Running head: A DESIGN-BASED RESEARCH APPROACH TO IMPROVE AN EXISTING LEARNING MANAGEMENT SYSTEM

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*Introduction*

In a digital age when learning has become borderless, exists anywhere, anytime, and is a lifelong process, tools that facilitate this process have become significant to the success of learning. Distributed learning, otherwise known by online learning is the “linking of a teacher and students in several geographic locations via technology that allows for interaction” (Rudestam & Schoenholtz-Read, 2010, p. 2). Online learning usually is facilitated by Learning/Course Management Systems (LMS, CMS) that offer a wide range of affordances for online education. LMSs share common affordances whereas they may have certain differences. Adopting or developing a certain LMS for an organization or an institution requires careful evaluation of the product as well as of the stakeholders. According to Goodwin (2009), “Good design helps humans accomplish something in an efficient, effective, safe, and enjoyable way… and it serves human needs and goals” (p.4), and by that she meant the design of any digital product. Since online courses are delivered through LMSs, then what makes the design of LMSs a good one, and what affordances do successful LMSs have? In the following section, I will discuss some findings from the literature about successful design of LMSs and students’ and faculty’s satisfaction pertaining to that design. In the light of the discussed affordances, a design-based research plan to revise the pedagogy of an existing LMS that is already being used at a university will be proposed.

*Literature Review*

*Definition of Learning Management Systems/ Course Management Systems*

Dabbagh and Bannan (2005) define course management systems by “a collection of Web applications that integrate technological and pedagogical features of the internet and the World Wide Web into a simple, template-based authoring and presentation system that facilitates the design, development, delivery and management of web-based courses and online learning environments” (p. 298). LMSs have several offer instructional features that facilitate the online course delivery through course announcements, calendars, uploading course material (syllabi, PowerPoint, videos, podcasts, and documents), synchronous/asynchronous chat capabilities, wikis, blogs, assessments, and grade centers (Powell, 2008). A wide range of open source and commercial LMSs are being used today by many organizations and universities, and of the most known platforms are Blackboard, Moodle, Sakai, Saba, Angel Learning Management Systems (recently purchased by Blackboard), and eCollege.

*Comparing the Affordances of two Widely Used LMSs: Moodle vs. Blackboard*

Moodle and Blackboard are two world-wide LMSs used by many organizations as well as universities to facilitate online course delivery or even file sharing. Figure 1. presents the mostly adopted LMSs of the year according to the eLearning Guild survey which measures the use of over 100 professionally-developed LMS products. Moodle is ranked as #1 preferred product followed by Blackboard. What makes universities or organizations select an LMS over the other depends on several factors. Challoo and Rodriguez (2010), Tella (2011), Aydin and Turkes (2010), Momani (2010), describe the specific features of each of Moodle and Blackboard. A summary of these features based on Momani’s (2010) classification of affordances is outlined in Table 1.

Momani (2010) illustrates the pedagogical factors, learner environment, instructor tools, course and curriculum design, administrator tools, and technical specification of both Moodle and Blackboard. In his description of both LMSs, basically they share almost the same features with respect to the measured affordances as outlined below. Aydin and Turkes (2010) share another comparison of Moodle with three other LMSs. Instead of pedagogical factors, learner environment, instructor tools, (in Momani, 2010) Aydin and Turkes refer to them as didactic functionality. As for the technical requirements, there are some differences between both LMSs and the biggest difference lies in Moodle’s open source nature. While Moodle is free, Blackboard is much more costly. However, Moodle requires a support team to deal with the technical issues while Blackboard provides all the support for the client.

*Figure 1.* LMS product usage including education

Table 1. Comparison between Moodle and Blackboard

|  |  |  |
| --- | --- | --- |
| Pedagogical Factors | Moodle | Blackboard |
| View course objectives | √ | √ |
| View course activity | √ | √ |
| Feedback for users | √ | √ |
| Self-assessing for students | √ | √ |
| Students’ progress tracking and monitoring for teachers | √ | √ |
| Learner Environment |  |  |
| Real-time chat room | √ | √ |
| Audio/Video conferencing | √ | √ |
| Whiteboard | √ | √ |
| Discussion forums | √ | √ |
| File sharing | √ | √ |
| Internal e-mail | √ | √ |
| Online journal | √ | √ |
| Metadata and keyword search engine | √ | √ |
| Search within courses | √ | √ |
| Calendar/ Progress Review | √ | √ |
| Student profile | √ | √ |
| Work offline | √ | √ |
| Instructor Tools |  |  |
| Online editor for course organization | √ | √ |
| Online quiz editor | √ | √ |
| Grade distribution | √ | √ |
| Course and Curriculum Design |  |  |
| Automated testing | √ | √ |
| Online grading | √ | √ |
| Course templates | √ | √ |
| Curriculum management | √ | √ |
| Customize look and feel | √ | √ |
| Automated glossary | √ | √ |
| Administrator Tools |  |  |
| Authentication | √ | √ |
| Course Authorization | √ | √ |
| Validation of input | √ | √ |
| Automated registration | √ | √ |
| Course creation, duplication, and deletion | √ | √ |
| Course and web site back-up | √ | √ |
| Statistics | √ | √ |
| First and last access date for courses | √ | √ |
| Technical Specifications |  |  |
| Client browser required | All | For the Windows 2000: IE 6.0, Netscape 7.1 and 8.0, and Firefox 1.0.  For Windows XP: IE 6.0 and 7.0, Netscape 7.1 and 8.0, and Firefox 1.0.  For Mac OS 10.2, 10.3, and 10.4, compatible browsers include: IE 5.2, Netscape 7.1, Firefox 1.0, Safari 1.1, 1.2 and 1.3. |
| Database required | Oracle, MS SQL Server, MySQL, PostGreSQL | Oracle and MS SQL |
| UNIX server | Linus or UNIX | UNIX |
| Windows server | Available | Available |
| Help desk | Online tutorials | Online tutorials |
| Multi-languages support | 77 languages | 8 languages + language pack editor |
| Cost | Free | Annual license fee |
| Open source | The software is distributed under one of the OSI-approved licenses |  |

*What makes an LMS a successful tool to facilitate online learning?*

Aydin and Turkes (2010) provide a description of the elements of a successful LMS by citing (Kis, 2007; Kritikou, P. Demestichas , Adamopoulou, K. Demestichas, Theologou & Paradia, 2008). A successful LMS can afford the following:

* “Creating content in different input format (Scorm, IMS Content Package, MPEg file, Office file, JavaScript, PHP),
* Including tools for content development and management of content installation (Modular Structure),
* Database support,
* Advanced search and header hiding ability,
* XML support to work with different systems,
* Compatibility with industrial standards (AICC and SCORM e.g.),
* Video Conferencing support,
* Exam module, Online exam (test based question preparation),
* Student education process prosecution,
* Multiple language support,
* Calendar,
* Backup support,
* Chat tool,
* Whiteboard,
* Group work, debate forums,
* Ease of system installation,
* Survey adding,
* System requirements (the less the requirements are the easier it is to set-up).” (p. 177).

Based on the description of the most adopted LMSs, Moodle and Blackboard, in the previous section, and when compared to Aydin and Turkes (2010), features of successful LMSs mostly resonate.

According to a design-based research conducted by Chen, Wang, and Hung (2009) to refine rules for online discussions, the following features of LMSs should be added to platforms in order to ensure more interactive online discussions. The suggested tools were the following:

* Activity Management System (AMS) – Design
* Group Management System (GMS) – Commitment
* Reference Management System (RMS) – Engagement
* Personal Assistant System (PAS) – Bridging
* Body Language System (BLS) – Acknowledgement
* Portfolio Management System (PMS) – Reflection

Their justification for adding an activity management system (AMS) lies in its structure to provide templates of activities that faculty could either choose from or they could create their own. They also proposed adding a group management system (GMS) that could form groups and dismisses them upon the completion of tasks in order for the instructor to save time assigning groups. Creating a reference management system (RMS) was also suggested by Cheng et al. (2009) so that learners can refer to each other’s posts by including an ID, link, which is individualized for every post. They also implied that the inclusion of a personal assistant system (PAS) that could send the students reminders from the LMS would also increase participation in online discussions. Equally important is including more body language emoticons which could prove that someone has read somebody’s post in online discussions. Cheng et al. also recommended creating a portfolio as another space in LMSs in which students can collect their contributions in personal page where they can reflect on their work and choose to publish them for the whole class to read.

However, student and faculty perceptions of a successful LMS have greater implications for the design of LMSs. A deeper understanding of how success of LMSs is interpreted by students and faculty is presented below.

*Student Perceptions of a Successful LMS*

A study conducted by Little-Wiles and Naimi (2011) on students’ perceptions of Blackboard revealed several usage specifics as well as students’ opinions about the LMS. Students reported the usefulness of the syllabus section, the resources, the grading system, the assignment section, and communication tools such as chat rooms and discussion boards. Although many students showed overall satisfaction with Blackboard as an organized LMS that provides them with the opportunity to navigate through all the course content in one program, however, others thought that Blackboard needs reorganization of structure for ease of navigation (Little-Wiles & Naimi (2011) & Challoo & Rodriguez (2010)). Students’ perceptions about the use of Blackboard were also ameliorated by the type of course they were taking when the study was conducted. Finally, students recommended having a mobile app for Blackboard that could be more portable and that is because not all universities have Blackboard mobile app yet. Klobas and McGill (2010) note that student involvement in online courses through discussion boards and different activities resonates with their perceptions of a successful LMS based on a study conducted at an Australian university. Hence, several basic features of an LMS such as communication tools, file sharing, a grading center, and mobility play an important role in the success of an LMS based on students’ experience in using these tools.

*Faculty Perceptions of a Successful LMS*

Unlike students who evaluate an LMS through its features, a study conducted by Steel (2009) proves that faculty perceive the success of an LMS in its ability to support pedagogical features. She reported case studies of three faculty members who use Blackboard to teach online at a university. The case studies overshadow the variety of teachers’ use of an e-learning tool whose use varies across a wide range of teaching styles. One of the faculty members in this study expressed the importance of communication tools that support the development of an “inclusive, social, engaging learning environment” (p. 405). Steel emphasizes the findings from her study that active participation, socialization, communication, collaboration and authentic materials and experiences are key factors that all three teachers in her study were interested in fostering in their online learning environment. Hence, tools that could afford the mentioned pedagogical strategies should be taken into consideration when designing an LMS to meet the varied needs of teachers.

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