

## Design of Expanded Assessment Management System for Open-Source Moodle LMS Module

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**Abstract.** Web-based online education is one of the best methods to supplement face-to-face lessons in classrooms. Web based learning has advantages in that it is possible for learners to participate in self-directed and cooperative learning. We need a LMS(Learning Management System) that offers learners functions to manage not only learning itself, but also contents, in order to provide learners with effective online education. The Moodle(Modular Object Oriented Dynamic Learning Environment) LMS is one of the learning management systems developed by teachers who want to deliver massive quality online contents. The Moodle LMS is a typical LMS, because it is an open-source model for development, expansion and utilization. Therefore, this paper is aimed at design of a learning management system for instructors to open and manage cyber classes in Moodle LMS.

**Keywords:** Cyber class, LMS, Moodle, Open-Source, Online education, Web based learning, etc.

### 1. Introduction

Nowadays with the rapid diffusion of the Internet, systems providing anytime and anywhere web based learning have become possible. This type of web based online education is one of the best methods to supplement face-to-face lessons in classrooms[1].

For example, web based learning has advantages in that self-directed and cooperative learning between learner and instructor is possible. Recently, web based learning tools of various kinds or authoring tools that can be utilized for teaching and learning have been introduced variously. However, as a matter of fact, education in Korea is outdated, making it nearly technologically impossible to implement a system where teachers can create contents, and uploads to the server and performs continuous updates, and thus the system cannot deliver online content of good quality. One such system developed for teachers for managing learning, which tries to overcome this defect and provide web-based online content of good quality, is the Moodle LMS[2].

Therefore, this paper aims to expand the system that utilizes Moodle LMS for managing learning and enables the instructor to open an online web-based lecture easily and administer and utilize it.

### 2. Related research

The open source LMS is a system for managing learning based on an open-source model that opens the source code of the program to unspecified individuals for use and revision and redistribution [3].

Recently, among the LMSs in use for free distribution on the basis of open-source software, systems for managing learning are integrated by Moodle LMS[4].

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The Moodle LMS open-source software can be considered to be software complying with the philosophy of Web 2.0 in that it means the beginning of an Internet in which the user positively participates and generates and shares information and knowledge[5].

Therefore, the Moodle LMS can be considered a type of lecture system developed for teachers for managing learning, which can provide web-based online lectures of good quality.

The Moodle LMS uses constructivism learning theory as the foundation in comparison with other LMS systems. And because the document design is modular, maximizing user convenience and pliability, it has features that are convenient for teachers to utilize. In addition, the security and management tool is strong and the IMS / SCORM standard of educational content development is supported[6].

### 3. Design of the assessment management system

#### 3.1. Basic system design direction

In the following section, a system that expands the evaluation administration module and can operate with the Moodle LMS is designed with the manager mode standard.

First, after the instructor connects to the administration account, the student's exam scores can be directly inputted on-screen or modified, in addition the posting task is checked and grading is performed.

Second, in order to easily confirm the students' the list of marks is outputted or can be downloaded in Excel format.

Fig. 1 indicates the system overview for the evaluation administration module extension.

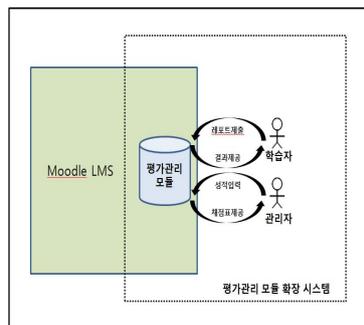


Fig. 1: Overview of Assessment Management System

#### 3.2. Module composition

In this paper, an expanded evaluation administration module of the Moodle LMS is designed.

Fig. 2 shows the configuration diagram of the instructor module.

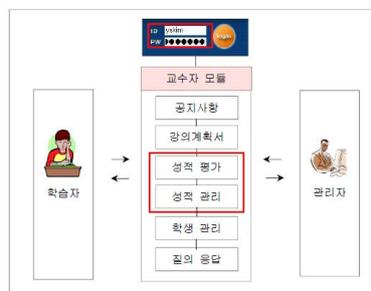


Fig. 2: Instructor module composition

#### 3.3. The input design

After students submit a report by posting it online, Fig. 3 shows the screen where scores can be directly inputted after the instructor connects to the administration account of the system and corroborates the student report.

Fig. 3: Score input screen

### 3.4. Process design

The report posted by the students, the midterm, and term-end exam scores can be modified and input after the instructor connects to the administration account of the system. The list of total learning marks is outputted and can be utilized.

In this section, the overall algorithm of the system class diagram, use-case diagram, and sequence diagram are shown.

Fig. 4 shows the procedure according to each mode of the algorithm.

```

process-flow-rtn()
begin
log-on();
if(undefined-user)
    reg-membership()&retry-log-on()
switch(mode-type) // the process according to the mode.
case: learner-type // the learner mode process
{
upload-report-exam(); // the report or examination paper submission
loop: review-result(); // result check
if(verify-result) break; // in the result satisfaction
else query-administrator()&goto loop; // ask to the administrator
}
case: administrator-type // processing of administrator mode
{
for(i=1; n; i++)
insert-score(); // personal result input
print-score-table(); // the list of marks output
}
End
    
```

Fig. 4: Assessment management system algorithm

### 3.5. The output design

The evaluation administration module of the existing Moodle LMS is improved and an easy user interface environment is designed. The instructor modifies the scores for grading the posted homework and midterm and term-end exam tests with the input. Fig. 5 shows the screen where the user can directly input and modify the scores for the midterm exam for the grade estimation module.



Fig. 5: Result input screen

Fig. 6: Result management screen

Our design allows the instructor to confirm the overall results for students taking a course or the list of marks can be received in the management of exam management module.

In the exam management module, Fig. 6 shows the screen where the list of marks is confirmed.

### 3.6. Comparison of Open- Source Learning Management Systems

We can see in table 1, the comparison is based on feature about the open source LMSs. Moodle has a good architecture, implementation, inter-operability, and internationalization, and also has the strength of the community. It is free and its Accessibility is average.

Tab. 1: Comparison of Open-Source Learning Management Systems

Category	ATutor	ILIAS	Moodle
Architecture	Weak	Complex	Good
Implementation	Weak	Complex	Good
Interoperability	Bad	Good	Good
Cost of ownership	Medium	High	Free
Strength of Community	Low	Medium	High
Licensing	GPL	GPL	GPL
Internationalization	Weak	Average	Good
Accessibility	Excellent	Bad	Average
Document Transformation	No	Average	No

## 4. Conclusion

This paper suggested an expanded system for managing learning that utilizes Moodle LMS and enables the instructor to open an online web-based lecture easily and administer it. There are many difficulties in the evaluation management module provided by the existing Moodle LMS in administration of learner evaluation, and the user interface is complicated.

In this paper, a system that expands the evaluation management module in order to overcome this problem was designed. And the advantage of the proposed system and its contribution is then presented in this paper.

First, the problem of the complicated user interface is solved, enabling the instructor to evaluate the result easily and administer it.

Second, attendance is automatically recognized at the same time as report submission for each posting under the system. The learner can be offered feedback about the result by the instructor.

Third, the manager mode provides an easy solution when results are input and modification is utilized.

This research subject will hereafter develop a module providing better user convenience when improvement of Moodle LMS is needed and can be utilized as needed.

## 5. References

- [1] DeokSeong Jang, "Design and Implementation of the web based learning system having one's learning strategy", Korea Information Processing Society, 11-A(4), 2004.
- [2] Wongyeong Choi, "Research on the cooperative learning of moodle and self-directed language learning experience", English literature, 42, 2009.
- [3] BECTA, Open source software in schools: A study of the spectrum of use and related ICT infrastructure costs, 2005.
- [4] JiWoong Shin, et al., "Research on the Web 2.0 base this running co-learning model development", 2008.
- [5] DuYeong Min, et al., "Comparative Evaluation of LMS based on the open source software", Korea Society of Computer & Information Proceedings of the Summer Conference, 16(1), 2008.
- [6] JaeCheon Park, et al., "The research on the elementary grade discourse system utilizing the open source LMS", Korean Society for Internet Information Proceedings of the Conference, 9(1), 2008.
- [7] C. Aydin, "Open Source Learning Management Systems in E-Learning and Moodle", IEEE EDUCON Education Engineering, pp. 593-600, April 2010.