

Web-Enhanced Project Management Course

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Abstract

The popularity of Skype, bulletin boards, text messaging and Facebook among today's youth paves the way for adapting learning management systems (LMS) allowing for the same experiences in the academic milieu. It also paved the way to the recognition of using a different blackboard being used to allow for anytime, anywhere learning to enhance and supplement traditional instruction. This is the Blackboard Learning Management System (BLMS). It is a learning platform which allows the web engineering students to access mini lectures, examinations, assignments, and classroom discussions and activities. This paper discuss the design and development of a web-enhanced project management course, a capstone course for graduating engineering students that integrates all the basic knowledge a student has learned in project management. The development and implementation of a web enhanced course in Project Management coupled with the use of classroom multimedia instruction, active and cooperative learning aimed to facilitate the teaching-learning process compared to the traditional whiteboard instruction.

Keywords: *Educational management,, innovation, project management, web enhanced*

1. Introduction

The teacher has always been the “star” of the whole show. Student learning is, for most of the time, passive. Communications technology has provided the academe an alternative in the delivery mode of instruction. The Learning Management System (LMS) leads the students to an infinite resource of information available in the Internet for better knowledge acquisition. It allows for real-time interaction between the members of the class anytime and anywhere [1]. It is an arena where asynchronous communication take place addressing the need for continuous exchange of ideas beyond the limits of time and space a traditional classroom can offer. More importantly, the LMS delivers timely feedback to various student activities required of the course. The LMS makes teaching more learner-centered as the teacher becomes the “guide” to learning [1, 3]. The teacher directs the students the internet resources and designs web-based activities allowing for student collaboration. The teacher can give more than what he traditionally delivers. In turn, the students get to know and learn more not only about the course but also about his classmates and his teacher [1, 4]. Learning becomes more fun and exciting.

New fields such as Construction Project Management, Engineering Management and Energy Management emerged to meet industrial and societal needs.

New topics such as MS Project and Primavera Planning were added to the project management course. These did not only place considerable pressure on curriculum time allocation but also led to excessive workloads and increased education costs for students [1, 2].

Curricula that attempt to remain current with industrial practice by continually providing courses in the “new technology” are likely to be ineffective [1, 6]. By the time the need is identified, the courses developed, and the students trained, the new technology has changed. The education that succeeds will be the one that facilitates lifelong learning, equipping students with the skills they will need to adapt to change.

The truth is, “no matter how many new topics were”, it will never be possible to teach graduating engineering students everything they will be required to know when they go to work.

The internet has always been a widely accepted tool to supplement additional knowledge. If student learning skills can be enhanced and instructor teaching can be facilitated by integrating the course with a learning management system delivered via the internet, then engineering graduates will be more ready to meet the demands of industry and society [1, 7].

The BS degree course in Engineering (Civil and Mechanical) is a 4- year course consisting of 139 credit-hours (12 credit-hours university requirements, 54 credit-hours college requirements, 68 credit-hours program and /or departmental requirements and 5 credit-hours free courses) based on educational system of Qassim University [2] At the University of Qassim the educational system in the college is based on two main semesters per educational year. Each semester is fifteen (15) week length. In addition; an optional eight week summer semester may be offered. An engineering student may complete any of the engineering programs in 8 semesters after the Preparatory Year Program (PYP). A successful engineering student may complete the full requirements of the selected program if he completed (after the PYP) a total of 139 credit-hours [2].

One of the general courses in engineering is project management, a 3-unit subject offered this semester. Project Management is the capstone course in general engineering since it integrates almost all the knowledge a student has learned in 4 years of college education [2]. This course has traditionally been delivered through classroom whiteboard instruction to engineering students. Often the one semester learning period is insufficient to fully discuss all the topics for this course.

In the past years, a shift to the use of multimedia through PowerPoint Aided Lectures (PAL) and, Active and Cooperative Learning (ACL) has been implemented to facilitate teaching and learning the Project Management course. Last two years, another innovative learning strategy was implemented when the course was delivered through a web enhanced Learning Management System (LMS) called Blackboard [7, 8]. This paper will discuss the advantages and disadvantages of these innovative learning strategies compared with traditional chalkboard learning. Lessons learned from a one-semester implementation of a web enhanced course will be discussed such as problems on online access and cheating during online assessments.

The development and implementation of a web enhanced course in Project Management coupled with the use of classroom multimedia instruction aimed to facilitate the teaching and learning process compared to the traditional chalkboard instruction [9].

2. Literature Review

2.1. Course Web-Enhancement

The learning theories of constructivists dominate today’s e- learning and e-teaching. Constructivists regard knowledge as a creation of the learner himself drawn from meaningful experiences provided by the learning environment. John Dewey’s emphasis on the significant role of the learning experience; Jean Piaget’s belief on thought

development from previous beliefs; Edmund Husserl's distinction between meaning-intention and meaning-fulfillment; and Thomas Kuhn's discussions on paradigm shifts facilitate the design and development of web-based course curricula [10].

Web-based learning allows learners take a very active part in the learning process inasmuch as activities are provided for enrichment [11]. Thus, teachers delivering web-enhanced courses have to carefully design the activities of the learning environment to allow the learners to find meaning and fulfillment in what they are doing.

Web-enhancement in instructional delivery involves creating an environment where learners are supported in developing independent learning skills. Web-based activities can support the process of effective student-centered learning with technology by providing peer support in the task the learner is attempting, enabling learners to search for and share information and later perform these functions independently, and enabling learners to articulate problems, share solutions and engage on collaborative problem solving [12].

The integration of the World Wide Web in courses requires redesigning existing syllabi or creating new ones to effect the enhancements for better delivery and for a more relevant learning to take place. De Montfort University in the United Kingdom defines what the new course syllabus will include www case study material, enabling students to study a large volume of material in different ways and to make links with other Internet resources, computer-based assessments submitted electronically for marking, electronic study support via e-mail and conferencing and electronic document delivery providing information about the course content, structure and staff and schedules of lectures, practical classes and assignments [13, 14].

Web-enhancement goes beyond the lectures delivered by the teacher, the information and activities provided by the textbook, the limited interaction between students inside the classroom, and the scheduled sessions with the teacher [15]. Relevant topics which cannot be discussed in the classroom due to limited time may be included as requirement for the completion of the course. The latest discoveries, improve-mints, and applications of the subject matter in hand, which are not provided by the text book can be integrated. Group discussions can progress and terminate formally within the allotted time without disrupting the lecture hours of the course and not necessarily being present in sharing ideas and experiences [14, 15].

2.2. Project Management Course

Project management is a carefully planned and organized effort to accomplish a specific one-time objective, for example, construct a building or implement a major new computer system [2, 16]. It introduces the concepts and methods of developing a project plan, which includes defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved, quantifying the resources needed, and determining budgets and timelines for completion [2]. Table 1 shows the coverage and requirements for the course. The total number of hours needed to finish the course syllabus is 56 hours for the whole semester. This does not include the times when faculty members are not able to attend their class because they participate in faculty development activities such as seminars and conferences.

One of the major course requirements in project management course is case study. The class is divided into groups of six members and each group is assigned to pre-prepare a case study with application of SWOT analysis in relationship with the course outline discussed.

As shown in Figure 1, a timetable of activities is prepared for this purpose where parts of the project are submitted at specific deadlines and graded in accordance with design criteria for presentation. At the end of the semester the complete case study final report is submitted. The project constitutes 10% of the final grade.

The preparation of the project is done outside class hours and entails a significant amount of team effort on calculations and data collection.

Table 1. Course Outline and Course Requirements of Project Management

PART 1		PART 2	
Project Management 1	Number of Hours	Project Management 2	Number of Hours
Project Management Concepts	2	Engineering Ethics	2
Initiating Process: Linking the project to the product. Problem, product and project scopes.	2	Behavioral Management: Stress management, Conflict management	2
Balancing competing demand with the triple constraints. Project success.	2	Negotiation and Anger management	2
Quiz No. 1	1	Quiz No. 3	1
Planning Process: The work break down structure	2	Second Midterm Exam	2
Gantt chart and PERT	2	Project Execution Process	1
First Midterm Exam	2	Project Controlling and Project Monitoring Process	1
Quality plan , Communication plan, Implementation plan	2	Project Closing Process	1
Project Organization, leadership, delegating, power, project vision and mission	2	SWOT Analysis and Case Studies.	3
Quiz No. 2	1	Quiz No. 4	3
Motivation, positive and constructive feedbacks, communication, team building and decision making	2	Hands-on Primavera Planning and MS Projects	16
Total	20	Career Success. Final Examination	5
Course Requirements		Time Allocation	
1. Quizzes	8	Hours Needed for Lecture and Exams	56
2. Homework/Reports	10	Passing Grade: Between 59 and 60	
3. Midterm Exams	30		
4. Projects	10		
5. Attendance	2		
6. Final Exam	40		
Total	100		

3. Strategies Employed to Manage Project Management Course

In the early nineties, the project management course was delivered using traditional chalkboard and transparencies on overhead projectors. Through the years, teaching innovations have been employed to improve the teaching and learning process. These are:

3.1. Active and Cooperative Learning

The class members were divided into teams and are required to select a leader. The grouping was based on individual student's learning styles and are selectively grouped based

on equal distribution of grades incurred in the prerequisite subjects. Assignments, seatwork and case studies were given as team activities. At certain times, games were played where teams compete against each other. This activity was very popular among the students but due to time constraints it was not implemented extensively.

3.2. PowerPoint Aided Lecture (PAL)

In the mid-nineties, power point was used in delivering lectures. A multimedia room was assigned to the 5th year graduating students that contained a computer, printer, video player, an LCD projector and an Internet connection [17]. The use of PAL facilitated the teaching of the subject. The main constraint however was that the students preferred chalkboard where derivations and problem solving were involved. The students were not given a copy of the PAL to ensure that they copied notes and listened during discussions

3.3. Software Aided Calculations and Design

Problem solving was made easier by the use of software. Part 1 of the course which required spreadsheet calculation and graphical projections were easily delivered using Microsoft Excel. PERT-CPM, Time scaled event network and, crashing and cost plan were made a lot easier using MS Project. Students were able to make use of primavera planning in the preparation of network diagrams. The students were trained in all these software in a separate course (Computer applications in Civil Engineering and Mechanical Engineering).

3.3. Internet Classroom Assistant (ICA)

Students were asked to log in to a website called Internet Classroom Assistant (ICA) [21]. ICA provides a free web-based learning environment for classrooms, distance learning programs and collaborative academic projects.

Lectures were uploaded and made available through a free web hosting site called Qassim who's URL is as follows: ([http:// www. stdatt.qec.edu.sa](http://www.stdatt.qec.edu.sa)) and web links were posted at ICA where students can easily access them. ICA also facilitated the discussion of ideas among students via email [18].

4. Blackboard Learning System

In November 2011, Qassim University subscribed to blackboard (www.blackboard.com), a learning system used in over 2000 universities and institutions worldwide [19]. Blackboard provides a convenient platform where students and teachers can access a robust set of tools, functions, and features for teaching and learning. Among these features shown in Figure 1 are 1). Announcements, calendar schedules, links and assignments; 2). Develop simple assessment using a variety of examination types or by choosing from a pool of questions; 3). Timed online examinations with options for single or multiple access and automatically checked; 4). Improved grading and tracking of student quizzes where after taking the examination the student is provided with an immediate feedback and the results are automatically entered into a grade book; 5). Submit take home examinations, assignments and projects via assignments, digital drop box, or groups file exchange; 6).Facilitate communications through discussion boards, email, lightweight chat and virtual classroom and 7). Assess to a blackboard manual ([http//www.company.blackboard](http://www.company.blackboard)) for web support [20].

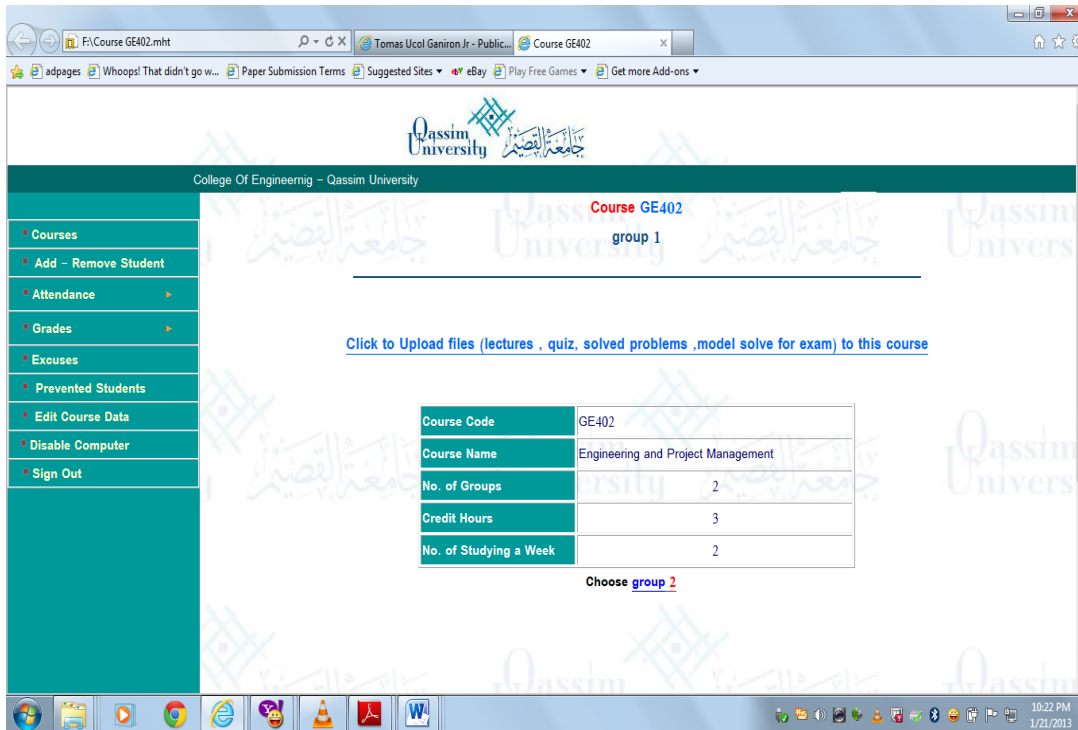


Figure 1. The Course Opening Screen of Blackboard Learning System Showing the Course Menu of GE 402-Project Management Course

5. Managing a Project Management Course Using Blackboard

The course on Project Management was one of 6 courses that test piloted the Blackboard Learning System. One class of 36 graduating engineering students were individually enrolled as blackboard users in Project Management. All the students were required to attend all classes since the course is a “Web Enhanced Course” (WEC) and not a “Fully Online Course” (FOC). As in the previous years, cooperative learning was fostered by dividing the students into groups of 3. Twenty-one groups (teams) were created and group-enrolled in Blackboard.

6. Features of Blackboard Learning System

6.1. Course Documents and Course Information

The course information contains all necessary materials such as the course description, syllabus and course requirements. All the lecture notes were uploaded into the course documents before the scheduled class day. Lecture notes were prepared using PowerPoint or Word and converted to pdf format. Problem statements and exercises were available for download minus the solution. The solution of problems was done in class using Mathcad or Microsoft Excel and the files were uploaded in mcd or excels format.

The easy access to all learning materials and class information provided a means for students to be reminded at all times of the course policies and deadlines. They had a complete set of lecture notes which they can study before the class and have available even if they fail to attend the class.

6.2. Assessment and Grade Book

One of the best features of the BLS is the creation of online examinations using a variety of question type (fill in the blanks, multiple choices, true or false, matching type, essay etc.) which the students can take anywhere [20, 21]. The exam is automatically graded (except for Essay) and students receive an immediate feed-back on their score; this grade is entered into a grading sheet called the grade book.

Most of the online examinations given to the students were Fill in the Blanks, short objective questions (10 questions) and design problems where the students must write only the answers. Team Examinations were also given to teams where the score was the same for all team members. These gave the students bonus grade points to be added to their classroom quizzes and major examinations.

One of the accepted problems in giving online examinations is cheating taking place. Among the methods used by students are: students sit in for other students; students “getting help” from others (classmates, other teachers, parents), students use a variety of materials to “aid” in the completion of a test or exam, students get around quiz time limits: they log on to a quiz, download it, log off then log on again with answers, students download papers from the Internet.

A survey on classroom cheating versus online cheating was conducted among the graduating students to determine if online cheating was taking place. Figure 2 shows that 92% of the students did not cheat during classroom exams whereas 55% cheated once or twice during the online exams.

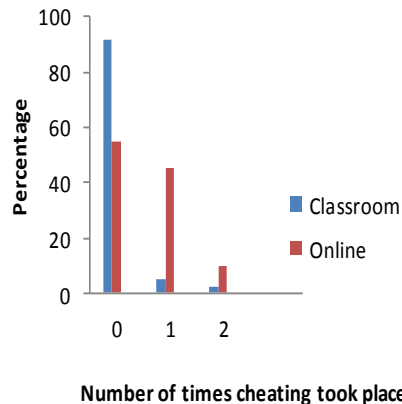


Figure 2. A Comparison of Students Who Cheated in Online Exams and Those Who Cheated in Classroom Exams

To discourage cheating online, three approaches were employed: the trust, fence and threat methods. A comparison of these methods and the strategies employed to prevent online cheating are shown in Table 2. At the beginning of the course and before any examination, the students were made to understand and sign an “Honor Pledge” indicating that they did not take part in any form of cheating and that any known violation of the honor code stated in their student manual will mean failure of the course.

Students were apt to abide by the “Honor Pledge” during classroom quizzes than during online quizzes. The most popular cause of cheating mentioned was peer pressure.

Table 2. Strategies Employed to Prevent Online Cheating Communications

Trust Method	Fence Method	Threat Method
Trust students not to cheat	Provide means to prevent cheating	Threaten them with punishment
Make students not to cheat. Make tests easier by including lots of short self-study drills that give students a chance to practice. Reduce the importance of grades. Use tests for only a small percent of the final grade or give online tests as bonus point to be added to the final grade. Consider group exams. Allow “open-web” tests. Allow multiple attempts. This lets students go back and practice or review while at the same time discouraging cheating; it also removes some of the pressure.	Provide means to prevent cheating. Create different sets of tests questions. Randomly select questions from a list. Randomly order multiple choice questions. Give essay questions. Show questions one at a time/no backtracking. Time exams/Control access time. Allow only single attempts. Proctored on- line exams/video on-line exams.	Threaten them with punishment. Make students sign an honor pledge that indicates the consequences of cheating. Learners caught cheating will fail the subject. Those who help another cheat are treated as cheaters. Those who fail to report cheating are cheaters themselves. Accusations of cheating are treated as confidential.

7. Digital Drop Box

The Digital drop box is a tool that the Instructor and Students can use to exchange files [19, 22]. Problem solving and writing assignments, design projects and a take home exam were submitted using the drop box. A variety of file types (doc, mcd, xls, bmp, jpeg, *etc.*) were submitted by the students which filled up immediately my allotted course size quota of 5 megabytes. The files were difficult to manage because students submitted filenames that did not indicate what requirement was being passed and some students even submitted several versions of the exam solution.

As shown in Figure 3, students were more attentive when the delivery of the course was combined with multimedia lectures, active learning through games⁷ and web enhanced. They found it very different from traditional teaching-learning and were satisfied with the way the classes were conducted.

Overall they found the blackboard system, the course content, class integration of web materials and the black-board delivery satisfactory. They said they were able to develop their learning skills from surfing the internet and they had better grades because they were given more chances to increase their scores.

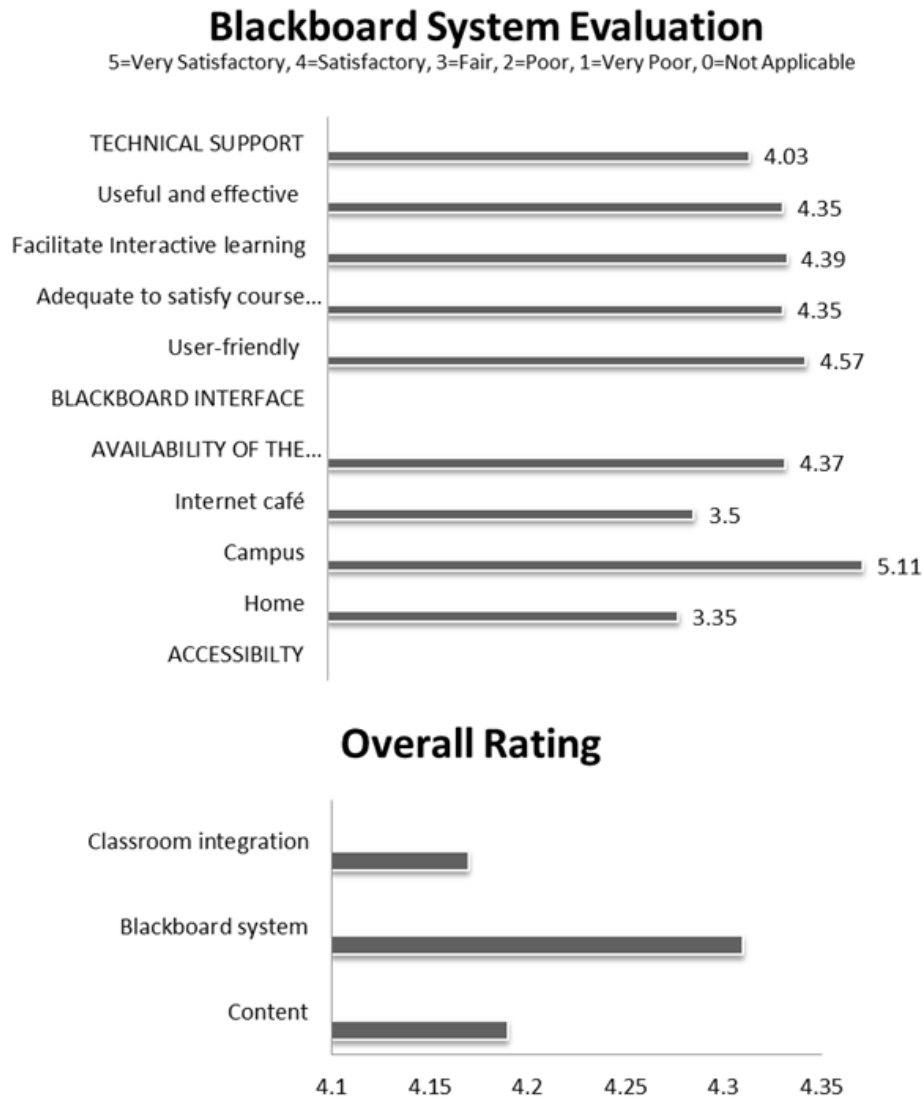


Figure 3. Survey on the Effectiveness of Learning System and Classroom Integration of a Web Enhanced Course

8. Conclusion

Teacher has a lot of considerations in making their Project Management Course interesting to engineering students. Like in web enhanced, teachers can make use of the web to upload their lectures, give reading assignments using subject links, provide discussion boards for individuals or groups to develop critical thinking and give on line examinations that are automatically checked by blackboard. Students on the other hand are able to learn more than what is given as lecture materials in the classroom and get additional points for solving online examinations.

Another, discussion of Blackboard Learning System is the creation of online examinations using a variety of question type which the students can take anywhere. Additionally, showing the enthusiasm in using web enhanced could also another form of motivational factor to the

learner. The teacher should always have the excitement of presenting the lesson and examination.

Some of the constraints of a web enhanced course are inequitable availability of the blackboard learning system to students and preventing cheating online. Online accessibility problems can be solved by proper blackboard learning management system such as providing free internet access to the students. Online cheating can be solved by techniques such as trust, fence and threat methods.

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