Demonstrating Blended Learning through Moodle

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Moodle (modular object-oriented dynamic learning environment) is a powerful online Learning Management System (LMS) that complements regular classroom practices to create a blended-learning environment. This paper describes how Moodle can be used to create such an environment. We argue that a blended-learning environment has advantages over typical classroom teaching because it features numerous resources and activities placed online, and it provides students with enhanced learning opportunities. Moodle's online testing with automated marking and individual test item analysis instantly provides comprehensive data about students' performance. These data, combined with the ability to access logs from the resources and activities, allow educators to gain greater insights into students' study habits. Finally, we conclude that in this age of technology where blended learning is fast becoming the norm, teachers have a responsibility to utilise technology to enrich the learning experiences of their students.

Moodleは、通常の教室授業と併用するブレンド型学習 (blended-learning) 環境を作る上で、高性能なオンライン学習管理システムである。本論文ではMoodleを利用した学習環境の構築について述べる。ブレンド型学習環境は、多彩な教材や活動をオンライン上に載せることにより、学生の学習機会を高めるという点で、従来の教室だけの授業よりも優れている。オンラインテストは自動で採点、項目分析が行われるため、瞬時に学生の成績に関する総合的なデータが得られる。教材や活動への学生の参加記録と組み合せてテストのデータを見れば、教師は学生の学習習慣についてよりよく知ることができる。結論として、ブレンド型学習が急速に標準になっているテクノロジーの時代にあっては、教師は学生に豊かな学習経験を与える技術を使う任務があると言える。

MOODLE IS a powerful, versatile, open source, online LMS. The brainchild of Martin Dougiamas, it was originally devised to promote educational collaboration. Specifically, Dougiamas (2003) referred to Moodle as a project in which he and others "applied theoretical perspectives such as 'social constructionism'" (p. 171), which focus on collaborative discourse. In addition to enabling instructors to create and upload a plethora of different materials and courses individually and together, it lets them organise, observe, and measure students' online course performance. Teachers can develop their skills by seeing how other teachers approach the same material and together they can reduce their workload. From the students' perspective, Moodle expands their learning opportunities beyond the traditional teacher-fronted, textbook-based classroom. Using Moodle as a supplement to classroom teaching allows students to benefit from a *blended* learning environment: a learning environment that combines classroom teaching with online instruction.

Moodle is used for subjects other than language learning, including math, geography, and history. Since its inception, its use has been increasing and according to statistics taken from the moodle.org website, in January 2012, 5,885,239 courses have been put online on over 72,100 sites. When compared to data from McNabb and Jenkins (2010), this is an increase of over 2,000,000 courses and almost 20,000 more registered sites in just over 1.5 years. Course creators have constructed over 109,000,000 quiz questions for over 57,760,000 users in 223 countries. In spite of these impressive statistics, site data indicates that Moodle remains relatively underutilised in Japan, Korea, and China. It would seem, therefore, that Moodle is a resource modern Asian educators should familiarise themselves with in order to become better attuned to the needs of their students, who are digital natives.

The Case for Blended Learning

Blended learning is the deliberate combination of classroom content with complementary online elements, making rich, comprehensive learning opportunities available any time, wherever Internet access is available. Moodle enhances the learning environment and extends the classroom by placing it online, increasing the depth of learner interaction with materials and promoting learner autonomy. In traditional classrooms, input, feedback, and collaboration with classmates generally ends at the classroom door, whereas in the blended-learning environment, teachers can provide supplementary content via the course website and use forums to maintain contact with students and allow peer teaching. Through the creation of (practice) quizzes and online lessons, for example, students can gauge their knowledge and gain instantaneous feedback on their performance. Instead of having only one opportunity to learn a lesson's content, students are free to reexamine all uploaded content, which may include slide show presentations given in class and even

full lectures. All this extra support is available to students at any time so *they* can choose what to study, when to study, and how to study, thus providing numerous collaborative, interactive, and autonomous learning opportunities.

The primary reasons for Moodle's increasing popularity are its ease of use, its increasing number of useful, evolving features, and the fact that it is free. Once a server has been set up, nontechnically inclined instructors can learn how to use it with a reasonable amount of proficiency within hours and then begin to create or upload course content. This is equally true for students; Moodle's simplicity allows them to start interacting within minutes. Beyond its simplicity, Moodle is comprehensive, versatile, and designed for cross-platform use. Developers have been very deliberate in minimising incompatibility issues, so users of operating systems and browsers other than Microsoft Windows and Internet Explorer will not be disadvantaged. Moreover, because Moodle is a cooperative, ongoing project, it is constantly being improved. There are dedicated forums where course creators can communicate with developers to produce enhancements and upgrades. In short, Moodle makes it easy for nontechnically minded educators to initiate blended learning for the benefit of their students, many of whom expect and enjoy online study and learning.

Blended Learning and Moodle Resources and Activities

Two aspects of blended learning that can be accomplished using Moodle include the online provision of educational resources and student participation in online activities. *Resources* are materials that are static and observable but not modifiable by students, whereas *activities* (for example, *forums* and *chats*) are dynamic and require student participation. Moodle makes the distinction between resources and activities clear, with its

interface that features two drop-down menus for each week (or section) of a course where teachers can add suitable resources or activities for their students (see Figure 1).


| 1 | Course Introduction |
| | • Orientation |

Add a resource... ▼   Add an activity... ▼
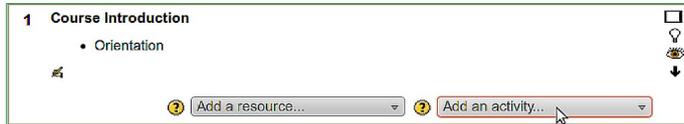
Figure 1. How to Add Content in Moodle

Resources

Beyond printed matter and textbooks, the online environment allows for the inclusion of multimedia resources. Some common resources include: course notes as PDF files, graphs as JPG images, URL links to external web resources, office suite presentations exported as SWF files, and webpages or text files created within Moodle. Course creators can also quickly embed YouTube videos and add podcasts. Checklists and a variety of self-assessment tools can be inserted to assist students in tracking their progress and developing their autonomy.

Courses are divided according to institutional or individual preferences and are generally organised into weekly or topic-based sections. Resources are added one by one to these sections of a course. Thus, at the bare minimum, a Moodle course constitutes a multimedia (i.e., with some resources and activities) online "syllabus" and at the maximum, a complete interactive course with various resources and activities for students to access.

Uploading Files

To illustrate to the simplicity of using Moodle to potential users, steps required to create several of the most common resources will be delineated. For example, to add an image, audio file, or PDF, find the section where the link to the resource should appear, then choose "Link to a file or website" from the "Add a resource" drop-down box. A new page will appear with several options to be configured. Then, give a suitable title to the resource—this is the link students will see on the course page. For a file or webpage on the Internet, simply input the URL. Then click "Save and return to course." When uploading a file from a computer, use "Choose or Upload File" and follow the instructions in the pop-up window. Once the file has been uploaded, click "Choose." Finally, save the settings and return to the course page to see the link to the resource.

Creating Content within Moodle

To create a webpage resource within Moodle, choose "Compose a web page" from the "Add a resource" drop-down box. Give the document a good title because, again, this is the link students will see on the course page. Then compose the page using the built-in editor or cut and paste from a preexisting document. Finally, click "Save and return to course." The webpage link will appear in the chosen week. To add web links to the document, highlight the text to be linked. Choose the "Insert Web Link" icon (see Figure 2). Insert the URL and a suitable title. Click "OK." Click "Save and return to course." The text will now be linked. If the link is to a YouTube video, the embedded video will appear instead of the text (Note: YouTube filter must be enabled for this functionality).

Figure 2. Inserting Web Links

Activities

Some activities, when enabled by the teacher, allow for extensive interaction between the students and with the teacher. This fosters a collaborative blended-learning environment that would be difficult to achieve via classroom-only instruction. Some of the activities available on Moodle include mindmaps, glossaries, chats, forums, surveys, Wiki entries, as well as audio and video recordings, and quizzes that are automatically graded. Due to space limitations, we will confine our description to forums and glossaries.

Forums

Forums allow students to post messages that can be read by fellow students and teachers. In this way, forums allow students a novel way to interact with both the material provided by the teacher and material provided by other students. This can be beneficial for students who prefer a written mode of communication to face-to-face interaction in a classroom. To create a forum in Moodle, choose "Add a forum," give it a name, set the topic, and choose "Standard forum for general use." Once these steps have been completed, students are able to make posts, view others' posts and comment (reply) freely. Other options allow for the creation of group forums where students can only see posts by members of the same group. Furthermore, teachers

can grade posts or even open the forums up for peer grading. Forums are useful for shy students who will not participate in class but who still want to express themselves. It is not uncommon to see such students vigorously participating in forums.

Glossaries

The glossary function allows the teacher or students to create a customised word list, so students can share the workload. The collaborative construction of a shared resource can be assigned and graded as a homework activity. To add a glossary to a course, choose "Glossary" from the activities menu, name it, and set the parameters. The default display setting is 10 words per page, but we have found it better to increase it to 100 or more so that entries can be viewed faster. According to teacher preference, editing of entries after their creation may or may not be permitted. It is always possible for the teacher to see who created each entry and rate them. In addition to its intended functions, the glossary activity is an effective initial way to see who does their homework and who does not.

Extending Moodle Resources and Activities

Moodle comes with many resources and activity types installed as part of its core package. However, as Moodle is modular, it is possible to install extra, custom modules for more specific purposes such as Moodle math or LaTeX plugins to display mathematical formulas, or a mindmap plugin to allow students to create collaborative mind maps. There are plugins to enhance every aspect of Moodle from question types from quizzes to themes that allow the customisation of the colours and layout of the site. Plugins can be freely downloaded from the Moodle plugins page, http://moodle.org/plugins/. If a desired plugin does not exist, it can be suggested or requested at moodle.org or developed by a third party. The most popular plugins may be

included in future versions of the core package of Moodle. Thus, teachers are able to create the blended-learning environment that is best suited to their students' needs.

Comprehensive Testing with Moodle

Without question, one of the most labour-saving features of Moodle is its impressive assessment capability. With it, a teacher can create quizzes that are marked automatically and have the results recorded directly into the course grade book. There are numerous weighting possibilities and the ability to override answers or manually regrade in the event of an error or other type of glitch. With paper tests, instructors would have to manually regrade and adjust scores one by one in their grade books, but with Moodle, such issues can be easily resolved in a few clicks. Testing in Moodle is achieved by entering questions into a question bank, which are transferred to a quiz.
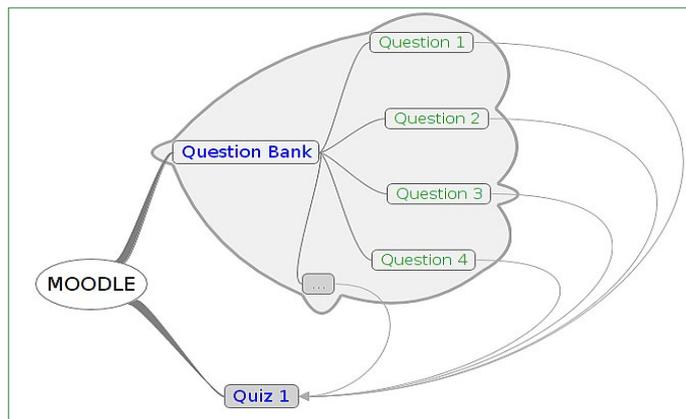

Figure 3. How Moodle Uses Questions from a Question Bank to Make Quizzes

The Question Bank

Colleagues teaching the same course can develop a cooperative question bank. In our case, it took about an hour for three colleagues to share the workload and create a full question bank for several units of a common course. Because different people bring different notions of what is important to test, greater variety is the result, potentially benefiting both teachers and students. There are many question types: matching, multiple choice, cloze, short answer, essay, true or false, and drag and drop ordering. Some question types allow for awarding partial points. For teachers who already have questions in text files, it is possible to create tests quickly by cutting and pasting from opened files. Using Moodle's "Aiken format," which is a very simple way to structure multiple-choice questions, it is possible to easily import multiple-choice questions made in standard word processing software. For example, files with scores of questions used for paper-based placement tests can be uploaded in one go. Otherwise, it is possible to make questions as for any paper quiz and upload them later. The slightly longer time it takes to do this is paid back later by not having to collect and grade papers or even calculate final grades. Figure 4 is an example of a question bank with several questions.

Making Quizzes

Setting up an empty quiz is a simple procedure that takes about a minute. Everything is done on a single page using various readily understandable drop-down boxes and fields (see Figure 5). First, find the section where the quiz link should appear (for example in Week 6) and choose "Quiz" from the "Add an activity" drop-down box. Give the quiz a suitable title. Next, set the parameters: date(s) and time (e.g., May 2, 1:15 p.m. to May 6, 5:45 p.m.) and then the test duration (e.g., 20 min.). To prevent cheating, teachers can decide whether or not to randomise

the quiz by shuffling questions and/or answers. Then fix the number of test attempts if necessary—practice quizzes could be configured to have unlimited attempts.
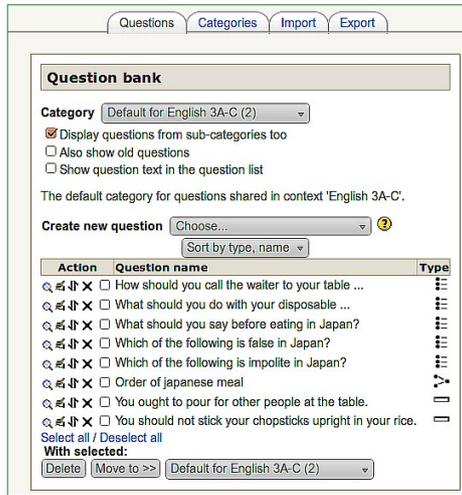
Figure 4. Questions in the Question Bank
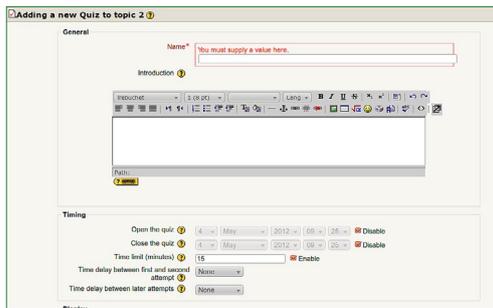
Figure 5. How to Set Up a Test in Moodle

The next step is to determine the way the quiz will be graded—according to the highest score, the average of all attempts, or the first attempt. Elect whether or not to offer overall feedback. Choose the level of security. For practice quizzes security may not be needed at all, but for real, in-class English tests, this can be an important issue, because in some Windows browsers in a nonsecure setting a Japanese translation is provided when the cursor is rolled over most words. Once security settings are set, click on "Save and display" at the bottom of the page to start populating the quiz with questions from the question bank.

In the final step, questions are selected from the question bank for insertion into the quiz. On this screen, the question bank is on the right side of the screen and the quiz is on the left (see Figure 6). At first, there are no questions in the quiz, so questions must be added by clicking on the "<<" button in the question bank beside each question. There is also the option to add a number of random questions, ensuring that each person gets a different version of the test. Up until students take the test, unlimited editing is possible.
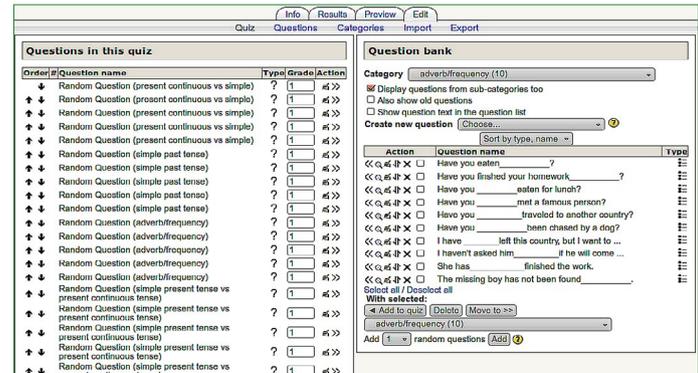
Figure 6. Moving questions in the question bank to a quiz

Administering the Quiz to Students

Instructors can administer online quizzes and tests in a class-room equipped with Internet or offer students the freedom to do the quiz in their own time at a place of their choosing. This flex-ibility may enable busy students to give their best performance and is integral to blended learning. As previously indicated, this may give the teacher insight regarding students' study patterns. Students who miss an in-class test may be able to take it at home or another designated place after a teacher resets the parameters and confirms the IP addresses. For example, students who miss our tests are offered another supervised opportunity to take them in our Language Centre using the specific IP address range for that room.

An advantage of having students do practice quizzes at home is that it frees up more time for classroom learning. Since Moodle marks the quizzes, teachers can devote more time to lesson planning or simply relaxing at home, enabling them to come to school energised. All of this initially requires some set-up time, but if the course or courses are going to be taught for several semesters or used by many teachers and students, it is a worthwhile initial investment that is not onerous. As the same quizzes will remain ready online in the following year, teachers can quickly fine-tune those existing quizzes rather than rewriting each test every year. For busy university teachers who have many students and many committee and administrative responsibilities, the hours gained by not having to mark papers alone is worth having Moodle. Furthermore, it reduces paper clutter in one's office, is environmentally friendly, and is part of the inescapable, growing trend toward having IT classrooms.

Cheating

Restricting when and for how long the quiz can be taken, fixing the number of attempts allowed, and automatically shuffling questions and answers makes it difficult to cheat. For example, the question and the answer choices for Question 7 could be different for all students taking the test. This discourages students from glancing at others' work. Once students realise this, they will know they have little choice but to study if they want to pass the test. Depending on the composition of given groups of students, the shuffling option will have greater or lesser value.

Results and Data (Item Analysis)

The instantaneous item analysis in Moodle allows teachers to quickly compare different class sections. It graphically displays grading to provide an immediate sense of students' achieve-ment and provides an abundance of useful statistical data that would normally require many calculations. Item analysis can be performed during or after quizzes. For example, it is possible to analyse an 80-question placement test taken by 350 students to get an immediate global impression of the cohort while at the same time verifying whether or not there were unsuitable ques-tions and confirm whether certain discrete grammar points will need to be addressed in future classes. Item analysis performed in a unit test can indicate that a question was not properly framed or that teachers need to revisit that particular point in lessons. While one can obtain this information by manual grading, it would take much more time. In brief, Moodle's item analysis features give educators greater awareness about test-ing, which allows them to teach with greater efficiency.

Administration and Observation

From an administrative standpoint, Moodle is a godsend. Once students register using their name, student number, and email address, name lists and grade reports can be generated. As a result, teachers can send group messages with a single click. While teachers can see the entire grade book, students are re-

stricted to viewing their own results. Teachers can export grades to a spreadsheet or text file, email them to other teachers, or print a hard copy.

Students can receive updates from the Moodle site, as well as send messages via the site to their teachers or other students, and receive messages. This provides students with yet another method to communicate with one another about their classes and homework, thus enriching their blended-learning experiences. The online calendar is highlighted and provides a link to any test, activity, or homework where a date parameter has been specified so students will always be able to know about tests and assignments. Because Moodle offers these tools for communication and course organisation, as well as providing course contents 24 hours a day, it empowers students to do more autonomous and collaborative, blended learning.

Teachers using Moodle have access to a variety of tools for measuring the study routines and performance of their students. There are several reports that teachers can access to obtain data related to student participation in a given course. When students do any kind of online task, it is tracked with Moodle's software. Therefore teachers can see when each student logged in, what the student did, for how long the student was logged in, and even which specific files within a course were used. These logs can be compiled into statistical reports that let the teacher know when students are using Moodle and how often each activity, resource, or forum has been accessed, thereby providing insights into the study habits of the class and of course those of individual students. Teachers can view the available data and interact with students accordingly either online or in the classroom. This allows for superior one-to-one instruction that cannot be duplicated in the traditional classroom alone. This application of technology to education, creating a blended-learning environment, leads to improvements in each class; before teachers come to their classes, they will have a much better idea of their students' study habits, of what to teach or reteach, and for how long. In large classes, from the activity logs, instructors can learn the names of students who may require special attention, be it enrichment or remediation. Without these records, teachers might have to wait weeks or even months for test results that reveal less comprehensive data than is produced by online testing and item analysis.

Conclusion

Moodle is a powerful, dynamic, and versatile e-learning platform whose simplicity should prove to be a boon to educators lacking computer expertise but who recognise the need to diversify their pedagogy by blending captivating and functional aspects of e-learning with the traditional classroom experience. Through Moodle, a professional collaborative environment is possible. The underlying, fundamental point is that students in the 21st century expect a degree of online education. These students are digital natives who expect a blended-learning environment—so it is incumbent upon educators to catch up and enrich their students' learning experiences. More information about Moodle is available at the Moodle Association of Japan website (http://moodlejapan.org/) and from the authors.

Bio Data

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References

Dougiamas, M., & Taylor, P. (2003). Moodle: Using learning communities to create an open source course management system. *Proceedings of the ED-MEDIA 2003 Conference*. Honolulu, HI. Retrieved from http://dougiamas.com/writing/edmedia2003.

McNabb, R. G., & Jenkins, A. (2010). Managing and measuring your students' coursework by utilizing Moodle. In Xiaoping Yu (Ed.), *Proceedings of the 2010 Academic Forum between Jiliang University and Shizuoka Institute of Science and Technology* (pp. 15-17). Hangzhou, China: Jiliang University Press.

Moodle.org: open-source community-based tools for learning. (n.d.). Retrieved from http://moodle.org/