

Project-Based Learning in an Online Environment: The Key to Collaboration and Communication

Project-based learning is a well-established component of effective instruction (Dewey, 1916; Papert and Caperton, 1999). Online instruction lends itself especially well to incorporating project-based, collaborative activities that allow students and instructors to communicate and interact with course content. Such collaborative activities build relationships and a sense of community within the online course. What follows are examples of proven techniques that foster effective communication among students and between students and the instructor in an online environment.

Synchronous

Synchronous communication includes chat (IRC), instant messaging (IM), and desktop videoconferencing. An effective way to use synchronous communication in an online environment is for an instructor to offer online office hours via any of these various asynchronous methods. Rather than delivering course content synchronously (class lectures, for example), online office hours provide an opportunity for the instructor and students to communicate in a more informal setting. Likewise, it is an excellent means for students to hold discussions and conversations among themselves.

Chat rooms can be accessed via any of the publicly available web sites, or more privately through a course management system such as Moodle, Blackboard or WebCT. If one has a server available, the several open-source software solutions (including Moodle and Wiki, for example) are easy to set up and quite manageable. These can provide one-to-one and group communication, thus enabling students to collaborate on projects through the planning, designing and developing stages. Anyone who has used chat for communication is aware of its inherent problems: they are sometimes chaotic due to the seeming randomness of comments; often there is no archive of the discussion to return to for review; the use of *nom de plume* [*nom de chat?*] can be confusing if one is not aware of the real identity of the writer. Yet many students are accustomed to and comfortable with this form of communication and can gain from the sense of community that it offers. Students use chat for a variety of purposes including socializing, communicating feelings about the course in general, discussing course work, and gaining feedback regarding progress in the course. Studies have found that for socialization purposes students more often use chat sessions. (Nicholas, 2003)

Instant messaging (IM) has become ubiquitous with its incorporation into cell phones, wireless PDAs and with the easy availability of software such as AOL and MSN Instant Messaging and Apple iChatAV. It differs from IRC in that typically IM is between two individuals, while chat can include a group of more than two (although beyond four or so the chaos turns to bedlam). Its use in an online environment for communication and for building community is similar to IRC. Students typically are quite comfortable with IM, often opening several chat windows simultaneously, and will use it for discussions with classmates and with the instructor.

An added component of IM and chat is desktop videoconferencing. Several free or inexpensive IM clients now incorporate videoconferencing capabilities that provide a live picture as well as text for each participant. In addition to simply providing an opportunity for familiarity among students (faces now associated with names), desktop videoconferencing is a potential tool for the instructor or student to offer pictorial demonstrations of concepts, whether a science experiment, an architectural example, or anything that can be presented using a small video camera. With free IM/videoconferencing clients and inexpensive web cams, such technology is accessible to a wider audience. Videoconferencing appeals to students' different learning styles for students who are visual and auditory learners can benefit from such a setting.

There are some drawbacks to the use of synchronous communication techniques in online environments. The first is accessibility. Persons with disabilities have difficulty using some of the online synchronous communication tools; alternatives must be provided for those individuals. Similarly, not all individuals have access to the necessary bandwidth to carry some desktop videoconferencing effectively; an alternative is to use audio conferencing only or stick to text-only messaging. Selection of videoconferencing tools can result in efficient compression of audio and video so that minimal bandwidth is required. An overall challenge in synchronous communication is finding a common time for individuals to meet in order to conduct discussions. Just as with any technology tool, some faculty are ill equipped to use synchronous learning tools, and will likely benefit from formal faculty development training.

In terms of collaboration, the chat and tools nurture learner brainstorming and questioning, presenter clarifications and explanations, role-play and private one-to-one mentoring. (Bonk, 2002)

Asynchronous

Asynchronous online communication includes the use of email, electronic mailing lists (e.g., Listserv), and discussion boards. There are many effective ways to use these common asynchronous tools for communication and to support project-based learning in an online environment.

Email is the most widespread tool used on the Internet. Participants and the instructor(s) must be aware of basic email etiquette, especially the need to reply to email messages in a timely manner. It often is helpful to inform students the time frame within which the instructor will reply to messages. Participants must be able to send and receive email attachments for sharing documents and for submitting documents to the instructor and each other for feedback. Email alone may be adequate for communication and for building some sense of belonging to a community, but in combination with other asynchronous tools, a truly vibrant course can evolve in which participants develop a sense of ownership and responsibility for the success of the course.

Electronic mailing lists are available for many academic topics and it is useful to encourage students to participate in a discipline-specific mailing lists relevant to the

content of the course. This provides an opportunity to expand the learning community beyond the class participants to a larger audience for discussion and communication. In many instances participants can learn from others and in turn share their knowledge and experiences with a broader audience. As students construct projects related to a specific course, they can draw on the expertise of authorities in the field or share their developing projects for outside critiques. Alternatively, instructors can set up an electronic mailing list (using Listserv software, for example) unique to a specific course, using the mailing list for announcements and class discussion.

An alternative or supplement to an electronic mailing list is the use of a discussion board (also known as an Internet forum or message board). There are many resources available for setting up discussion boards, including those found in course management systems (Moodle, Blackboard, WebCT, for example). The discussion board component of a course management system is one of its most beneficial features. Within the course management system, discussion boards are private; all students typically are automatically enrolled; the instructor can moderate the discussion entries to varying degrees; and an archive can be maintained. A discussion board is a powerful means for enhancing a project-based, collaborative environment in an online course. Its advantage over synchronous tools is that participants have time to reflect before they submit their entries to the board. They can edit their entries, and in a threaded discussion they can select which topics they wish to reply to. Discussion boards permit each student to participate and join in the conversation thus addressing the problem of “quieter” students who may be hesitant to participate. There are many advantages to the use of this asynchronous tool: a discussion board provides an outlet for students to pose their questions and receive feedback from the instructor and from other discussion board participants; a board allows students to reference and bring external sources of information into the conversation (e.g., URLs, attachments, media files); and a discussion board allows discussions to include perspectives from individuals outside of the original class.

Some course management systems (Moodle and Blackboard, for example) permit the instructor to set up sub-groups within the class with a separate discussion board for each particular group. Students then can use the sub-group’s discussion board to plan projects, and to discuss or debate topics from readings or other sources. This is especially effective with a larger class that must be divided into smaller groups. It makes discussions more manageable for both the instructor and the students, and it helps build community within the class.

An especially beneficial use of discussion boards in a project-based, collaborative learning environment is to assign students as individual leaders of discussions in response to course readings. An example of instructions for moderating a group discussion may be viewed at <http://edtech.usca.edu/courses/et755/ss04/moderate.html>. Additionally, a discussion board can be used for class critiques of student projects; the author in turn can respond to the critiques via the discussion board. In such an environment, students typically are supportive of each other and build on their skills as critical thinkers.

Inevitably there are potential drawbacks to the use of these asynchronous tools in an online learning setting. As with any electronic learning tool, one must address accessibility by all students. Persons with disabilities may have difficulty using some of the online asynchronous communication tools and alternatives must be provided for those individuals. Similarly, there may be inequities in the level of Internet access necessary for full participation in the online course. Technical requirements for participation in the course should be made clear at the beginning, and whenever possible alternatives should be provided.

With regard to these specific asynchronous communication tools, email, in spite of its ubiquitous use, can present challenges for the instructor and the students. The quantity of email received by the instructor can be overwhelming. This can be addressed by using discussion boards and electronic mailing lists (as well as synchronous tools such as chat and desktop videoconferencing) for communication to supplement email.

A class policy regarding email attachments is important. A common format for text documents, for example, should be established (e.g., .txt, .rtf, .doc, or .pdf). If media files are being submitted, the instructor might offer server space for submissions via ftp rather than as large email attachments.

Regarding the potential drawbacks of electronic mailing lists and discussion boards, there are several issues that must be addressed. If a student has joined a public, discipline-specific electronic mailing list recently, she should “lurk” for a while before submitting comments to the electronic mailing list. “Lurking” provides students an opportunity to determine the topics and level of discussion on the electronic mailing list and will help students to make significant contributions to the discussion.

The course discussion board can be an effective way to actively engage students in learning. However, the role the instructor adopts for participation in the discussion is a critical factor in implementing an effective project-based course environment. Students should be encouraged to make meaningful and substantial contributions to class discussion boards. One of the greatest demands of an online course is challenging students to maintain a high level of discussion (both in quantity and quality) without the instructor having to moderate frequently. The instructor should try to assign groups so that a natural leader is in each group who can help keep the discussion at a high level. Another approach is to provide a rubric for self-evaluation of student submissions to the electronic mailing list or discussion board.

Rubric evaluation has been used in many academic contexts and continues to be implemented as a component of authentic assessment. One of the greatest challenges in many forms of collaborative work is fostering ethical understandings of individual student responsibility with regard to the quality of individual and group contributions to projects. Rubric evaluation can help address this dilemma by focusing on process as well as content. When constructing a group evaluation rubric, items to be addressed might include 1) Contribution to Group's Tasks and Completion of Personal Tasks, 2) Problem-solving and Cohesion, 3) Discussion Skills and Active Listening, 4) Quality of Work, 5)

Working with Others, 6) Specific Contributions, 7) Attitude, and 8) Time-management. It is often beneficial to ask the students themselves to generate a rubric for group activities early in the course.

There are many synchronous and asynchronous communication tools available for use in online learning. These communication tools help build online communities and can enhance collaboration among students especially when used in project-based courses. Designing effective online learning requires an understanding of the features of these communication tools and a carefully planned implementation within an online course. Not only can student participation be increased with such tools, but also the administration of the course can be somewhat simplified as well.

References

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