Learner's Tracker: A Learning Management System for Analyzing Student Assessments Data

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Background of the Study

Education is important to the students because it prepares them for the social responsibilities they will have in the future. Universities or institutions aim to offer the kinds of quality education that best suits the requirements of both learners and society. Nowadays, education in our country has different aspects in which the students should learn in order to adapt to society. However, tracking their assessments data should be important so that, students will have an idea whether they will pass the course or not. In the rapidly changing environment of modern education, effective management and analysis of student assessment data have become essential to both educators and learners. With the development of technology-driven solutions, Learning Management Systems have evolved as strong tools to assist the gathering, organization, and interpretation of important data (Bradley, 2020).

A Learning Management System is a software application or web-based platform designed to facilitate the administration, delivery, tracking, and management of educational and training content (Kirvan & Brush, 2023). LMSs are commonly used in various educational settings, including schools, colleges, universities, corporate training, and online learning environments. They can offer a variety of features and functionalities and act as a main focus for arranging and delivering educational material (Imed Bouchrika, Phd, 2023).

Due to technological improvements, the educational landscape has undergone considerable changes in the digital age. Technology's integration into education has

 transformed both teaching techniques, but it has also made it necessary to create effective administrative systems to control the amount of student data that is generated within educational institutions. With the development of Learner's Tracker, tracking the students' academic performances and assessments has been simplified, communication has been improved and educational outcomes have generally enhanced.

In the present condition of education, students have a little hint or idea on what are the results of all assessments that the students take. Many of the students wondered if their performances have been improved or a failure. By implementing a web-based system Learner's Tracker: A Learning Management System A Learning Management System for Analyzing Student Assessments Data, students will be able to track down their academic performance or assessment easily. By the use of the system, students will be able to know if there's a need to improve their academic performance or grades in a specific course.

By developing comprehensive and user-friendly system to handle and monitor student information effectively, the research project "Learner's Tracker: A Learning Management System A Learning Management System for Analyzing Student Assessments Data" seeks to satisfy the changing needs of students and also, the needs of educational institutions or universities. This system is a web-based system that can be used by the TUP students anytime and anywhere whenever the students want to access their assessment records. The system will be used to add the information about specific courses and also, through the specific courses, there will be the assessment record and data of the grades of the students, and it will be used to track the students' grades so that the students will know if they will need an improvement and take an actions through the provided output of their overall grades.

Objectives of the Study

General Objective

The objective of this study is to create and develop a web-based Learner's Tracker: A Learning Management System A Learning Management System for Analyzing Student Assessments Data that will track the students' grades in order for students to know their grade ahead of time, prevent failing, and come up with solutions that will improve their grades.

Specific Objectives

Specifically, the objectives of the study are as follows:

1. Design a Learner's Tracker: A Learning Management System for Analyzing Student Assessments Data with the following features:
   a. Module for students where they can be able to see their class programs or courses, assignment section, quizzes section, examination section, and project section with the following features:
      - Registration form where the students will need to register first to have a student access or student account.
      - Class section where they can find their class/course grade progress.
      - Assignment section where they can fine their assignment information and also, view or upload their assignment and then they can see their assignment's score.
      - Project section where the students will upload their projects and, they can see there the project information and their scores

- Quiz section where the students can be able to take the quiz and the students can see their score.

- Examination where the student will take their exam and they can see their score.

b. Module for professor where they can be able to add class section, add students, assign quizzes, assignments, projects, and examinations with the following features:

- Registration form where the professors will need to register first to have an access or professor account.

- Class section where the professors will need to add a new class section and inside of it, professors can add new students manually for class list. So, if ever there will be a new student in class, they can add it individually. Professors can view the student's class standing and class progress in this section.

- Assignment section where the professors will assign a new assignment, select class to assign the assignments and can view the student's submitted assignments where the professor will provide the score there.

- Project section where the professor will assign a new project for the students. The professors can see the students who already submitted the project and once the professor viewed who submitted the project, the professor will put a score for the student's project.

- Quiz section where the professors will add a new quiz, view quiz, and provide scores to the quizzes

- Examination section where the professors will add a new exam that the students will take, and the professors can also view the exam and add the grades to the exams.

- Chat section where the professors can interact with their students.

c. Module for administrators where the administrators will manage the professors and student. This module also has the following features:

- Manage professors where the admin can see the list of professors and the admin can change the professors' passwords, and the admin can update the professors' information.

- Manage students where the admin can see the list of students and the admin can change the students' passwords, and the admin can update the students' information.

- Manage admin where the administrator can add new admins. The admin can also see the lists of admins and the admin can update the password and information of other admins.

2. Create a Learner's Tracker. A Learning Management System using the following tools:

- Xampp

- Php

- Mysql

- HTML

- CSS

- Java Script

- Bootstrap

3. Test and improve the system features, maintainability, and functional suitability.

4. Define the level of acceptability using ISO 25010 evaluation instruments and quality software models.

Scope and Delimitation of the Study

The study focused on implementing a web-based system for storing student courses. The system enables three specific users which are the faculty or professors, administrator and the students which gives the system access to a dashboard with information such as the student's courses, student's projects, assignments, and quizzes. The faculty or the professors can add their lessons, assigned quizzes, projects, and assignments through specific fields. The admin has access to the faculty user and student user and maintain the website's functionalities and usability. The system has an assessment grade tracker to track the students' grades and, the system has information of the student's assessments such as quizzes, projects, and assignments. The system can be used by the TUP students.

To run the Learner's Tracker effectively, it requires a device that can accommodate a compatible operating system like Windows 10, or a much higher version. It is recommended to have at least 4gb of ram and at least intel core i3 processors. Moreover, the user should have an internet connection, maybe a wireless internet connection or preferably built-in ethernet to connect to the local network and access the website.

The system will be developed using web development tools and will involve collecting data from the students in Technological University of the Philippines ranging from first year college to fourth year college every semester in the College of Science Department.

The study will not cover other university's student grades and assessments. Moreover, the research will only be conducted within a specific timeframe.

Significance of the Study

The system will be implemented to help the students and professors to easily track the student's information and assessment records.

Benefiting the study are the various sectors as follows:

The students. The system will be beneficial to the students as it will provide summary data or records about the student's academic performance and also their subject courses in the university.

The professors. The system will be beneficial to the professors since the system will be the one who can provide the professors the various information of the students that a professor needs.

The faculty. The system will be beneficial to the faculty as it will simplify and integrate the faculty's work process.

To the users. The system will be beneficial to the users as it will allow users to adjust their system preferences, while the system keeps account of any changes that are made to the records.

To the researchers. The system will be beneficial to the present or future researchers as it will help researchers to develop new knowledge about the system and the system may be the one of the foundations for the development of a new learning theory.

Chapter 2

CONCEPTUAL FRAMEWORK

The review of relevant studies and literature that forms the study's conceptual foundation is presented in this chapter. The operational definition of words and the conceptual model for the investigation are also included.

Review of Related Literature

This section includes significant studies and articles that supported the researchers in conceptualizing the subject of their study.

Grading System

In Philippine higher education, the grading systems may differ between educational institutions. There is no national grading system. Higher education institutions provide information about their grading system on the transcripts. Students' academic success in the Philippines is gauged by the grading system. It is crucial for students to comprehend how the grading system operates to set reasonable objectives and monitor their development. Most Philippine universities, including the University of the Philippines, base their grading scheme on a 5-point rating system. Universities may differ in the precise letter grades that are assigned to each point value. Usually, a passing mark of 75–77 is the lowest. Academic performance is represented numerically in the Philippine grading system.

In his 2010 article Computerized Grading System, Harold Wilson writes, "The idea of grading system is introduced in the aim of the universities to supply the correct grades to their students. This involves the computation, submission and retrieval of the

grades that can effectively support the student's performance and information. The retrieval of grades can be easy because of the accurate and fast process of the system."

Learning Management System

A learning management system (LMS) is defined as a piece of software that helps educational establishments to oversee every facet of the online learning environment. Teachers can develop and manage classes, offer quizzes, and grade students all from one single location for online learning. It also provides an open line of communication between educators, learners, parents, and administrative personnel.

Robust features are provided by an LMS with the goal of streamlining the entire teaching and learning process. Because of this, everyone involved in these procedures—whether directly or indirectly—is already qualified to use an LMS. In general, users of learning management systems consist of:

1. **Schools, Colleges, and Universities.** Traditional education institutions as well as schools selling eLearning and online lessons have a great deal to gain from an LMS solution. Primarily, the system helps them design and manage online courses, flipped classroom teaching, blended learning, and in-class multi-device learning.

2. **Administrators**. A learning management system collates all information in one centralized place, thus streamlining the management of the soup-to-nuts teaching process.

3. **Educators**. It helps lecturers and teachers to create and integrate course materials, align content and assessments, and create customized tests for students. In addition, they can articulate learning goals and track studying progress.

4. **Students**. A learning management system for students offers a flexible and highly effective learning path that is way more meaningful than the mass-produced learning models. It is particularly suitable for professionals with tight work schedules that cannot be accommodated by traditional classroom learning. Studies show that 90% of students prefer eLearning to classroom learning, which makes them prime LMS users (Pappas, 2019).

5. **Parents**. Better still, learning management systems help loop in all parents. It enables administrators to deliver real-time communication regarding a student's performance.

According to Iqal & Qureshi (2011) Learning management systems, as well as technology in general, have had fast changes within the last fifteen years. When the course was first offered in the 1990s, over time, management methods changed to become the current form of learning management frameworks. Although these terms are still frequently used synonymously, they have important variations. The delivery focus of course management systems is substantially more limited as well as course materials. Learning management systems, on the other hand, enable greater attention to the requirements of the e-learning instructor and the student in terms of assignments.

Dahlstrom and Bichsel (2014) discovered that 72% of the students they looked at chose a blended learning environment combining online and in-person instruction. According to their research, within the past ten years, students have used blended learning settings more frequently, coinciding with the growth in LMS use.

Hamane (2014) research has also looked at the relationship between the degree of student participation and the academic success of remote learners through LMS activities like page visits and discussion frequency.

Baepler and Murdoch (2010) discovered that universities were using Learning management systems have been creating the required technological instruments that would enable them to spend money on infrastructure and human resources. Nevertheless, the pupil Neither student participation in LMS contexts nor student performance with the material investigated in connection to students' adaption within such educational settings.

AlNajdi (2014) however, the integration of online learning has been sluggish in Saudi Arabia. higher education because traditional methods have been the mainstay of the Saudi higher education system techniques to aid in teaching. Consequently, online education hasn't been utilized as broadly as possible to aid in instruction and learning. However, LMS has many benefits for pedagogy, which could combine face-to-face and hybrid learning. From the start, Saudi universities and colleges have also been implementing and adapting LMS programs to provide other opportunities for students to study via online learning such as reaching students located in remote or rural areas of the country or to allow students with certain disabilities access to education via the Internet.

DeVine (2013) Nonetheless, there are a lot of advantages to online learning, like the capacity to continue communicating with kids at a higher level, adaptability in the capacity of educators to serve as mentors and coaches rather than just a director, as well as a stronger feeling of community, all of which could encourage students to be more Successful in an online learning setting as opposed to a real one with rigid scheduling times.

According to **Oliveira (2012)** In order to improve the process of mediated communication, systematic guidance, and constant monitoring, focused on the formation of skills and attitudes that allow the student to have learning process autonomy in a continuous self-education, the potential that IT offers may bring e-learning closer to the

classroom mode in relation to personal interaction and preserve the distance between teachers and students. Within this framework, information technology offers ever-increasing adaptability and accessibility to culture, education, and career and personal growth, which helps to form educational systems.

Bersin, Howard, and O'Leonard (2008) determined that learning management systems (LMS) are a useful and effective manner for educational institutions to manage their operations. An LMS is an intricate, web-based program that offers features and capabilities including learning and content distribution course management, communications services, and assessment.

Fetaji (2007) An e-learning platform called an LMS uses extensive strategic planning to oversee training initiatives within a company to enable online education in a virtual classroom, giving the organization control over students and the kinds of tasks events as well as essential administrative tasks.

ITT Technical Institute (2007) Students can now learn whenever and wherever they want thanks to online learning, which is described as an online classroom where learners are free to choose their own speed instructional procedure and possess the freedom to utilize their programs whenever it's convenient to work about matters like obligations to one's family or other jobs. Thus, virtual education has grown to be a crucial part of the educational system.

Web-based System

A web-based application is one that runs on a web browser. As long as you have a browser and an internet connection, it can operate on any platform. It is also known as browser-based applications for this reason. For instance, you can use your PC's web browser to log onto Facebook. Additionally, you can access Facebook through the browser on your smartphone. The

web-based application can be compared to software that is an improved version of a webpage. As you are aware, a website often provides information to its readers. You can browse info and use a website with little to no interaction.

On the other hand, an interactive user interface is provided by web-based applications. The sophisticated parameters are adjustable to your preference. Moreover, web-based apps only load once. This means that if you want to view other pages while using a web-based application, it won't refresh itself. You won't need to refresh the page to get to any other pages when you access them.

Development tools

Xampp

According to EDUCBA, XAMPP is a cross-platform web server that is free and open-source. Cross-Platform, Apache, MySQL, PHP, and Perl are collectively referred to as XAMPP. A well-liked cross-platform web server called XAMPP enables developers to write and test their programs on a local web server. The Apache Friends developed it, and anyone can edit or change the native source code. Among other computer languages, it comes with Maria DB, Apache HTTP Server, and interpreters for PHP and Perl. Because of XAMPP's ease of deployment, developers may quickly and easily set up a WAMP or LAMP stack on an operating system with the added bonus of being able to load popular add-on applications like WordPress and Joomla. Web designers and programmers could test their work on their own computers without the need for an Internet connection thanks to XAMPP, which was designed to be used as a development tool. To make this as simple as possible, many important security features are by default disabled. The Internet's web pages are served via XAMPP. Along with other databases,

it can be used to build and modify databases in Maria DB and SQLite. An FTP client can connect to a local host and treat it as if it were a distant host once XAMPP is installed. Use a program like FileZilla to install content management systems like Joomla or WordPress. Additionally, an HTML editor can be used to establish an FTP connection to a local server.

PHP

According to Wikipedia, Personal Homepage was the earliest definition of the acronym PHP. However, it is now an acronym for hypertext preprocessor. On a web server, PHP code is often interpreted by a PHP interpreter that is implemented as a module, daemon, or Common Gateway Interface (CGI) executable. Any type of data, such as produced HTML or binary image data, might be the outcome of the PHP code being interpreted and executed on a web server and would make up all or a portion of an HTTP response. To organize or facilitate the development of that answer, a variety of web template systems, web content management systems, and web frameworks can be used. PHP is also useful for a wide range of programming activities that are not related to the web, like the control of robotic drones and standalone graphical apps. Using the command line, PHP code can also be executed directly. The Zend Engine-based default PHP interpreter is free software distributed under the PHP License. Since PHP has been widely adapted, it can be used on the majority of web servers across many different platforms and operating systems. Without a defined formal specification or standard until 2014, the PHP language evolved with the initial implementation serving as the de facto standard that subsequent implementations tried to match. Since 2014, efforts have been made to formalize the PHP specification.

According to W3Techs, as of January 2023, "PHP is used by 77.8% of all the websites whose server-side programming language we know." Only 8% of PHP users are said to utilize the 8.x versions that are still officially supported. The majority use PHP 7, notably PHP 7.4, which is not maintained, while 23% use PHP 5, which is not supported with security fixes and is known to have significant security flaws. However, given that Linux distributions like Debian offer protection, this does not always mean that these websites are susceptible.

MySQL

According to Talend, One of the most well-known technologies in the current big data ecosystem is MySQL. Given that MySQL is sometimes referred to as the most popular database and is currently being used widely and successfully across all industries, it is obvious that anyone working with enterprise data or general IT should at the very least strive to become something familiar with MySQL.

Even those who are unfamiliar with relational systems can quickly construct robust, secure, and quick data storage systems using MySQL. The programmatic interfaces and syntax of MySQL serve as excellent entry points into the world of other well-known query languages and structured data storage.

Structured query language (SQL) is the foundation of the relational database management system (RDBMS) MySQL, which was created by Oracle. A systematic collection of data is called a database. Anything from a straightforward shopping list to a photo gallery or a location to store the enormous volumes of information in a business network may be it. A relational database, in particular, is a digital repository that collects data and arranges it using the relational paradigm. In this paradigm, relationships

between data items all adhere to a rigid logical structure, and tables are made up of rows and columns. A set of software tools used to implement, manage, and query such a database is known as an RDBMS. MySQL is a key component of many of the most widely used software stacks for creating and sustaining anything from robust, data-driven B2B services to customer-facing web apps. Due to MySQL's open-source nature, dependability, and broad feature set, as well as continued development and support from Oracle, it is used as the backend by a number of key websites, including Facebook, Flickr, Twitter, Wikipedia, and YouTube.

HTML

According to TheServerSide, HTML (Hypertext Markup Language) is a text-based language used to describe the organization of material in an HTML file. The markup on a webpage instructs a web browser how to display text, images, and other types of multimedia. The World Wide Web Consortium (W3C) has made HTML a formal guideline, and most popular web browsers, including those for desktop and mobile devices, generally follow this proposal. The most recent version of the specification is HTML5.

A text file marked as HTML should be interpreted as such by a computer and a web server since it follows specified syntax, file, and name conventions. A user can create and design a simple webpage and upload it to the internet by applying these HTML principles to a text file in almost any text editor. The inclusion of a document type declaration at the start of the text file is the most fundamental HTML convention. As the part that explicitly tells a computer that this file is an HTML file, it always comes first in the document. Typically, the document heading looks like this: <!DOCTYPE html>

Always write it that way, without adding additional material or fragmenting it. A computer will not identify any material that comes before this declaration as HTML.

CSS

According to TechTerms.com, HTML webpage content can be formatted using the style sheet language CSS. Separate from the actual content, CSS style sheets can specify how text, tables, and other elements should look and be formatted. Styles can be found in the HTML code of a webpage or in a different document that is referred to by several webpages. Using CSS, web designers may give a website a consistent appearance throughout. A style is defined only once in a CSS style sheet, as opposed to setting the appearance of each table and block of text in the HTML code of a webpage. Custom styles can be developed and applied to text, graphics, and tables. Common HTML formatting tags, such as <h2>, <strong>, and <em>, can have custom formatting defined in a CSS file. Any page that connects to the CSS file can use a style that has been defined. In order to make it simple to alter styles across multiple pages at once, CSS separates the text from the formatting of a webpage. You simply need to alter the style once in the CSS file, for instance, to change the body text size from 10pt to 12pt across dozens of different HTML pages. Every time the style is used on a page that uses that style sheet, the font size changes.

JavaScript

According to Code Institute, Text-based and server- and client-side compatible, JavaScript is a programming language. It manages multimedia on web pages and enables interaction. A developer may do a variety of things with JavaScript, such as automatically updating material on a page or adding animation to images.

The great majority of websites you visit let you interact with them thanks to JavaScript. It's highly likely that JavaScript programming is what enables you to complete forms, look through maps, or register for events.

For instance, if you're on a website with a JavaScript-powered shopping cart, you'll notice that it displays the complete cost of your desired purchase, including taxes, shipping, and other fees, right away. Before sending your credit card information across the internet to the bank for processing, JavaScript first checks to see if it is legitimate.

Bootstrap

According to F5 Studio, Initially developed by Twitter developers for internal usage, Bootstrap was eventually made available to the public and developed into a useful set of tools for creating user interfaces of any complexity. Web developers now use Bootstrap, an open-source, free HTML, CSS, and JS toolkit, to rapidly and efficiently generate flexible website layouts. Great bootstrap web design examples may be found on specialized websites like Award. There are numerous benefits to using Bootstrap while creating websites. Companies as a whole as well as freelance developers use the Bootstrap framework. Its primary use is in the creation of admin interfaces and front-end component websites. The most well-known of related systems is the Bootstrap framework. Bootstrap is really just a collection of CSS and JavaScript scripts. There are several classes and pre-made components that may be used for design layout when a Bootstrap web developer connects these files to the page. They are quite useful in the development of contemporary websites with responsive web design.

Ajax

According to geeksforgeeks, AJAX stands for asynchronous javascript and XML the user to make a request to the server for the data without any reloading and without block, any other request also so provide a smooth performance to fetch the data to the server and show to the page.

JQuery

According to geeksforgeeks, this javascript library makes everything easy and provides a very effective method for doing something in the front end and gives many essential features like browser event handling, DOM animations, Ajax interactions, and cross-browser JavaScript development.

Evaluation Instrument

The evaluation instrument model which categorizes the software to evaluate the functional suitability, reliability, performance efficiency, usability, security, compatibility, maintainability, and portability.

ISO Software Quality Indicators

ISO 25010, titled "Systems and software engineering – Systems and software Quality Requirements and Evaluation (SQuaRE) – System and software quality models", is a software quality standard. It describes the models, consisting of characteristics and sub-characteristics, for both software product quality, and software quality in use together with practical guidance on the use of the quality models.

ISO 25010 is software quality model includes:

- o **Functional Suitability** -refers to how well a product or system is able to provide functions that meet the stated and implied needs.

- o **Reliability** - refers to how well a system, product, or component performs specified functions under specified conditions.

- o **Performance Efficiency** - refers to the performance related to the amount of resources used.

- o **Usability** - refers to how well a product or system can be used to achieve specified goals effectively, efficiently, and satisfactorily.

- o **Security** - refers to how well a product or system protects information and data from security vulnerabilities.

- o **Compatibility** - refers to how well a product, system, or component can exchange information as well as perform its required functions while sharing the same hardware or software environment.

- o **Maintainability** - refers to how well a product or system can be modified to improve, correct, or adapt to changes in the environment as well as requirements.

- o **Portability** - refers to how well a system, product, or component can be transferred from one environment to another.

Related Studies

Student Tracking System

According to Ashish Vartak (2023) in their study "Student Performance Tracking System" student Performance Tracking System is a solution tool that is designed to track, maintain and manage all the data generated by a Schools, colleges including the grades of a students, their attendance, their extracurricular activities records, etc. It helps to

manage all the student-related data in a well-organized manner. A Student Performance Management System gives a unique ID against every student. And using that ID, Teacher and Student can easily track assignments, exam results, grades, and attendance information within seconds.

According to Zuhairah Nadiah Ismail (2020) in their study "Development of Student Performance Tracking Apps" the aims of this project is to develop mobile application that is a proposed solution to solve the problems faced by the school and parents as there is less communication between parents and teachers, parents have limited updates regarding their children's academic performance because of time and distance that barrier hinders parents to involve actively in their children's schooling.

According to Ishak, Oathman, Talib, Rahmat and Ilayas (2017) in their study "Student paperwork tracking system: SPATRASE" the current problem faced by the user is the process of approval paperwork takes around a month or more. The process took around a month to get full approval from the department because of many procedures that need to be done. Nevertheless, the user cannot know the location status of the paperwork immediately because of the inefficient manual system. The submitter needs to call the student affairs department to get the information about the location status of the paperwork. Thus, this project was purposed as an alternative to solve the waiting time of the paperwork location status. The prototype of this system involved the hardware and software. The project consists of NFC tags, RFID Reader, and mobile apps. At each checkpoint, the RFID Reader was placed on the secretary desk. While the system involved the development of database using Google Docs that linked to the web server. After that, the submitter received the URL link and be directed to the web server and mobile apps. This system is capable of checking their location status tracking using

mobile apps and Google Docs. With this system, it makes the tracking process become efficient and reliable to know the paperwork at the exact location. Thus, it is preventing the submitter to call the department all the time. Generally, this project is fully functional and we hope it can help Universiti Tun Hussein Onn Malaysia (UTHM) to overcome the problem of paperwork missing and location of the paperwork.

According to Zhang, Hangjin; Almeroth, Kevin (2010) in their study "Moodog: Tracking Student Activity in Online Course Management Systems" any universities are currently using Course Management Systems (CMSes) to conduct online learning, for example, by distributing course materials or submitting homework assignments. However, most CMSes do not include comprehensive activity tracking and analysis capabilities. Their paper describes a method to track students' online learning activity, and provides this information to instructors to allow them to assess students' learning behavior and progress.

According to Mons (2007) in their study "Tracking effects on achievement and opportunities of middle-high ability students: a case study in Switzerland" shows that when first tracking occurs later, the overall level of students tends to improve, the number of students with academic difficulties decreases, and academic inequalities between students and between schools as well as social disparities in academic achievement remain low. In streamed systems, the overall academic ability of students tends to be lower, with greater educational inequalities.

According to Dhuha Al-Shaikhli (June, 2022) in their study "The effect of the tracking technology on students' perceptions of their continuing intention to use a learning management system" research examines the effect of having a tracking technology in a learning management system (LMS) that reports the effect of perceiving

other students' interactions on a learner's intention to keep using LMS in the future. The main underlying theory is herd behavior theory which argues that crowd behavior affects the perceptions of the observers. The researcher proposed and found that tracking technology will affect a learner's perceptions of cognitive absorption and that perception of self-regulation from using an LMS. These perceptions are found to influence the learner's intention to keep using the LMS in the future positively. This research developed a new tracking technology in response to weaknesses noted in the literature and validated by interviewing teachers.
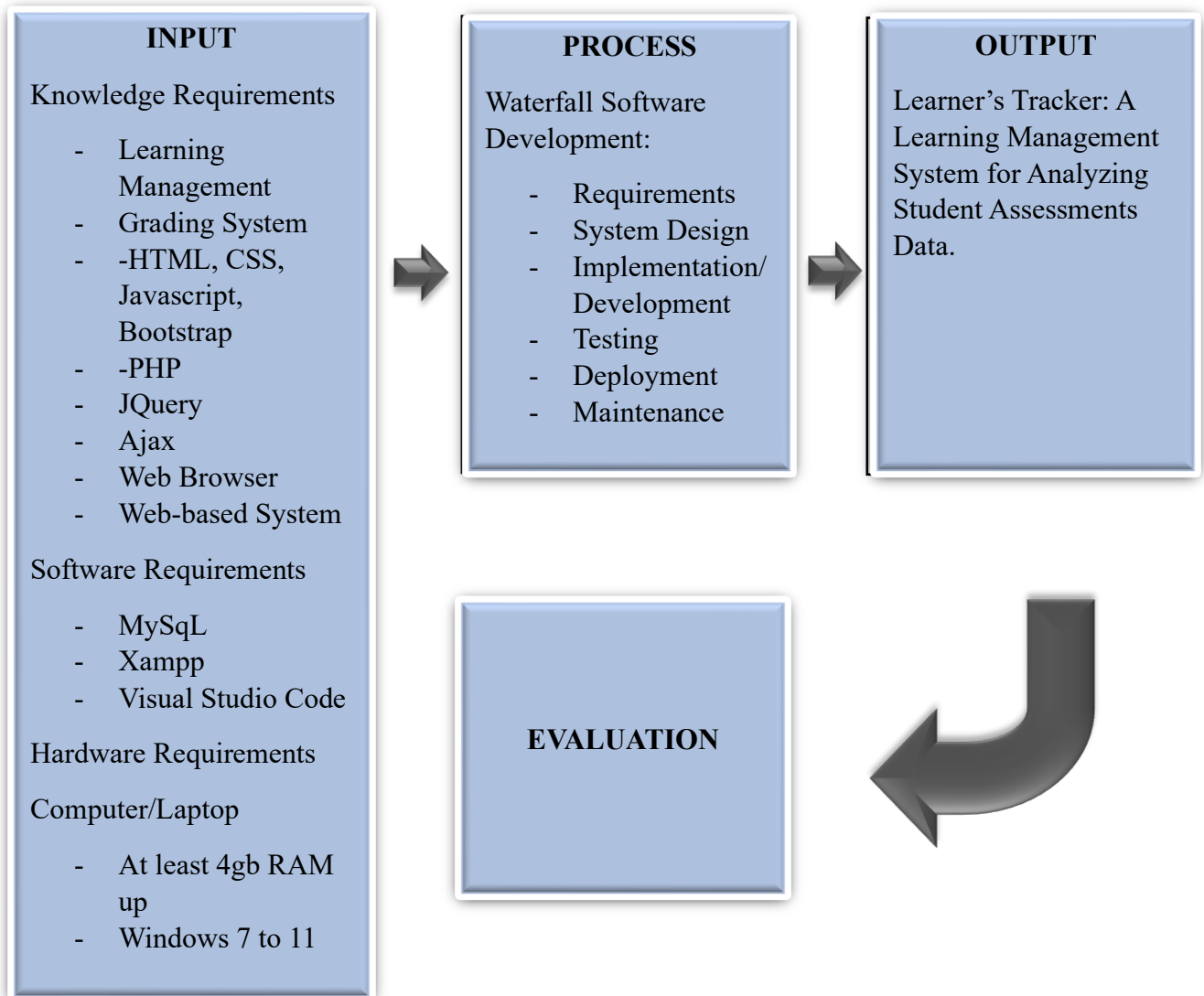
Learning Management System

According to Nor Aziah Alias & Ahmad Marzuki Zainuddin (2015) in their study "Innovation for Better Teaching and Learning: Adopting the Learning Management System", the MitechPlus Learning Management System is a web-based integrated e-learning solution which consists of portfolio (courses) management, learning resources and learning portal system. Users are able to subscribe to courses (portfolios) available in their learning resources. Authorised users such as lecturers or administrators will be able to create and manage these portfolios from anywhere in the world. Portfolios may be in the form of courses, projects, tasks, clubs, communities etc. Originally, outsiders who do not have their account in the system may also join and subscribe to the portfolios available by accessing system. However, IIUM has since ruled against adapting the learning portal system as the university wanted only authorised individual and facilitators to use the system.

According to Alshwaier et al. (2012) in their study "A study on satisfaction of users towards learning management system at International University – Vietnam National University HCMC" *Blackboard* is compound learning environment with capacity to take over various fields of teaching procedures which takes advantage of the technology variety. It is a learning tool that supports lecturers for online material approach to students, online assignments and even for marking and giving comments for students' reports. With the development of technology, Blackboard can be seen as the useful assistant to both teachers and students due to optimal functions.

According to (Ohliati and Abbas, 2019) in their study "Learning Management System usability towards online learning: A Literature Review" When online and distance learning emerged, a lot of institutions of higher learning held back their urge to adapt this technology. However, as time went by, some top-notch institutions of higher learning globally began offering courses, professional certificates, and degrees online through the electronic Learning platform.

Conceptual Model of the Study

Three system components, input, process, and output are part of the study's conceptual model. To accomplish the objectives of the study, certain systemic components are essential.

INPUT	PROCESS	OUTPUT
Knowledge Requirements - Learning Management - Grading System - -HTML, CSS, Javascript, Bootstrap - -PHP - JQuery - Ajax - Web Browser - Web-based System **Software Requirements** - MySqL - Xampp - Visual Studio Code **Hardware Requirements** Computer/Laptop - At least 4gb RAM up - Windows 7 to 11	**Waterfall Software Development:** - Requirements - System Design - Implementation/ Development - Testing - Deployment - Maintenance	Learner's Tracker: A Learning Management System for Analyzing Student Assessments Data.

EVALUATION

Figure 1. Conceptual Model of the Study

Input

Knowledge requirements, software requirements, and hardware requirements are necessary for the study's input phase. The study includes both the web programming languages used to develop the system and the knowledge prerequisites needed to comprehend it. The system needs MySql, Xampp, Visual Studio Code, and a web browser as its software components. The specifications of a computer required to access the system are known as the hardware requirements.

Process

The process phase outlines the system planning and data gathering, system design, system creation, and system testing components. System planning and data gathering is where we make our plan on how to start our system and gather crucial information. System design is where we make our layout for our system. System creation is the actual making of the system; this is the time we do the coding for our system. System testing is where we test our system to see if it is functioning as intended and if there are any errors or other things that need to be improved.

Output

The finished system is the output phase with the inputs and procedures. "Learner's Tracker: A Learning Management System for Analyzing Student Assessments Data" which was developed by the researchers.

Operational Definition of Terms

The Following terms were operationally defined for better understanding of the study and to utilize the context of describing and discussing the research project.

Assessment - refers to the wide variety of methods or tools that educators use to evaluate, measure, and document the academic readiness, learning progress, skill acquisition, or educational needs of students.

Dashboard - dashboard is a tool for condensing different kinds of visual data. Typically, a dashboard's purpose is to present various, linked facts in an easy-to-understand style.

Professor - someone who teaches at a college or university. A professor is officially a teacher of the highest rank, above adjuncts and lecturers, but college students can call them all professors.

Class - a collection of classes or courses that a learner might take to learn a certain skill or gain knowledge on a certain subject. The teacher's role in the classroom is to impart knowledge to the students on any subject they are knowledgeable about.

Learner's Tracker – The Learners Tracker is a web-based Learning Management System which can be use by the University. It is a web-based Learning Management System to conduct a class assessment and track the student's performances.

Chapter 3

METHODOLOGY

This chapter necessitates the research methodology with the following sections of project design, project structure and operation and testing procedure and evaluation procedure.

Project Design

The study developed a Learner's Tracker Management System for analyzing the assessment data of the students where the progress of the student will be monitored. The system was furnished to both professors and students to keep track of the learner's performance through online.

In figure 2, It will start by registering the credentials needed for student or the professor's information, then proceed with the log in. If it matched, it would display the credentials of the student and if not it will display the invalid credentials and will process in logging again until the credentials were matched. If the student's credentials were matched it will display the student's dashboard. Then if the professor's credentials were matched it will automatically display the professor's dashboard.

In the student dashboard, students may select multiple tabs that contain their classes, assignments, quizzes, exams, projects, and chat that will give them access to their professor. They may view the classes that they are enrolled in, may view the given assignments, and may even view it to monitor on how their progress is going,

same with the other tabs like quizzes, exams and projects, it may also be viewed on whichever the student's decided to hover.

Hence, the professor may add classes that they can automatically insert class & students which they can also view their handled class and students. They may also hover the assignment tab that they can insert their assignments and view the students' scores or progress on how they are doing with the subject taken. Professors may also do the same at the quiz/exams tab where they can insert the quiz/exams and view the scores and the progress of the student about their quiz/exams. Same as the projects, professor's may insert new projects and view it to see the outcome of how their students are doing. Lastly is the chat, the chat between the professor and student will be displayed as is.

In the admin, admin will log in then if the credentials were matched it will proceed on viewing the students and professor's account. If the credentials were not matched it will display invalid, then it will be taken back at the login process. Then after the credentials were matched, it will view the login details and will automatically ask if the admin would update or delete the account signed in. The system will end if it chooses to logout but will be thrown.
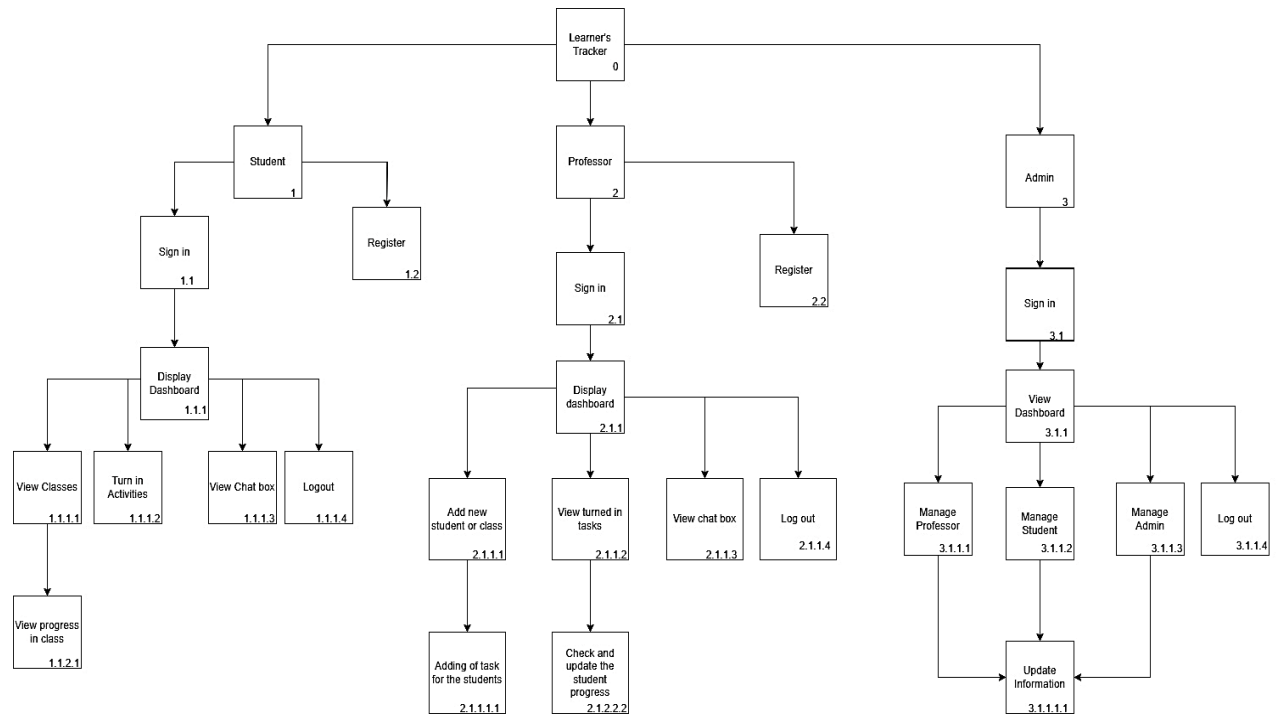
Figure 2*. System Flowchart of the Learners Tracker*

Software Design

Figure 3 shows that the administrator, students, and professors will need to log in using their credentials to be able to enter the system. The students and professors need to register first if they have no account yet. Students and professors can interact with each other using that chat section. The administrator can view the lists of students and professors. Also, the administrator will manage the students, professors, and admins and can add additional admins. The administrator can update the passwords and information of each user.

The professor will add a new class. Once the professor creates a new class, he or she needs to add a new student. In each class, the professor can add a new assignment. new quiz, new project, and new exam. The professor can view all turned-in assignments, quizzes, projects, and exams and then assign grades to each.

The students can view their classes or courses, and in the class section, they can track their grades in all assessments. The students can view their assignments, projects, quizzes, and exams. Also, the student will be able to turn in their assignments, projects, quizzes, and exams.

Moreover, Figure 3 shows the use case diagram of the learner's tracker. It presents a graphical representation of possible interactions between a user and a system. It shows, which is often complemented by other types of diagrams as well, the numerous use cases and user types that the system has
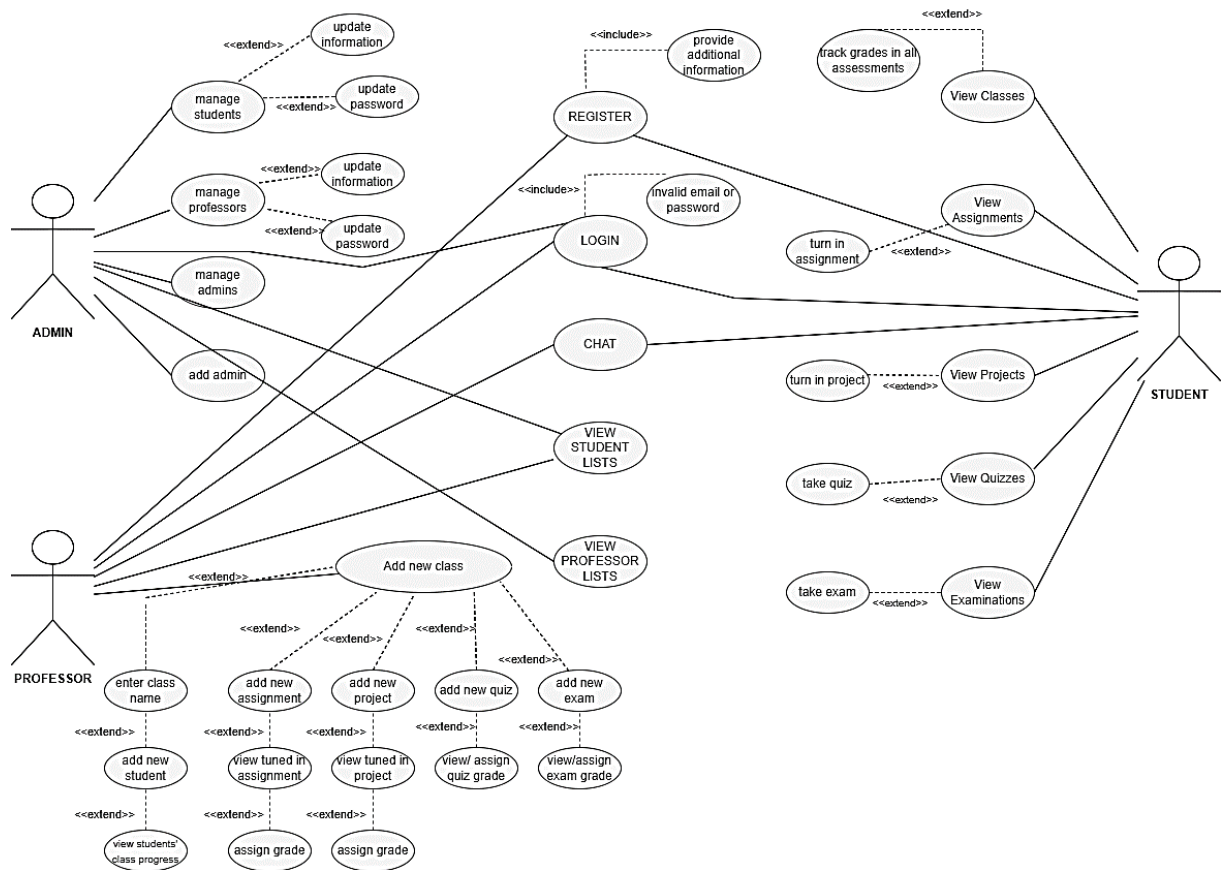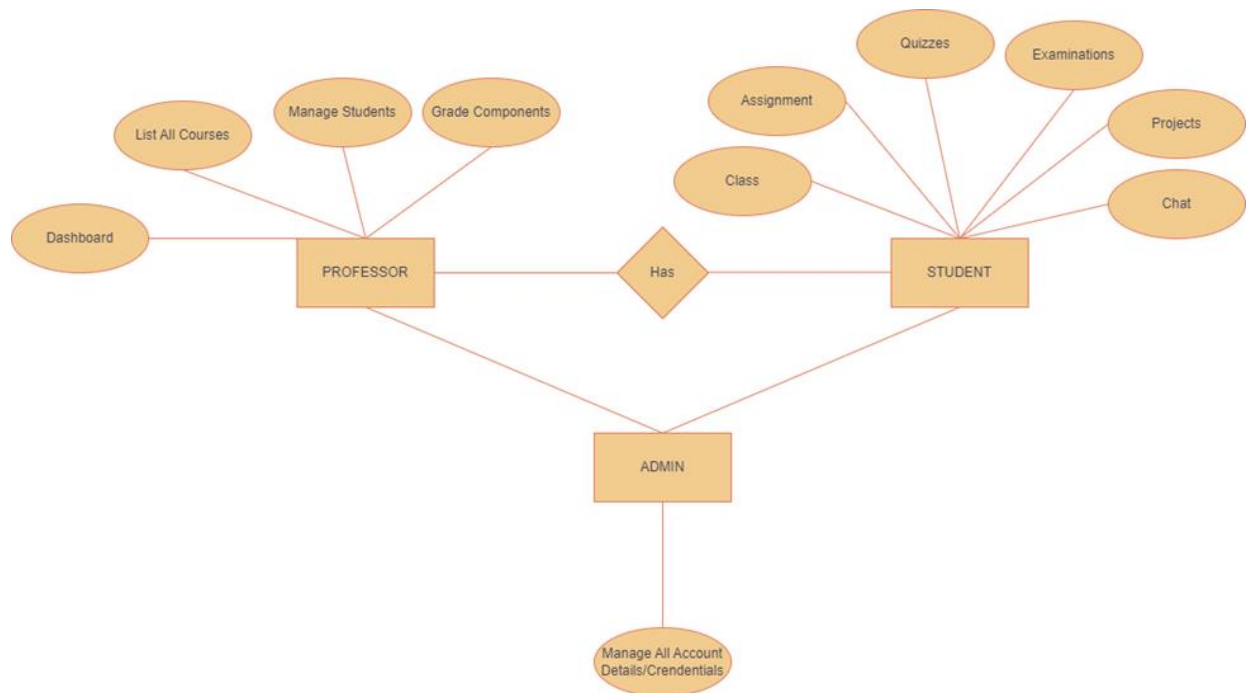
Figure 3*. Use Case Diagram of the Learner's Tracker*

In Figure 4, the administrator, professor, and students illustrate the dashboard summary, manages professor and students, keeps an eye on duties involving students, and is in charge of different system. Management and oversight are made easier by this technique.

This section demonstrates and addresses the development processes that were employed to create a system that meets the design specifications. It was created using both XAMPP and PHP. Our system's development also made use of Bootstrap to make it more responsive to the actual world. A more adaptive and accessible website was made

using HTML and CSS as well. It is intended to make it simpler to keep track of how students are doing and decide which departments and courses they ought to take.

Figure 4. *Entity-Relationship Diagram of the Learners Tracker*

Project Development

The Learner's Tracker Management System was developed in accordance with the paradigm shown in Figure 5, which consists of six distinct phases: requirement analysis, system design, coding or implementation, testing, deployment, and maintenance. Additionally, the model incorporated a feedback mechanism, allowing for changes or corrections based on the preceding phase to accommodate required revisions.

The system was developed by following the subsequent steps:

1. Implement user system: loginUser(), logoutUser() for users to log in. Assigned users different roles, such as student, professor and administrator. Store this information in a database.

2. Integration of the Database: In this step, a database was established to store various essential data, including student information, the grade components and the progress of the grading system.

3. Backend development: Created server-side to interact with the database. Implemented each feature's necessary CRUD (Create, Read, Update, Delete) operations.

4. Frontend development: Designed and developed the user interface for different pages and features using Xampp, PHP, MySql, HTML, CSS, Bootstrap and JavaScript.

Operation and Testing Procedure

The following procedures were undertaken to ensure the system's operation and test its reliability, accuracy, and functionality.

The following were utilized during the testing phase:

1. Internet
2. Desktop or Laptop

The testing protocols that were carried out for functional sustainability and security are displayed in the following tables. The tests make a comparison between the expected and actual results. The objective of these tests is to find out if the system functions as it should. In table 1, it shows here the testing procedure using functionality suitability testing procedure and in table 2, it shows there the maintainability testimg procedure.

Table 1.

Functionality Suitability Testing Procedure of Learner's Tracker

Test Scenario	Steps to be Taken	Expected Output
Login(Student)	1. Logged in to system using the created username and password of the student.	Shows the student's dashboard.
Dashboard	2. Click dashboard	Shows every grading element for the student.
Assignments	3. Click assignments	Shows the assigned assignments for the students.
Quizzes	4. Click quizzes	Allows taking the quiz provided by the professor, with the score reflecting after completion.
Examination	5. Click examination	Allows taking the exam provided by the professor, with the score reflecting after completion.
Projects	6. Clicked projects	Facilitates turning in projects assigned by the professor for submission.

Login (Professor)	1. Logged in to system using the created username and password.	Presents the dashboard.
Class	2. Click class	Displays the class and allows the addition of a new class. Upon clicking "Add New Class," it prompts to enter the class name, shows the student list, and facilitates the addition of a new student. Clicking on a student's class standing prompts entry of the TUP ID, revealing the student's progress.
Assignment	3. Click assignment	Enables the creation of assignment titles, instructions, and selection of the target class. After assignment creation, clicking on "Students' Assignments" indicates if the student has submitted the assignment, allowing the assignment score to be entered.
Quizzes	4. Click quizzes	Facilitates the creation of quizzes, including title, link, total score, and selection of the target class. After quiz creation, selecting "View Quiz" shows if the student has completed the quiz, enabling the assignment of a score.
Examination	5. Click examination	Enables the generation of exams, where you can specify the title, link, total score, and the designated class. Following exam creation, choosing "View Exam" determines whether the student has finished the exam, allowing you to assign a score if necessary.

| Projects | Click projects | Supports the creation of project titles, instructions, and selection of the target class. After creating project information, selecting "Students' Projects" indicates if the student has submitted the project, allowing the assignment of a score. |

Login (Admin)	1. Logged in to system using the created username and password.	Presents the dashboard.
Manage Professors	2. Click manage professors	Shows the professors' ID, name, and updated password. The admin has the capability to edit this information or delete a professor's record.
Manage Student's	3. Click manage students	Provides the student's ID, name, email, and updated password. The admin has the ability to edit this information or delete a student's record.
Manage Admin	Click manage admin	Reveals the username and updated password of the admin. Additionally, the admin has the authority to add a new admin.

Table 2.

Maintainability Testing Procedure of Learner's Tracker

Test Scenario	Steps to be Taken	Expected Output
Backup and Recovery	1. Initiate a full system backup and verify that the backup process completes without errors.	Successful backup completion message.
Database Schema Update	2. Apply updates to the database schema and check for any errors during the update process.	Updated database schema without errors.
Error Handling and Logging	3. Trigger a simulated error scenario and check error logs for details and response.	Clear error logs with detailed information, system response to errors is appropriate.
Documentation Update	4. Update system documentation with recent changes and ensure documentation is accessible to the users.	Updated and accessible documentation for developers and administrators.
Continuous Improvement	5. Gather user feedback on system improvements and evaluate areas for enhancement.	Positive user feedback, identification of areas for improvement.

Evaluation Procedure

To determine the adaptability of the system, random respondents in the university, specifically at the COS department who were experts in web-based programming, were asked to rate the system based on the criteria of I SO 25010 specifically, the functionality suitability and maintainability. The respondents will rate the maintainability, efficiency, accessibility, functionality stability and utilize it if the system met their standards for the researcher's web-based project.

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