LESSONS LEARNED FROM IMPLEMENTATION OF LEARNING BY DESIGN METHOD IN A LEARNING MANAGEMENT SYSTEM FROM THE INSTRUCTORS PERSPECTIVE

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ABSTRACT

In this study the benefits and considerations related to implementation of “Learning by Design” (LBD) method through a Web-based learning environment were investigated from the instructor’s perspective. LBD is a project based learning approach on the basis of case based reasoning and problem based learning approaches. The case course of the study, Foundations of Distance Education, was given in blended form containing face-to-face sessions and web based instructional activities. The students were assigned to design a course site within LBD approach. The information gathered from the instructor in three different semesters were evaluated and compared. The 2010 and 2011 summer implementations of the course had some differences in technical and administrative level. These modifications were led by the previous experiences from the former implementations of the course. The outcomes of these differences were also investigated. It was emphasized that the project work had as a positive effect on the students’ learning. Taking role in the design of a course with iterative processes was accepted to be effective in learning of the subject. It was also mentioned that this type of LBD implementation required a technical support. It was observed that the instructor has the sole responsibility of maintaining the servers, besides being the instructor.

Keywords: Learning by design, Learning management system, Project based learning, Collaborative instruction, Constructivism

1. INTRODUCTION

The development in educational technology has been arose significantly especially after the advent of Internet. Web based education with which we come across as a distance education model is based on students’ receiving the instructional material via web tools. The development of the Internet technologies, the use of synchronous and asynchronous communication devices made further advancements of the educational models possible (Akman, 2010).

The progress in web based tools, such as Learning Management Tools (LMS), has positive impact on instructional design processes. These LMS’s contain several editing, interaction and evaluation tools. Through the use of LMS, the instructor could arrange the course content and realize curriculum planning. Besides, with the use of different evaluation tools such as quizzes, online exams, assignment tools, and process of student evaluation become easier (Altun, Gülbahar and Madran, 2008).

These technological advances simplifies the course design process, however, some instructional strategies are also needed in order to increase quality of learning. Project based approach, in this manner, is rather beneficial approach to accelerate student’s knowledge construction. In this study, blended course design is preferred. In other words, face-to-face lecture sessions and online activities were performed...
successively. In the Web-based part of the course, several educational modules of an open source learning management system (LMS) were used. The students were assigned to design an educational course site on the LMS platform. In other words, the students were both in the role of “student” in the course and the “instructor” in their own spaces.

1.1 Learning by Design

Learning by Design (LBD), is a project based learning approach on the basis of case based reasoning and problem based learning approaches (Kolodner, Camp, Crismond, Fasse, Gray, Holbrook, Puntambekar & Ryan, 2003). It is briefly an instructional system that the student presents what s/he learned in an artifact as a project. Han and Bhattacharya, 2001, define LBD as the outcome of the constructionist theory that attributes importance to learning through creating, programming, or participating in other forms of designing. LBD emphasizes the value of learning during creating, programming, or participating in other forms of designing. When a learner designs an artifact related to the subject to be learned, s/he develops a rich context for learning. The designed outcome is valued by means of learning by design method in addition to design and learning process (Kolodner, Hmelo, Narayanan, 1996, Kolodner et.al 2003).

Han and Bhattacharya (2001) stated the strategies and application examples of learning by design as in the following Table 1.1. In Figure 1.1 Learning by Design Cycle is shown. This cycle describes schematically how learning by design method works. The Learning by Design Cycle consists of two important components of learning from design activities – 1) design/redesign (application) and 2) investigation.

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Way of Implementation</th>
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| 1. Clear expectations at the beginning | • Handouts, explanation, discussion sessions, Web page  
• Clarification of questions embedded in the course |
| 2. Inform participants of implicit and explicit objectives and how they will be evaluated | • Discussion following pre-test, handouts, Web page  
• Question/answer sessions  
• Collaboratively determined evaluation criteria |
| 3. Learner should be the active builder of knowledge | • Brainstorming, group discussions, games, decision making  
• Learner has a choice of topic and context  
• Investigative tasks |
| 4. Instructor should take on the role of a facilitator, motivator | • Scaffold learners’ activities and challenge learners  
• Assign open-ended design tasks  
• Balance scaffolding, challenging learners and assignment of tasks  
• Reinforce concepts, confront misconceptions |
| 5. Tasks given should allow learners to design and construct an artifact that can be shared. | Design tasks can include but are not limited to:  
• Educational software  
• Educational games  
• Web sites, PowerPoint presentations |
| 6. Provide rich and varied feedback for the designers/learners | • Agreeing on a rubric initially, self-evaluation through reflection, journals, progress reports  
• Class discussion, short paper, peer evaluation  
• Portfolio: progress report  
• Piloting to target audience and subject matter experts  
• Feedback by observing student interaction and participation |

Table 1.1. Strategies and application examples of LBD
1.2 Learning Management System

Learning Management System is a web based software application that automates the administration and reporting of course content for instructors, so that the instructor can create, update, store and deliver when necessary any instructional material on the web. The instructor does not necessarily need to know html or other web programming languages. Instructors cannot only create educational data, but also are able to create/evaluate online quizzes, assignments, exams, etc. via the learning management system (Meerts, 2003, Simonson, 2007). In this study, Moodle, an open source LMS, is used.

The word Moodle is an acronym for “Modular Object-Oriented Dynamic Learning Environment”. Moodle is an open source web based software package to create, update and deliver online courses and other instructional communication tools. Since it has a modular structure, programmers can also script additional modules for different educational purposes.

1.3 Blended Learning

Briefly, blended learning can be defined as an instructional system that synchronous, face-to-face instruction and distance learning tools are used sequentially. Different combinations of synchronous/asynchronous communication tools, and face-to-face instructional sessions may be used (Bonk and Graham 2006, p. 4). In this study, blended learning refers to the combination of face-to-face lecture sessions per week and web based activities in LMS of the course. In the 2010 summer implementation of the course lecture sessions were included the theoretical aspects of the course. After presenting the theoretical part, the instructor gave necessary recommendations about the students’ projects which they assigned to prepare. In the later implementations, the lecture sessions were contained only project related information and recommendations, and course related topics were delivered to students from the LMS of the course via text based and audio/visual tools.

2. METHODS AND PROCEDURES

Within the scope of this study, the perceptions of the instructor about the technical and administrative concerns of the instructional design, online and classroom activities, and course-related projects were investigated through interviews and observations. The information gathered from the instructor of the undergraduate course "Foundations of Distance Education" in three different semesters were evaluated and compared. The data were collected by observations in both 2009, 2010 and 2011 summer schools as well as 2009 fall semester.

In three each summer Schools, nearly 100 students from different departments enrolled to the course, most of which were enrolled the course as a technical elective. On fall semesters, on the other hand, all students were from the Department of Computer Education and Instructional Technology (CEIT) students, nearly 25, and enrolled as a must course. The course was not available as elective to non-CEIT students. The duration of semesters in summer period was six weeks and fourteen weeks in fall semesters. Because of this significant difference, only summer school implementations were considered in this study.

Semi-structured interviews containing open-ended questions are used. The recorded interviews were transcribed in a word processing program word by word. Analysis of the qualitative data consists of three progressive action, data reduction, data display and conclusion drawing processes (Miles & Huberman, 1994).
The 2010 and 2011 summer implementations of the course had some differences in technical and administrative level. These modifications were led by the experiences from the former implementations of the course. The outcomes of these differences were also investigated. The main difference in 2010 summer implementation, the LMS servers for course and students’ project sites were different. This was necessary for the continuity of the course and prevented the technical interruptions. In the 2011 summer implementation, different from the former implementations, the projects that the students assigned to were decided by the instructor.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Details</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td>2010 Summer</td>
<td>Two servers were used, one is for the course web site and the other was for students’ projects</td>
<td>Minimizes technical interruptions, bisects the risk of interruptions</td>
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<td></td>
<td>More user friendly modules were used</td>
<td>The students were able to focus on course related content, instead of trying to learn Moodle related topics.</td>
</tr>
<tr>
<td>2011 Summer</td>
<td>Project themes were assigned by the instructor</td>
<td>The distribution of students’ workload about project could be provided to be more equitable than before.</td>
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Table 2.1 Summary of the alterations and the effects of these alterations in course design:

3. RESULTS

The interviewee was the instructor of the course and the interviews were conducted in three different periods, following the corresponding semesters ended. Since the same instructional methodology is used in the same course, some of the opinions were common for each interview. He listed strengths and weaknesses of each semester.

According to the observed weaknesses or inconveniences, some alterations have been made. The common opinions and outcomes of these differences are listed below. The results of the interview were categorized in terms of implementation semesters and analyzed according to LBD, LMS and interaction topics.

3.1 General opinions obtained from all interviews

The instructor highlighted that the instructional material and the learning environment should be selected carefully as they directly affect the students’ effective learning. According to the instructor, the students think web based instruction is easier compared to traditional one since course related activities are more limited. The students do not generally concern web based activities as instructional. In order to overcome this prejudice, he selected a project based approach so that the student have had chance to use what s/he learned during the semester. Another benefit was that, the students could be able to understand web based instructional environment better.

Since the duration of summer course was shorter, the iterative processes in projects were less compared to regular term. The students used existing resources from several web sites and declared the sources for these contents. It is not possible to write an original content for a course in a short period of time.

3.2 Summary of the interview related to 2009 Summer School and 2009-2010 Fall Semester implementations:

Both the students’ participation in the activities and the results of exam and quizzes confirm that the course was successful. He also declared that all students joined at least two of the online activities. Preparing a project was declared to be effective for the students learning the subject.

Since the course was given in LMS, the theoretical content was available through the web site. The LMS related supplements were also beneficial for the students. In addition, Internet also served both text and audio/video based resources.

Socialization seems to be important outcome for these LMS environments. It prevents “sense of loneliness” for the students. He pointed out the distinction between the at-campus and off-campus students. In this case, the students both in summer school and fall semester were on-campus students and were familiar to each other. For this reason, the communication tools in LMS, such as forums, chat tools, etc. were utilized only for course related activities. If the course was given for off-campus students, socialization effect of these tools would be observed.
These interaction tools were also beneficial for the course related interaction. Especially for the instructor-students interaction, the general recommendations and announcements were also done via web based tools. The use of these tools was also acted as a model for the students since they were required to prepare a web based learning environment.

The major problem which he emphasized was that the maintenance of the LMS. The technical support and assistance were required so that the course would be delivered more productive. The 2010 fall semester, the LMS server was interrupted for one week and this had some negative effect for the students.

It was regarded as the strength of the instruction design that the students were able to access these resources twenty four hours a day and seven days of a week. The students were independent from location and time. They had opportunity to experience what they learned was also significant benefit.

Having technical problems in providing the continuity in online interaction was considered as the weakness of the course, which was also mentioned above. Another weakness mentioned was that the students do not take the virtual communication into seriously.

3.3  The results of the interview related to 2010 Summer School implementation:
The instructor reminded the copyright issues in this interview. Both the course sources and the students’ project sites were compound of copyrighted materials which created by other people. For all presented materials were referenced in course web site and similarly, students were also supposed to declare the reference of the source. Since the course was not a commercial action and was accessible only for the enrolled students, “copyright” was not a serious ethical consideration. But the instructor warned about this case.

Some of interaction modules of course web site were internal modules of Moodle in the former implementation. In 2010 Summer School, the instructor preferred a wiki platform from Open University, which seems more user-friendly, compared to Moodle based one.

The LMS platforms for course site and students’ project sites are separated. This bisects the risk of interruption.

3.4  The results of the interview related to 2011 Summer School implementation:
In 2011 Summer School, the instructor made changes in some parts of lesson. He added new resources. Especially multimedia materials supported the students’ multiple intelligences. Variety in resources increased the students’ success in lesson.

Another issue drawn from the interview was that although communication tools, such as forum, chat, e-mail, etc. are used in that platform, these tools cannot usable for large groups. For crowded groups, instructor suggested that using web 2.0 or 3.0 application as a communication tools. Lastly, the instructor underlined the fact that nearly a hundred students take this lesson in summer school and that brought some problem especially, need of support, for example lecture assistants, technical supports staff, etc. As the number of students increase, this need was also increasing.

4. CONCLUSION
The most important finding of the study was that both the instructor and the students emphasized the fact that the project work has a positive effect for the students. Participation in the design of a course with iterative processes was accepted to be effective in learning of the subject. The instructor also highlighted that lesson projects might be more creative and followed the future trends.

Another important finding of the study was that the implementation of such course design required a wider technical support. In this case, it was observed that the instructor has the sole responsibility of maintaining the servers, besides being the instructor. Student-instructor interaction was an important aspect, especially in project development phases, and as a nature of online instruction. Interaction tools of course site were productively used.

As an outcome of this study, many important factors, which lead to successful results in implementation of LBD method in a Web-based environment, have been identified.

For the maintenance of the learning management system, a person should be employed. By doing so, the instructor could care more about the course content and facilitate better the students' projects. Besides,
technical support would be provided for students’ related problems on LMS, in addition to the assistance from the course instructor. The instructor indicated that this kind of support could facilitate students to be more successful.

The faculty or university should support these web based applications and these applications must be followed by universities. That is, web based application should be institutionalized by universities.

The distribution of tasks in collaboration should be followed by the instructor seriously. The validity of the projects is an important factor in the success of project.

5. REFERENCES.


