

An E-classroom Management System Implementation: Contextualization, Perception, and Usability

John Oliver P. Brioso
Far Eastern University, Manila, Philippines

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ABSTRACT

E-Learning can be viewed as an innovative approach for delivering well-designed, learner-centered, interactive and facilitated environments to anyone, any place, anytime by utilizing the attributes and resources of various digital technologies along with other forms of learning materials that are suited for open, flexible and distributed learning environments. The role of learning management system (LMS) in pedagogical practices has expanded in recent years. Blended Learning which uses education technology tools is proving to be influential in helping both students and teachers to flipped their classroom management from didactic approach towards blended learning through LMS that is more student-centered and constructivist. This study was conducted in order to aid the encountered problems based on the gathered data and aimed to address the cited issues, inadequacies and problems that were gathered by the proponent and improve the methodological aspect of teaching-learning system by developing a new approach in delivering education through web-based scheme. Also, this research is bound to know the readiness, acceptability, and effectiveness of the proposed IT Capstone Project under certain formulated criteria such as Functionality, Usability, Reliability, Performance, and Supportability (FURPS) and to show comparison between the effectiveness of face-to-face learning-teaching compared to a blended learning environment in Pamantasan ng Lungsod ng Pasig (University of Pasig).

Keywords: LMS, Blended Learning, E-learning.

1. INTRODUCTION

We are living in the techno-era. The time has been changing rapidly if we compare it with ancient times. Various techniques have been discovered in the area of educational learning with a view of time saving and getting good results.

Technology has blurred all the boundaries across the globe. It has an intensive impact on learning. As we are aware that our life is totally dependent on electronic devices for whole 24 hours every now and then from morning to night. Technology for learning is used in the collection, processing, transmission, and interpretation of information. Human learning capacity can be enhanced with the optimum use of various technologies but need effective training. Technology is changing all aspects of human life from A to Z.

Educational institutions, through its school administrators and information technology personnel, have developed various application enhancements regarding learning that will narrow the gap between the institution's stakeholders – students, faculty members, and administrators. Pamantasan ng Lungsod ng Pasig, the sole local university in the city of Pasig, has already developed systems for the improvement of the traditional educational methods such as enrollment, student registration system, and so on. However, the university has not yet

implemented an e-learning or learning management system, according to the students and professors of the university.

Aside from letting students learn only within the walls of the lecture rooms of Pamantasan ng Lungsod ng Pasig, given that most of them are engaged in the online community, perhaps it will be more enjoyable to students if the process of learning be extended to the zone where they find it accessible, resourceful and amusing – the Internet. Learning management system is a web-based application used to assess, implement and plan a specific learning process according to Rouse (2005). This system collates all of the academic-based tasks into one portal that allows interaction between students and teachers and any other school administrator if available. Resources from electronic media, assessment of student performance through online examinations, monitoring of student participation through grade and attendance monitoring with the use of Short Message Service (SMS) technology and interest to subject matter even advanced communication medium between teacher and student through posts, forums and for some advanced e-learning system are all packaged into this innovative system that supports educational processes through the use of information and communications technology.

Pamantasan ng Lungsod ng Pasig from its mission and vision is striving for academic excellence and quality education, yet there is an opportunity to enrich the traditional method of learning and take advantage of technology to advance the learning procedures of its young professionals. Looking at the magnitude of different activities that can be improved by the use of information and communications technology, a learning management system for the Pamantasan ng Lungsod is time-bound and feasible.

Class participation is limited in the classroom. According to some students in the university, for there is a minimum of three hours per week for general education subjects, by which not all voices and ideas from at more or less forty-five students per class. And, according to the number of students per class last academic year 2014-2015, is heard and molded in the classroom. In line with the aforementioned, there are various reasons for absences of students that affect cancellation of classes due to bad weather, orders from the high offices of the university, monthly university activities, and others events which lessens the time of accomplishing the course syllabus of a certain subject area. In terms of the students' attendance, reports are increasing about unofficially dropped without any notice, is commonly observed. These concerns affect the foundation of students in learning – their behavior towards class participation and these may become barriers in the communication between teachers and students. All of these can be resolved if there will be a technology that will allow students and professors of Pamantasan ng Lungsod to collaborate in a place accessible anytime and anywhere.

Likewise, a learning management system for Pamantasan ng Lungsod ng Pasig will provide a powerful, uniform, and secure 21st-century instructional environment that will allow instructors to showcase their talents as educators, students to express their ideas while utilizing technology to create innovative and original educational experiences. Learning management systems have made learning jump shift to a teacher-centered to a learner-centered process. Furthermore, the online community is already influencing the way information and knowledge are delivered and shared to university stakeholders. In areas of education, learning management system presents an instrument that has capacity to be more responsive to students, to encourage greater participation in their own learning, to give easier reach to a variety of sources of information than the traditional paper-and-pen method offers, and also to encourage not only the students but give the parents or guardians opportunity to involve themselves in tracking their child's grades and participation in class through attendance monitoring that will facilitate through the use of SMS technology.

Parallel to the aforementioned situation, the development of E-classroom Management System with Performance Mechanism Feedback is an application software/program that facilitates learning management system with the integration of SMS technology utilized for sending grades report and attendance monitoring purposes. This proposed system will improve the learning process offered in the university, promote the efficiency of e-learning in teaching, acquiring knowledge within the target subject mastery and solve educational problems presently encountered and caters the involvement of parents or guardians to keep track the performance progress of their child in school which may be addressed by having an e-learning system devoted to Pamantasan ng Lungsod ng Pasig.

2. STATEMENT OF THE PROBLEM

This study aims to develop and determine the effectiveness of an E-classroom Management with Performance Feedback Mechanism System for Pamantasan ng Lungsod ng Pasig.

This study aims to investigate and find the answer to the following problems:

- What are the problems, inadequacies, and issues existing in the current process in terms of delivering education and students concerns?
- How ready and acceptable is the E-classroom Management with Performance Feedback Mechanism System as perceived by the respondents?
- What are the respondents' perception on the effectiveness of the existing system (traditional learning-teaching) system in terms of:
 - a. Content of information characteristics,
 - b. Instructional design and presentation,
 - c. Class interaction aspects,
 - d. Methodological aspects,
 - e. Learning outcomes.
- What are the proposed system features/modules that can be designed to address the existing problems, inadequacies, and issues in the present process?
- What is system development tool appropriate in designing and developing the proposed e-classroom management with performance feedback mechanism system?
- Is there a significant difference between the existing system and the proposed system in terms of :
 - a. Content of information characteristics;
 - b. Instructional design and presentation;
 - c. Class interaction aspects;
 - d. Methodological aspects;
 - e. Learning outcomes.
- How effective and acceptable is the proposed system in terms of:
 - a. Functionality;
 - b. Usability;
 - c. Reliability;
 - d. Performance;
 - e. Supportability.
- Is there any significant difference between the existing and the proposed system as perceived by the respondents when they are grouped according to the category in terms of Functionality, Usability, Reliability, Performance, and Supportability (FURPS)?

3. OBJECTIVE OF THE STUDY

The general objective of the study is to develop an E-classroom Management System with Performance Feedback Mechanism for Pamantasan ng Lungsod ng Pasig which will enhance the traditional method of the teaching-learning system and would be used for evaluating and keeping track of students' performance.

This proposed capstone project specifically aims the following:

- To resolve the problems, inadequacies, and issues existing in the current process in terms of delivering education and students concerns.
- To determine the readiness and the acceptability of the proposed system as perceived by the respondents.
- To determine what the respondents' perception of the effectiveness of the existing method (traditional learning-teaching) in terms of:
 - a. Content of information characteristics,
 - b. Instructional design and presentation,
 - c. Class interaction,
 - d. Methodological aspects,
 - e. Learning outcomes.
- To develop a system that would have a user interface module and facilitate the following features objectives.
 - a. **To be able to develop a learning management system to achieve learning more effectively and to improve information content delivery.** Learning activities and course contents will be housed in one setting and delivered over a Web-based interface, allowing for an entirely remote educational experience for the instructor and student and thus reduce costs while also creating greater visibility for learning opportunities. Instructors can more easily prepare and present quality courses that will act as positive learning opportunities for course participants.
 - b. **To improve compliance reporting.** Able to produce pertinent report files such as the list of students, users and activity logs for monitoring, recorded grade files, and item analysis analytics and the like.
 - c. **To empower educational administration through analytics.** The instructor will become more informed of the learning of the students who participate in by tracking the course topics which needs greater focus through item analysis reporting.
 - d. **To integrate Short Message Service (SMS) technology.** An instructor can facilitate sending messages through SMS technology. Be able to send educational announcement concern to the students.
- To determine the appropriate development tool in designing and developing an e-classroom management with performance feedback mechanism system.
- To prove the significant relevance on the level of effectiveness assessment on the proposed system as perceived by the respondents according to:
 - a. Content of information characteristics,
 - b. Instructional design and presentation,
 - c. Class interaction aspects,
 - d. Methodological aspects,
 - e. Learning outcomes.
- To evaluate the system in terms of Functionality, Usability, Reliability, Performance, and Security (FURPS). Evaluate the system in terms of Functionality, Usability, Reliability, Performance, and Security.

- To assess if there is a significant difference between the existing system and the proposed system as evaluated by the respondent's system in terms of Functionality, Usability, Reliability, Performance, and Supportability.

4. SCOPE OF THE STUDY

The study covers the development of E-classroom Management System with Performance Feedback Mechanism. It is a web-based learning management system for Pamantasan ng Lungsod ng Pasig with the following scope:

4.1 Learning Management System. Design and develop a web-based modular learning management system for Pamantasan ng Lungsod ng Pasig that includes the following features:

- Creation and uploading of lessons (Learning Materials);
- Construction of assignments and projects with enabling setting configuration (submission deadline);
- Administering and management of assessment examination (quizzes, activities, etc.);
- Downloading of learning materials and response to lessons of instructor.
- Manage class group members.
- Facilitate group page virtual bulletin board for announcements, activities, and collaboration with students and instructor;
- Content Management System. It includes the university calendar, student and university information, helpful and related course links and downloads.

4.2 Grade Recorder. Design and develop a module that will facilitate a web-based grade recorder module that would allow the instructor to see record/s of students' performance evaluation (eg. quizzes, exams, projects, etc.) and keeping track of the student's attendance as well.

- Records students score evaluation from different assessment tools (quizzes, activities, assignments, projects, and the like);
- Attendance monitoring.

4.3 Analytics. Design and develop a module that will facilitate grade analytics and assessment examination descriptive analysis.

- Evaluation and generating grade analytics report base on the grade recorder particularly grade summary report;
- Evaluation and generating an assessment examination analysis report base on an examination given specifically item analysis report.

4.4 SMS Technology. Design and develop a module that will facilitate the integration of SMS technology for performance feedback mechanism.

- Sends educational concern messages to both student and parents/guardians for monitoring purposes.

5. REVIEW OF RELATED STUDIES AND LITERATURE

The following the related studies and researches of several authors who studied and researched the same concept.

Ballesterol, et. al (2010) developed an LMS for Technological University of the Philippines (TUP). The study saw that there is a need to employ a distance education in TUP Manila, specifically on Bachelor of Technology major in Information Technology programs through

the implementation of e-learning and saw a potential of applying an LMS. The developed system used open source technologies like HTML, CSS, JavaScript, PHP, MySQL, Apache and x7Chat. The developed system serves as an aid for students and professors of the mentioned program. It was evaluated by fifteen respondents composed of five students, five professors and five technical experts who are randomly selected in the TUP campus and in the industry. The system's performance was also evaluated through to the Philippines Web Awards' indicators, namely: design, content, usability, and functionality. The result of evaluation shows that the developed system was "Very Acceptable."

Likewise, Doctor (2012) developed the Academic Resource Expert (ARX) System. Its main objective is to provide an integrated system for academic processes which integrates educational institutions independent information systems as solutions for their problems towards effectiveness and efficient institutional processes, redundancy of data, accessibility, and reliability of information. The developed system is intended to be implemented in different educational institutions that use independent information systems or to those that have no information systems for academic processes at all. Its features are composed of different academic modules namely: examination management system that facilitates creation of examination, collections of examination answers, auto-marking and submission of scores to the electronic class record and produce printable reports; e-learning management system that helps students and teachers collaboration in terms of learning materials and online consultations; student grading system that provides electronic class record and seat plan; faculty loading of subjects; has student enrollment; content management of web site; information banking of employee and student information; and management of different user accounts that provides privileges. It was also built using various open sources technologies such as PHP, HTML, CSS, XAMPP, JavaScript, and MySQL. It was tested based on the academic standards of Lyceum of the Philippines University, Cavite campus. The system was rated "Excellent" with a mean average of 4.79 by the respondents that include IT Experts, Faculty, Registrar, Human Resource, Student Admission Staff and the Dean for College of Engineering, which proves that the system can be a useful tool for educational institutions academic processes.

Additionally, according to PinoyTechBlog (2014), entitled "Moodle: Open Source E-Learning in the Philippines" mentioned the following:

First, among the open source greats is a learning management system (LMS) called Moodle. With the cheap PC and connectivity projects, we may have found an answer to a problem that is education.

Second, Moodle has been adopted by many educational institutions worldwide and is steadily gaining prominence in the Philippines. Among its features are lessons, quizzes, forums and reports just to name a few. And since it is open source, everything is customizable. There is a friendly forum for support at the site. Going further, it may even spur some IT businesses such as consultancy and tech support which can also offer services to international Moodle users.

Currently, De La Salle schools, Ateneo de Manila, St. Paul, Xavier, SEAMCO, UPOU, People Support and several other institutions are using Moodle as their platform of choice for e-Learning.

While the study of Marcial (2010), entitled "E-Learning 4-All: The SOUL Model" claims that Virtual - Class is a course management system that aims to provide enhanced and innovative teaching and learning experiences to all Sillimanians. The system can handle classes virtually.

E-Learning is categorized into two subsystems that cater to two groups of learners. First, E-Learn-P is a distance education program that caters to all individuals who wish to earn

non-professional degrees but is not able to take advantage of traditional modes of education. This subsystem provides alternative opportunities to aspiring online learners who wish to enroll in quality programs responsive to the demand for national development. Second, E-Learn-T is a learning management system that caters to any individual who hopes to acquire specific areas of learning through personalized electronic and online tutoring services but is not able to take advantage of the traditional modes of tutoring.

New communication and information technologies have become major resources for teaching and learning in higher education. An article published by Glencoe on Teaching Integration Strategies states that the use of technology has a positive impact on students' learning only when applied and utilized effectively. It can:

- Increase student motivation for learning,
- Improve communication of learning goals,
- Facilitate higher-order thinking skills,
- Build valuable skills that students will use in college and in the workplace
- Expand students' understanding from novice to mastery.

Silliman University (SU) is among the many educational institutions that wanted to change students learning through electronic learning. In August 2008, the Silliman Online University Learning (SOUL) system was launched and institutionalized by the University.

In addition to local related literature based from the Philippines E-Learning Society Online Journal (PeLS), written by Quimbo (2009), entitled "Teachers' Perspectives of the Quality of E-Learning Courseware Integration in the Secondary Curriculum", stated that an e-learning material that had provided the greatest impact on student psychomotor domain, followed by affective domain, then by cognitive domain. In the psychomotor domain, the findings show that apart from directly improving student skills in using the computer, teachers believe that e-learning has given students the opportunity to acquire the ability to access information and use the information as study materials at the same time.

On the affective domain, e-learning is perceived by teachers to have made the greatest impact in developing a positive attitude among students toward the major subject areas, engaging students to stay on-task, improving student confidence toward learning, and facilitating collaborative work among students. On the whole, e-learning makes an important contribution to the development of a positive attitude among students not only toward major subject areas but also toward the entire learning process. It has also facilitated collaborative learning, which has been found to effectively enhance and improve knowledge acquisition and positive learning behavioral change.

On the cognitive domain, e-learning is perceived by teachers to have brought the greatest impact among students in improving knowledge acquisition, reducing Mathematics anxiety, and increasing the emphasis on individualized instruction. These results indicate how e-learning is perceived by teachers as having made an important contribution to knowledge acquisition in major subject areas and as having helped teachers put the students at the center of the learning environment.

This local study was excerpted from the University of Southern Mindanao – Graduate School Website, Vasquez, Ed.D and Tabora Ph.D. (2014), entitled "Comparative Study of e-Learning Approach and Traditional Approach".

The study was conducted to determine the effect of teaching approaches in Central Mindanao Computer School, Mlang Cotabato, Philippines. Specifically, this research aimed to determine the effectiveness of the traditional method and the e-Learning method in teaching Introductory Accounting Part I Course and compare the difference in the achievement of students in the traditional method and those in the e-Learning method in teaching.

The research design was Pretest-Posttest-Control-Group Design. The two groups of students were randomly assigned to the control and experimental group. The pretest-posttest teacher-made tests were prepared ahead of time and were tested to be reliable research instruments of the study. The data gathered from the results of the pre-tests and post tests scores were analyzed using a common parametric statistical technique known as a t-test for dependent and independent samples to empirically compare the achievement of respondents in the experimental group and control group in terms of a pre-test, post-test, and gain scores.

The findings or results of the study showed that the pretest and posttest scores of the students in the traditional method differed significantly at 5% level ($p < 0.05$), and the pre test and posttest scores of the students in the e-Learning method differed also at 5% ($p < 0.05$). The comparison of the gain scores showed that the gain score of the experimental group was higher than the control group. The result in the t-test indicated that there was a significant difference in the achievement of respondents in the control and those in the experimental group at 5% level of significance ($p < 0.05$) with those taught using the e-Learning approach as performing better.

Same with local studies there are studies that are conducted around the world, a study by Li and Dong (2014), entitled "Towards a Knowledge Portal for E-Learning based on Semantic Web" claims that with the popularity of the e-Learning, Learning Content Management System (LCMS) emerged expecting to provide standard-based content repositories that allow learners to capture, store, deliver, and manage learning resources.

E-learning is an area which can benefit from Semantic Web technologies. The Semantic Web technology has enabled by a set of suitable agents, which seems to be powerful enough to satisfy the e-learning requirements – fast, just-in-time and relevant learning. It is suggested that the possible uses of Semantic Web technology for e-learning are:

- Pull: Knowledge items (learning materials) are distributed on the web, but they are linked to commonly agreed ontologies. This enables construction of a user-specific course, by semantic querying for topics of interest.
- Interactive: Software agents on the Semantic Web may use commonly agreed service language, which enables coordination between agents and proactive delivery of learning materials in the context of actual problems.
- Nonlinear: User can describe the situation at hand (the goal of learning, previous knowledge) and perform semantic querying for the suitable learning material. The user profile is also accounted for. Access to knowledge can be expanded by semantically defined navigation.
- Symmetric: The Semantic Web (semantic intranet) offers the potential to become an integration platform for all business processes in an organization, including learning activities.
- Continuous: Active delivery of information (based on personalized agents) creates a dynamic learning environment.
- Distributed: The Semantic Web will be as decentralized as possible. This enables an effective co-operative content management.
- Personalized: A user (using a personalized agent) searches for learning material customized for her/his needs. The ontology is the link between user needs and characteristics of the learning material.
- Dynamic: The Semantic Web enables the use of knowledge provided in various forms, by semantical annotation of content. Distributed nature of the Semantic Web enables continuous improvement of learning materials.

While, according to Tella et al. (2012), entitled "Impact of Web Portals on E-Learning" discussed that a portal is an application that primarily integrates the organization's information

and provides users with a single interface. A student portal is a web-based interface to access personalized information, resources, applications, and education/academic options with which students can reach a range of internal and external sources through a network connection in a password-protected setting.

However, another suggestion was made by Kaur (2017) in his study entitled “Deployment of Cloud in Blended Learning Environment to Enhance Academic Quality: An Indian Perspective” coined that blended learning is considered to be an emerging teaching practice of mixed learning environments for educational transfer. The technological backbone of blended learning is cloud computing. Blended learning with cloud enables the learner to access all the resources and applications as services anywhere and anytime. Cloud Computing is becoming an adaptable technology in the field of education with its active scalability and virtualization. Implementing blended learning approach under the umbrella of a cloud platform can reduce cost and provides security and compatibility.

Furthermore, in the study conducted by Radenković, Despotović-Zrakić, Barać, Bogdanović, and Milić (2011) entitled “Web Portal for Adaptive E-learning” claims that educational web portal is a single access point to all relevant information, resources, and applications in the education process. Web portal integrates different functionalities and services for adaptation of e-learning courses with existing learning management system. Integration includes educational web portal users, information, processes and software platforms used in an e-learning system. We describe the architecture of the portal for adaptive E-learning, technologies, design, and techniques applied in the implementation of portal's key components.

E-education systems provide various types of learning resources: tutorials, e-books, scientific articles, etc. Discovering adequate learning materials becomes one of the key issues in these systems. At the same time, each learning resource has some specific characteristics, when it comes to the way of presentation, areas of interest, the structure of content, etc. Learning Management Systems (LMS) stand out as the most appropriate software solution for the implementation of re-education. Learning Management Systems are environments that enable users to create, insert, manage, search and reuse small units of content and learning objects. Currently, there are many different LMS platforms. Moodle LMS has been used in Laboratory for e-business, University of Belgrade, for conducting courses at all study levels. This system is used by more than 700 students, every year. According to numerous researches, Moodle is one of the LMSs with the most functionalities and services. Moodle is flexible for implementing new components and integration with other systems and technologies.

Based on the related studies, these are the proponent's findings that learner experiences of an e-learning feature took a learner-centered and holistic approach which aimed to capture the richness and complexity of the learners' experience. The review established that:

- Technology use is pervasive and integrative. Learners make frequent use of technology at home and within their learning institution.
- Learners primarily use technology in order to access information, the dominance of internet and browsing such as Google and Wikipedia in everyday life is reflected in the choices learners make about how to find information.
- Similarly, personalization and choice are core elements of technology use in learner's everyday lives that they expect to transfer to their study is more enjoyable and convenient.
- Learners are involved in an underworld of informal learning, making use of social networking sites and instant messaging systems.

6. CONCEPTUAL MODEL OF THE STUDY

On the basis of the foregoing concepts, theories, and findings of related literature present studies and insights. Hence, a conceptual model of the proposed project in the form of an IPO model as developed as shown in Figure 1.

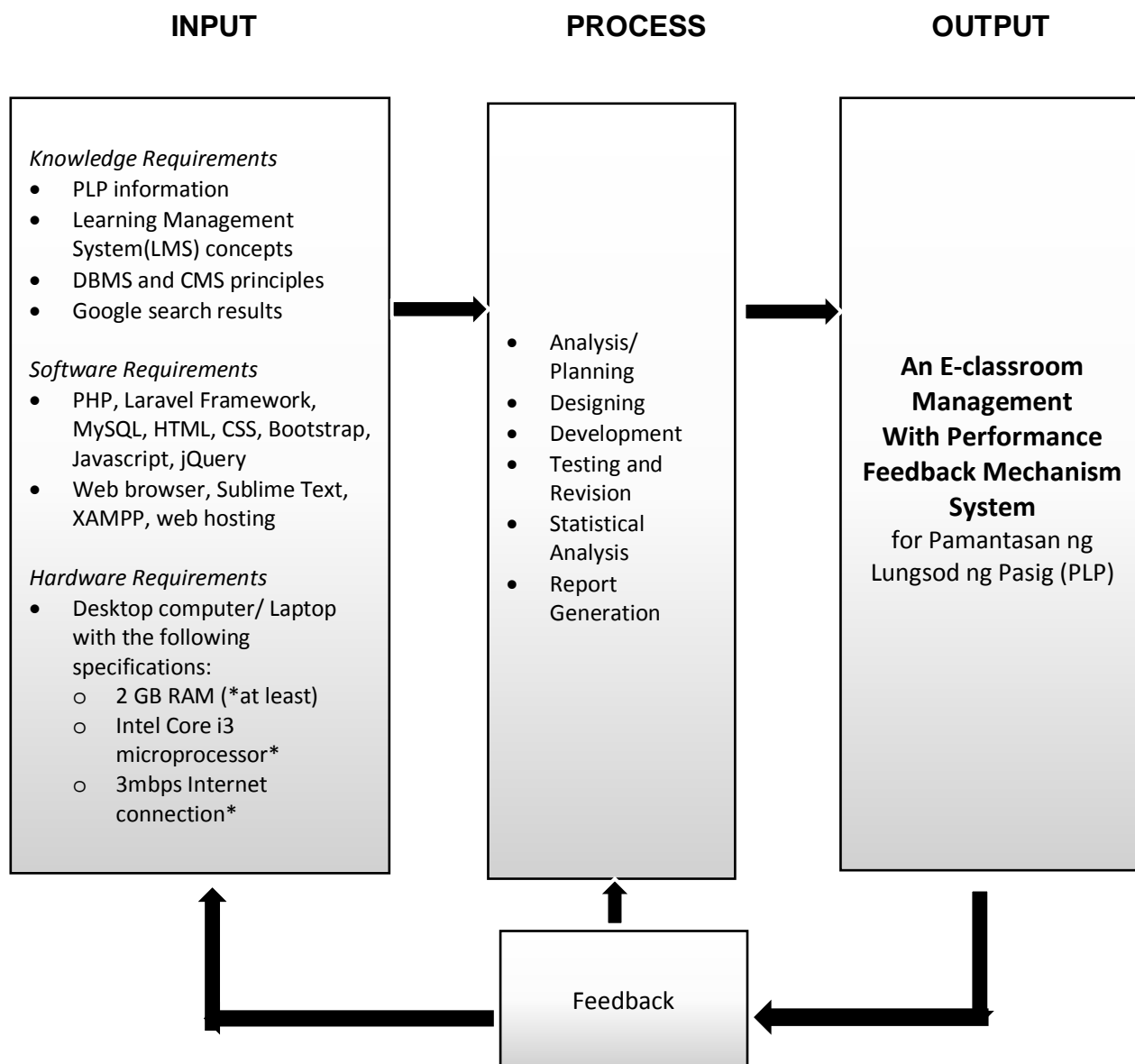


Figure 1. Context diagram for E-classroom Management System for Pamantasan ng Lungsod ng Pasig (PLP).

Figure 1 explains the conceptual model of the study. It shows the different stages involved in order to achieve the objectives of this study.

6.1 System Design

In the system design, all pertinent input data and required outputs were determined and planned. The design took into consideration the project standard in order to display the outputs. Data flow diagrams were used as tools in this phase.

6.2 Context Diagram

Fig. 2 shows the context level data flow diagram of the said project. It presents the overview of the data/ information flow into and out from the system respectively, it also displays the general scheme of the project whereas it presents all the entities namely admin, instructor, and students along with their main activities with respect to the system.

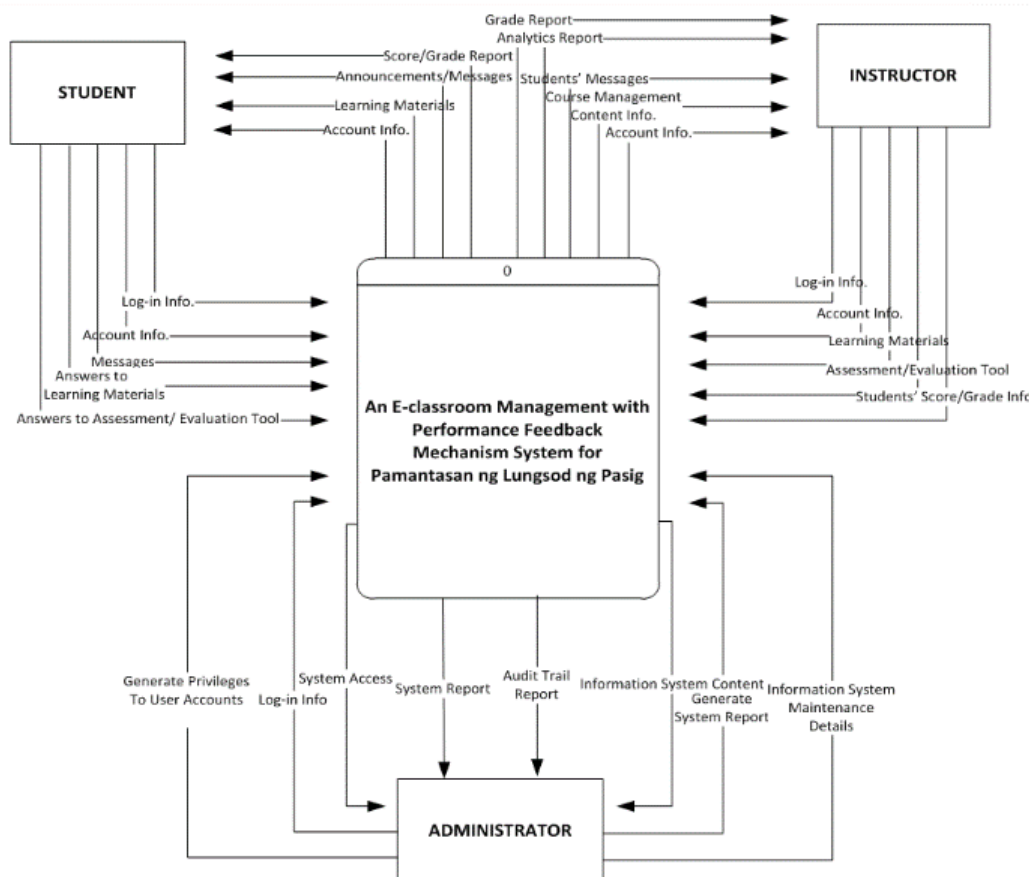
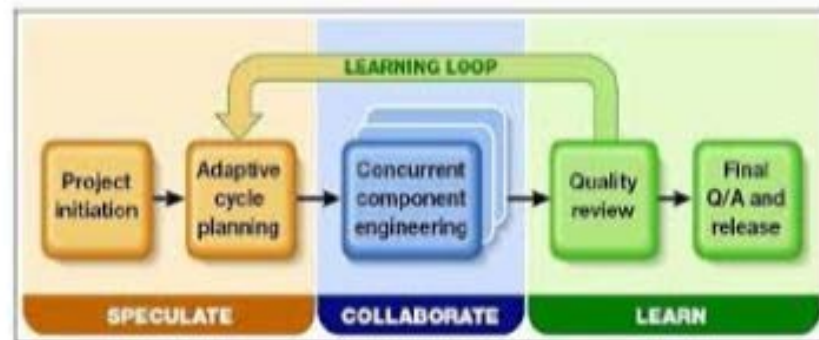


Fig. 2. Context diagram of an E-Classroom Management with Performance Feedback Mechanism System for Pamantasan ng Lungsod ng Pasig

6.3 System Development

In developing the software, the proponent adopts the Agile method specifically Adaptive Software Development (ASD). Agile method is a software development method that is people-focused communications-oriented, flexible (ready to adapt to expected change at any time), speedy (encourage rapid and iterative development of the product in small releases), lean (focuses on shortening time frame and cost and on improved quality), responsive (reacts appropriately to expected and unexpected changes), and learning (focuses on improvement during and after product development), Adaptive Software Development is a software development process that grew out of rapid application development.

ASD embodies the principle that continuous adaptation of the process to the work at hand is the normal state of affairs.



Excerpted from: http://www.slideshare.net/guy_davis/agile-software-development-methodologies

Fig. 3. Agile Method – Adaptive Software Development (ASD)

7. METHODS OF RESEARCH

In this study, the opponent used Descriptive (Qualitative and Quantitative) Research Method wherein the study used research question, design, and data analysis that would be applied to a given topic. This method is very important and convenient for the proponents to show the existing system works as well as to identify the problems thereof encountered in utilizing the current system. It involves gathering data, analysis, and presentation of the existing system. In the descriptive method, it can involve collections of quantitative information that can be tabulated along a continuum in numerical forms, such as scores on a test or the number of times a person chooses to use a certain feature of a multimedia program, or it can describe categories of information such as gender or patterns of interaction when using technology in a group situation. Descriptive research involves gathering data that describe events and then organizes, tabulates, depicts, and describes the data collection.

A survey was conducted among the beneficiaries of the proposed system and that would be students and IT professionals of Pamantasan ng Lungsod ng Pasig. With the help of the survey, the proponents are able to concentrate in the specific areas on where the solutions to be addressed to the encountered problems thereof. These findings were all about the existing practices done in the traditional approach of education which are obtained with the use of the survey method. The results and findings of the study should be compared with the existing system to evaluate how effective is the proposed system and be an advantage integrating technology enabled system with the traditional current system.

8. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

8.1 Summary of Findings

8.1.1. Established from the gathered data, the problems can be categorically summarized as follows:

- a. Class Organization/ Management - The classroom should be arranged to promote effective learning and minimize behavior problems. The classroom should also be flexible to allow for different types of learning activities.

- b. Class Participation - Students must be able to see and hear instruction and have efficient access to learning materials.
- c. Class Monitoring - The teacher should be able to easily monitor students and provide feedback.
- 8.1.2. As regards the readiness of the respondents and as presented, analyzed and interpreted it shows that more than half of the respondents strongly agreed that they are ready integrating the proposed system in their context of pedagogy. And almost 1/3 of the respondents are ready, agreeing in the criterion thereof, while, less than 10 percent are in neutral to the idea. These findings are supported by the obtained composite percentage average scores of 53.3, 37.9 and 9.7 percent respectively. On the other hand, the acceptance of the respondents of the proposed system confirms that they strongly agree and accept the integration of the proposed system. In conclusion, there are composite percentages of 53, 36.4 and 10.5 percent who strongly agreed, agreed and in neutral perception respectively which means that an estimated 2/3 of the respondents are in accord accepting the proposed system.

Table 1
Summary of Respondents' Assessment of the Proposed System
In terms of E-learning Readiness

Sub-questions	Students		IT Professionals		Average	
	Weighted Mean	VI	Weighted Mean	VI	Mean	VI
1	3.93	A	3.93	A	3.93	A
2	4.70	SA	4.13	A	4.41	A
3	4.77	SA	4.60	SA	4.68	SA
4	4.76	SA	4.67	SA	4.71	SA
5	4.92	SA	4.53	SA	4.73	SA
6	4.19	A	3.93	A	4.06	A
7	4.97	SA	5.00	SA	4.98	SA
8	3.97	A	4.00	A	3.98	A
9	4.15	A	4.07	A	4.11	A
10	4.39	A	4.13	A	4.26	A
11	4.51	SA	4.07	A	4.29	A
12	4.08	A	4.40	A	4.24	A
13	4.08	A	4.87	SA	4.47	A
14	4.64	SA	4.67	SA	4.65	SA
15	4.58	SA	4.73	SA	4.65	SA
Composite Mean	4.44	A	4.38	A	4.41	A
Legend: VI – Verbal Interpretation 4.51-5.00=Strongly Agree(SA); 3.51-4.50=Agree(A); 2.51-3.5=Neutral(N); 1.51-2.5=Disagree(D) and 1.00-1.50=Strongly Disagree(SD)						

- 8.1.3. Based from the gathered and presented data, the existing system is still effective but there are profound issues stated in the statement of the problem that needs to address and resolve. There are issues most common and can be categorically stated as class organization/ management, class participation, and class monitoring. However, this study proposes a tool that could resolve or at least minimized the said issues and inadequacies.
- 8.1.4. Based on the issues, inadequacies, and problems presented, the following are the proposed features and modules that would address the following issues and inadequacies and problems stated.

- **Learning Management System;**

- **Grade Recorder;**
- **Descriptive Analytics;**
- **SMS Technology.**

8.1.5. The system development tool by the proponents. Adaptive software development is a design principle used by the proponents for the creation of the proposed system. The principle focuses on the rapid creation and evolution of software systems.



Excerpted from: http://www.slideshare.net/guy_davis/agile-software-development-methodologies

8.1.6. Summary of findings as to the perception of the respondents between the existing and the proposed system. Based on the resulted product of the survey, it shows that there is no significant difference when it comes to the effectiveness of the existing system and proposed system shows an overall composite mean perception of the respondents rated 3.78 and 4.36 which means "Effective" respectively. This was evaluated by the respondents in accordance with the criteria given. These criteria are content of information characteristics, instructional design and presentation, class interaction aspects, methodological aspects and learning outcomes with the composite mean scores of 3.84, and 3.69 for the existing system, while, there are composite mean scores of 4.20 and 4.51 for the proposed system which are all interprets as "Effective" correspondingly, except from the composite mean rated as 4.51 which is rated as "Very Effective" from the proposed system. Based on the outcome of the computed means of both existing system and proposed system, it shows that even if there is a significant difference from the weighted mean of each criterion as it was compared the results both systems can still be interpreted as "Effective." From these results, it can be drawn the essential contribution of the proposed system as it would be integrated into the traditional context of the educational system.

Table 2
Summary of Respondents' Assessment between the Existing System and the Proposed System in terms of Content of Information Characteristics, Instructional Design and Presentation, Class Interaction aspects, Methodological aspects and Learning Outcomes

Criteria	Students				IT Professional				Average			
	Existing System		Proposed System		Existing System		Proposed System		Existing System		Proposed System	
	WM	VI	WM	VI	WM	VI	WM	VI	WM	VI	WM	VI
Content of Information Characteristics	4.00	E	4.40	E	3.73	E	4.42	E	3.87	E	4.41	E
Instructional Design and Presentation	3.60	E	4.40	E	3.60	E	4.37	E	3.60	E	4.39	E
Class Interaction Aspects	4.00	E	4.60	VE	3.68	E	4.74	VE	3.84	E	4.67	VE
Methodological Aspects	3.80	E	4.00	E	3.64	E	4.68	VE	3.72	E	4.34	E
Learning Outcomes	3.80	E	4.00	E	3.82	E	4.34	E	3.81	E	4.17	E
Overall Mean and Verbal Interpretation	3.84	E	4.20	E	3.69	E	4.51	VE	3.78	E	4.36	E

Legend: WM – Weighted Mean and VI – Verbal Interpretation
 4.51-5.00=Very Effective(VE); 3.51-4.50=Effective(E); 2.51-3.5=Average(A); 1.51-2.5=Inadequately Effective(E) and 1.00-1.50=Needs Improvement(NI)

8.1.7. To evaluate the system, the researcher chose FURPS guideline criteria which consist of the following criteria in evaluating the proposed systems:

- Functionality
- Usability
- Reliability
- Performance
- Supportability

From the evaluation gathered from the users, the proposed system was given a rate of 4.76 in terms of functionality, 4.65 for usability criteria, 4.45 for system reliability, and 4.79 for performance, and 4.61 for system security. Referring to the general mean as presented in Table 26. The proposed system has an overall weighted mean of 4.65 which is equivalent to a very satisfactory evaluation. Thus, the proponent determined that the proposed system is effective and accepted by the respondents.

Table 3
Over all Weighted Mean, and Interpretation of the Respondents' Evaluation of the Proposed System

Criteria	Weighted Mean	Interpretation
Functionality	4.76	Very Satisfactory
Usability	4.65	Very Satisfactory
Reliability	4.45	Satisfactory
Portability	4.79	Very Satisfactory
Supportability	4.61	Very Satisfactory
Overall Mean and Interpretation	4.65	Very Satisfactory

8.1.8. Based on the results of the t-test, it can be concluded that there is a significant difference between the existing system and the proposed system assessments of the respondents. It confirms that the proposed system is way up to better than the existing system as measured through a set of criteria, this criterion is a developmental tool which measures functionality, usability, reliability, portability, and supportability commonly known as FURPS.

8.1.9.

Table 4

**Summary of T-test Results of the Respondents' Assessment
between the existing and the proposed system in terms of the given
Criteria (FURPS)**

Group	Existing and Proposed System		T-value	df	Standard error of difference	Interpretation
	Mean Score	SD				
Existing System	3.78	0.1309	33.19	428	0.018	Significant
Proposed System	4.36	0.2253				

8.2. Conclusions and Recommendations

Based on the mentioned summary of findings, the following conclusions and recommendations were drawn:

- The proposed system is effective as perceived by the respondents in accordance with the given criteria such as the content of information characteristics, instructional design and presentation, class interaction aspects, methodological aspects and learning outcomes.
- The implementation of an e – classroom management with performance feedback mechanism system needs careful planning and collaborative efforts among students and IT professionals. The e-classroom management with performance feedback mechanism system as a tool which would aid the issues, inadequacies, and problems as categorically stated as class organization/ management, class participation and class monitoring in blending to the existing system would create a mix-mode strategy in teaching-learning approach in the context of pedagogy was perceived as effective and acceptable by the respondents.
- Based on the result, there is a significant difference between the existing and the proposed system as evaluated by the respondents with the given criteria accordingly.
- The developed system fully confirmed and rated as "Very Satisfactory" from the given measures such as system's functionality, Usability, reliability, portability, and security along with its sub-criterion.
- Blended learning also tended to involve additional learning time, instructional resources, and course elements that encourage interactions among learners. This confounding leaves open the possibility that one or all of these other practice variables contributed to a positive outcome for blended learning. Further research and development on different blended learning models are warranted.

- Experimental research design principles for blended learning and face to face instruction for different kinds of learners is needed.
- As some authors (Maddux, Ewing-Taylor, Johnson, 2002; Thiele, 2003) have noted, when designing e –learning environment, adequate support strategies must be provided for students with different learning styles and adapt online course design to accommodate these styles. Catering to the different learning styles could result in higher retention in e – learning environment.
- Crafting Syllabus with Mix-Mode Teaching Strategy which will aim the following:
 - Provide pedagogical background on the use of LMS as a tool in teaching and learning.
 - Identify courses that will be developed as a mixed-mode course.
 - Develop syllabus that will complement the mixed-mode teaching strategy.
 - Understand teaching pedagogy using Learning Mangement System.

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