Assessment of Collaboration in Online Courses

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Abstract. New educational dynamics require new assessment strategies. In this article, three strategies for evaluating the collaboration of learners are presented and discussed: assessment of participation in conferences, assessment of competence and collaborative assessment. These strategies have been investigated in a course taught entirely at distance by the AulaNet, which supplies some mechanisms for the application of these new assessment strategies.

Keywords: Assessment, Collaboration, Distance Education

1. INTRODUCTION

Many online courses use the Internet in the instructionism approach: some content is made available for subsequent checking, through tests; of how much the learners have assimilated. Most Learning Management System (LMS) make available mechanisms for preparing tests; if all of the questions are multiple choices, then the environment itself can issue a grade the moment a learner finishes an exam. However, this assessment strategy is insufficient for an online course that makes use of a collaborative learning approach, representing a pseudo-innovation that optimizes the traditional practices.

In collaborative learning, each learner is responsible for his or her own learning and the learning of the other members of the group. If the learner and the group are responsible for the learning, then grading must also be carried out in a collaborative manner and no longer only by the teacher. In this article, the assessment strategies that have been investigated during an online course with a collaborative learning approach are discussed. The AulaNet and the course are presented in Section 2. Then, in Sections 3, 4 and 5 the strategies investigated in the course are presented: assessment of participation, assessment of competence and collaborative assessment. The conclusion is presented in Section 6.

2. COLLABORATIVE LEARNING AND ASSESSMENT IN AULANET

AulaNet is a Learning Management System based upon a groupware approach for teaching-learning in the Web that has been under development since June 1997 by the Software Engineering Laboratory (LES) of the Catholic University of Rio de Janeiro (PUC-Rio). The AulaNet is a freeware available in Portuguese, English and Spanish versions at http://groupware.les.inf.puc-rio.br and http://www.eduweb.com.br. Regarding assessment, AulaNet offers the Exams service through which the teacher prepares tests for the learners. For a more innovative assessment, the AulaNet offers services for Participation Follow-up and Competence Management, discussed in the next sections.

The AulaNet development team also develops and maintains the Information Technology Applied to Education course, ITAE (Fuks, Gerosa & Lucena, 2002), a discipline offered by the Computer Science Department which has been taught entirely online since 1998.2 (second semester of 1998.) The course offers a real environment for conducting investigations and experiments related to the development of AulaNet. The ITAE course is organized into two stages. In the first stage, learners study and discuss the course's subjects through seminars and debates, and the participation of learners in these discussion activities is evaluated (Section 3). In the second stage learners are organized into small groups based upon their competences (Section 4) in order to build new content for the course. Collaborative assessment is used to appraise the content developed by the group (Section 5). The final grade of a learner enrolled in the ITAE course is calculated as being the weighted average of the grades received for his or her participation in the seminars and debates and the grade given to the final version of the content developed by the group.
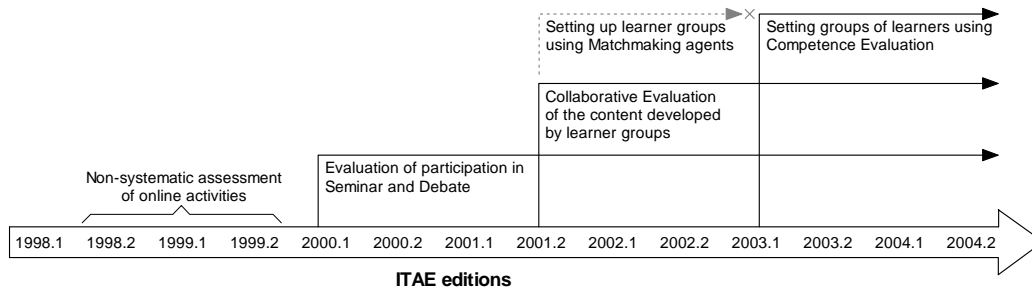
Figure 1. Assessment strategies tried out in different ITAE editions

The assessment strategies discussed in this article are the result of 7 years of experiments in the ITAE course. Figure 1 presents the chronological sequence of experiments involving these strategies in the course. In the following sections, we will discuss how these strategies were applied in the most recent edition of the course (ITAE 2004.2) and present the conclusions.

3. PARTICIPATION ASSESSMENT

One course subject is studied and discussed each week during the first phase of the ITAE course. Learners participate in an asynchronous seminar conducted through the Conferences service where specific questions are discussed about the topic being studied. They also participate in a synchronous one-hour-long debate through the Debate service. In this Section, we present the strategy developed for evaluating the participation of the learners in these discussion activities that take place in the ITAE course.

In a fruitful discussion, everybody is supposed to make significant contributions and send a similar amount of messages (Koyle & Aakhus, 2002). Anybody who participates without being prepared is cheating and disappointing the group. Anyone who merely reads the messages in a conference is not participating, only attending. When one person participates much more actively than the others, s/he is monopolizing the discussion. Thus, in order to evaluate the participation of learners in a conference, it is appropriate to take into account both the quality of their messages and the frequency of their participation (Fuks, Cunha, Gerosa & Lucena, 2003).

The strategy developed to evaluate the participation in the ITAE course is by multiplying the quality-grade by the quantity-weight of the messages sent by each learner during each seminar or debate session. The mediator evaluates the quality of the message by analyzing the text. The mediator gives each message a grade and, then, the average of the grades of the messages sent by a learner in a session is multiplied by the quantity-weight of messages s/he sent. Figure 3 shows some weighting models based upon the quantity of messages.
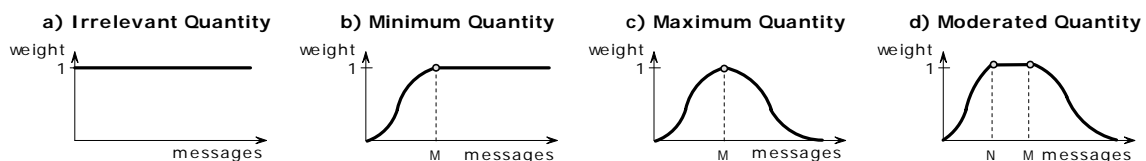

Figure 2. Models for weighing quality based upon quantity

The purpose of this assessment strategy is to get learners to try to achieve balance between the quality and the number of the messages they sent during the course's discussion activities. The next subsections show how this assessment strategy has been applied during the ITAE course seminars and debates.

3.1 Assessment of Seminar Participation

In each ITAE course seminar, one learner is selected to play the role of the seminar leader. This learner prepares the seminar text and three questions for group discussion. Learners then discuss the questions, arguing and counter-arguing based upon the messages that are sent by the learners. Mediators evaluate the messages as they are sent in over the course of the seminar, assigning a grade and writing a comment on each message. To evaluate the quality of a message sent during a seminar, the mediator analyzes the message based upon some pre-defined criteria. For each message, the mediator lists the main problems identified for each criterion. Based upon the quantity and the type of problems found, the mediator scores each criterion and gives the message a final grade. The average of the grades of each learner's messages is weighed based upon the number of messages s/he has sent during the seminar. The weighing function follows the Moderated Quantity model and was established that a learner must send from four to six messages per seminar (in this specific case of ITAE).

The seminar dynamics and the strategy for evaluating learner participation have been developed and tested over the ITAE editions. Figure 4 shows the average number of messages sent per learner per seminar, indicating the influences of the dynamics and of the assessment procedures that caused learner participation to improve and become more frequent.
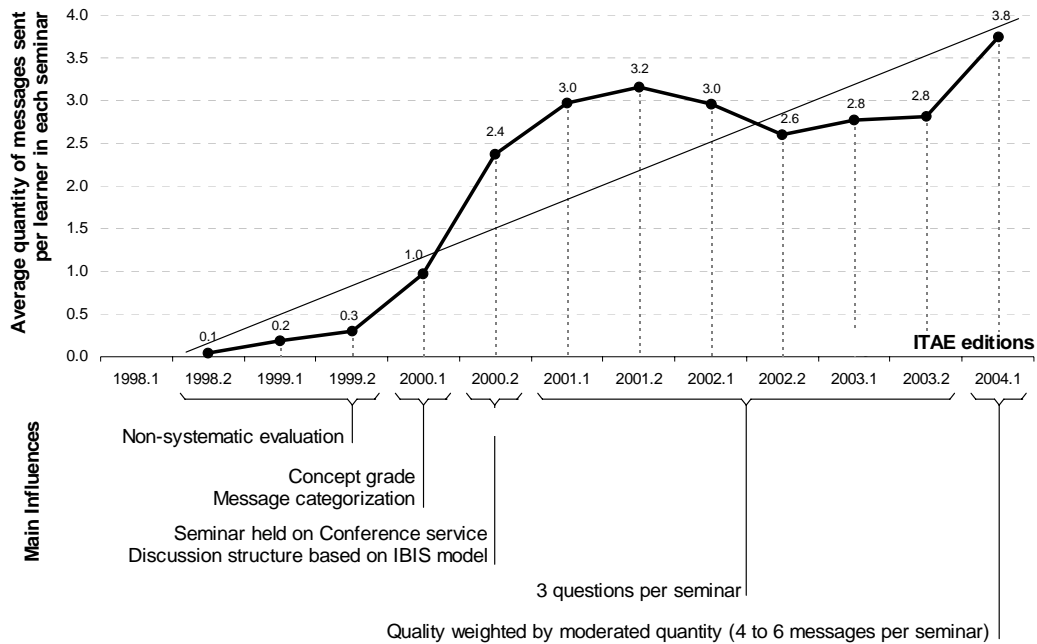

Figure 3. Average quantity of messages sent by learners per seminar

The 1998.1 ITAE edition was conducted in a 'face-to-face' classroom, and there is no data regarding learners' participation. Participation was sporadic in the 1998.2 to 1999.2 editions: on average, each learner sent only one message every four seminars. This fact mainly was a result of the lack of systematic assessment of participation. On the other hand, in the 2000.1 edition, seminar participation became more regular: on average, each learner sent one message per seminar. This regularity was due mainly to the messages being graded. In the following edition, 2000.2, the average quantity per learner increased, mainly as a result of the transfer of the seminars to the Conferences service (they previously had been conducted through the Discussion List service), where messages could be threaded. The discussion structure was based on the IBIS model (Gerosa, Fuks & Lucena, 2001). In the subsequent editions, from 2001.1 through 2003.2, the average increased mainly because it was defined that three questions would be discussed during each seminar. In the 2004.1 edition, it was established that each learner had to send between four to six messages per seminar (weighting quality by quantity), leading the learners to suppose that it was necessary and sufficient to send the lower limit of this target: they sent approximately four messages per seminar.

The main lesson learned from these experiments is that evaluating learners' messages, even simply by grading them, fosters participation and increases message quality. But it is not sufficient to simply grade the messages in order to properly provide learners with guidance. Commenting on the assessment is also necessary: it is desirable to follow a set of criteria to guide the assessment, but it is not feasible to present very detailed analyses about each criterion. Another important lesson is that multiplying quality by quantity of messages encourages submission of more messages without a concomitant decline in quality and makes the number of messages sent by learners more homogeneous.

3.2 Assessment of Debate Participation

In the ITAE course debates, a previously selected learner plays the role of moderator, being responsible for the coordination of the debate session. First the moderator returns to each question previously discussed in the seminar. Next each learner sends in a comment about the question. Then learners elect one of the comments for further discussion. After the discussion, participants summarize what was discussed and present their conclusions. After discussing the third question, mediators declare the end of the debate and subsequently evaluate the participation of the learners.

To evaluate a debate session, mediators score the messages that have been sent: 10 is given to a message whose content is related to the debate subject; 5 is given to a message whose content misses the debate subject; and 0 (zero) is given to a message that interrupts the debate dynamics (for example, messages that are sent after

the moderator requests "silence" or "attention," since they hinder debate coordination and disrespect moderator's authority). For a message to be given the top mark it only needs to be related to the subject being discussed and appropriate to the dynamics—for example, it does not take into account grammatical errors. The emphasis of the debate is on the exchange of messages, being established that each learner must send a minimum of 20 messages per debate (Minimum Quantity model).

As a result of the debates held during the running of the ITAE course, it has been identified that the use of chat makes it possible to constitute a space to explore new educational methods where there is an absence of expositive content, there is a high level of dialogue and the teacher no longer is considered to be a repository of knowledge and conveyor of the truth. It has been identified that informal conversation allows learners to be more aware of others and to be more aware of themselves as part of the group, offering space for showing their emotions, reducing this way the sensation of impersonality and isolation. The continuous and integrated use of chat tools in educational activities is a way of keeping learners motivated and engaged in order to ensure the success and continuity of the distance learning course. The assessment of participation is an appropriate instrument for equating chat activities with other course activities.

4. ASSESSMENT OF COMPETENCE

In AulaNet, a learner's competence is characterized by three dimensions: Qualification, Interest and Performance (Fuks, Mitchell, Gerosa & Lucena, 2003). Interest and Qualification are indicated by the learners themselves. Performance is calculated by the AulaNet environment according to the results obtained in the courses. For example, in each ITAE course seminar, the average grade of the learners' messages influences their performance in the subjects taken up in the seminar.

In order to visualize learners' competence, the AulaNet offers a Competence Report. The assessment of competences is still underway in the AulaNet. This study was initiated out of the necessity to form groups of learners based upon their interests, qualifications and performance with regard to course topics. The first solution investigated was for the AulaNet environment itself to assemble groups using software agents (Cunha, Fuks & Lucena, 2003). The automatic grouping was not satisfactory, generating groups of learners that the mediators considered inadequate. Then, the strategy of supplying reports as described in this paper to enable the mediators themselves to form the groups was adopted.

5. COLLABORATIVE ASSESSMENT

Collaborative learning requires collaborative assessment. When learners share assessment responsibility, there is an increase in assessment comprehension and utility (O'Sullivan, 2004; McConnell, 2002). For those being evaluated, multiple assessments of their work generate greater trust of the assessment results. With practice, learners who make the assessment come to better understand the process and objectives of the assessment procedure, enhance their critical senses and are more capable of appraising their own work.

5.1 Collaborative Assessment of the Seminar Messages

As of the 2000.1 edition, when the ITAE seminar messages were first graded, learners in almost all of the editions have suggested collaborative assessment of the seminar messages. The use of this assessment strategy is being planned. In each seminar, some learners will be selected to evaluate messages. Mediators will continue making their assessment; however, their grades and comments will only be published after the seminar is over so as not to influence the appraisal of the evaluator-learners. Concluding this assessment process, the author of the message conducts a self-assessment, taking into account all the grades and comments the message has received. The final grade of the message will be the average of all assessments. The Conference service must be modified in order to make this collaborative assessment of seminar messages method feasible. New mechanisms are already being developed to support collaborative assessment in the AulaNet environment and the method planned will be tested during the next editions of the course.

5.2 Collaborative Assessment of the Content Developed by Learner Groups

In the second stage of the ITAE course, learners develop new contents about the subjects studied and discussed during the course. This stage of the course begins with learners being organized into small groups (Section 4). Next, each group submits a prototype of the content. Learners themselves evaluate this prototype. Based upon the assessments, each group modifies the prototype. The final version then is evaluated by the mediators.

The collaborative assessment of the prototype is carried out through the Conferences service. For each prototype, a conference is created where learners analyze the prototype, based upon some criteria that have been established. Then, the developers must initiate a discussion of the problems identified in the prototype.

The adoption of this assessment strategy has shown that mediators and learners are not familiar with collaborative evaluation. Learners fear criticizing other learners' work and cheating such as "assess me well and I'll do the same for you" are prone to happen. Learners also react to other learners' criticism. Self-assessment, an essential part of collaborative assessment, has an additional obstacle in the sense that it is very difficult for one to be impartial about oneself. Future research must be conducted in ITAE course to investigate these problems.

6. CONCLUSION

The assessment strategies normally employed in traditional classrooms are not sufficient for the collaborative learning conducted in online education environments. In this article, there was a discussion of the assessment strategies that have been developed and tested in an online course: participation follow-up, competence management and collaborative assessment. While these strategies still need to be improved, and the AulaNet environment is being modified to provide more support for them, it can be concluded that these strategies have made it possible to more adequately evaluate the learners.

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