PAMANTASAN NG LUNGSOD NG MUNTINLUPA

DEVELOPMENT OF PIZARA: A LEARNING MANAGEMENT SYSTEM FOR THE TECHNOLOGICAL UNIVERSITY OF THE PHILIPPINES

A Capstone Project Presented to the
College of Information Technology and Computer Studies
Pamantasan ng Lungsod ng Muntinlupa

In Partial Fulfilment of the Requirements for the Degree
Master in Information Technology

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CHAPTER II
REVIEW OF RELATED LITERATURES AND STUDIES

This chapter presents the review of related literature and related studies underlying the framework of the study. It includes the conceptual model of the study and the operational definition of terms.

TECHNICAL BACKGROUND

The researcher used the following third party software tools in order to complete and finish the features needed in the development of the system.

AdminLTE is a standard popular open source web application template for admin dashboards and control panels. It is a responsive HTML template that is based on the CSS framework Bootstraps 3. It utilizes all of the Bootstrap components in its design and re-styles many common used plugins to create a consistent panel dashboard that can be used as a user interface for backend applications. It was used by the system to be more accessible in the over-all look and content of Pizara [1].

PHP programming is created by [2]; PHP is an HTML embedded scripting language. Much of its syntax is borrowed from C, Java, and Perl with a couple of unique PHP-specific features thrown in. Therefore, the researcher used this language to build simple, dynamic web application for the development of Pizara and added support for forms. PHP offers security as well that helps prevent malicious attacks.

Customizable Bootstrap: the Bootstrap can be customized and used for the development of the system. The researcher can make choices to select the aspects which can be simply complete and utilizing Bootstrap page. Bootstrap approaches with a group of JavaScript components for including the functionality that crafts it in simple

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way of operating things, such as tooltips, modal windows, alerts, and even leave out writing scripts.

MySQL is an open-source database that facilitates effective management of databases by connecting to the software and the system administrator to configure the MySQL database server for a smooth performance. MySQL is easy to use, secure, and scalable because of its small size and speed. With this, it is the ideal database solution in the development of the system [3].

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Web Real-Time Communication is a technology that supports browser-to-browser communication for voice calling, video chat and peer-to-peer file sharing without the need for neither internal nor external plugins. The technology is developed by Google and was released as open-source in May 2011. Currently, Chrome, FireFox, and Safari have support for WebRTC without external plugins.

WebRTC differs from the existing methods to communicate via a browser in the sense that others use a server-client model where all traffic goes through the server. This effectively means that for two clients to communicate with each other, their traffic needs to go via the server. With WebRTC the server is used to setup the connection between the peers and their traffic goes directly to the other peer. All network communication technologies suffer from security concerns and WebRTC is not an exemption, and therefore it is imperative to be aware of what security and privacy issues WebRTC have in order to utilize it effectively [4].

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Google Forms was used for creating test/ quizzes, these forms are normally used to connect people for classroom, file-sharing, and etc. The forms are integrated with

Google Sheets which gives a spreadsheet view of the data collected, making it easy to analyze. There are many ways that Google Forms can be used that benefit teaching and learning, not only for building quizzes or assessment but can also be used for many classroom tasks, such as managing assignments, collecting student feedback, writing book reviews, and collaborating on group projects [5].

A Comma-Separated Values (CSV) file performs as a database table or an intermediate form of a database table. CSV file is a set of rows and columns stored in a text file such that the rows are separated by a new line while the columns are separated by a semicolon or a comma. It is safe and can clearly differentiate between the numeric values and text. Importing CSV files can be much faster, and it also consumes less memory [6].

Webmail applications [7] enable user to check the email accounts through browser. Third-party e-mail client applications, such as Thunderbird and Microsoft Outlook Express, generally provide more features than webmail applications but also require more initial configuration.

RELATED LITERATURES

The rapidly changing world of software development and design is vital for the teachers and students to use a tool to assess the developed programs and the pedagogical validity and usefulness. According to [8], "Software, or computer-based teaching, is not able to make connections to what the student knows and deals with in daily life" and using an evaluation tool, it allows the instructors and decision makers to better assess new software tools which may prove to be very useful in the current system.

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PAMANTASAN NG LUNGSOD NG MUNTINLUPA

The Learning Management System, or LMS, is the most significant educational system for teaching and learning. The LMS means by which course information is distributes to the students. The LMS primarily serves the institutions mission. Accordingly, the role of a Learning Management System varies depending on the organization's objectives, online training strategy, and desired outcomes. The most common used for LMSs is to deploy and track online training initiatives. Typically, assets are uploaded to the Learning Management System, which makes them easily accessible for remote learners. In some cases, the LMS may even have built-in eLearning authoring tools that allows user to develop online training materials.

In general, the LMS as a vast repository where can store and track information. For open source LMS, anyone with a login and a password can access the online training resources. For self-hosted LMS, users have the LMS software installed on its computer. Whatever the installation option, the LMSs users divided into two categories: First, a student who uses LMS participates in online training courses; and second, is the instructor that relies on the LMS platform to distribute information and update the online training courses.

These are the following benefits of using learning management system:

- Organizes and Safely Stores Big Data. Learning Management System allows big data to gather in one location, this made easier to maintain and update the learning materials. Most, LMS feature advanced encryption.
- Monitors Learner Progress and Performance. All LMS platforms features have built-in reporting and analytics tool such as graphs and charts.

- Improves Resource Allocation, There are many ways that LMS platforms can help users to allocate online training courses more effectively. First, can identify aspects of the online program and meets the expectations. Slow learner engagement is usually an indicator that needs to reevaluate the online modules or activity. Second, LMS help the instructor to update the course module quickly.
- Improves eLearning Accessibility, millenial's expect online training resources on demand. In the digital age, all information is always at the fingertips, using smart phones and tablets.

To further understand the concepts of the Learning Management System benefits and its features, here are some of the existing LMS used and Tables 1 to 2, shows the comparison of an Open Source LMS:

Table 1.
Comparison of an Open Source LMS

Open Source LMS	Moodle	ATutor	Dokeos	OLAT
Maintain and Support the Standards (AICC, SCORM)	SCORM and Learning Management System Support Content Package	SCORM and Learning Management Support Content	Has a capacity to build up different LMS's that are in SCORM package.	SCORM and Learning Management System Support Content Package
Multiple Language Support Accessible in Installation and Maintenance	77 different foreign language support The compiled document is easy to retrieve and restores using Moodle.org	64 different foreign language support Unable to maintain documents and restored	5 different foreign language support Flash drive-based only on their server	14 different foreign language support Unable to maintain documents and restored

Table 2.
Comparison of an Open Source LMS (cont.)

Open Source LMS	Moodle	ATutor	Dokeos	OLAT
Graphical User Interface (GUI)	Very Satisfactory in the user interface Themes skins, allow for skinny stones, color, and layout	With ownership of the design	With ownership of the design	With ownership of complicated menu design
Supported by Multimedia Tools	Supported by a third-party tool and JavaScript-based content	Supported by Multimedia tools	Supported by Multimedia tools	No multimedia support
Supported by Cloud backup tool	Supported by Cloud backup tool via internet	Manual restoration of data Separate Module Backup	Manual restoration of data Separate Module Backup	Manual restoration of data Separate Module Backup
System Requirement is included	MySQL, Apache, and PHP Programming	MySQL, Apache, and PHP Programming	MySQL, Apache, and PHP Programming	JAVA, TOMCAT 5, and Openfire

Tables 1 and 2, shows the comparison of an open source learning management system. This illustrates that OLAT and Moodle have the ability to view users login activity, tracking, and details that are presented with graphs and detailed modules. And, explained the learning communication tools that Moodle owns debate forums, transfer file system, email application, a calendar application, and whiteboard [9].

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RELATED STUDIES

As different from other LMSs in Moodle there are different access possibilities from different groups for the administrators. These are administrators, teachers, students and guest's accounts. Teachers can save students text files that are limited only for course usage or students can save their documents by themselves.

A Moodle LMS as a course management system, was developed by Mr. Dougiamas, an Australian graduate. This platform was released in 2002 to the public and initially only with the education market. Moodle LMS was written in PHP programming as well as the free scripting language intended for building dynamic webpages. This is trusted by the clients and the other platform's core development. In addition, the system is designed to be highly modular and competitive. Further, developers in the corporate industries also created plug-ins and other add-ons features for it to be more competitive all over the world.

This is considered as the most common open-source language software and or learning management system today. There were more than 49,600 registered sites as of October 2010 that implemented and integrated MOODLE in their site. Moodle is free, can be modified, and freely distributed under the terms of the General Public License. There are lots of documentation, compilation, and resources available on Moodle.org for use under this term. MOODLE allows teachers to create its own personal online education site. It is extremely customizable with more standard features.

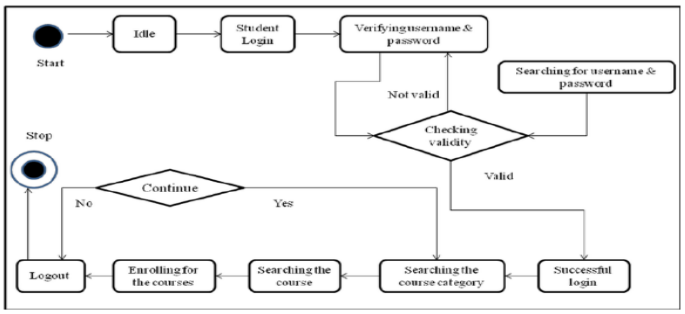

Figure 1. Sample Screen of State Machine Diagram of Moodle LMS

Figure 1 shows the architectural machine diagram of moodle, user first logs in the dashboard e.g. Moodle. The system verifies the entered username and password. After, verifying the logs in information, the user find the courses list and subjects. This enrollment information is stored in database as Moodle store each and every action of user. All stored data in Moodle database was generates and prepared. Through this steps, the first selected data from database which is relevant was clean and transformed into the format for testing process and go back to the fisrt process.

The following are the standard core features of Moodle LMS:

- Modern, easy to use interface.
- Personalized Dashboard: displays the courses and view current tasks.
- Collaborative Tools and Activities
- Calendar tool, helps to keep track of the academic calendar, course deadlines, group discussions and other personal events.
- Convenient File Management, drop and send files from cloud storage services including MS Skydrive, Dropbox and Google Drive.

- Simple and Intuitive Text Editor, suitable in adding media and images using Moodle editor that works across all web browsers and devices.
- Notifications, users can receive alerts on new assignments and deadlines, forum posts and also send private messages to one another.
- Track Progress, users can track progress and completion with an array of options of tracking individual activities or resources and at course level.
- Customizable Site Design and Layout, easily customize a Moodle theme with logo, color schemes, and layout.
- Bulk Course Creation and Easy Backup, can add courses in bulk, backup and restore large courses with ease upload.
- Manage User Roles and Permissions, can address security concerns by defining roles to specify and manage user access.
- Supports Open Standards, readily import and export IMS-LTI, SCORM courses and more into Moodle
- High Interoperability, freely integrate external applications, content, and plugins for custom integration.
- Detailed Reporting and Logs, can view and generate reports on activity and participation at course and site level.
- Direct Learning Paths, design and manage courses to meet various requirements for the classes.
- Encourage Collaboration, teach materials and include assignments from other sites connect to the grade book in Moodle.

- Multimedia Integration, support Moodle built-in media that enables users to search video and insert audio files in the courses.
- Group Management, shared courses, and facilitate team work group.
- Peer and Self-Assessment, provides survey tools, view grade and assessment.

Additionally, the researcher found out that the learning management system will help to fulfill these complete related studies as well as to familiarize with the different learning management system for the benefit of this study [10].

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In contrast to Moodle, these are the strengths and weaknesses of SAKAI Learning Management System (LMS). Sakai is a collaborative learning environment, and its collaboration tools perform and cover the full range offered by most commercial solutions. It also offers four main categories of features and tools:

1. The general collaboration feature is a module that ranges from announcements to Wikis to RSS feeds, consisting of common web-based communications and collaboration tools.
2. The teaching and learning tools allow the instructor to build and prepare lessons.
3. The portfolio tools provide the user features to design publish, share, create, and view portfolios of work. These include a variety of wizards, templates, matrices to make building easier.
4. The administrative management toolkits offer robust options for managing accounts, user roles and date, site setup and editing.

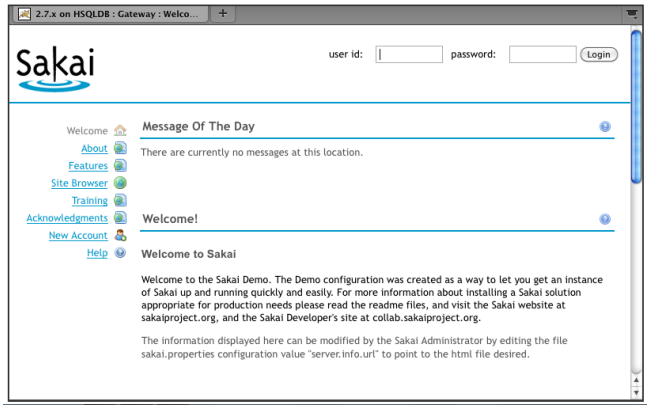

Figure 2. Sample Screen of Sakai's Default Login

Figures 2 show the Sakai's Learning Management System accessibility, this configuration was created to get an instance of Sakai up and running quickly and easy to set the email notification preferences.

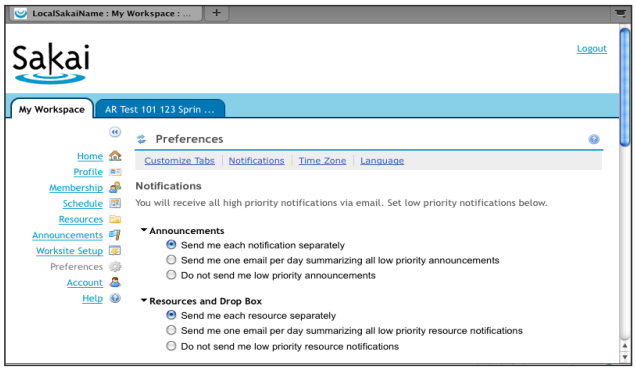

Figure 3. Sample Screen of User to Set their Email Notification Preferences

Figures 3 show the Sakai's Learning Management System sample screen of user on how to set its email notification preferences, accessibility, this configuration was created to get an instance of Sakai up and running quickly and easy to set the email

notification preferences. Users can interact with login page and submit the necessary credentials to get access the Sakai's module.

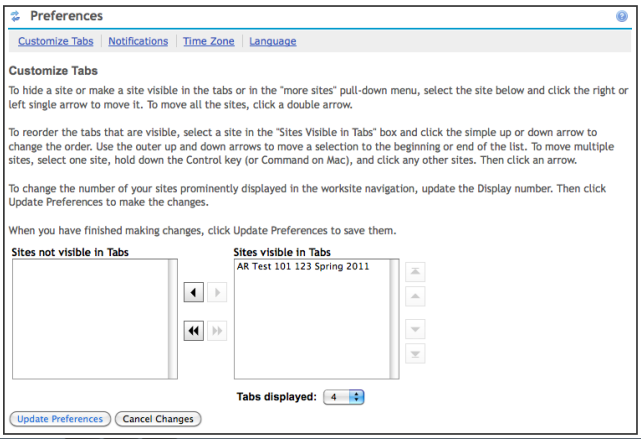

Figure 4. Sample Screen of Sakai's Setting Displayed in the Course Navigation

Figure 4 showa the core and expanded features and capabilities of Sakai are wide-ranging. The following are the standard core features of Sakai:

- Grade book tools were used to store and calculate data.
- Discussion forums were used to evaluate the grade and class participation.
- Syllabus Tool was used to posting the course outline summary.
- Test and Quizzes tool was created to manage and assess the performance of the learners.
- Calendar tool was used for the scheduling of activities.
- Chat features engaged in real-time conversations.

- Webcasting tool was created to moderately manage the discussion, lessons/ topics and groups within the module also a private message.
- Podcast tool was used to create a podcast from audio or video files, post them to a course or worksite participants.

This tool was designed, developed and tested in the market, and then packaged with the latest version of Sakai features [11].

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ATUTOR labeled learning content management system [12] with the following features:

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1. Modular Course Tools. This tool used to create custom courses for a wide range of purposes. The modular course tool can added a course as navigation tabs, as side menu blocks, or as Home page, or Student tool page module.
2. Personal Preferences, students and instructors can configure the learning environment, enable and disable navigation features. Change colors, fonts, and text size for the main screen.
3. Integrated Multimedia that is easy to operate and has link to YouTube and other Audio content.
4. Content Authoring, a tool for creating and assembling learning content.
5. Import/ Export used to import the course content.
6. Content Repository, to find and share learning materials.
7. Tests and Surveys were used to evaluate the performance of the users.

8. Social Networking provides a networking environment that allows students and instructors to develop contacts and communication to learners.
9. Communication, use for discussion forums to communicate within and across the courses.
10. File Sharing, this tool used to gather and distribute course documents, assignments and other project drafts.
11. Accessibility, to ensure the students and instructors access in the course and or course materials, and for the current access web technology used.

Figure 5 shows the sample screen of Atutor Learning Management System Home Screen was first launched in 2002.

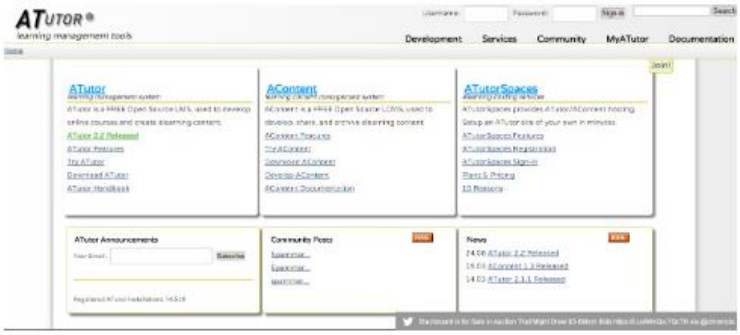

Figure 5. Sample Screen of Atutor LMS Home Screen

ATutor was released in 2002 and designed with accessibility and adaptability. It was used in various frameworks same with the career development, improvement for

teachers teaching methodology and style, online course module, and as well as research development [13].

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Additional learning management system tools used in an online education is the EDMODO. EDMODO is an educational technology company offering collaboration, communication, and coaching tools to K-12 education schools.

The EDMODO network enables users to share content information, assignments, distribute quizzes and manage communication with students, colleagues, and parents.

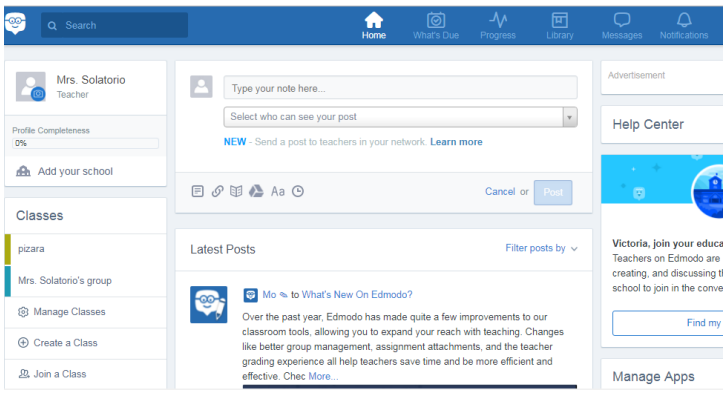

Figure 6. Sample Screen of Edmodo Personal Dashboard

Figure 6 shows the home screen of Edmodo. This is a free web-based social networking site designed for users, parents and other schools, with a safe and secure

platform to users, teachers, and parents to collaborate, share content, access homework, and view grades.

Edmodo provides a secured environment where teachers can create a classroom group for the students. The following are the integrated virtual group in Edmodo class [14]:

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a. Place digital access to download the resources,
b. Create polls for students to vote online,
c. Write short summaries of lessons for students who were absent from class, and
d. Post homework information.

Figure 7. Sample Screen of Totara Home Screen

Figure 7 shows the Totara learning management system dashboard, Totara is a PHP programming based open-source learning management system presented in nineteen (19) languages over five (5) million subscribers. This provide major learning features including performance rate management, certifications, reporting, open

badges, competency skill-based management and cloud technology as well as classroom management [15].

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An additional research study in Google Scholar [16] allows the user to search particularly for scholarly literature, such as preprints, theses, books, peer-reviewed papers, abstracts and technical reports from all areas of research. It is also noteworthy for the fact that it is conceived of as an interdisciplinary search engine. Indifference to specialty search engines like the Cite Seeker system which indexes freely available computer science literature or for economic papers, the Google scholar approach can be conceived of as a comprehensive science search engine. The following is a short description of the most important features of Google Scholar:

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1. The advanced search offers, in addition to searching the title of the article, the opportunity to search for an author name, journal title and year of publication, of an article or book. These attributes represent only a minimal set of search criteria compared to specifically scientific search interfaces and the reliable extraction of this data from un- or only partially structured documents pose.
2. Full-Text Access: In contrast to classical abstracting and indexing databases, which search in bibliographic metadata, including abstract and keywords, Google scholar searches based on a full-text index, this means that the user can with minor limitations.
3. Relevance Ranking: It orders your search results by how relevant they are to your query, so the most useful references should appear at the top of the page.

4. The link to the Google main index is useful especially when the documents are not directly available from the Google Scholar result list and the query is expanded to the whole (Google) web.
5. Institutional Access: The pilot project Institutional Access mainly offers additional value for institutional users such as students or scientific staff as Google uses open linking/ link resolver such as SFX to link directly to local library holdings.
6. The Query OCLC WorldCat.

Google Scholar has also illustrated attention from literature studies coming from the fields of 7 bibliometrics and informetrics. Proponents from this field compared the new Google Scholar service with the established citation indicates Web of Science (WoS) and Scopus or other citation databases.

DEFINITION OF TERMS

The following terms are defined operationally to better understand the project study.

PIZARA is a Learning Management System that includes the following features: Manage Courses, Assigned Classes to Courses, Add Lecture/ Assignment, and Test.

Learning Management System refers to online learning system phenomenon bringing accessibility, effectively and opportunities that allows users and institutions to improve quality service in education.

Dashboard	refers to the admin panel that contains the link of modules included in the system.
Video Conference	is a set of telecommunication technologies which allow two or more locations to communicate by simultaneous two-way video and audio transmissions.
vClass	refers to integrating Pizara with third-party tools using WebRTC Real-Time Communication.
000WebhostApp.com	particularly refers to a free web hosting used to support the Pizara file management data.

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Both Operational and Technical should be minimum of 20 terms.