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▶ **To cite this version:**

Josianne Basque, Kim Dao, Julien Contamines. Participating Virtually to a Scientific Conference: A Collaborative E-Learning Scenario for Authentic Learning In Higher Education. Wold Conference on Educational Multimedia (ED-MEDIA) 2005, 2005, Montreal, Canada. pp.1953-1960. hal-00190660

HAL Id: hal-00190660

https://telearn.hal.science/hal-00190660

Submitted on 23 Nov 2007

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Basque, J., Dao, K., Contamines, J. (2005). *Participating Virtually in a Scientific Conference: A Collaborative E-Learning Scenario for Authentic Learning In Higher Education*. In P. Kommers & G. Richards, Proceedings of ED-MEDIA 2005, Montreal, June 27 to July 2, 2005 (pp. 1953-1960).
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Participating Virtually in a Scientific Conference: A Collaborative E-Learning Scenario for Authentic Learning in Higher Education

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This paper presents a collaborative e-learning scenario inspired by socio-constructivist and situated learning theories which encourage authentic learning. Developed for a graduate distance education course, this scenario requires students to participate virtually in an asynchronous scientific conference. This paper presents the learning scenario, the technological environment developed to implement this scenario, as well as the results of a preliminary investigation which examines students' perceptions and satisfaction towards the scenario and the environment.

Introduction

Over the last few years, online learning has become increasingly popular, not only for distance education universities, but for campus-based universities as well. At the same time, the education sector, at all levels, has been undergoing a shift of paradigm towards socioconstructivist and situated approaches to learning (Brown, Collins, & Duguid, 1989; Hung & Nichani, 2001; Jonnaert, 2002; Jonnaert & Vander Borght, 1999; Lafortune & Deaudelin, 2001; Kirshner & Whitson, 1997; Lave & Wenger, 1991; Orey & Nelson, 1997; Wilson & Madsen Myers, 1999).

Instructional designers are looking for ways to implement socioconstructivist and situated learning principles in the design of online courses. Computer-supported collaborative learning (CSCL) is one main approach used (Dillenbourg, 1999; Henri & Lundgren-Cayrol, 2001; Roberts, 2004). Authentic learning is another mainstream approach suggested by many authors. For example, Duffy & Jonassen (1991) propose that students should use tools to perform activities which are similar to those found in their future professional fields. Savery & Duffy (1995) highlight the importance of creating situations which let the students practice the competencies required by the professional environments in which they will eventually be working. For Reeves, Herrington, & Oliver (2002), authentic learning has ten main characteristics: (1) activities matching real-world tasks, (2) ill-defined activities, (3) complex tasks engaging students over a sustained period of time, (4) opportunity to examine the task from different perspectives, using a variety of resources, (5) opportunity to collaborate, (6) opportunity to reflect, (7) interdisciplinary perspectives enabling students to play diverse roles, (8) activities integrated with assessment, (9) creation of polished products and (10) allowance for competing solutions and diversity of outcomes.

In this paper, we present a collaborative and authentic e-learning scenario designed for graduate students. This scenario invites them to participate in an asynchronous virtual scientific conference (VSC[1]). A scientific conference is an event that these future high level researchers and professionals are likely to attend during and after their graduate studies. This scenario is thus compatible with the Legitimate Peripheral Participation Theory proposed by Lave & Wenger (1991), who assumes that "the mastery of knowledge and skill require newcomers to move toward full participation in the sociocultural practices of a community" (p. 29).

To our knowledge, few collaborative online activities reported in the literature use the scientific conference analogy to structure the interactions amongst students. Fjuk & Sorensen (1997) describe what they call "Pedagogical On-line Seminars", which essentially consist in virtual forums moderated by a professor or an expert in a given domain. Clemson (2002) reports an online course which includes a "virtual poster session", which is a typical activity of a scientific conference; however, it is conducted in a synchronous mode and implies essentially the sharing of files and chat discussions. In our scenario, all the learners' interactions occur in an asynchronous mode and it includes three main events: a virtual poster session, a symposium and a plenary session.

This paper describes first the instructional scenario of the VSC and the technological environment developed to implement this scenario within the context of an online course. Then, the results of a preliminary study assessing the students' perceptions and their level of satisfaction regarding both the scenario and the environment of the virtual conference are presented.

The Learning Scenario

The VSC learning scenario was designed and tested in a graduate course, which is offered entirely at a distance at the Tele-universite of Quebec, a French-Canadian distance education university. Up to now, 68 students from five different cohorts have successfully completed this 135-hour course entitled *Information Technology and Cognitive Development*.

The entire course is structured around the metaphor of a scientific conference. The "Conference program" includes four (learning) activities (see Figure 1): *Preparing for the conference*; *Participating in a poster session*; *Attending a symposium*; and *Participating in the plenary session*.

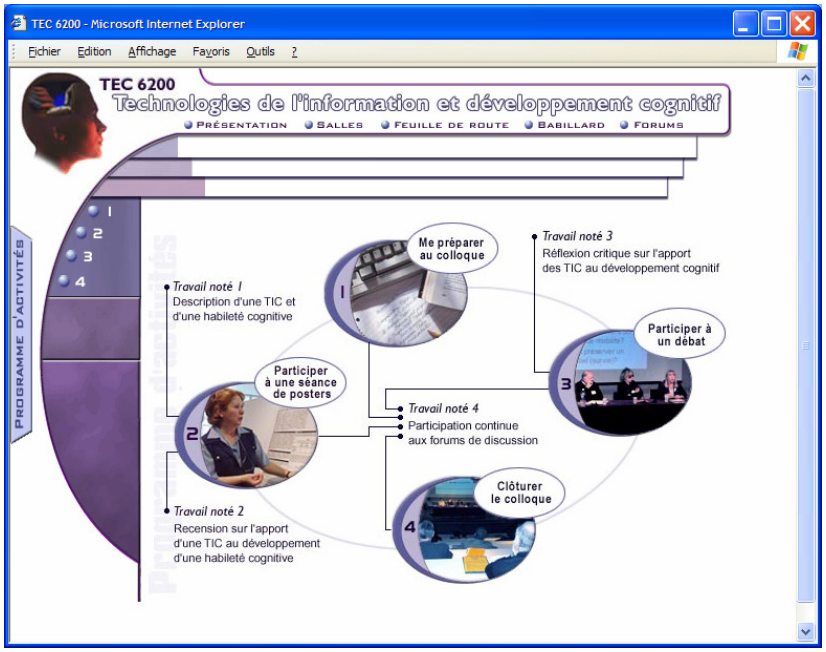


Figure 1. The Conference Program

[1] In French, the acronym CSV stands for *Colloque scientifique virtuel*.

In the first activity, students get acquainted with the conference environment and program and complete the conference "registration" process by presenting themselves to other participants. They also use a questionnaire to activate their prior knowledge related to the topic of the conference and continue to build on this knowledge by reading some introductory documents on the subject. Finally, with other participants, they use the forum tool to discuss how those first readings have already changed their prior knowledge in the domain.

During the second activity, students participate in a virtual poster session where they produce a poster (with PowerPoint) which summarizes the results of two published research papers related to the conference topic. Students can find the papers on their own or they may select them from a list provided in the VSC environment. Each student must then write a comment or formulate a question regarding one of the posters. Finally, the poster's author must reply to these comments and questions.

In the third activity, students participate in a virtual symposium about the effects of ICT on learning and cognitive development. The papers presented at this symposium are, in fact, a collection of published papers reporting different points of view from experts in the field. Thus, students "attend" this symposium and write a text in which they critique or defend one of the issues presented. Each participant must then comment on one participant's text, who, in turn, replies to the comments he or she receives.

In the fourth and final activity, learners participate in a plenary session that takes place within one of the forums of the course. The goal of this activity is to reflect upon and discuss the conclusions they have gathered and the knowledge they have acquired as a result of the interactions which occurred within the forums, during the poster session and finally, during the symposium.

All of the work produced throughout the conference (posters, debates, discussions in the forums, comments and replies) is used for summative assessment of learning. Throughout the course, students are assisted by a tutor whose main tasks consist of moderating the forums, responding to questions submitted by email or posted in the forums and evaluating students' productions.

The Virtual Environment of the Scientific Conference

Unlike certain collaborative learning platforms (Faerber, 2001), the VSC environment is not structured according to a spatial metaphor. It could be described as a functional metaphor, which, according to some authors, is sufficient to induce a sense of immersion (Daele *et al.*, 2000; Jensen & Heilesen, 2004). Harrison & Dourish (1996) argue that the critical property of computer-supported collaborative work system "is not rooted in the properties of space at all. Instead, it is rooted in sets of mutually-held, and mutually available, cultural understandings about behaviour and action. In contrast to 'space', we call this a sense of 'place'. Our principle is: 'Space is the opportunity; place is the understood reality'." (p. 67). The two virtual zones created, although called the Poster Session Room (*Salle des posters*) and the Symposium Room (*Salle des conferences*), have interfaces that are free of icons which would represent actual, physical rooms. Indeed, these two "rooms" are displayed as electronic tables which include various posting spaces.

Basically, both rooms are organized similarly and they offer the same functionalities. The Poster Session Room is illustrated on Figure 2. Both rooms allow users to post and display their papers and posters, and they also allow users to discuss these documents. Users select an interface button to indicate the action they wish to perform; for example, they can post a file, view a posted document, ask a question or make a comment, reply. In order to ensure that all participants have the opportunity to receive and respond to a question or comment, a "first come, first serve" principle was implemented in the system. The buttons displayed in these interfaces are dynamic, meaning that they appear gradually, according to how the interactions unfold. This permits us to control the actions that each participant can do at one point in the scenario. For example, as long as a posting area remains empty, a single button appears to all participants: the "Speak" button (*Intervenir*). Once a participant has manifested his intention to "speak" in one of the posting spaces in a room, his name appears in the "Contributors" column (*Intervenants*) and the "Posting'' button (*Déposer*) appears in the column "Possible actions" of this specific participant only. Later, once the "contributor" participant has posted his or her work, the ''View'' button (*Voir*) appears automatically in the same column, inviting all participants to view the contributor's posting. When a participant posts a comment or question concerning the poster, his or her name appears in the "Authors of questions'' column. Finally, when the contributor responds, a check mark appears in the ''Answered Question'' column. By selecting the ''View'' button, a single window then appears where all participants can view (1) the contributor's poster or symposium paper, (2) the comment or question formulated by another participant, and (3) the contributor's reply.

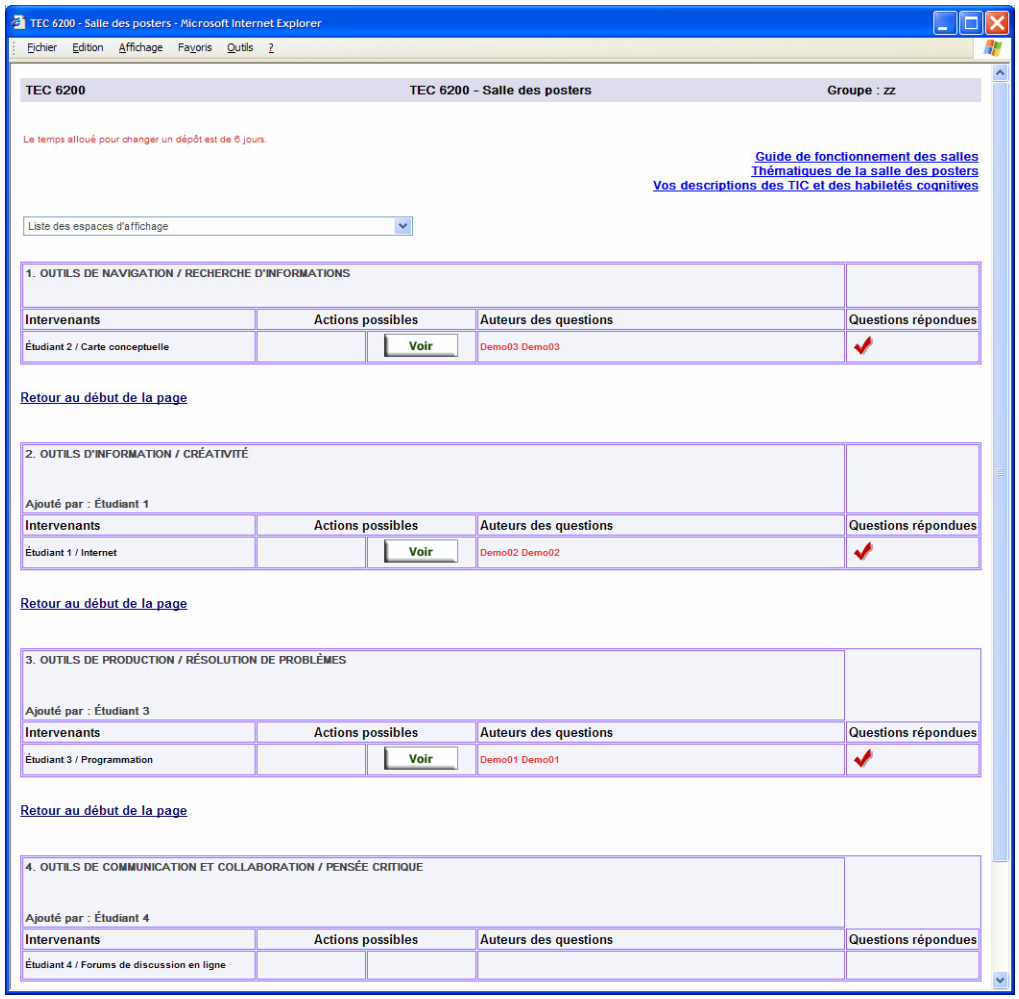


Figure 2. The Poster Session Room

Once a participant posts a file, it can be modified within a certain period fixed by the professor (in this case, six days). When this delay has expired, the system prevents users from performing any type of modification. This feature ensures that students who prepare a response to another's work do not encounter a different document at the moment they are about to post their response.

Data Collection

In order to assess students' satisfaction and perceptions towards the learning scenario and the VSC environment, two sources of data were used:

1. *Questionnaire*. At the end of the course, students are asked to volunteer their opinions by filling out a questionnaire anonymously. This questionnaire is designed to assess the course in general and its overall structure. It also includes a section which specifically addresses the VSC (15 questions). Up to now, 22 students have filled out and returned this questionnaire.
2. *Spontaneous comments regarding the VSC*, posted by students in the forums.

Results from a descriptive preliminary analysis are presented below.

Preliminary Results

A preliminary analysis of the data collected provides a portrait of the students' perceptions regarding (1) the similarities between the VSC and other types of conferences, (2) the technological aspects of the VSC, and (3) the effect the VSC had, if any, on their motivation and learning.

Perceived Similarities between the VSC and Other Types of Conferences

More than a half of the 22 learners who filled out the questionnaire indicated they had previously attended a ''live'' scientific conference (N=13). Eight respondents said they had previously attended *synchronous* virtual conferences, and 9 that they had participated in another asynchronous virtual conference aside from this one. These last results are startling as the virtual conference analogy is not widely used in e-learning. We hypothesize that students who offered an affirmative answer associated this strategy to various online collaborative activities, such as discussions in forums or chat, for example.

Thirteen respondents feel that the dynamic of the discussions within the VSC is ''very" or "moderately" similar to those occurring at live conferences (see Table 1). As one participant indicated, ''*It's not exactly the same as attending a live conference; however, discussions through the question and answer approach provide a close replica of these events.*'' Ten respondents indicated that they encountered the same dynamics at the VSC as those typically found in synchronous virtual conferences.

Statements	Very	Moderately	A little	Not at all	Don't know	TOTAL
The VSC reproduces the dynamic of the discussions in live conferences.	7	6	4	1	3	21
The VSC reproduces the dynamic of the discussions in synchronous virtual conferences.	6	4	3	0	6	19

Table 1. Results for the dimension "Perceived Similarities between the VSC and other types of conferences"

In their comments, respondents mentioned certain advantages of the VSC compared to live conferences. For example, they noted that the information is available at all times, that participants can attend according to their own schedule, and that users can research a topic before getting involved in a discussion. ''*In a live conference, it is difficult to gather all of the information. However, the asynchronous conference offers the possibility of consulting reference work and relevant documents''*, indicates a student. Others add that ''*The conference formula allowed me to attend the conference at my own pace''* and that ''*This approach provides us with the opportunity to research certain topics before responding."* However, some learners mentioned that the limits imposed on the number of comments that could be made on each production in the VSC differ significantly from the reality of live conferences. Another person noted that participants must ''get into the game". In fact, the suspension of disbelief seems to be an essential condition to engage in authentic online learning environments (Herrington *et al*., 2003) and virtual worlds (Hand, 1994).

The asynchronous conference paradigm becomes problematic for students who require a course extension (for personal, professional or health reasons, for example). Thus, students who complete the course beyond the regular 15-week course time frame are alienated from the group, its activities, and can no longer participate in the discussions related to the documents (posters and papers), thereby missing out on the emulation that ensues from the VSC scenario.

Evaluating the Technological Aspect of the VSC

Users had mixed reactions as to whether the rooms were user-friendly (see Table 2). To the statement '"the organization and operation of the Poster Session Room are user-friendly'', thirteen learners indicate that they ''agree'' or that they ''strongly agree'', although many indicated they had difficulty understanding how to use the Poster Session Room, which was the first one used in this course. Seven students indicated that they had technical problems using the VSC rooms. Two said they had difficulty posting their work. Another one claims that the

documents posted suddenly disappeared. Some learners dislike being prevented from modifying their files after it has been in a room for a certain period of time.

Statements	Strongly agree	Agree	Disagree	Strongly disagree	TOTAL
The organization and operation of the Poster Session Room are user-friendly.	7	6	5	2	20
I had no technical problems in the VSC rooms.	6	6	6	1	19

Table 2. Results for the dimension "Technological aspects of the VSC"

Many of these issues were brought up during the first semester the course was offered, which resulted in a number of modifications to the operation and aspect of the rooms. Furthermore, a concise user's guide to help learners navigate within the rooms was created and the tutor provides, if needed, some technical support to the participants, especially during the first activity held in the Poster Session Room.

The Impact of VSC on Motivation and Learning

In general, students have a positive attitude towards the VSC, which is considered a motivating and stimulating tool (see Table 3). Almost all respondents (N=20) feel that the conference analogy is stimulating, and all (N=21) agree that posting their work and viewing others' work is a stimulating factor that favors learning. Most of them (N=17) feel that the peer discussions are very motivating, if not essential: ''*In my case, it favored motivation, overachievement, collaboration and sharing expertise''*; ''*Fantastic idea! We must act as experts, return to our assignments and reading, take a stand in front of the rest of the group…*'' One indicated that one advantage of the CSV is that it ''*allows learners to compare their knowledge with that of their peers''*. However, two respondents would have would have liked to see asynchronous activities supplemented with synchronous discussions

All respondents enjoyed the virtual poster session (N=21) and most of them the symposium (N=19). Furthermore, the majority (N=19) indicated that they would recommend the use of a VSC in other e-learning courses.

As to how students perceive the learning contribution of the VSC, all respondents confirm that they have learnt from participating in the VSC, whether from the virtual poster session (N=21) or during the symposium (N=18). ''*A wonderful synthesis!*'', claims one of the respondents. When asked whether they have learnt from the course overall, all respondents indicate they have expanded their knowledge "a lot" (N=19) or "moderately" (N=2). Furthermore, the estimated mean percentage of reaching their own learning goals is 92% (SD = 2,11).. Finally, 82% of the respondents would recommend the course to other students (N=18).

Statements	Strongly agree	Agree	Disagree	Strongly disagree	TOTAL
The scientific conference metaphor is stimulating for learning.	10	10	1	0	21
Having my productions accessible to others and having the possibility to view others' productions is stimulating for learning.	17	4	0	0	21
The interactions with other students in the VSC (Formulate/Answer a question) are stimulating for learning.	11	6	2	1	20
I enjoyed the Poster Session activity.	18	3	0	0	21
I enjoyed the Symposium activity.	13	6	1	0	20
I would recommend the use of VSC metaphor in other distance courses.	11	8	2	0	21
I have learned from the Poster Session activity.	18	3	0	0	21
I have learned from the Symposium activity.	14	4	1	1	20

Table 3. Results for the dimension "Impact of the VSC on motivation and learning"

Conclusion

For learners enrolled in graduate studies, the VSC scenario integrates many characteristics of authentic learning (Basque, Dao & Contamines, 2005). It is an "*ideal formula to favor discussions in a distance learning course"*, as one student commented. Compared to other types of conferences, it is even seen as an advantageous avenue and it is considered a stimulating and motivating learning tool. Thus it seems that most learners were satisfied with this experience and that they met their own learning objectives. However, we should be cautious with this conclusion, as our sample size was small.

Based upon the results of this preliminary study, a list of recommendations and improvements has been compiled to enhance the VSC:

- Investigate the ergonomics of the room's interface;
- Reconsider the necessity of setting a time limit in order to prevent users from modifying a posted file while considering the discussion process;
- Review the scenario to allow for multiple comments on a single production;
- Prepare a more detailed description of the role of the tutor in the VSC and develop room management tools for him or her;
- Investigate possible adaptations of the VSC in other learning contexts.

Work on two of those issues has already begun. First, we elaborated the tutor‘s guide. This manual includes a description of the various tasks tutors must perform to ensure that the conference runs smoothly, tips to help students during the conference, help tools to assist individual students and the entire group, as well as various instructions to deal with difficult or delicate situations. Second, the VSC was recently integrated in another course, at the undergraduate level. In one of the learning activities, students from different countries have to elaborate a case study on biodiversity: each of them present the plan of their case study in the form of a poster in the Poster Session Room and post their paper (reporting the case study) in the Symposium Room. In this case, students are the main "speakers" in the symposium, as opposed to the initial design of this activity in the VSC. Moreover, each participant must comment at least two papers or others comments in each of the two rooms of the VSC, instead of only one in the initial application of the VSC.

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