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Development and Evaluation of Course Management System with Short Messaging Service Notification

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Abstract

Advancements in technology provided an educational platform for advanced learning strategies. Teachers seek better ways to deliver teaching materials where students can actively participate. This study aims to develop and evaluate a new, privately owned Course Management System with Short Messaging Service (SMS) notification at Centro Escolar University. The study used a developmental and descriptive survey research design, which included one hundred (100) students and eight (8) full-time faculty members. The administration evaluated the study using the standard evaluation criteria of ISO 25010. The results from the evaluation showed that faculty members were satisfied with the new course management system as they perceived it with a highly acceptable rating for each criterion, which includes functional suitability, performance efficiency, compatibility, usability, reliability, security, and maintainability of the system while the students evaluated it with a very acceptable rating for each criterion. This showed that the system delivered the needs of the faculty members while improvements were needed to meet the needs of the students. Such improvements include user interface design; additional features such as taking online quizzes and exams, communicating with the teacher and students through chat room; and security features of the system such as archiving the students' and faculty's deleted files and accounts.

Keywords: course management system, short messaging service, notification, learning management system

Introduction of the study

A classroom is a room or place especially in school in which classes are conducted. The traditional way of conducting classes inside the classroom is that the teacher stands in front of their students where blackboards are used to facilitate learning by writing the lessons. Because of technology, different tools and equipment are being introduced to help the teachers in conducting their classes, especially in presenting their lectures. The use of projector and computer as a tool in presenting lessons has now become a practice to most teachers, especially those in the universities.

By using technology effectively in education, more educational opportunities will be created. Both teachers and students have benefited from various educational technologies, teachers have learned how to integrate technology in their classrooms and students are getting

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more interested in learning with technology. By using advanced educational technology in education, the educational boundaries have been removed, both students and teachers can cooperate with each other in real time.

The use of internet technology has permitted teachers to reach students across borders and students have used it in subscribing for advanced educational courses. Universities and Colleges have embraced online education by creating virtual classrooms where students can interact with other students virtually. Teachers on the other hand, can deliver their educational resources, post announcements, and post assignments and quizzes.

At Centro Escolar University, some but not most of the faculty members and students are using Modular Object-Oriented Dynamic Learning Environment or also known as MOODLE, which is an open-source course management system, originally developed by Martin Dougiamas which allows teachers to create online courses, which students can access as a virtual classroom. Modular Object-Oriented Dynamic Learning Environment (MOODLE) has not been frequently used by the faculty members for the same reason – they find it difficult to use and they really need further training to fully use the system and use all its features. Students on the other hand, are also not using it frequently for a reason that not all the faculty members are using it. Considering the faculty concerned, the researcher had an idea to develop a new Course Management System.

The new Course Management System is different from other Course Management System because of its added feature. The new Course Management System will give Centro Escolar University a system that it can call its own. The system will allow the faculty to post their educational materials easily and can also be accessed online by the students anytime and anywhere, teachers can create online courses, add students in the online course, post announcements, quizzes and assignments and can also post student grades. The students on the other hand, will be able to view teacher's announcement, access posted educational materials (e.g. course syllabus, modules, PowerPoint presentation of lectures, and video clips used in discussions), submit assignments, view their grades, and can leave comments to announcements and reply as well. The additional features include Short Messaging Service (SMS) notifications that will inform students whenever the teacher post any educational materials, announcements such as quizzes and assignment to answer and other class related matters so that the students will be aware of it even if they are not online. This will give a new challenge to the university in elevating teaching strategies and making use of technology to its maximum potential to better maximize its use especially in education where challenges arise as technology continue to grow.

The Course Management System will also give the university a kind of system where students can actively participate by using it daily since the teacher will use this system for everything that is related to their classes. The dissemination of information will no longer be a problem since the system can automatically send notifications to students and students will be kept updated on all the class activities and the teacher's announcement. Students can monitor their grades on different subjects as they can be able to view it online when the teacher encodes their grades.

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This study is a development and evaluation of the new Course Management System with Short Messaging Service (SMS) Notification in tertiary education of Centro Escolar University, Computer Education Department through ISO 25010 product quality model which includes functional suitability, performance efficiency, compatibility, usability, reliability, security, and maintainability.

The results and findings of this study provided understanding and appreciation of the services and features of the new Course Management System and the benefits it gave to the faculty and students in terms of availability of educational materials. Though the study was limited only to the faculty and computer students, it gave conclusions important enough to change the way how the faculty integrated technology in education and how students embraced it.

Statement of the problem

The main purpose of this study was to develop and evaluate a new Course Management System with SMS notification on tertiary education of Centro Escolar University so that the university will have its own developed system.

Specifically, the study was guided by the following research questions:

1. What are the stages carried out to develop the new Course Management System?
2. How do the faculty and students evaluate the newly develop Course Management System using the ISO 25010 with respect to:
    - 2.1 functional suitability,
    - 2.2 performance efficiency,
    - 2.3 compatibility,
    - 2.4 usability,
    - 2.5 reliability,
    - 2.6 security, and
    - 2.7 maintainability?
3. What is the difference between the evaluation of faculty and students on the new system based on the variables?
4. What are the problems encountered in the implementation of the new Course Management System of Centro Escolar University?
5. What user's manual can be developed in the use of the new CMS?

Theoretical Framework

This study made use of a theoretical framework formulated by Manuela Aparicio, Fernando Bacao and Tiago Oliveira (2015) of Instituto Universitario de Lisboa namely an e-Learning Theoretical Framework. This theory framework was based upon three principal dimensions: users, technology, and services related to e-learning. This theory framework presented the related concepts of computer use in learning across time, revealing the emergence of new trends in e-learning. The theoretical framework was a contribution for guiding e-learning studies. It classified the stakeholder groups and their relationship with e-learning systems. The framework shows a typology of e-learning systems' services. This theoretical approach integrates learning strategies, technologies, and stakeholders.

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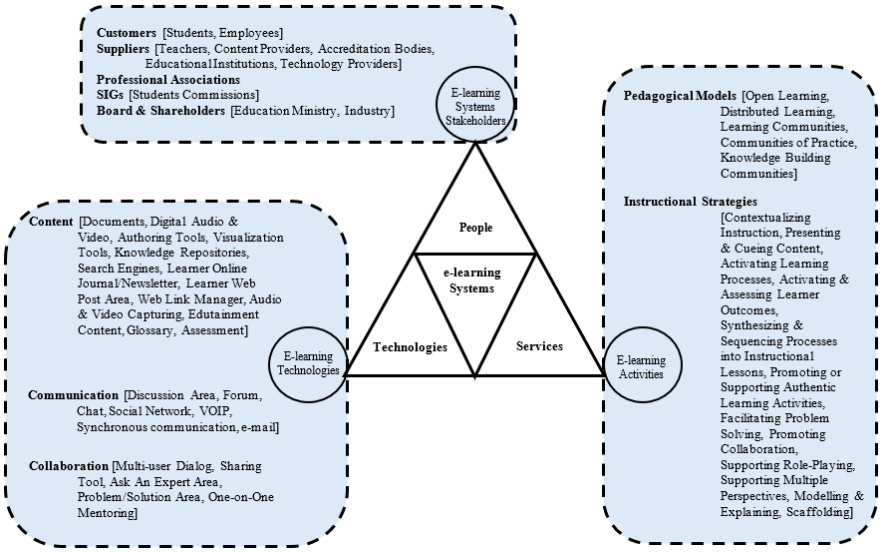
An e-learning theoretical framework holds that a framework "classifies the important factors in information systems development can imply that these factors are causally connected with successful systems development" (Gregor, Martin, Fernandez, Stern, & Vitale, 2006, p. 619). In this framework (Figure 1), is presented the main information systems dimensions adapted to e-learning systems. This framework is a theoretical generalization (Carroll & Swatman, 2000; Lee & Baskerville, 2003) resulting from the literature review on e-learning dimensions.

The e-learning systems' theoretical framework contained the three main components of information systems. These components are people, technologies, and services. E-Learning System Stakeholder or People interacted with e-learning systems. E-learning technologies enabled the direct or indirect interaction of the different groups of users.

E-Learning Technologies provided support to integrate content, enable communication, and provided collaboration tools. E-learning services integrated all the activities corresponding to pedagogical models and to instructional strategies. The complex interaction combination is the direct or indirect action with e-learning systems. At the same time, E-Learning activities or systems provided services according to the specified strategies for activities. In other words, service specifications are e-learning activities aligned with the e-learning pedagogical models and the instructional strategies. These dimensions provided our theoretical framework with a more holistic view.

Figure 1. Holistic e-learning systems theoretical framework



Conceptual Framework

This study aimed to develop and evaluate a new course management system with SMS notification of Centro Escolar University.

The research paradigm was primarily anchored on the systems approach, which is composed of input, process, and output. The inputs to this study are the determination of

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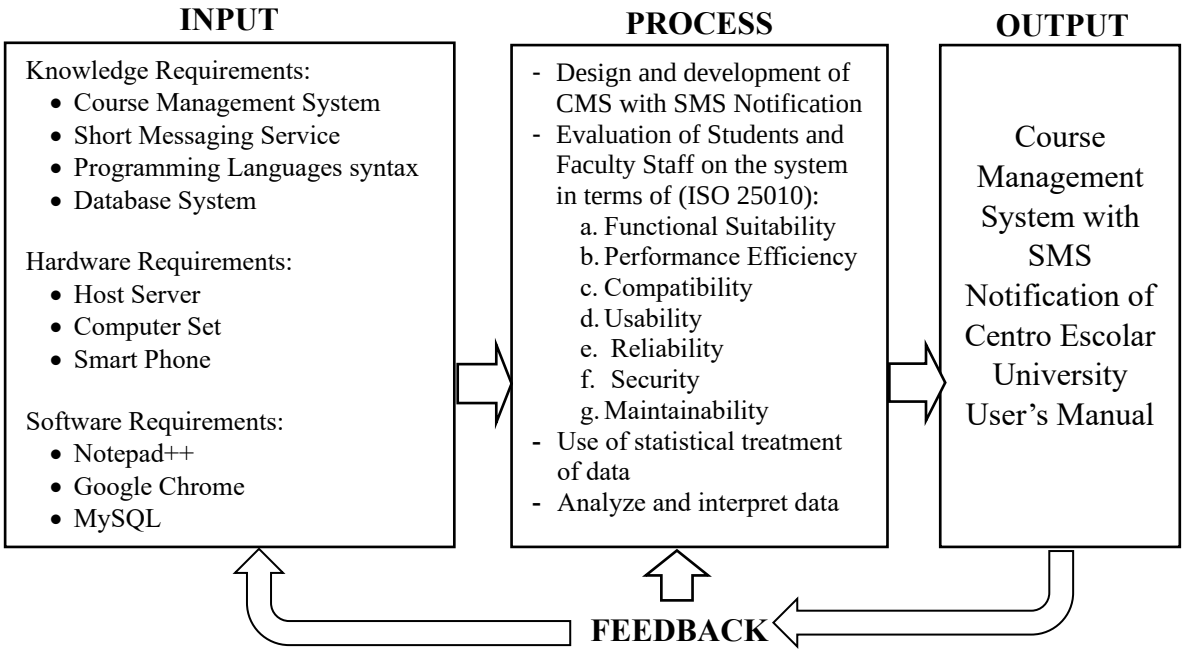
needed requirements such as knowledge, hardware, and software to develop the system. In the process stage, is the evaluation of system using ISO 25010 using different variables. The output was a developed Course Management System with SMS Notification User's Manual for Centro Escolar University.

Figure 2. Research Paradigm of the Study



Literature Review

This section presented the related literature of the study through books, unpublished materials, journals, newspapers, and web articles associated to the study of course management system. The literature included three areas of study associated with Course Management System, Learning Management System and Short Messaging Service System.

Course Management System

A course management system (CMS) is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as: (a) an area for faculty posting of class materials such as course syllabus and handouts, (b) an area for student posting of papers and other assignments, (c) a grade book where faculty can record grades and each student can view his or her grades, (d) an integrated email tool allowing participants to send announcement email messages to the entire class or to a subset of the entire class, (e) a chat tool allowing synchronous communication among class participants, (f) a threaded discussion board allowing asynchronous communication among participants (Vanderbilt University, 2019,"Course Management Systems", para 1).

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Doan (2015) examined how instructors perceive customized student profiles on course management systems. He surveyed instructors examining how these instructors use both CMS and student profiles inside and outside of the classroom at Iowa State University. He found out that instructors use their course management systems in various online ways: as online syllabi, as workshops for their students, as homework hubs, and as an extension of the classroom. Five main themes from this study include course management systems as space, course management systems as a resource, boundaries between the physical and online classrooms, online identities through user profiles, and course management systems versus social media. He also found out that while all instructors surveyed used CMS in their teaching, the instructors' attitudes, proficiency, and interactions with student profiles varied. Instructors primarily conceptualized CMS in one of two ways: as a space, such as describing their CMS in terms of where to find content, or as a tool, describing their CMS in terms of functionality and use. While many instructors did respond positively about giving students electronic feedback versus paper feedback, many instructors did not use their CMS for much more than an online syllabus or grade book. Overall, the instructors who encouraged student CMS profile customization seemed more engaged with their teaching and with their students.

Ford (2013) explained that the rise of the course management system provided the promise of efficient classroom management, where resources could easily be distributed, and a slew of additional online resources would ease the burden of classroom management. The study sought to better understand the current adopters of an established CMS in a higher education institution, why and how these users adopt and interact with the system, and how they interact with the system over their first session of instruction, analyze where the usage traits of sixteen apparent Late Adopters of an established CMS via survey, interview, and course site analysis. Findings suggest that not all new users of an established CMS have traits of Everett Rogers' description of Late Adopters, users have similar traits and tactics during their first quarter of instruction, most users are influenced and rely on non-educational technologies for assistance, and these users were not an additional strain on support services.

Unal and Unal (2011) studied "*Evaluating and Comparing the Usability of Web-based Course Management Systems".* The goal of the study was to report the results of a comparative usability study conducted in 2008-2009 on two different course management systems: Blackboard and Moodle. The study was participated in by 135 students enrolled in the fall 2008 and Spring 2009 sections of Introduction to Educational Technology. The participants were randomly divided into two groups to experience CMSs at different times.

The study concluded that in almost every module or function comparison that was made, Moodle was favored by course participants over Blackboard except for the Discussion Board module where scores were not significantly different. It was concluded at the end of the study that the use of Moodle in online courses can be a suitable alternative to the current CMS system (Blackboard). The researchers have already shared their experiences with the faculty and expanded their investigations by involving numerous other online courses, instructors, and students, because the product showed significant potential for further examination. The study also tried to explain in detail what specific component or function of each CMS student found useful or better than in the other. And it was concluded that each course management system available currently has key features that allowed students to be actively involved in their courses, including downloading, and uploading of files,

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participating in chat and discussion boards, taking assignments, viewing grades, and contacting teachers and classmates. In choosing a CMS for an educational institution, the usability of the system is the key to effectiveness and efficiency of the online courses that are to be applied.

Li (2009) studied the *Design and Implementation of course management system for experiments in college's educational administration* at Quanzhou Economy and Trade Vocational and Technological College in China. The experiment was established as an information platform for both teaching management and communication between teachers and students where students can make instant inquiry about courses, marks and classes or hand in their homework, while teachers can input information about the courses or marks, adjust classes or make announcements. The course management system experiments with browser/server construction, strengthens the school's teaching management, and improves the information system as well as service level and offered efficient and convenient information service. The study concluded that it was necessary to build up a new Browser / Server information system. The ASP.NET technology and database access technology played an important role in the development of the system. ASP.Net technology and ADO.NET technology was the first choice of database access. The author designed the course management system for experiments to meet the demand of the school's teaching management, an application system realizing open information management and inquiry and being more interactive and secure. The development of the system was of great importance to the informatization of experiments' educational administration and management as well as the improvement of lab courses.

Blackboard as Course Management System

Perry (2010) studied the use of the course management system (Blackboard) at all classes in fall semester 2008 at rural community college in California, used 10 faculty characteristics and five instructional environment conditions as the independent variables and the basis for analyses which includes the age, gender, highest degree earned, discipline, number of faculty teaching in discipline, number of courses teaching by an individual faculty member, average class size, number of years teaching, employment status, and hourly pay rate. The five instructional environmental conditions were teaching location, course delivery method, course type, and career technical education status and course duration. The dependent variable was the use of a course management system. The study aimed to identify any significant relationships between faculty characteristics and use of a course management system and between instructional environmental conditions and the use of a course management system. The study also sought to determine the strength of those relationships. Faculty who are females, had more formal education, were tenured, earned more money, taught on campus, taught online for the full semester were more likely to use a course management system. There were moderate to strong relationships for the faculty who were females, had more formal education, were tenured, earned more money, taught on campus, or taught online.

Learning Management System

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The Learning Management System is a software application for the administration, documentation, tracking, reporting and delivery of educational courses or training programs. It helps the instructor deliver material to students, administer tests and other assignments, track student progress, and manage record-keeping. It supports a range of uses, from supporting courses that meet in physical classrooms to acting as a platform for fully online courses, as well as several hybrid forms, such as blended learning and flipped classrooms ("Learning Management System", n.d.).

According to Kehoe (2014) in her article "Moodle usage increases regardless of complaints", the Learning Management System and Course Management System are used to better support faculty and students for teaching and learning online. Some of the schools are using Moodle to facilitate learning on distance education. According to usage reports from Distance Education and Learning Technology Applications, N.C. State's Company for creating and learning technologies, 2,866 course sections used Moodle in the spring of 2012. For the spring of 2014, the number has risen to 3,566 course sections. This indicates that despite of persisting complaints leveled against Moodle by several professors, usage reports show an increase in the number of faculty members using the learning management system but for Bob Larson, a communication lecturer, he wished a simpler version of the program (Moodle) would be made available for professors who are less technology literate.

Modular Object-Oriented Dynamic Learning Environment (MOODLE)

According to the study made by Sunga (2015) about the development and evaluation of a knowledge-based portal using Moodle for the University of Rizal System, it was found out that the developed Web-based portal was rated highly acceptable by the faculty and student respondents in terms of accuracy, content, modifiability, navigation, screen design, user-friendliness, and workability. The evaluation of the two-group respondents (faculty and students) significantly differs in terms of accuracy, content, modifiability, and navigation.

However, they perceived similarly on the acceptability level of the knowledge portal in terms of screen design, user-friendliness, and workability. Common problems that were encountered while using the knowledge portal that was evaluated by 133 respondents were listed. Knowledge portal is too difficult to navigate in finding necessary features appeared to be the most common problem and knowledge portal commands do not function well got the least number of respondents who encountered the problem. The researcher recommended that future research may be conducted to improve the knowledge portal in terms of navigation and screen design to the end users in accessing the knowledge portal in easier way and training must be provided to the faculty and students to effectively use the portal.

The purpose of the study of Jones (2015) was to explore the factors that influence administrators in three rural Pennsylvania school districts to continue using a Moodle learning management system (LMS) and discover teacher perceptions and other factors that affect the use of Moodle in these school districts.

Using a mixed explanatory design, the researcher determined that teachers' opinions on why a school district subscribes to an LMS or how successful a school district is in meeting its goals for using an LMS had no effect on their level of LMS use. Also, the teachers' level of LMS use was not affected by encouragement from other teachers or school

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district administrators. However, it was discovered that perceived usefulness and perceived ease of use were factors that affected the teachers' level of LMS use.

Administrators from each participating school district indicated a unique factor that prompted them to continue using Moodle. These factors were: (a) the continued need to facilitate elective courses for one district's cyber school program, (b) the gaining popularity of Moodle due to teachers becoming more familiar with it, and (c) the need for increased collaboration among faculty within one district's teacher induction program.

The study made by Burgos (2014) which took place in a small campus from the public university system in Puerto Rico with a group of 13 faculty members, sought to share the experiences of faculty members who use an open-sourced learning management system in their face-to-face courses, their perceptions of its impact on teaching and learning, and the factors that support or hinder its integration. The study findings demonstrate that (a) majority of the participants use Moodle for the distribution of documents and resources, some use it for evaluation and others for teaching, but only three participants use it also for community building beyond the classroom; (b) the participants find Moodle useful in teaching process and to enhance learning, but they need additional knowledge and skills to foster interactive, collaborative learning; (c) the participants' personal and professional dispositions are the internal factors that promote engagement with Moodle; and (d) the most important external factors that influence the use of Moodle in the classroom are related to the students' lack of technological literacy in the academic context and the limited institutional support that is available. In conclusion, the participants do not use Moodle to its full potential; most of them use it from a teaching-centered perspective, and they need further institutional support structures and resources to encourage the kind of teaching and learning expected in the 21st century.

Liu (2013) investigated the factors impacting on ESL (English as Second Language) college students' acceptance and use of the Moodle at Iowa State University. Participants of the study expressed five major factors that influenced the adoption of Moodle in ESL grammar and reading classes. These factors were performance expectancy, effort expectancy, social influence, facilitating conditions, and former practice. The participants attribute Moodle for improving their study efficiency and learning skill, providing them with multiple learning resources and giving them emotional motivation. The performance expectancy was the most important reason in adopting Moodle. Ease of use, or effort expectancy are also cited as the second significant reason for adoption. Additionally, social influence and facilitating condition were considered supplemental factors influencing their acceptance of Moodle.

Zarkoskie (2010) attempted to determine the effects of Moodle on student participation and level of detail when responding. The researcher used three different methodologies to triangulate the data which included weekly scoring rubrics, a Likert survey, and an open-ended questionnaire. Results of the study suggested that Moodle forums were a tool that may have helped students increase their participation and improve their level of detail in responses. Students indicated they enjoyed the interactive nature of Moodle forums. In addition, students believed the ability to view peer and teacher posts allowed more time for reflection and encouraged additional ideas for responding.

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GEO Academic Journal Vol. 5 No. 1 – 2024 series

Fellows (2009) addressed an issue at the Whiteside Area Career Center in Sterling Illinois. The Whiteside Area Career Center (WACC) is a regional vocational center where 11th and 12th grade high school students can attend a variety of programs. The Computer Technology program has both 11th and 12th graders in the same class, but the students take different classes. In the past, the instructor had trouble teaching two subjects simultaneously to both groups. With all the advances in online education tools, including Course Management Systems like Moodle, 12th grade students can work more independently while the instructor can focus more on the 11th grade students. Based on a positive student performance and a survey that 14 (70%) out of a possible 20 students took after the course, it was determined that the project was successful, and the format will continue in the Computer Technology program.

Facebook as a Learning Management System

A study that explores the use of Facebook as Learning Management System tool on teaching Wang, Woo, Quek, Yang, & Liu (2012) explained that Facebook is a popular social networking site. It, like many other new technologies, has potential for teaching and learning because of its unique built-in functions that offer pedagogical, social, and technological affordances. In this study, the Facebook group was used as a learning management system (LMS) in two courses for putting up announcements, sharing resources, organizing weekly tutorials, and conducting online discussions at a teacher education institute in Singapore. The study explores using the Facebook group as an LMS and the students' perceptions of using it in their courses. Results showed that students were basically satisfied with the affordances of Facebook as the fundamental functions of an LMS could be easily implemented in the Facebook group. However, using the Facebook group as an LMS has certain limitations. It did not support other format files to be uploaded directly, and the discussion was not organized in a threaded structure. Also, the students did not feel safe and comfortable as their privacy might be revealed.

Short Messaging Service

Retrieved from techterms.com, Short Message Service (SMS) is used to send text messages to mobile phones which can typically be up to 160 characters in length, though some services use 5-bit mode, which supports 224 characters. The Short Message Service was originally created for phones that use GSM (Global System for Mobile) communication, but now all the major cell phone systems support it. While it is most used for text messaging, it has several other uses, for example, subscription SMS services can transmit weather, news, sports updates and can also notify employees of sales inquiries, service stops, and other information pertinent to their business.

Fortunately, text messages sent via SMS do not require the recipient's phone to be on for the message to be successfully transmitted. The SMS service will hold the message until the recipient turns on his or her phone, at which point the message will be sent to the recipient's phone.

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Mengawade and Mogal (2013) conducted a study about SMS Based Student Services Administration. According to them, the use of short message services for various applications has increased significantly but in the field of academics, these services have not been utilized to their full potential. The study focused on a university campus where the system aimed to take advantage of mobile phone technology where most of the students used their mobile phones as a means of communication. The study revealed that student access to mobile phone technology is very high and therefore the mobile phone presents a very attractive option to easing communication between the students and the Department in terms of information dissemination. The study also showed that there are several advantages that accrue from the use of SMS for communication and that students preferred SMS because it kept them informed of what is happening at the University and most students felt happy and connected. The study showed that SMS communication was an effective way of communication between educational institute and its students.

This research, Development and Evaluation of Course Management System with Short Messaging Service Notification for Centro Escolar University will show that it will be good for the school to have its own course management system. There are a lot of open-source Course Management System and Learning Management System available, but it is of great advantage if the school has its own CMS that will fit to its procedures and principles. The researcher believes that it is easier to maintain an owned system than modifying a free one. Having an owned system is an edge especially today where the Course Management System and Learning Management System gained more popularity in higher education.

The review of the related literature helped this researcher a lot in pursuing his research towards the development of the new course management system exclusively for the school because the views and ideas from the authors gave him the idea of how this technology brings a lot of advantages and changes to education, especially in delivering and conducting classes. This benefit of technological integration in education will not be taken for granted. In developing a Course Management System or Learning Management System, several factors need to be considered and be implemented. Usability, Effectiveness, Efficiency, and User Friendliness are some of the factors that need to be considered. The type of Course Management System or Learning Management System that a school needs to be developed will based on different factors which this Course Management System can be of its full effectiveness and efficiency. Effectiveness means that the Course Management System used by the school achieved its objective and that it will be available anytime the students and faculty used it. The Course Management System needs to be user-friendly, which means that it is easy to use for the students and faculty. The design of the system is easy to read, and the students and faculty will be able to click the buttons, links and easily find the information they need. The faculty and students will find it easy to use and that it will not require them to have further training on how to use the system.

The researcher, being an Information Technology instructor, was also inspired by Stephanie's quote "You stand no chance of being called "the cool teacher" if you keep neglecting the use of educational technology in the classroom" (Norman, 2016). Technology is everywhere and as teachers, we are challenged to keep abreast of what technology can offer, especially in delivering quality education to our students and think of ways on how to inject this in our classes. Keeping in mind also that this technology offers a lot to make our

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discussions easy, but it can have a negative effect if not being used effectively and efficiently. The teacher must have a good knowledge of when to use the technology better and when not to use it. The students need to be guided well to use the technology for education and good communication for both teachers and students.

Research methodology

The developmental and descriptive survey research designs were used in this study which involves the analysis of the current system and was used to develop the new Course Management System in tertiary education of Centro Escolar University. The development research design was used in this study because it includes analysis of the course management system to be developed and once it is developed, the final system is evaluated. Descriptive research was used; hence, the respondents of the study were described. A survey was conducted as the basis to design and develop the system.

The study was evaluated by the administration of the set of standard evaluation criteria of ISO 25010 and was interpreted by different statistical measures to determine the results of the study specifically the research problems in different variables.

Study Population

The sample of this study was taken from the students and faculty of Centro Escolar University under the College of Science and Technology, Computer Education Department with a total population of 150 students comprising courses from Information Technology, Computer Science and Computer Engineering school year 2018 – 2019. The simple random sampling was utilized to select the 100 students only and all 8 full time faculty of Computer Education Department. The Slovin's formula was used to get the exact and proper distribution and representation of the sample student population.

Description of Respondents

The samples of this study were taken from 100 of tertiary students at Centro Escolar University under the College of Science and Technology, Computer Education Department which comprise the males and females of Information Technology, Computer Science and Computer Engineering students of 1st year, 4th year and 5th year respectively. The respondents were from 18 to 30 years old, with different religions and are knowledgeable enough in using computer applications and other computer-related tasks. The 8 full time faculty were composed of 5 females and 3 males. The respondents were chosen because the researcher is one of the faculty of the university under the said department.

Research Instruments

The research instruments used in this study are syllabus, documents, questionnaire, and an unstructured interview that were designed to accurately collect the necessary information. The syllabus was used to guide the teacher in creating their lectures and can also be a guide to students on the topics of their subjects. The document analysis was also a big help in analyzing the flow of the system and in designing the system, especially in the content

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matters. The questionnaire's contents were adopted from the software quality model standard developed by International Organization for Standardization, ISO 25010. The ISO 25010 is a software quality model standard developed to evaluate a system based on different characteristics. The unstructured interview was used to get more information needed to identify problems encountered in the implementation of the system and to get additional information that can be used for recommendations.

Data Gathering Procedures

The researcher asked for an approval through a letter to the office of the VP for Research and Education and to the Dean of the College of Science and Technology through the Department Head to conduct a study in the Computer Department to 1st year up to 5th year computer students. After getting the approval, the researcher asked the experts to validate the questionnaire so that it will cover all the relevant areas of the study and that it could also be understood by the respondents before finally distributing it. A letter was also given to the faculty asking for permission to conduct a study in their classes and asked the students permission to let them be participants in the study.

With permissions on hand, copies of the validated questionnaire were administered to the respondents and the data were gathered and organized following the set evaluation criteria.

Statistical Treatment of Data

Prior to the beginning of the study, after the chosen computer students and faculty of Computer Education Department answered the questionnaire, results were obtained, summarized, and treated statistically to answer the research problems and decided whether to accept or reject the hypotheses. Examination of means, percentage and z-test were used to effectively interpret the results from the gathered data. A Slovin's formula was used to get the number of students who are part of the study. At the completion of the study, scores were compared using statistical tools.

The researcher made use of the five-level Likert scale. A Likert scale is a rating scale that requires the respondent to indicate his or her degree of agreement or disagreement to a statement. The answers were quantified using the scale below.

Range	Assigned Values	Verbal Interpretation
4.50 – 5.00	5	Extremely Acceptable
3.50 – 4.49	4	Very Acceptable
2.50 – 3.49	3	Moderately Acceptable
1.50 – 2.49	2	Slightly Acceptable
1.00 – 1.49	1	Unacceptable

Results and discussion

1. Stages Carried Out to Develop the New Course Management System

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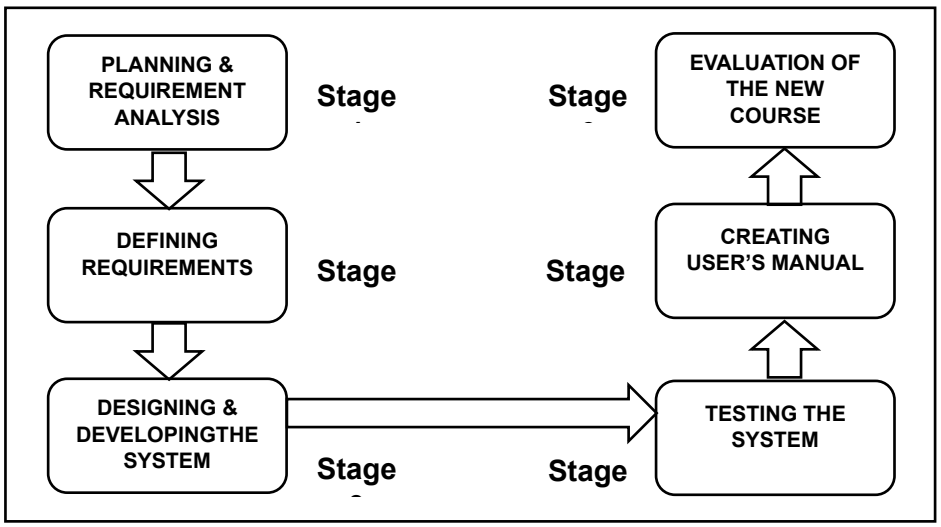
ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

Figure 3 presents the stages carried out to develop the new Course Management System of Centro Escolar University, Computer Education Department.

Figure 3. Stages Carried Out to Develop New CMS



Stage 1 shows the planning and requirement analysis of the new course management system. The researcher identified the problems and gathered the necessary information to develop the new course management system. In gathering data, the researcher himself used all the learning management systems available such as MOODLE to experience on hand the problems that might be encountered by the teacher. The Moodle was introduced to all the Faculty by the Administration to be used within the school year in the course of learning. The option to use another learning management tool is within the discretion of the faculty but still they are required to use Moodle as the primary learning tool. The researcher also gathered information through interviews and observation in different classes conducted within the department.

Through interviews and observation, the researcher was able to identify the requirements needed to develop a new course management system.

Stage 2 defines the requirements needed to develop the system which includes the technical feasibility analysis in Computer Department of Centro Escolar University. The resources needed to develop the system are feasible to the developer as well as the requirements to maintain it since the developer is a faculty of the department.

Stage 3 is designing and developing the new course management system. The developer modeled the system through different models used in designing the new system to fully develop a functional system that will address the needs of the faculty and the students. With system models such as Use case diagram and Activity Diagram, the developer can analyze the new system to be developed and decide the necessary requirements to build it.

Programming Environment

Front End

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ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

The new Course Management System of Centro Escolar University under Computer Department used PHP programming language as a front end of the system that includes the user interface design and other front-end activities of the system. Defined in w3schools.com, PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages. It is a widely used, free, and efficient alternative to competitors such as Microsoft's ASP.

Back End

With PHP as the front end, the researcher can connect to and manipulate databases and MySQL is the most popular database system used with PHP and the developer used it as the back end to develop the system. Defined in w3schools.com, MySQL is a database system used on the web that runs on a server which is ideal for both small and large applications. It is free to download and easy to use which was developed, distributed, and supported by Oracle Corporation. The developer used this database to organize and manage data that runs on a server.

Stage 4 covers the testing of the system. The researcher uploaded the system on the internet so that it will be available for use. He tested the system by checking every function and feature of the system. He tested the entry capability of the system to know if the data will be stored in the database. Functions and other features of the system such as viewing of posted data, updating and maintenance of data and notifying the user through SMS notification were also tested. The system is now ready to be used by the Faculty and Students under the Computer Department of Centro Escolar University.

Stage 5 Creating User's Manual. The researcher created the user's manual that contains all information needed to operate the system. The details of every process were stated through step-by-step instruction starting from how to access the website, how to logon the website, how to add students in the class, how to post announcement and lectures, view students and announcement, and other transactions.

Stage 6 Evaluation of the new Course Management System. The researcher turned over the users' manual to the department head and informed him that the system is ready to be used as well as asking permission to use the laboratory for evaluation of the system. The faculty and students had also been informed and had asked for their time to evaluate the system. The evaluation form was distributed to them for their feedback regarding the new course management system.

The questionnaire followed the ISO 25010, a quality model used to evaluate the system. There are 8 faculty and 100 students from different computer courses who evaluated the system. After the evaluation, the forms were collected for interpretation.

2. Evaluation of the new Course Management System by Faculty and Students

The evaluations of faculty and students of the Computer Education Department of the characteristics of the new Course Management System were presented in the table below. The

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ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

system was evaluated through ISO 25010 quality model in terms of: Functional Suitability (Table 1), Performance Efficiency (Table 2), Compatibility (Table 3), Usability (Table 4), Reliability (Table 5), Security (Table 6), and Maintainability (Table 7).

Table 1. Evaluation by the Faculty and Students in terms of Functional Suitability

CMS	Faculty Mean	Verbal Interpretation	Student Mean	Verbal Interpretation
Functional Completeness	4.63	Extremely Acceptable	4.20	Very Acceptable
Functional Correctness	4.75	Extremely Acceptable	4.17	Very Acceptable
Functional Appropriateness	4.88	Extremely Acceptable	4.19	Very Acceptable
Overall	**4.75**	**Extremely Acceptable**	**4.19**	**Very Acceptable**

Table 1 shows the evaluation of the functional suitability of the system. It shows that functional completeness had the lowest mean of 4.63 and interpreted as *extremely acceptable*. This means that the system is not yet fully complete in terms of functions necessary for the system according to Faculty staff. Functional appropriateness had the highest mean of 4.88, which had an equivalent interpretation of *extremely acceptable*. The faculty perceived the usefulness of the new Course Management system appropriate to its objective.

The students evaluated the functional correctness as *very acceptable* with the lowest mean of 4.17. This means that the course management system is not yet fully correct in providing the results needed. Also, functional appropriateness and functional completeness were evaluated and interpreted as *very acceptable* with a mean of 4.19 and 4.20 respectively. Functional completeness had the highest mean according to the students. This can be translated as that the system provides the necessary functions needed to perform the specified tasks.

Table 2. Evaluation by the Faculty and Students in terms of Performance Efficiency

CMS	Faculty Mean	Verbal Interpretation	Student Mean	Verbal Interpretation
Time Behavior	4.88	Extremely Acceptable	4.31	Very Acceptable
Resource Utilization	4.75	Extremely Acceptable	4.25	Very Acceptable
Capacity	4.75	Extremely Acceptable	4.29	Very Acceptable
Overall	**4.79**	**Extremely Acceptable**	**4.28**	**Very Acceptable**

Table 2 shows the evaluation of the performance efficiency of the system. It shows that time behavior had the highest mean of 4.88 with a verbal interpretation of *extremely acceptable*. This means that the speed of the system in processing and performing tasks is timely as perceived by the faculty. Both resource utilization and capacity had the lowest means of 4.75 with an interpretation of *extremely acceptable*. This can be translated as that

DOI: https://doi.org/10.56738/issn29603986.geo2024.5.46
ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

the system can utilize its resources and the capacity is also acceptable according to the faculty.

Both the time behavior, resource utilization and capacity had been evaluated by the students as *very acceptable*. Resource utilization had the lowest mean of 4.25 while time behavior had the highest mean of 4.31. This means that the resources of the system and its speed and capacity need to be improved to meet its requirements as perceived by the students.

Table 3. Evaluation by the Faculty and Students in terms of Compatibility

CMS	Faculty Mean	Verbal Interpretation	Student Mean	Verbal Interpretation
Co-existence	4.88	Extremely Acceptable	4.31	Very Acceptable
Interoperability	4.88	Extremely Acceptable	4.41	Very Acceptable
Overall	**4.88**	**Extremely Acceptable**	**4.36**	**Very Acceptable**

The compatibility of the new course management system as evaluated by faculty and students is shown in Table 3. Co-existence and interoperability were both evaluated by the faculty as *extremely acceptable* with a mean of 4.88. This means that the system can easily adapt and can perform its functions efficiently in other environments.

The students both graded the Co-existence and interoperability as *very acceptable*. The co-existence had the lowest mean of 4.31 while the interoperability obtained the highest mean of 4.41. This explained that the system needs more improvement to efficiently perform its function required when used in other environments as perceived by the students.

Table 4. Evaluation by the Faculty and Students in terms of Usability

CMS	Faculty Mean	Verbal Interpretation	Student Mean	Verbal Interpretation
Appropriateness	4.75	Extremely Acceptable	4.40	Very Acceptable
Learnability	4.88	Extremely Acceptable	4.31	Very Acceptable
Operability	4.88	Extremely Acceptable	4.32	Very Acceptable
User Error Protection	4.38	Extremely Acceptable	4.06	Very Acceptable
User Interface Aesthetics	4.50	Extremely Acceptable	4.11	Very Acceptable
Accessibility	4.88	Extremely Acceptable	4.35	Very Acceptable
Overall	**4.71**	**Extremely Acceptable**	**4.26**	**Very Acceptable**

Table 4 shows the evaluation of the usability of the system evaluated by the faculty and students. The table shows appropriateness recognizability, user interface aesthetics, learnability, operability, and accessibility rated as *extremely acceptable* by the faculty. Both learnability, operability and accessibility obtained the highest means of 4.88. On the other hand, user error protection obtained the lowest mean of 4.38 translated as *very acceptable*. This explained that the system is easy to use, effective and accessible but needs improvement by protecting users against making errors.

DOI: https://doi.org/10.56738/issn29603986.geo2024.5.46
ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

The students evaluated the system in terms of appropriateness recognizability, learnability, operability, user error protection, user interface aesthetics and accessibility as *very acceptable*. This means that the system needs more improvement in all aspects as perceived by the students. User error protection obtained the lowest mean of 4.06 while appropriateness recognizability obtained the highest mean of 4.40.

Table 5. Evaluation by the Faculty and Students in terms of Reliability

CMS	Faculty Mean	Verbal Interpretation	Student Mean	Verbal Interpretation
Maturity	4.88	Extremely Acceptable	4.33	Very Acceptable
Availability	4.88	Extremely Acceptable	4.30	Very Acceptable
Fault Tolerance	4.75	Extremely Acceptable	4.12	Very Acceptable
Recoverability	4.75	Extremely Acceptable	4.11	Very Acceptable
Overall	**4.81**	**Extremely Acceptable**	**4.22**	**Very Acceptable**

Table 5 shows the evaluation by the faculty and students in terms of reliability. The table shows maturity, availability, fault tolerance and recoverability evaluated by the faculty as *extremely acceptable* with a means of 4.88 and 4.75 respectively. Maturity and availability both obtained the highest means while fault tolerance and recoverability both obtained the lowest means. This can be explained that the system is reliable, able to operate and can be accessed when required; and can be recovered when necessary.

The students evaluated the maturity, availability, fault tolerance and recoverability as *very acceptable* with the following means of 4.33, 4.30, 4.12, and 4.11 respectively. Recoverability obtained the lowest mean of 4.11 while maturity obtained the highest mean of 4.33. This explained that the system needs more improvement to be fully matured and can recover affected data directly in case of a failure.

Table 6. Evaluation by the Faculty and Students in terms of Security

CMS	Faculty Mean	Verbal Interpretation	Student Mean	Verbal Interpretation
Confidentiality	4.75	Extremely Acceptable	4.34	Very Acceptable
Integrity	4.88	Extremely Acceptable	4.23	Very Acceptable
Non-Repudiation	4.88	Extremely Acceptable	4.19	Very Acceptable
Accountability	4.88	Extremely Acceptable	4.26	Very Acceptable
Authenticity	4.88	Extremely Acceptable	4.37	Very Acceptable
Overall	**4.85**	**Extremely Acceptable**	**4.28**	**Very Acceptable**

The security of the system was evaluated by the faculty and students as shown in Table 6. All the five characteristics are evaluated by the faculty as *extremely acceptable*. Confidentiality obtained the lowest mean of 4.75 while both integrity, non-repudiation, accountability, and authenticity obtained the highest mean of 4.88. This can be translated as the system can prevent unauthorized access to data, identify the user accessing the data, and meet the requirements of system security.

DOI: https://doi.org/10.56738/issn29603986.geo2024.5.46
ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

The students on the other hand, evaluated the five characteristics as *very acceptable* with the following evaluation: confidentiality with a mean of 4.34, integrity with a mean of 4.23, non-repudiation with a mean of 4.19, accountability with a mean of 4.26 and authenticity with a mean of 4.37. Authenticity obtained the highest mean while non-repudiation was the lowest.

Table 7. Evaluation by the Faculty and Students in terms of Maintainability

CMS	Faculty Mean	Verbal Interpretation	Student Mean	Verbal Interpretation
Modularity	5.00	Extremely Acceptable	4.26	Very Acceptable
Reusability	5.00	Extremely Acceptable	4.28	Very Acceptable
Analyzability	5.00	Extremely Acceptable	4.27	Very Acceptable
Modifiability	5.00	Extremely Acceptable	4.35	Very Acceptable
Overall	**5.00**	**Extremely Acceptable**	**4.29**	**Very Acceptable**

Table 7 shows the evaluation of the maintainability of the system as evaluated by the faculty and students. It shows that the faculty evaluated the system in four aspects such as modularity, reusability, analyzability, and modifiability as *extremely acceptable* with the same mean of 5.0. This means that the system as perceived by the faculty meets all the requirements needed for maintenance.

Meanwhile, the students evaluated the four criteria with *very acceptable* verbal interpretations. The modularity obtained the lowest mean of 4.26 while the modifiability obtained the highest mean of 4.35. It is seen that the faculty perfectly scored the criterion for maintainability while the students wanted the system to have more improvement as they graded it with a *very acceptable*.

Overall, the faculty evaluated the functional stability, performance efficiency, compatibility, usability, reliability, security, and maintainability of the new course management system as *extremely acceptable* as shown in the overall means for these characteristics. This clearly shows that the system had met the requirements of the faculty and just needs improvements to use the system efficiently and effectively.

Moreover, the students evaluated the functional stability, performance efficiency, compatibility, usability, reliability, security, and maintainability of the new course management system as *very acceptable* based on the overall means shown in the table. From the point of view of the students, the system needs more improvement to satisfy their needs for them to use the system effectively and efficiently.

3. Differences Between the Evaluation by the Faculty and the Students of the System Aspects of the New Course Management System of Centro Escolar University, Computer Education Department

Table 8. Z – Test Values Obtained on the Evaluation by the Faculty and Students of the new Course Management System of Centro Escolar University

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ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

(Level of Significance = 0.01)

CMS	Faculty Mean	Student Mean	z-test value	Verbal Interpretation	Remarks
Functional Suitability	4.75	4.19	-2.835	Significant	Failed to Accept
Performance Efficiency	4.79	4.28	-2.519	Significant	Failed to Accept
Compatibility	4.88	4.36	-3.123	Significant	Failed to Accept
Usability	4.71	4.26	-1.997	Significant	Failed to Accept
Reliability	4.81	4.22	-2.811	Significant	Failed to Accept
Security	4.85	4.28	-3.199	Significant	Failed to Accept
Maintainability	5.00	4.29	-6.642	Significant	Failed to Accept

Table 8 shows the result of the test of significant differences between the faculty and student evaluations based on different aspects from performance suitability, performance efficiency, compatibility, usability, reliability, security, and maintainability. It was found out that in functional suitability, the overall mean of the faculty was 4.75 which is greater than the 4.19 mean of the student with their z-test value of -2.835.

In performance efficiency, the overall mean of the faculty was 4.79 greater than the student means of 4.28 with a verbal interpretation of *extremely acceptable* and *very acceptable* with their z-test value of -2.519.

In compatibility, the faculty perceived an overall weighted mean of 4.88 translated as *extremely acceptable* while students obtained an overall weighted mean of 4.36 equivalent to *very acceptable* with their z-test value of -3.123.

On the other hand, usability obtained an overall weighted mean of 4.71 with an equivalent rating of *extremely acceptable* as perceived by the faculty is greater than that of the students as they perceived it as *very acceptable* with an overall weighted mean of 4.26 with their z-test value of -1.997.

In reliability, the faculty graded it with an overall mean of 4.81 with an equivalent rating of *extremely acceptable* greater than that of the students as they perceived it with an overall mean of 4.22 translated as *very acceptable* with their z-test value of -2.811.

In security, the faculty obtained an overall mean of 4.85 with an equivalent rating of *extremely acceptable* greater than that of the students with an overall weighted mean of 4.28 which is equivalent to *very acceptable* with their z-test value of -3.199.

Lastly, maintainability obtained the highest among the seven (7) criterions viewed by the faculty with an overall mean of 5.0 interpreted as *extremely acceptable* while student obtained an overall mean of 4.29 interpreted as *very acceptable with* their z-test value of -6.642.

The z-test conducted for responses among the faculty members and students revealed that the obtained z values are less than -1.96 and that the null hypothesis of no significant difference between the evaluation of faculty and students of the system aspects of the new

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ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

course management system in terms of functional suitability, performance efficiency, compatibility, usability, reliability, security, and maintainability is rejected. Rejection of the null hypothesis indicates that the faculty staff and students perceived the new course management system in different ways.

4. Problems Encountered in the Implementation of the New Course Management System of Centro Escolar University, Computer Education Department

Table 9. Problems Encountered by the Students While Using the new Course Management System of Centro Escolar University

Item No.	Question	Answers	Frequency	Rank
1	Performance Efficiency	a. Slow Processing	47	1
		b. Can't upload more than 200mb file	27	4
2	Functional Suitability	c. CMS unable to send SMS	42	2
		d. Can't play video	38	3

Table 9 shows problems encountered by the students while using the new course management system of Centro Escolar University. In Item 1 for Performance Efficiency, it shows that there are 47 out of 100 students who answered slow processing of system and 27 out of 100 students who experienced that the system was unable to upload files more than 200MB. Slow processing of the system ranks number 1 which means that most of the students experienced the same problem.

In Item 2 for functional suitability, 42 out of 100 students answered that the Course Management System is not able to send SMS which is rank number 2. This is the second problem that most of the students have responded to in which they experienced that while using the system, they weren't able to receive an SMS (Short Message Service) notification when the teacher posted something on the system. There were 38 out of 100 students who experienced problems playing the video posted by the teacher. This problem is rank number 3 to the problems encountered by the students. There are no problems experienced by the students with regards to compatibility, usability, reliability, security, and maintainability.

Table 10. Problems Encountered by the Faculty While Using the new Course Management System of Centro Escolar University

Item No.	Question	Answers	Frequency	Rank
1	Usability	Scores of assignments are not generated by the system	8	1
2	Functional Suitability	Can't upload more than 200mb file	7	2
3	Performance Efficiency	Slow processing	1	3

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GEO Academic Journal Vol. 5 No. 1 – 2024 series

Table 10 shows the problems encountered by the faculty while using the new course management system of Centro Escolar University. It was found out that most of the faculty answered the problem related to usability of the system which obtained the rank number 1. There were 8 out of 8 faculty who experienced that the scores of assignments were not generated by the system. The system can only accept submission of assignments from the students, but the system was not able to generate the score.

Rank number 2 of the problems encountered, which obtained an answer of seven (7) out of eight (8) faculty, was the problem related to functional suitability. The faculty had trouble uploading a file more than 200mb in size. They couldn't upload a video that was more than 200mb but there was no problem with other files such as documents and images.

There was one (1) faculty out of eight (8) who experienced a problem related to performance efficiency of the system which was on rank number 3 of the problems encountered. The faculty experienced slow responses of the system while using it. The speed of the system in responding to the tasks was slow. There was no problem encountered by the faculty related to compatibility, reliability, security, and maintainability of the system.

5. User's Manual for the new Course Management System of Centro Escolar University, Computer Education Department

The researcher made a user's manual to guide the user in using the new course management system. The user's manual is step-by-step instruction on how to access the system, log on to the system and use the system by accessing all the available menus.

Figure 4. User's Manual for the new Course Management System of Centro Escolar University

DOI: https://doi.org/10.56738/issn29603986.geo2024.5.46
ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

Conclusions

The following are concluded:

1. The development of the new course management system involves the six stages of development: planning and requirement analysis, defining requirements, designing, and developing the system, testing the system, creating user's manual, and evaluation of the new course management system.

2. The faculty perceived the seven (7) ISO criteria of functional suitability, performance efficiency, compatibility, usability, reliability, security, and maintainability as *extremely acceptable*, while the students viewed these characteristics as *very acceptable*.
3. There is a significant difference in the evaluation by the faculty and students of the new Course Management System in the seven (7) criteria. The faculty evaluated all the seven (7) criteria as *extremely acceptable* while the students evaluated all as *very acceptable*.

4. Problems encountered by the students during the use of the new course management system are related to performance efficiency and functional suitability. Slow responses of the system were viewed as rank number 1, followed by the inability to send SMS notification as rank number 2, unable to play the video posted were on rank number 3 and on rank number 4 was the problem in uploading files more than 200MB. Faculty on the other hand, encountered problems related to usability, functional suitability, and performance efficiency such as generating the scores of submitted assignments as rank number 1, followed by the problem related to uploading files more than 200MB as rank number 2 and on rank number 3 for the slow responses of the system.

Recommendations

Based on the conclusions of this study, the following are recommended:

1. The researcher recommends that the university may consider using the new course management system as it was viewed excellent by the faculty which indicated that the system had initially provided the needed requirements to satisfy the needs of the faculty.
2. Though the faculty evaluated the system as excellent, the usability of the system can be further improved as it was the criteria that obtained the lowest mean among other criteria.
3. Further development and improvement should be done since the students viewed the system as very satisfactory in all the seven (7) criteria.
4. Further studies should include the development of the new course management system with regards to user interface design, additional functions such as the administration of online quizzes, online exams, live video discussions, and venue for chat room for students and faculty, modification of the components of the grades to be encoded such as adding class standing grade, quizzes and assignment grades and other

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ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

activity grades, posting of class record, attendance checking, archiving of deleted account together with the files associated with it by the super admin account and many more.

5. Future researchers should focus on the improvement of the user interface design of the students. The students may find it more interesting and fun to use if the system provides an eye-catching design since the students are more interested in what they see rather than what the system can do. Young students are more attracted to the design of the functionalities of the system.

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ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

References

Burgos, R. (2014). Faculty experiences, perceptions, and the factors that influence the use of e-learning technologies in the classroom. Retrieved 08 May 2019, from https://search.proquest.com/docview/1500830175?accountid=31613.

Carroll, J. M., & Swatman, P. A. (2000). Structured case: A Methodological framework for building theory in information systems research. *European Journal of Information Systems, 9*(4), 235–242.

Christensson, P. (2018, March 3). Moodle Definition. Retrieved 2024, Apr 1, from https://techterms.com

Classroom. (n.d.) American Heritage® Dictionary of the English Language, Fifth Edition. (2011). Retrieved April 1, 2024, from https://www.thefreedictionary.com/classroom

Doan, S. C. (2015). Digital classrooms, public profiles. Retrieved 08 May 2019, from https://search.proquest.com/docview/1707937473?accountid=31613.

Fellows, D. S. (2009). Blended courses at the high school level. Retrieved 08 May 2019 from https://search.proquest.com/docview/305176956?accountid=31613.

Ford, J. K. (2013). Course management system interaction analysis: A study of current adopters of an established course management system. Retrieved 08 May 2019, from https://search.proquest.com/docview/1468678380?accountid=31613.

Glen, S. (2015). Statistics How To: Statistics for the rest of us. Retrieved 10 May 2019, from https://www.statisticshowto.datasciencecentral.com/sample-mean/.

Gregor, S., Martin, M., Fernandez, W., Stern, S., & Vitale, M. (2006). The Transformational dimension in the realization of business value from information technology. *The Journal of Strategic Information Systems, 15*(3), 249–270.doi:10.1016/j.jsis.2006.04.001

ISO/IEC 25010:2011 (2017). International Standardization Organization 25010. Retrieved 08 May 2019, from https://www.iso.org/standard/35733.html

Jones, D. S. (2015). Analysis of factors that influence use of learning management systems by Pennsylvania rural school districts. Retrieved 08 May 2019, from https://search.proquest.com/docview/1698462876?accountid=31613.

Kehoe, K. (2014). Moodle usage increases regardless of complaints. Retrieved 10 May 2019, from www.technicianonline.com/news/article_d0d187ac-8fb9-11e3-pad2-001a4bcf6878.html

Learning management system (n.d.). Retrieved 08 March 2019, from https://en.wikipedia.org/wiki/Learning_management_system

DOI: https://doi.org/10.56738/issn29603986.geo2024.5.46
ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

Lee, A. S., & Baskerville, R. L. (2003). Generalizing generalizability in information systems research. *Information Systems Research, 14*(3), 221–243.

Li, Z. Z. (2009). Design and implementation of courses management system for experiments based on browser/server structure in college's educational administration. Retrieved 08 May 2019, from https://search.proquest.com/docview/1869033275?accountid=31613

Likert scale (n.d.). Retrieved April 1, 2024, from https://en.wikipedia.org/wiki/Likert_scale

Liu, J. (2013). E-learning in English classroom: Investigating factors impacting on ESL (English as second language) college students' acceptance and use of the modular object-oriented dynamic learning environment (MOODLE). Retrieved 08 May 2019, from https://search.proquest.com/docview/1452046100?account id=31613.

Manuela Aparicio, Fernando Bacao, & Tiago Oliveira. (2016). An e-Learning Theoretical Framework. Journal of Educational Technology & Society, 19(1), 292–307. http://www.jstor.org/stable/jeductechsoci.19.1.292

Mcdaniel, R. (2015). Course Management Systems. Retrieved 08 May 2019, from https://cft.vanderbilt.edu/guides-sub-pages/course-management-systems

Mengawade, T., & Mogal, M. (2013). SMS Based Student Services Administration. Retrieved 08 May 2019, from https://computerresearch.org/index.php/computer/article/view/311/311.

Norman, S. (2017). 7 Benefits of Technology Integration in the Education Sphere. Retrieved 08 May 2019, from https://elearningindustry.com/benefits-technology-integration-education-sphere

Perry, K. A. (2010). The use of technology in relation to community college faculty characteristics and instructional environments. Retrieved 08 May 2019, from https://search.proquest.com/docview/749391992?accountid=31613.

PHP 5 Tutorial (n.d.). Retrieved May 8, 2019, from https://www.w3schools.com/php/

Pickle, B. (2023, October 12). SMS Definition. Retrieved 2024, Apr 1, from https://techterms.com

Ramey, K. (2013). The use of technology in education and teaching processes. Retrieved 08 May 2019, from www.useoftechnology.com/the-use-of-technology-in-education/

Unal, Z., & Unal, A. (2011). Evaluating and Comparing the Usability of Web-based Course Management Systems. Journal of Information Technology Education: Research, 10, 019-038. doi: 10.28945/1358

DOI: https://doi.org/10.56738/issn29603986.geo2024.5.46
ISSN 2960-3986
GEO Academic Journal Vol. 5 No. 1 – 2024 series

Vanderbilt University (2019). Course Management System. Retrieved 08 May 2019, from https://cft.vanderbilt.edu//cft/guides-sub-pages/course-management-systems/

Wang, Q., Woo, H. L., Quek, C. L., Yang, Y., & Liu, M. (2012). Using the Facebook group as a learning management system: An exploratory study. *British Journal of Educational Technology*, 43(3), 428-438. doi:10.1111/j.1467-8535.2011.01195.x

Z Test Formula (n.d.). Retrieved 08 May 2019, from https://formulas.tutorvista.com/math/z-test-formula.html.

Zarkoskie, L. (2010). Using MOODLE forums to increase middle school student participation and level of detail in student responses. Retrieved 08 May 2019, from https://search.proquest.com/docview/276056857?accountid=31613.

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