

Using Virtual Students to Facilitate Online Group Discussion

By Jennifer Bigus

Discussion and collaboration are an important part of online learning. Often these activities need to be moderated or facilitated to insure higher-level learning. This facilitation can be done by either an instructor or a student or peer facilitator.

There are some of advantages to having a student moderate an online discussion instead of an instructor. Students may be intimidated when an instructor participates in a discussion. If the instructor is perceived as an authority figure who has the "right" answer, students are less likely to challenge an instructor's postings. And efforts by the instructor to play "devil's advocate" and challenge the student by asking probing questions or rebutting a student's point are sometimes counter-productive. Instead of defending his or her position, the student often capitulates. This doesn't happen as readily when students are responding to peer challenges.

Online discussion are often slow to get started as well, but once one student posts something, that posting seems to motivate others to post, either as a response to the first student's posting or as a new posting. The first student's posting often serves to "break the ice" in a discussion.

In many situations, collaboration between peers is the key to online learning. But what if those key postings don't happen? This article examines the role of the discussion facilitator or moderator and looks at how a "virtual student" can be used to fill this role.

Facilitating Online Discussions

Online group discussion is an important part of Computer-Supported Collaborative Learning (CSCL). CSCL is "an emerging paradigm of education that emphasizes a delicate balance between the individual mind



and socially shared representations developed through ongoing discourse and joint activities that take place within a learning community (Koschmann, 1996) ... CSCL uses mediated communication in both its synchronous (real-time) and asynchronous forms to develop shared knowledge bases and promote common understandings” (Sherry, 2000).

The term “mediated communication” has a few implications in the context of CSCL. First is the role the computer plays in mediating communication between the students and between the instructor and the students. Computer-mediated communication (CMC) is the term usually used to refer to both task-related and interpersonal communication using computer-based tools such as email, discussion boards, instant messaging or chats, and file or information sharing software (Ferris, 1997).

But “mediated communication” can have a second meaning in CSCL. In group discussions in an online learning environment, a moderator or facilitator often has a role in insuring that meaningful discussion occurs within the context of the course. It is this role that is the focus of the remainder of this article.

The role of the online facilitator

Unlike traditional face-to-face classes, the instructor in an online class often is more of a learning facilitator than knowledge disseminator. To facilitate learning effectively in an online environment, Berge (1995) suggests that four roles are required: pedagogical, social, managerial, and technical. While an instructor can take on all of these roles, in reality they are often shared by multiple individuals.

The pedagogical role revolves around the educational aspects of the discussion. This includes using questions and probes to facilitate learning and ensuring that the discussions focus on the important information, concepts, and skills. Part of this role includes encouraging participation through activities such as small-group discussions, debates, polling activities, dyadic learning partnerships between students, and one-on-one communication. In addition, the pedagogical role includes highlighting or

introducing conflict to encourage critical thinking and using summarization to encourage the synthesis of threads in a discussion.

According to Berge (1995), the social role of a facilitator encourages the relationships between the students and between the students and facilitator to ensure a comfortable environment for learning. This includes activities that allow the participants to get to know one another as both students and individuals with diverse backgrounds and interests. While this happens fairly naturally in a face-to-face environment, in “distance education, attention needs to be paid to the developing sense of community within the group of participants in order for the learning to be successful” (Palloff & Pratt, 1999, p. 29).

The managerial role involves organizational, procedural, and administrative responsibilities. This can include deciding on the agenda and timeline for the discussion, setting up the procedures and rules for the discussion, and providing direction and leadership. Other administrative tasks might include redirecting an tangential or inappropriate discussion, emailing non-participatory students, and administering the discussion board or course management software (Berge, 1995).

Berge also recommends that the facilitator make the technology as transparent as possible so that the students can concentrate on the academic tasks. This means that time and activities should be planned to allow new users to become comfortable with the technology. While the facilitator need not provide technical support, it should be available to the students. Common technical problems may also be addressed in the study guide or other materials provided by the facilitator.

Problems with instructors as facilitators

All these additional roles and tasks can overwhelm an online instructor. In addition, some studies have found that the presence of an instructor in an online discussion may actually limit the discussion. Walker (2004) examined synchronous discussions facilitated by instructors using Socratic strategies and devil’s

advocacy to encourage critical thinking in their students. The research found that while students responded well to opening questions or postings that started a new topic or subtopic, they were less likely to respond to a challenge or counter-argument meant encourage students to justify their position or examine an alternate viewpoint. This stems in part from the students' perception of the instructor's posting as instructional, and they are unwilling to challenge the instructor's expertise or authority.

Some instructors also have difficulty making the transition from "sage on the stage" to "guide on the side." For a number of reasons, online education usually requires students take a more active role in their learning, rather than being passively taught. It requires that the instructor step to the side, being there to guide the learning and allowing the student to be the center of the experience. Some instructors have not made that transition and end up dominating online discussions by simply carrying the traditional lecture format over to the new CMC environment.

The issue of an instructor's dominating or authoritative presence isn't unique to CSCL, however. For decades researchers have argued that an instructor's presence can hamper the free exchanged of ideas. As Kremer and McGuinness (1998, p. 45-46) stated, "At the level of the group, it could be argued that in a social situation, such as a seminar or tutorial, where there is an obvious imbalance of power and expertise among those present then it is unlikely that an atmosphere conducive to openness, to debate and to a free, frank and fair exchange of opinion will ever be fostered (Forsyth, 1991)". These desired to make learning more student-centered has led to the use of students as facilitators in both face-to-face and online courses.

Using students as facilitators

Jeong, Darabi, and Roussos (2004) discuss the results of three studies involving student- or peer-facilitation of online discussions. In a study done by Tagg (1994), one student took on the managerial role of setting the agenda and providing the initial direction of the discussion.

Another filled the pedagogical role of synthesizing and summarizing the discussion. In this study, "the results showed the peer facilitators improved the structure and coherence of the discussions, increased student participation, and contributed to a higher proportion of students that believed the discussions helped them to better understand the content" (Jeong, Darabi, & Roussos, 2004, p. 14).

In another study cited by Jeong, et al., Rourke and Anderson (2002) assigned the responsibility for some of the "teaching presence" in an online course to teams of students. The teams were partially responsible for instructional design and organization, facilitating discourse, and direct instruction, which roughly equate to Berge's managerial, social, and pedagogical roles. A questionnaire distributed to students as part of this study revealed that peer moderators were rated slightly higher than the instructor in fulfilling these roles due to their responsiveness and the interesting questions posed during the discussion.

In the third study cited by Jeong et al., teams of graduate students were assigned to all four facilitation roles – pedagogical, social, managerial, and technical – for an undergraduate course. In this study, Murphy et al. (1996) found that using student facilitators was more effective than a single instructor and that the benefits outweighed any negative factors.

Yet using student or peer facilitators is not a panacea. As Jeong, et al. (2004) also cited:

Harrington & Hathaway (1994) hypothesized that peer facilitators would encourage freedom of expression by removing power imbalances between the instructor and students, and as a result, the student led discussions would increase students' identification and discussion of taken-for-granted assumptions. However, their case study of online discussions among undergraduate students in teacher education found that the discussions were dominated with unsupported opinions, were lacking in the production of multiple perspectives and questioning of taken-for-granted assumptions. As a result, one of the conclusions drawn from

this study was that the peer facilitators did not perform some of the common tasks often performed by instructors. (p. 14)

So how does one blend the expertise of an instructor with the non-intimidating presence of a peer? One possible approach is using “virtual” students to help facilitate online discussions.

Virtual Students

Virtual students are a tool to promote learner interaction and collaborative learning in an online learning environment. They can help to facilitate discussion, enhance learning, and build a community of learners. They range from the fairly simple “Joe Bag O’Donuts” to fairly complex multi-agent architectures involving multiple intelligent agents in a learning environment.

Joe Bag O’Donuts

King (2002) has used a virtual student named Joe Bag O’Donuts (or Joe Bags for short) to help facilitate discussion in his online classes. Joe Bags is set up as an additional student in the class, and as such, is a full participant. The students are informed of Joe’s fictitious nature, yet they respond to him as if he were a real student.



King uses Joe to perform many discussion facilitation tasks. It is Joe who posts the first messages to a discussion board, often conveying what the objectives are and what the instructor deems important. In this way, Joe takes on part of the pedagogical role described by Berge. He also serves in a social facilitation role, “breaking the ice” and starting the dialogue on the discussion boards.

Joe also posts questions (and answers) to the technical discussion board, providing part of the technical role described by Berge. By posting some initial technical questions, Joe

opens the door for other students to ask their questions without feeling uncomfortable.

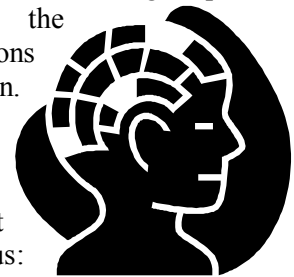
Joe also makes mistakes or presents an opposing point of view as a way of introducing conflict and getting the other students to think about their assumptions. He sometimes disagrees with the instructor and uses research to back up his point-of-view, modeling research-based argumentation in the discussion.

In addition to different roles Joe plays in the facilitation of the online course, he provides an added benefit for the instructor. By logging on as a student in the guise of Joe Bags, the instructor can participate in the course from two different perspectives, helping to engage both the instructor and the other students in the learning experience.

But this type of virtual student has its drawbacks as well. Even though it helps to facilitate discussion in the course, it takes additional time for the instructor to participate as both the instructor and the virtual student. Another approach gaining attention by researchers and practitioners is the use of pedagogical agents.

Pedagogical Agents

A pedagogical agent is an intelligent piece of software that has the capability to make decisions and act on its own. “Pedagogical” simply implies they are designed to teach, and ‘Agent’ connotes that they are semi-autonomous: they have goals and make their own decisions on what actions to take to achieve their goals” (Slater, 2000).



Pedagogical agents are an application of artificial intelligence in education. Evolving from a combination of intelligent tutoring systems, learning companions, and intelligent agents, pedagogical agents can present students “with human-like characteristics, such as domain competence, emotions, and other personal characteristics. The characteristics can

be expressed or displayed in text, graph [*sic*], icons, voice, animation, multimedia, or virtual reality” (Chou, Chan and Lin, 2003, p. 256).

While this may sound like science fiction, pedagogical agents are being designed and built today. In the next sections, we will examine a few pedagogical agents and the roles they play as facilitators in a CSCL environment.

EduAgents

The EduAgents framework (Hietala & Niemirepo, 1998) is an environment in which elementary school students solve mathematical equations with the help of four virtual students called learning companion agents. Two of the virtual students are quite knowledgeable in the subject matter and two are much weaker, often making mistakes and introducing conflict as they learn along with the student.

The learning companions play both pedagogical and social roles in their discussions with the student. Students can ask the learning companions to suggest the next step in a mathematical sequence and can ask for explanation of the suggestion. Reciprocally, the learning companions can ask the students for suggestions and explanations as well.

As social facilitators, the learning companions are given a name, a face, and a manner of speaking. This personalization of the companion was a factor in which companions the students chose to interact with.

An interesting result of the student/companion collaboration was that while the group in general showed improvement in their problem-solving skills, it was the group of introverted students that showed the greatest improvement. This may be an indication that the introverted students felt more comfortable with a “peer” helping to facilitate their learning, although this was not investigated as part of the study.

Note that in this study, all collaboration was between the students and the learning companions. Interaction with other “live”

students or instructors was not facilitated by the virtual students.

Future Learning Environment (FLE)

Chen and Wasson (2005) describe FLE, a web-based agent architecture to support CSCL. Facilitator agents are used to monitor collaboration, support awareness, and give advice to students both synchronously and asynchronously.

The monitor agent provides some of the managerial facilitation described by Berge. It collects information regarding the messages posted by students in an online discussion as well as monitors the activities of both the instructors and the students as they participate in the course. From this information, the agent provides statistical information on the collaboration process which is used to provide awareness information and to give advice.

The awareness agent provides social facilitation. It provides students with a view of who is online, who has posted materials to be downloaded, who has posted new messages since the last time the student logged on, and statistics regarding collaboration. This awareness allows the student to feel like they are part of a learning community by making them aware of when other students respond to their postings. They also can get a feel for how their collaboration efforts compare to others in the class so they can improve their self-regulation.

The advice agents fill mainly managerial roles. The agents give the students advice when the students have difficulties following the structure and processes required. They also can give the instructor advice when they detect problems in collaboration, like when a student’s participation level drops or certain topics are not being addressed.

A Socio-Cultural Multi-Agent Architecture

The final approach we will examine is a multi-agent architecture based on socio-cultural pedagogical approaches. Jaques, Andrade, Jung, Bordini, and Vicari (2002) are modeling a system in which intelligent multiple agents are used to facilitate CSCL.

The system includes five different types of pedagogical agents – the Mediating Agent, the Diagnostic Agent, the Semiotic Agent, the Social Agent, and the Collaboration Agent.

The Mediating Agent is an animated pedagogical agent that fills a pedagogical facilitation role by communicating with the student and presenting content based on the model of the student and his or her needs.

The Diagnostic Agent also fills a pedagogical role by assisting the student in the learning process through identifying the student's abilities and deficiencies through observation of the student's behavior.

The Semiotic Agent provides both pedagogical and technical facilitation by presenting the student with a personalized web page that includes content based on the student's current level of learning. It also makes the tools for social interaction such as email, meeting schedulers, chat tools, and FAQs available to the student.

The Social Agent is responsible for finding peers that can assist a student in the learning process, matching them up to enhance collaborative learning.

The Collaboration Agent performs many of the tasks and roles identified by Berge. It monitors and mediates the interaction between students. It provides stimulation when the student appears to be lacking motivation. It presents new ideas to the student, and corrects misconception. It interacts with the other agents to insure that the student is being presented with appropriate content and also monitors the affective state of the student.

While this architecture has not yet been fully implemented, it gives some idea of where the area of virtual students and pedagogical agents in heading and how these technologies can be used to facilitate discussion and collaboration in an online environment.

Conclusions

Facilitation is an important part of computer-supported collaborative learning. While an instructor can fulfill the different facilitation roles, it is often better to have peers facilitate the online discussions and collaborative activities.

Virtual students can be used to fulfill some of the facilitation roles as well. These can range from simple personas enacted by the instructor that present a less intimidating role to a very sophisticated multi-agent system based on artificial intelligence and socio-cultural pedagogical approaches.

Many of the more sophisticated systems are still in the early research stages. The technology still is not mature enough for wide-spread use. Still, systems of pedagogical agents hold promise for future CSCL environments in which all the aspects of facilitation identified by Berge can be realized by using both human and artificial instructors and learners.

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