Electronic Environment for Management of Learning Systems

L.A. Plugge., S. Schoenmakers, and P.A. Kirschner
Maastricht McLuhan Institute, Netherlands

This article summarizes an in-depth review* of electronic tools that enable flexibility and support of collaborative teaching and learning environments. The review was commissioned by UNESCO and conducted by the Maastricht McLuhan Institute. The authors looked into 50 different electronic environments, reviewed nine of them and short-listed four environments that they considered well equipped to serve learning and teaching , particularly in developing countries and are susceptible for efficient use in a multi-lingual, multi-country, and multi-media network context. Below are descriptions of these four electronic environments.: Blackboard, IntraLearn, TopClass, and WebCT.

BLACKBOARD http://www.blackboard.com

Blackboard is a widely used teaching environment. It supports all Roman-based languages. The product line consists of a free public edition (Blackboard.com), a registered edition (CourseInfo) with additional administrative features, and the Blackboard Enterprise edition. The free and registered editions all run on the Blackboard Company servers. Blackboard Enterprise edition is available for use on private servers for campus or countrywide deployment. This heavy-duty edition also provides large scale monitoring and data reporting. Technically this system is suitable for a multi-country context.

Blackboard Enterprise Edition provides management and organization for different kinds of enrolment, such as the use of existing databases and subscription by students, as well as different kinds of reports and statistics. Course materials can be re-used and multiple forums can use the same course.

The environment provides freedom of choice for educational process management, such as an extended classroom and distance education, but also didactical forms like tutorials, interactive simulations, virtual classroom and collaborative work groups. A calendar and announcements section informs students about the things to do. A presentation area gives access to other members of the learning community.

Database reports provide possibilities for tracking of students. Course designers and teachers can easily edit and update course materials, supported by 5-step templates. Blackboard supports popular file formats and plug-ins, such as video and interactive simulations. It has built-in communication means that provide threaded discussions, synchronous communication, online file exchange, online tutorials, sharing of documents and archival of student discussions.

Student testing is connected to courses and offers many options, such as item banking, importing of items, use of multimedia, mix of question types, randomization, password protection, timing, auto marking, instant performance feedback, and the ability to add off-line grades. Blackboard provides no tutorial differentiation based on test answers. It is the teacher's task to take care of this. Wizards provide support for the organization and analysis of tests, as well as student progress. Students can review their attendance, graded assignments of projects and exams, and can determine which items within their profiles they want to show to the public.

Blackboard Enterprise Edition is hosted on a Windows NT or Unix server. Students only need a web browser and an occasional plug-in. On-line help is available. Support for the institution is available through the World Wide Web, E-mail, and telephone. Additionally, there are courses on various aspects of working with Blackboard. The administrator controls the security permissions for various roles and applications. Students can work off-line, if needed with use of CD-ROM, and upload directories.

Although the program offers many choices, the interface is rather rigid. Administrators and teachers can switch applications and keys on and off, but they cannot add new ones or alter the structure of the interface. However, the above-mentioned features of Blackboard make it a strong contender as a teaching environment for large-scale and heavy use in multi-country context such as Sub-Saharan Africa.

INTRALEARN http://www.intralearn.com

IntraLearn is a Microsoft online learning partner and makes use of several Microsoft programs such as Office and Netmeeting. Approximately 100 large organizations use the

system. The costs are relatively high. IntraLearn is available in multi-lingual versions and contains a conversion engine to replace the English version with other languages. IntraLearn pays particular attention to the disabled learner by offering the option to translate screens into sound for the visually impaired.

The administrator can manage the enrolments, including the import of learner profiles, entering one student at a time or bulk import from databases. Students can also self-register. The administrator can also control the look and feel of the environment. The toolbar and utilities pages are customizable. The administrator can delegate tasks to a course administrator who can switch on or off features in a course, such as chat, FAQs, web links, and glossary.

The curriculum structure is pre-built. Templates for instructional design guide a course designer through the creation and editing of lesson plans, assignments, learning activities, quizzes, and learning objectives. It is possible to create an educational hierarchy (course, lesson, topic, nuggets-chunks) and integrate it with other applications.

The program supports many facilities for cooperation between instructors and experts and for teambuilding and collaboration between students. The instructor assigns course materials to individuals or groups. In the course room, students accumulate knowledge that they can exchange with others. IntraLearn supports file exchange and file sharing in all areas of communication: discussion groups, teams, integrated e-mail, streaming audio, video and images. Students work mainly in Office applications. Outlook provides a calendar and scheduling. IntraLearn provides chatting on lesson level, but also campus wide, in clubs, private meeting, and team rooms. Students can create personal and group websites.

The student testing facility is well developed with tools for question creation or upload, timing facilities, one question at a time, completion and results recovery, different questions to different students, possibility to retake tests, and assign point values to questions. Questions are linked to the topics from which they were derived. Multi-layer security enables secure testing over the Internet. It is possible to shut off the browser during the exam to protect the integrity of the test. Courses and tests are protected from downloading. The student can print a customized certificate upon qualified course completion. Grade and process status, usage reports, comparisons, statistical analysis and statistical presentation of results are built in. Customized feedback by the teacher is possible as well as auto marking. Additionally, IntraLearn makes it possible to redirect the tutorial path depending on the answers given. It is also possible to create non-graded survey questions (course evaluation) and to add offline grades. Instructors can determine if a student achieved the competency goals by comparing objectives with the results. Students can manage their profile in a portfolio.

IntraLearn runs on a Windows NT or Unix server, and by hooking up several servers, a statewide system is possible. An automatic backup of the server database is provided with SQL Server. IntraLearn's security is of e-commerce level. The client installation runs automatically via a browser interface and a server based product. Hosting, maintenance, and other optional services by IntraLearn are possible. Students use a web browser for uploading to the server and viewing records. All data and programs are contained and managed from a single server database, so the client machine needs only limited memory requirements. All classroom functions are accessible within the familiar environments of Office and Outlook. The entry costs are $25,000 for unlimited users, courses, years of use, etc. and $1500 per year for technical support and upgrades. This is higher than the costs of other environments for learning and teaching.

IntraLearn fits the criteria for a multi-lingual, multi-country learning environment. It has many unique facilities for modern education. The system works with applications that are also popular outside school. A week point with IntraLearn is perhaps the tracking of student progress through a course. Another problem could be the required computer specifications due to the MS Office applications. Nevertheless, IntraLearn is a serious contender that justifies further investigation.

TopClass http://www.wbtsystems.com

TopClass is predominantly used in industry, universities, and in vocational training in 50 countries. The program makes intensive use of icons, and language strings are customizable, including for various courses. The program is designed to manage courses, but curriculum management is not supported. An administrator manages the privileges of instructors and students. Differentiation of these privileges is possible. Some instructors have the right to create and edit the courses, while others have only tutor rights. This difference is also used for item and test construction.

TopClass automatically updates revisions or additions, and modules can be moved from course to course. The courses are created with the help of a hierarchical outlining tool. Instructors can create courses in TopClass off-line. In addition, a number of 'canned' courses are available through several (US) publishers, and development services are available.

Information is distributed through announcements and e-mail, and threaded, moderated discussions are possible. For the student, the messages in discussions have a status (new, read, old but unread). Synchronicity is not integrated but possible to link in with third party tools (application sharing, chat, video and whiteboard, etc.). Tracking of students is

also provided for use of this third party software that students attach.

During a course, the students are grouped in classes for teamwork and motivation. The instructor controls the student's access to content. The program monitors student performance, and provides remedial material or progress to a higher level. Students can preview the work assigned to them and the deadlines in all courses. The program supplies wizards for test creation and assessment management. The pool concept provides random generation of test questions and control on reusability in multiple tests. It is possible to grade tests automatically or route them to the appropriate instructor for correction. Summary reports are available on a class and on individual student level.

TopClass runs on a Windows NT, Unix or Macintosh school server. A browser interfaces the installation and access. The server provides Campus wide security. Personal technical support for the administrator is provided and other users can attend an optional training workshop or just have 'how to' pages. TopClass Lite is freely downloadable. A single-server license for an unlimited number of users costs $1450 and is upscalable to a campus wide licensing agreement. Students can download courses to the desktop, work off-line and make private annotations of course material.

Although TopClass is not applied in secondary education yet and it is limited to courses instead of curricula, it seems like a solid solution for large-scale implementation.

WEB CT http://www.webct.com

Web CT provides organizations the ability to create local applications. Since organizations in 55 countries use Web CT, it is no surprise that it provides multi-language support.

Templates help the instructor to create standard pages for course outlines, assignments, and reading lists. These pages have custom tags and are not exportable to standard HTML. However, the administrator can edit the look and feel of the environment. The educational form of the environment is project oriented. It contains conferencing facilities, a presentation area, mail facilities and threaded, searchable discussions, related to a particular subject. Students can select topics from the study guide and make private annotations. To return to the most recent learning context there is a 'Resume session' tool.

Tracking student progress is the strongest feature of the management and organizational facilities. Additionally, instructors can assign course material to an individual or to a group of students. However, there can be only one (virtual) instructor in a course. A number of courses are delivered by textbook publishers and on cartridges. The course designer authorizes the participation of tutors and students.

The student testing facility enables test submission, different questions for different students, one-question-at-a-time testing, mixture of question types, assigning points to questions, submission of self-tests to the instructor, and redirection of the tutorial path depending on the answers given. Organizations can tune the test to their education and end terms. It is possible to export the grade book for analysis. Students can review their grades and compare them with the performance of other group members. Students have a newsgroup facility and scheduling tools for the course.

The environment runs on a private NT or Unix server, but it is also possible to let Web CT serve as a host. The system supports local backup and transfer from the desktop by the teacher. Web CT has several means for technical support, such as a tutorial for start-up users, a manual, context sensitive help, and a mailing list for administrators and designers. It is also possible to arrange additional technical support. Licensing is organized by yearly subscription, covering support and upgrades.

Web CT is particularly useful in two situations: (1) in cooperation with educational publishers, and (2) for very specific local applications. Functionality is too limited for implementation as a teaching environment in a multi-country context, such as in Sub-Saharan Africa.

Conclusion: The authors of the report observe that choosing an environment for flexible education requires attention. Each of the environments above presents small differences in focus. While Blackboard focuses on enhancing education in a regular educational environment, IntraLearn is engaged in education from any location, TopClass aims at the business community and is more course-centered, and WebCT is more student-centered. If the choice is to have an environment independent of regular education and its location, then TopClass and IntraLearn are the choice. If the users wish to focus on automated tracking, assessment, and certification, then IntraLearn has the advantage. When the users intend to implement student-centered learning, then WebCT is a better choice. One problem with those environments is that they are designed with U.S. educational facilities in mind, and this must be taken into account when adapting the environments to the conditions of different countries.

[*] Plugge, L.A., Schoenmakers, S., & Kirschner, P.A. (June 2000). *Electronic Learning Environments. Final Report, Concept VS 0.A.* Prepared for UNESCO by the Maastricht McLuhan Institute.