However, their participants also reported that it was helpful to have one or more of their teams participate in all activities in an asynchronous manner, to provide thoughtful reflection, offer summarizing comments, and to take a synthesizing role.

Trust. Another conclusion reflected the need for substantial team and trust building that require a significant amount of time to evolve, before true collaboration can occur. This suggests that the instructor may need to create small tasks that lead to larger projects over time (Schrum, Fitzgerald, and Luetkehans, 1997). It became clear that not everyone has the same mental model of what collaboration means, or how it is accomplished and a shared vision must evolve through authentic

activities. This issue is summarized by King and Kitchener (1994) in the following thought, "The demanding nature of such an approach sets the stage for learning how individuals typically reason about such issues, not how they would reason given the opportunity to think long and hard about them (p. 104).

Assessment. Effective peer collaboration and discussion needs active reinforcement systems and feedback for sustaining interaction. Standards for accountability and modeling appropriate interaction needs to be shown and otherwise communicated. There should be an expression of appreciation to learners for contributing to the discussion and performance evaluation should reflect contributions made to the participation observed.

Conclusions and Implications for Practice

Online courses meet the needs of some students. Those students who are unable to attend a university or whose university does not offer the desired course, those in remote locations or in gridlocked urban areas, those already comfortable with computers, and most certainly, those who prefer to work without time and location constraints are among those who benefit most from the virtual classroom. The characteristics and questions that emerge from understanding the students participating in online classes can be used to help construct guidelines for making decisions about the creation of courses.

Keeping in mind what was said in the article about our perspectives and biases above, some of the points we believe need to guide practice when designing online instruction include:

define/describe each activity, level and types of social and instructional interactivity desired and their purpose(s), reframe it in light of the online personnel and technology resources available;

define the levels of teacher-control, guided-teacher-control, student control, and group-control that is desired regarding each activity;

if face to face meetings are a possibility, determine if a mixed mode of online and face-to-face classroom meetings would enhance the overall learning experience;

take into account the amount of student support that can be anticipated because of student skills, knowledge, and comfort with the online environment;

consider what level of technology each student has access to as you make decisions about the minimum hardware/software configuration needed to take the course;

recognize that while online environments such as the web permit multiple-media, currently text and graphics are the easiest to use. If, in your course design you choose a heavy reliance on audio or full-motion video, you may need to include CD-ROM, video or audio tape in addition to web-based instruction;

while much has been written about learning styles, do not forget that the instructor delivering online courses also has a teaching style(s) that he/she is comfortable using and needs to be considered in the design of the course.

One way to view the design of online learning is to describe the interaction that students will need with regard to content, the instructor, and other learners. Once done, the design task mainly involves aligning the content, objectives, and evaluation with these inter-activities. Interaction with content can take the form of posting materials, summaries and leading discussions by students; developing working papers on material; reflection papers, abstracts of related scholarly work; or the creation of test questions; development of presentations, critique of theoretical material. Interaction between the learner and the instructor often is determined by the instructor structuring his or her availability for individual or small groups to interaction; the use of such two-way communication channels as video conferencing, telephone, fax, e-mail, or face to face meetings. The design for interaction among learners includes joint projects or investigations, collaborative development of multimedia projects and demonstrations; and sharing materials and perspectives through online discussion.

Teachers and learners can not duplicate the interaction with students as during face-to-face instruction regarding "immediate feedback, inquiry, questioning, control of pacing, sequencing, and other interactive controls available in the live classroom" (Gilbert and Moore, 1997, N. P.) Perhaps they should not! Perhaps much of face-to-face teaching is not the shining exemplar that should be held up as the epitome of interactive learning. With today's technologies, the planning of interaction may be limited only to the designer's imagination and what makes sense in the service of teaching and learning.

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