A Collaborative Learning Environment for Educational Technology Centers

1. Introduction

The Brazilian Program of Informatics in Education (ProInfo) is an effort of the Brazilian Government to equip 6,000 schools with 100,000 PCs, reaching 7.5M students and 25,000 teachers. To support the schools and train the teachers, the program also includes 200 Educational Technology Centers (NTEs).

This abstract describes an environment for collaborative learning proposed for the schools and NTEs, which was field-tested in the NTE/01-RJ with 10-15 teachers. The environment was designed to meet the ProInfo ultimate goals, which are the qualification of the teachers in computer-based educational technology and the gradual integration of this new technology into the educational system, stimulating the initiative and creativity of the students and teachers.

The environment is based on Lotus LearningSpace, a courseware authoring tool that emphasizes collaborative learning. The tool runs as an application of Lotus Domino, a hypermedia document management system that facilitates the development of Internet applications.

In the context of an NTE, the environment plays a dual role. First, the NTE team can use LearningSpace to create courseware that will help train the teachers and the school's staff in computer technology, following a more or less traditional strategy. Second, and more importantly, the NTE team can train the teachers in LearningSpace and guide them through the process of creating pilot courseware from their own material. Therefore, this extended team will gradually bootstrap courseware in Portuguese that suits the needs of the schools covered by the ProInfo Program.

From the school's point of view, among other benefits, the environment can be used to offer remedial classes in alternative schedules that best suit the students' pace and cognitive styles, as well as to promote greater student engagement through the creation of more attractive courses.

The rest of this abstract summarizes the major components of the environment and describes the experiment conducted at the NTE/01-RJ to validate the environment.

2. The Collaborative Learning Environment

2.1 Definition of the Environment

The environment is based on Lotus Domino and on Lotus LearningSpace.

The Lotus Domino is a comprehensive server offering several Internet services. In the context of the proposed environment, the Domino Server will act as a courseware repository and mail server.

LearningSpace is a courseware authoring tool that emphasizes student-centered collaborative learning. A course in LearningSpace consists of five modules, implemented as Notes databases and called: Schedule, MediaCenter, CourseRoom, Profiles and Assessment. Students have access to the first four modules and instructors to all of them. LearningSpace also has a central module to help manage courses.
Briefly, the course modules have the following functionality:

- **Schedule** contains the lessons plan of the course. It defines student tasks – reading lessons, exercises, collaborative work, etc. – and the pacing (or scheduling) of the tasks.
- **MediaCenter** holds the reference material for the course, including pointers to material from other sources, such as the Internet.
- **CourseRoom** is a virtual environment where students discuss on-going work among themselves or with the instructor.
- **Profiles** contains students’ and instructors’ home pages.
- **Assessment** is a tool that helps instructors create and grade assessments is various formats. A student starts an assessment from the Schedule and can receive feedback via e-mail, for example.

The environment will be the same for the NTEs and the schools.

Recall that each NTE and each school that participates in the ProInfo Project has a LAN with a server running Windows NT and a number of PC workstations running Windows 95 or 98. To create the proposed environment (see Figure 1), it suffices to install Lotus Domino and Lotus LearningSpace on the server and either the Lotus Notes Desktop client or a Web browser in each PC. To simplify the installation and administration process, the Lotus Domino Server is pre-loaded with a number of pre-defined id’s with the profile of a manager, author, instructor or student. Therefore, the administration of the environment will be limited to distributing the pre-defined id’s to the participants.

The adoption of a single environment for NTEs and the schools has significant advantages. Besides simplifying the technical support NTEs will give to the schools, it permits the NTEs staff to adopt a strategy where the teachers recruited for training will gradually bootstrap courseware in Portuguese that suits the needs of the schools covered by the ProInfo Program, as already mentioned.

Finally, the environment was designed to simplify the use of the Internet as a pedagogical instrument, giving the limitations of the telecommunications infrastructure in Brazil. Both the NTEs and the schools may operate off-line, connecting to the Internet only occasionally through a dial-up line. Even if an NTE is connected through a leased line, the environment will help reduce traffic. Briefly, in each NTE or school, the Domino server will locally store the LearningSpace courseware as well as the local messages sent to remote users. When connect to the Internet, the Domino server, using a built-in replication mechanism, will automatically update the courseware, if necessary, and transfer e-mail to remote users.
2.2 Use of the Environment

In the context of an NTE, the environment will be used to train teachers in computer technology and in the craft of courseware authoring.

In what follows, by an author, we understand a member of the NTE staff or a teacher recruited for training, or a team of such persons. In a naïve way, the courseware authoring process in LearningSpace can be divided into three major phases:

- collecting the instructional material, defining the lessons plan and preparing the course script (or storyboard);
- input the raw into the computer, probably in separated files containing text, figures, etc...
- coding the course in LearningSpace by:
  - copying reference material to the MediaCenter;
  - mapping the lessons plan into the Schedule and creating the appropriated references between Schedule and MediaCenter entries;
  - using Assessment to define assessments and mapping them into Schedule entries.

In the context of a school, the environment can be used to replace or supplement regular classes, to offer remedial classes and to implement collaborative learning experiments. Each school will have to define teachers in the role of LearningSpace instructors to organize students in groups, define specific activities, mediate discussions and grade exercises, using the facilities offered by the Schedule, CourseRoom and Assessment modules.

Each student will use the environment as follows. He or she will enter a course in LearningSpace through the Schedule module. Probably one of the first entries of the Schedule will contain an instruction to the student update his or her profile in the Profiles module. The student will navigate back to the Schedule and open the next task, say, a reading assignment that sends him or her to the MediaCenter. The MediaCenter entry may direct him to the Internet to obtain additional information or indicate that he or she should participate in a
CourseRoom discussion on the theme. Going back to the Schedule, he or she will observe that the next task is a quiz. The student will then take the quiz and submit it for grading by e-mail. The instructor will then return the graded quiz to the student.

3. Testing the Environment

The environment was field-tested during November and December of 1998 at the NTE/01-RJ with 10-15 teachers from several schools in the City of Rio de Janeiro, Brazil. This early experiment focused on authoring a prototype courseware in LearningSpace using the teachers' own material.

The first phase of the experiment was to assign an experienced person to train the NTE staff, first, in the basics of Notes and, then, in LearningSpace. As always, the continuous guidance of an experienced person greatly contributed to the successful development of the experiment. The next phase was to familiarize the teachers with the use of PCs and basic software and to discuss the pedagogy of collaborative learning. The final phase was to choose an interdisciplinary theme and to create a prototype courseware in LearningSpace following the steps described in Section 2.2.

The teachers selected a rich theme - Globalization - and covered topics such as the impact of China on the Brazilian market and the monopoly of the transnational corporations. The engagement and the enthusiasm of the teachers visibly grew as the prototype courseware began to show up on the screen and was enriched with additional multimedia material. Not surprisingly, the group at first felt it difficult to change from a traditional approach to courseware development to one that emphasized collaborative learning. This change was harder to carry through than mastering the details of the tool itself. However, once this first barrier was broken, the teachers' reaction was very positive towards the concept of collaborative learning and towards authoring tools that support this pedagogy.

4. Concluding Remarks

We firmly believe that the proposed environment will contribute to the success of the ProInfo Project and will promote the development of courseware in Portuguese based on collaborative learning. We expect to expand this experiment to a full blown project in the state of Rio de Janeiro, covering a significant number of schools that benefited from the ProInfo Project, with the following objectives: (1) production of 6 courses per year; (2) training all teachers that lecture in the schools covered; (3) offering LearningSpace classes to all students in the schools covered.

Authors’ Short Biography

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