Constructing an e-learning program

Stuart Walker and Norihito Kawana

walker@ed.siu.ac.jp

Sapporo International University

Recently, many educators have been discussing and establishing e-learning programs at their schools. E-learning is much different from traditional classroom learning because of the hardware and software requirements, an online syllabus, and the need for a rental server and a powerful computer to hold the e-learning activities. The e-learning program administrator also needs to have a basic working knowledge of homepage design.

We explain how we use a classroom management system (CMS) called *Moodle* to format the e-learning program at our university. We describe the components of *Moodle* and show its advantages over other available CMS software. We show how our program is flexible, efficient and cost-effective. Finally we evaluate e-learning as an innovative way to motivate students.

独自 e ラーニング・システム構築に関する一考察：
経済性・効果・安定性へのチャレンジ

e ラーニングは伝統的な教育システムでは不可能だった部分を補う教育ツールとして最近注目されている。しかし、e ラーニングの環境を整え、実際に教育現場に導入するためには、まだ高いハードルを越えなければならない。e ラーニングに必要なハードウエア・ソフトウエアの購入、教育で使うコンテンツの確保、そして安定した e ラーニング環境の整備が必要である。また、e ラーニングシステム全体を管理する人材も必要である。本研究ではハードウエア・ソフトウエアの選定からはじまり、コンテンツ制作やサーバー管理まで独自にやることで e ラーニングシステムの自己管理の可能性とその利点を探った。特に e ラーニングで重要な学習管理ソフト（LMS）には無料でダウンロードできる "Moodle" を採用した。

Introduction

Recently, many educators have been talking about and establishing e-learning programs at their schools (Ministry of Economy & Industry 2004). E-learning is much different from traditional classroom learning. It is flexible, efficient and cost-effective. There are several pre-conditions for establishing an e-learning program including computer hardware and software, as well as having an administrator with the requisite skills and experience to create the program and maintain it. Once established, an e-learning program can provide an effective learning environment for a wide variety of learners. In this paper, we will show how easily, efficiently, and economically we have set up our own e-learning program. We will begin with a general comparison between e-learning and learning in a traditional classroom. Then we will describe the hardware and software necessary for setting up an e-learning program. After describing the part played by the e-learning administrator, we will discuss a popular LMS (Learning Management System)/CMS (Course Management System) software, *Moodle*. Finally, we will explain how we used *Moodle* in our college courses. In the conclusion, we will offer an evaluation of e-learning based on our recent experience.

E-learning vs. classroom learning

E-learning is electronic learning, *i.e.*, learning within a computer-based environment. In the traditional classroom, there is a limit on the number of students who can effectively learn because there must be a teacher present in the classroom and. there is a scheduled time for the class meeting. Because an e-learning syllabus is on-line, anyone, not only students registered at one particular school, can access the program at any time of day or night. They can study anywhere there is a computer connected to the Internet. Lastly, no teacher is required.

Set-up requirements

Hardware

Operating an e-learning program requires a strong and sustainable server and fast network. We used the following to satisfy these requirements:

● Macintosh G5 computer with a 160GB hard disc, 2GB memory, and dual CPU.

The Mac G5 is used to store the contents of the e-learning program.

● Rental server with 2GB capacity.

The rental server is used for *Moodle*-related activities. A rental server is needed to avoid a breakdown ("crash") in the system. A crash usually occurs when an excessive number of people have accessed the e-learning program at the same time. The G5 can also be used as a backup for the rental server.

● 12MB ADSL connection to the Internet.

This connection is independent of the university LAN (Local Area Network). Since the university LAN has many important functions, it is imperative to avert any interference by the e-learning program with the LAN.

Software

Operating an e-learning program requires several software programs:

● LMS/CMS

Moodle: We are using the *Moodle* learning management system. *Moodle* can manage the components of the e-learning program such as attendance, interactive communication, and so on. (See extended discussion of *Moodle* below.)

● Authoring Software

StarQuiz: We chose *StarQuiz* as our authoring software. It can create a quiz with multiple choice, true or false, fill in the blank, and even essay-type questions. *StarQuiz* has a variety of options. A quiz can include pictures, movies, web links, a time limit, and on-computer help. It can also create a web page quiz, which students can take on the website. *StarQuiz* can correct a quiz

and display the answers immediately for the benefit of the student. Alternatively, it can email the quiz results directly to the teacher.

- *QuickTime*:

    This software is used to create movies and an MP3-compressed speech button.

- *Dreamweaver*:

    This is homepage-making software. All the e-learning contents are created on HTML format in order to access the program on the website.

- *Java*:

    Java is a programming language, but it is not necessary to learn it. It is necessary only to find a free, useful *Java* script, copy it, and paste it on the homepage site. It can be used, for example, for typing exercises.

- *i-Movie*:

    After materials are videotaped for the e-learning program, they must be edited. The two most common tasks in the editing process are (1) making the material fit within a certain time frame, and (2) adding comments to the material. *i-Movie* can be used to accomplish such tasks.
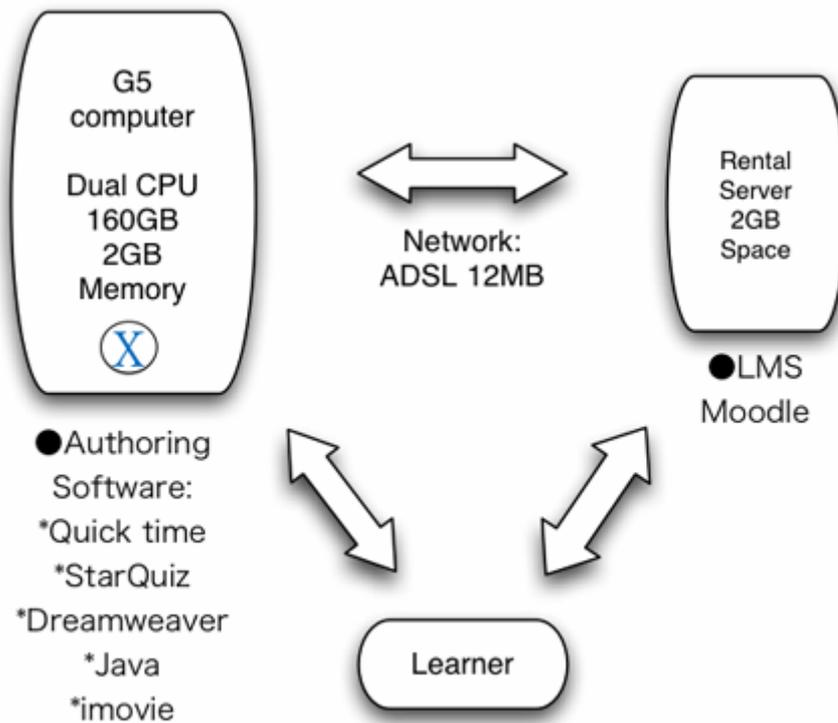
Figure: The e-Learning System

Administrator

An e-learning program needs an administrator (often the teacher in charge of the course (or courses) being offered online). The administrator should be familiar with the hardware and software described above, and have basic skills in homepage design. Typically, the administrator establishes the format for the course(s) offered online and provides information and directions to the learners while controlling the server for the e-learning program, and maintaining and updating the program. .

Moodle

> *Moodle,* a software package designed to help educators create online courses, is one of many CMS's. *Moodle* is open-source software, which means it can be downloaded, used, modified, and even distributed without cost. Two other

widely used systems are WebCT and Blackboard, both of which are expensive. Robb (2004, p.1) states: "Many schools in Japan have opted for creating their own systems which provide discussion boards and a system for students to submit assignments online, but none of these has the functionality and ease of use of *Moodle*."

Moodle's features

Moodle contains a variety of teaching and learning components:

● *Quizzes*

Quizzes, including multiple-choice, true-false and matching can be created within *Moodle*, and it will automatically calculate students' scores. Alternatively, the popular Hot Potatoes software quizzes can be used, and *Moodle* will track them. For quizzes created in *Moodle* or imported into it, *Moodle* produces various types of statistical reports analyzing the test items.

● *Messages*

"The e-mail and archiving system in *Moodle* is one of its greatest features. Students post their messages on the *Moodle* web page, but the messages are sent out to all subscribers as regular e-mail after a teacher-determined delay, of say, 15 or 30 minutes. This gives the writer a chance to review the message and revise it if necessary." (Robb 2004, p.2)

● *Photos*

At the time of their initial registration in a course offered via *Moodle*, participants (teachers and students) have the option of affixing a small photo of themselves next to their names. This photo reappears next to any message or product sent within the *Moodle* system. "This small feature goes a long way towards building 'community' since it allows students to place a face with a name." (Robb 2004, p.3)

● *Settings*

The teacher has full control over all settings for a course. There is a choice of course formats such as by week, by topic, or a discussion-focused social format.

- *Course activities*

    Apart from quizzes, there is a wide array of activities including forums, journals, resources, choices, surveys, and assignments.

- *Other features*

    Students can create a personal profile that can even display a list of the student's online comments. Students can upload their assignments (any file format) to the server, which are then date-stamped. Instructors can keep track of student involvement as well as monitor and get reports on other aspects of the student's learning.

Moodle in the classroom

We are currently using *Moodle* in two university courses. For both courses, the administrator-teacher formatted a *Moodle* homepage for his university. At the first meeting of each course, the teacher instructed the students on how to access the homepage and register for our course. They entered information about themselves in the "Profile" section. The teacher took photos of each student as well as himself and transferred them to the database. Then the teacher uploaded the photos, placing them in the list of course participants.

Before the first class, the teacher wrote a welcome message to the course students in the "Recent News" section and explained the assignment for the first class in the "First Week" section. Once the students had completed their assignment as an MS Word document, they uploaded their writings to *Moodle*. The teacher accessed these products later for correction. *Moodle* then automatically emailed the corrections directly back to

the students. Subsequent weeks' assignments included a research project in which the teacher referred students to an Internet link. We intend to use *Moodle*'s other features during the remainder of our courses.

Evaluation

We feel that we have overcome the concerns of many teachers who are considering establishing an e-learning program. A recent Japanese government White Paper lists these concerns as follows: (1) not enough money for setting up an e-learning program and creating materials; (2) concerns about copyright issues; (3) teachers and teaching assistants don't have e-learning skills; (4) no system to include a grade for web-posted discussions; (5) no positive support from the teachers (Ministry of Economy & Industry 2004).

This is how we dealt with some of these issues.

Cost

Throughout this paper, we have stressed the importance of three factors when considering a CMS: flexibility, efficiency and cost-effectiveness. *Moodle* is free. The costs which accompany establishing an e-learning program are very reasonable. They amount to approximately 400,000 yen. The major portion of this total is the price of the Macintosh G5 (350,000 yen), the repository of the contents of the e-learning program. The remainder is the total price of the various software packages required. In addition, there is a 4000 yen monthly charge for the ADSL connection. In contrast, WebCT and Blackboard, the two most popular commercial programs, could easily cost more than 10 times more, depending on the number of the students.

Teacher support and customizing materials

There are two important things to keep in mind when using an e-learning program. One

is that e-learning without any support from teachers doesn't work. Interactive communication (teacher-student; teacher-students; student-student; student-students) within an e-learning program is the most attractive feature. The other important factor is the contents of the e-learning program. Many institutions wanting to establish an e-learning program purchase materials from a commercial materials-making company. This is costly, and the materials often turn out to be unsuitable for the particular needs of the teachers and students at the institution. As a result, such e-learning programs often fail in the long term (Sakamoto 2003).

Aided by our university colleagues, we created all the materials used for our program. Although this was a time-consuming task, it had one great advantage. Because we customized all the materials based on our experience and our knowledge of the abilities and needs of our own students, we could ensure that the materials suited the students. The sacrifice in terms of time and effort was clearly worth it. Wada (2004) points out that it is crucial to customize materials for your students to maintain student motivation and ensure the success of the program.

Efficiency and program maintenance

Stable functioning of an e-learning system is of crucial importance to the long-term success of the program. With a commercial e-learning program such as WebCT and Blackboard, the user pays a maintenance fee to ensure this kind of stability. Although *Moodle* is open-source, and therefore free, users can access a very helpful support site. Simply by posting a description of a system problem on the *Moodle* support BBS (bulletin board service), the user will find that other *Moodle*-users ("*Moodlers*") respond quickly with advice.

To date we have found both administration and use of *Moodle* to be flexible, efficient and cost-effective. We intend to continue experimenting with and improving the e-learning program at our university.

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