



**WEB BASED LEARNING ASSESSMENT SYSTEM**

**BY**

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**NAS/STE/20/1054**

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**AWARD**

**OF BACHELOR'S DEGREE**

**IN**

**SOFTWARE ENGINEERING**

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## **DECLARATION**

I hereby declare that this project work titled “Web Based Learning Assessment System” is my original work, undertaken under the supervision of Dr. Usman Hamza, and the work has not been submitted to any higher institution for any academic award. All sources used have been duly acknowledged.

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Date

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## **CERTIFICATION**

This is to certify that the project work titled “Web Based Learning Assessment System” by Mudathir Mukthar Muhammad with Reg Number NAS/STE/20/1054 was carried out under my supervision.

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Dr. Usman Hamza  
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## APPROVAL

This project work titled “Web Based Learning Assessment System” has been read and approved as meeting the partial requirement for the award of Bachelor of Science degree in Software Engineering of Al-Qalam University, Katsina.

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## **DEDICATION**

In the name of Allah, the Most Gracious, the Most Merciful. I dedicate this work to Allah (SWT) for granting me the strength, guidance, and perseverance to complete this project. I also dedicate this to my beloved parents Engr. Mukthar Muhammad and Haj. Gambo Abubakar, whose prayers, support, and encouragement have been a constant source of motivation throughout my academic journey. May Allah reward them abundantly. Additionally, I dedicate this work to supervisor Dr. Usaman Hamza whose wisdom and mentorship have helped shape this accomplishment

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In addition, I would like to express my deepest gratitude to my supervisor, whose expertise, wisdom, and guidance have been essential to the success of this project. His insightful feedback, patience, and dedication have helped me grow academically and overcome the various challenges faced during this process.

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## ABSTRACT

*The Learning Assessment System is a web-based platform designed to streamline the process of delivering, managing, and evaluating assessments within educational institutions. Traditional methods of test management often suffer from inefficiencies such as delayed feedback, administrative burdens, and limited adaptability to various test formats. This project aims to address these issues by developing a comprehensive system that automates assessment administration, grading, and performance tracking while offering a user-friendly interface for students, instructors, and administrators alike.*

*The system was developed using PHP, MySQL, and Apache, leveraging a responsive front-end design to ensure accessibility across devices. The Agile methodology was employed throughout the project, allowing for iterative development and continuous improvement based on feedback from stakeholders. Core features include automated grading, customizable test creation, and detailed performance analytics, all of which contribute to a more efficient and effective assessment process.*

*System testing and evaluation demonstrated the platform's reliability and user satisfaction, with positive feedback highlighting its ease of use and time-saving benefits. Recommendations for future enhancements focus on expanding the system's analytical capabilities, improving the user interface, and strengthening security measures to further protect user data. The Learning Assessment System stands as a valuable tool for modernizing the educational assessment landscape, enabling more efficient management and insightful evaluation of student performance.*

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.0 Introduction**

This chapter provides an overview of the Learning Assessment System. It outlines the background of the project, the problems addressed, the aim and objectives, the significance, the scope, and the operational definitions of key terms used throughout the documentation.

#### **1.1 Background**

In recent years, the advancement of technology has significantly impacted the educational sector, leading to a notable shift towards digital learning and assessment platforms (A. Haleem, 2019). This shift is driven by the increasing need for more efficient, flexible, and accessible education systems. Traditional methods of assessment often involve paper-based tests, which can be time-consuming to administer and grade. These methods also require significant physical resources such as paper, printing, and storage, and they are less efficient in providing immediate feedback to students, which is crucial for the learning process.

The evolution of E-learning platforms has addressed many of these challenges. These platforms offer various functionalities, including the ability to deliver instructional content, facilitate communication between students and instructors, and administer assessments (Lin, 2020). Among these functionalities, online assessments have become particularly important. They offer the potential to streamline the testing process, provide instant feedback,

and allow for a broader range of test formats, such as multiple-choice questions, essays, and interactive problem-solving tasks.

## **1.2 Problem Statement**

Despite the growing adoption of digital learning tools, many educational institutions still rely on manual assessment methods, presenting several challenges. These methods are time-consuming, as the manual grading of tests is labor-intensive and delays feedback to students. They are also resource-intensive, requiring significant physical resources such as paper, printing, and storage. Furthermore, traditional assessments are limited in accessibility, necessitating that students be physically present to take tests, which restricts flexibility for distance learners. Additionally, the management of tests is inefficient, with administrators facing difficulties in organizing, updating tests, and managing user data. (Richmond G, 2019)

## **1.3 Aim & Objectives**

### **Aim**

The aim is to develop an efficient and user-friendly online Learning Assessment System that enhances the assessment process for both students and administrators.

### **Objectives**

- i.** Develop a secure login system for users and administrators.
- ii.** To Develop an interface for users to take online tests and view their scores.
- iii.** Design an administrative interface for managing tests and user accounts.
- iv.** To Ensure the system is responsive and accessible across various devices.

#### **1.4 Research Questions**

- i. How will you ensure the security of user and administrator login credentials?
- ii. What features will you provide to users for reviewing their scores and test results?
- iii. What functionalities will the admin interface include for managing tests and user accounts?
- iv. How will administrators create, update, and delete test questions and test sets?

#### **1.5 Significant of the Study**

The Learning Assessment System offers several significant benefits. By reducing the time required for test administration and grading, the system enhances efficiency. It increases accessibility by allowing students to take tests from any location with internet access. Additionally, the system provides immediate feedback, enabling students to quickly identify areas for improvement. This immediate feedback mechanism also fosters a more responsive and engaging learning environment. Furthermore, the Learning Assessment System eliminates the need for physical materials, which results in substantial cost savings and a reduced environmental impact. For administrators, the system simplifies the process of updating tests and managing user information, thereby streamlining the overall management of assessments. Overall, the Learning Assessment System addresses key challenges in traditional assessment methods, providing a more effective, efficient, and environmentally friendly solution.

## 1.6 Scope of the Study

The scope of this project is limited to developing a web-based Learning Assessment System that encompasses several key features. It includes user and administrator login functionality, providing secure access to the system. Users will have an interface for taking tests, viewing their scores, and retaking tests as needed. Administrators will have an interface to add, remove, and manage tests and user accounts efficiently. Additionally, the project involves the creation of a backend database to store and retrieve test questions, user data, and results. The implementation of this system will be carried out using PHP, Bootstrap, and MySQL technologies, ensuring a robust and responsive platform for both users and administrators.

## 1.7 Operational Definition of Terms/Keywords

- **Learning Assessment System:** A web-based platform for conducting online tests and assessments.
- **PHP:** A popular server-side scripting language used for web development.
- **Bootstrap:** A front-end framework for developing responsive and mobile-first websites.
- **MySQL:** An open-source relational database management system.
- **Administrator:** A user with privileges to manage tests and user accounts within the Learning Assessment System.
- **User:** A student or test-taker who uses the Learning Assessment System to take tests and view results.

## **1.8 Chapter Summary**

This chapter introduced the Learning Assessment System, outlining its background, the problems it seeks to address, its aim and objectives, its significance, and the scope of the study. The subsequent chapters will delve into the detailed design, development, implementation, and testing of the system.



## **CHAPTER TWO**

### **LITRATURE REVIEW**

#### **2.0 Introduction**

This chapter provides a comprehensive review of the development and implementation of learning assessment systems. It support an exploration of existing work in the field, theoretical concepts that support these systems, and a summary of the key points discussed. This review aims to establish a foundation for understanding how learning assessment systems have evolved, their current state, and the theoretical frameworks that support their design and functionality.

#### **2.1 Related Work**

Learning assessment systems have undergone significant transformations with the advent of technology, moving from traditional paper-based methods to dynamic, interactive digital platforms. These systems are now integral to the educational process, aiding in the evaluation of student performance and informing instructional strategies. The following sections delve into the related works that have shaped the current landscape of learning assessment systems, highlighting key developments and innovations

##### **2.1.1 Student Assessment System**

This system assessment in the context of student learning outcomes. It covers terms related to assessment in secondary school.

Student assessment is the pivotal piece around which school improvement take place. Assessment of student learning is undergoing profound change. For the

parents and students, improving the quality of education invariably means raising the levels of academic performance usually measured in the test scores in various subjects of school curriculum. Good assessment system must rest on strong educational foundations. These foundations include organizing schools to meet the learning needs of all their students, understanding how students learn, establishing high standards for student learning, and providing equitable and adequate opportunity to learn. Assessment systems report on and certify student learning and provide information for school improvement and accountability. Information for accountability and improvement comes from regular, continuing work and assessment of students in schools and from large-scale assessments. Assessment systems are regularly reviewed and improved to ensure to be beneficial to all students.

After many years in the comfort of general public trust, education has come under scrutiny. Educating children eventually produces more educated adults, and many economists have suggested that this type of investment raises incomes in developing countries more than in others. This opinion is backed by Nobel prize-winning research (Schultz, 2019) Investment in human capital has caused economic growth in East Asia ((McMahon, 2022) A year of education is associated with a 3 to 14% increase in wages and productivity in Sub-Saharan Africa In Taiwan, it is found that rising education rates positively correlated with growth since 1960 ((Lin, 2020) In such a situation of priority given to education, simply investing in the system and letting it develop in its own way and produce the results as a natural output will not be the spirit of management. There must be some type of controlling mechanism incorporated in the system itself for ensuring

the quality and efficiency of the system to ascertain the envisioned goals of the nation as well as the society.

### **2.1.2 When an Assessment System Works to Improve Learning: the Case of Sobral**

Students in the Brazilian municipality of Sobral have made remarkable progress in foundational learning, surpassing national trends. Systematic learning assessments and the accountability they foster are central to this success. Let's take a closer look at Sobral's education reform. In 2005, student learning outcomes in Sobral lagged behind the national average. Yet, through the right policy reforms and targeted interventions, Sobral not only reversed this trend but also significantly accelerated learning, even after adjusting for learning losses due to the COVID-19 pandemic.

A cornerstone of success has been the implementation of multiple learning assessment activities to understand what students know and can do, and the effective use of assessment results in improving learning outcomes. In Sobral, learning assessments are used to monitor students literacy and numeracy skills, adjust instruction, and provide supplementary learning resources and remedial education for students in need.

Learning assessment results are also utilized to set learning targets for schools, ensure accountability for continuous improvement, and tailor in-service training for school leadership. Furthermore, assessment results are used to provide financial incentives to high-performing teachers and schools, allocate additional

financial support for schools not reaching specific targets, and hold officials from the municipal department of education accountable for poor performance.

Sobral places significant emphasis on learning assessments for continuous improvement and accountability, utilizing the results to make informed decisions and promote activities aligned with the broader goals of the education system. In this sense, these assessment activities help Sobral set clear learning targets for the local education system, guide the development and revision of teaching and learning materials, inform the professional development needs of teachers, and support remedial education and extracurricular activities for students who need additional assistance. ((Diego Luna-Bazaldua, 2023.)

## **2.2 Conceptual Framework**

The conceptual framework for learning assessment systems is grounded in several theoretical concepts that inform their design, implementation, and effectiveness. This section discusses key theories and models that are relevant to understanding how these systems operate and achieve their educational goals.

### **2.2.1 Constructive Learning Theory**

Constructive learning theory is an educational theory that suggests that learners construct their own understanding through experiences and social interactions. Constructive learning theory is based on the idea that learners use their cognitive abilities to process information and internally relate new information with existing information. When faced with new information, learners view it through the lens of their current understanding, beliefs, and cultural background, which all influence their interpretation of the new information(Saul Mcleod, PhD, 2023.)

This theory support many modern assessment systems that emphasize interactive and experiential learning activities. By incorporating elements such as simulations, problem-based learning, and real-world scenarios, these systems encourage students to actively engage with the material, thus encourage deeper understanding and retention of knowledge.

### **2.2.2 Bloom's Taxonomy**

Bloom's taxonomy is a hierarchical model that classifies educational learning objectives into six levels of complexity and specificity. The model was developed by Benjamin Bloom in 1956 and helps educators create learning goals and assessments. The taxonomy includes six levels:

- Knowledge: Remembering information
- Comprehension: Explaining the meaning of information
- Application: Using abstractions in concrete situations
- Analysis: Breaking down a whole into component parts
- Synthesis: Putting parts together to form a new and integrated whole
- Evaluation: The highest and most advanced level of Bloom's taxonomy

This framework is widely used in the creation of assessment tools to ensure they measure a range of cognitive skills, from basic knowledge recall to higher-order thinking skills. Effective learning assessment systems incorporate tasks and questions that span all levels of Bloom's Taxonomy, thereby providing a comprehensive evaluation of student learning.

### **2.2.3 Self-Regulated Learning**

Self-regulated learning refers to one's ability to understand and control one's learning environment. Self-regulation abilities include goal setting, self monitoring, self-instruction, and self-reinforcement (Crippen, & Hartley, 2019).

Self-regulated learning emphasizes the importance of metacognitive skills, motivation, and behavior in the learning process. Learning assessment systems that incorporate Self-regulated learning principles provide tools and features that help students plan their learning, track their progress, and reflect on their performance. This can include goal-setting modules, progress dashboards, and reflective journals.

### **2.3 Summary**

This chapter reviewed the literature on learning assessment systems, covering their evolution, current state, and theoretical foundations. The Reviewed Related Work section highlighted the shift from traditional methods to interactive digital platforms, emphasizing the importance of strong educational foundations and accountability in improving educational outcomes. Notable examples include the transformation of student assessment systems at the secondary level and the successful education reform in Sobral, Brazil, which used systematic learning assessments to enhance student performance.

The Conceptual Framework section discussed key theoretical concepts that support learning assessment systems. These include Constructivist Learning Theory, which emphasizes active and experiential learning; Bloom's Taxonomy, which helps create assessments that measure a range of cognitive skills; and Self-Regulated Learning, which focuses on metacognitive skills, motivation, and behavior in the learning process.

this chapter established a foundation for understanding the design and effectiveness of learning assessment systems, setting the stage for further research and practical application in educational assessment.

## **CHAPTER THREE**

### **SYSTEM ANALYSIS AND DESIGN**

#### **3.0 Introduction**

This chapter provides a detailed analysis and design of the Learning Assessment System. It covers the software development model used, the requirement engineering processes, and the system design. In this chapter, all the requirements necessary for the software development process, namely functional and non-functional requirements, system architecture, use case diagram, activity diagram, class diagram, and entity relationship diagram

#### **3.1 Research/Implementation Design**

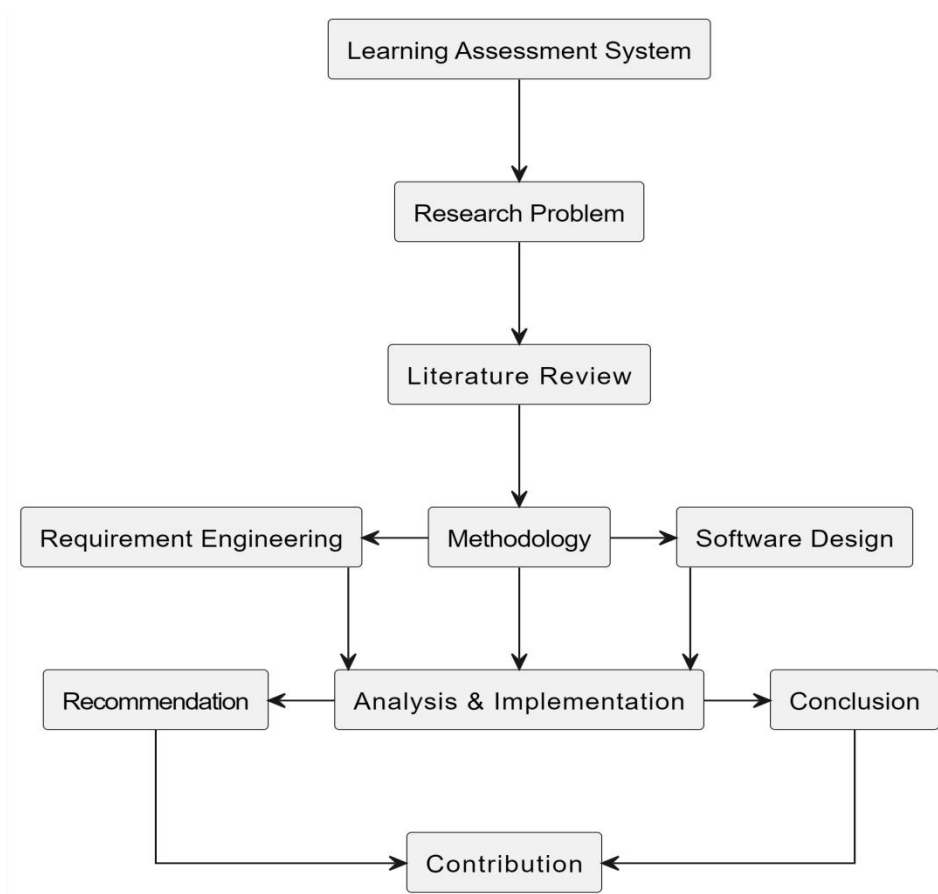
##### **Explanation of Each Part of the Learning Assessment System:**

- 1. Learning Assessment System:** This represents the entire project, which revolves around developing a system that facilitates the management of assessments for students and instructors.
- 2. Research Problem:** This is the initial phase of the project where the problem the Learning Assessment System aims to solve is defined. It outlines the shortcomings of traditional assessment methods that motivated the development of the system.
- 3. Literature Review:** After identifying the research problem, this phase involves reviewing existing literature and research to understand current solutions, their limitations, and how the proposed system will improve upon them.



4. **Methodology:** This section details the approach taken to develop the Learning Assessment System. It encompasses the strategies, techniques, and frameworks (like Agile) used to implement the system.
5. **Requirement Engineering:** A part of the methodology, this phase involves gathering and specifying the system's requirements. It determines what the system needs to achieve, such as user authentication, assessment creation, grading automation, etc.
6. **Software Design:** This part involves creating the architecture of the Learning Assessment System. It includes designing the user interface, database structures, and back-end components necessary to support the system's functionalities.
7. **Analysis & Implementation:** In this phase, the system is actually built and tested. The analysis ensures that the software design meets the requirements, and the implementation includes coding, testing, and deploying the Learning Assessment System.
8. **Recommendation:** This phase draws from the analysis and implementation results, offering suggestions for improvement or enhancements to the Learning Assessment System.
9. **Conclusion:** The conclusion sums up the entire project, discussing the outcomes, how the system met its objectives, and whether the research problem was effectively addressed.
10. **Contribution:** This final phase discusses the system's overall impact, both academically and practically, on the assessment processes in educational institutions. The contribution loop also shows that insights from

recommendations and conclusions can contribute to future iterations of the system.



**Figure 3.1:** Research Implementation Diagram

### 3.2 Software Development Model

The Agile model was chosen for the development of the Learning Assessment System. Agile is an iterative and incremental approach to software development that emphasizes flexibility. The process begins with an initial planning phase, followed by multiple iterations or sprints, each resulting in a potentially shippable product increment.

Agile's iterative nature means that, I can quickly adapt to new insights or changes in requirements. For example, if I discover that a particular feature could be

enhanced for better user experience, I can incorporate those changes in the next sprint. This approach ensures that the final product aligns closely with user expectations and requirements, even if those evolve during the development process.

Each sprint involves planning, designing, coding, testing, and reviewing, allowing for continuous improvement and adaptation to changing requirements. The justification for using the Agile model is its ability to accommodate evolving user needs and incorporate feedback quickly, ensuring that the final product aligns closely with user expectations and requirements. The iterative nature of Agile also helps in identifying and addressing issues early in the development process, leading to a more robust and reliable system. Using the Agile model in this solo project enables a structured yet flexible approach to development. It allows for the accommodation of evolving user needs, continuous improvement, and early detection and resolution of issues. Ultimately, this approach ensures that the Learning Assessment System is developed efficiently and effectively, meeting its objectives and providing a valuable tool for online testing and assessment.

### **3.2.1 Benefits of Using Agile**

- 1. Customer-Centric Development:** Agile's ensures that the Learning Assessment System is developed with direct input from users and stakeholders, leading to a product that meets their needs more accurately.
- 2. Flexibility and Adaptability:** Agile allows for changes in requirements even late in the development process. This is particularly important for the Learning Assessment System, as educational requirements and technologies can evolve rapidly.

3. **Faster Time-to-Market:** By delivering product increments at the end of each sprint, Agile enables the Learning Assessment System to be released to users sooner, allowing for early feedback and continuous improvement.
4. **Improved Collaboration:** Agile fosters a collaborative environment where all team members and stakeholders are engaged in the development process, leading to better communication and teamwork.
5. **Risk Mitigation:** The iterative nature of Agile helps in identifying and addressing risks early in the development process. Regular reviews and retrospectives ensure that potential issues are resolved promptly.
6. **Quality Assurance:** Continuous integration and testing during each sprint help maintain a high level of quality in the system. Issues are detected and resolved quickly, resulting in a more stable and reliable product.

By adopting the Agile model, the development of the Learning Assessment System is more responsive to user needs, able to adapt to changing requirements, and capable of delivering a high-quality product in a timely manner. This approach ensures that the Learning Assessment System remains relevant and effective in providing online learning solutions for educational institutions.

### **3.2.2 Agile Model Used**

The Agile model used for the development of the Learning Assessment System was Scrum. Scrum is a widely-used Agile framework that divides the development process into sprints, typically lasting two to four weeks. Each sprint begins with a planning meeting to define the goals, followed by daily stand-up meetings to track progress and address any challenges. At the end of the sprint, a review meeting is held to demonstrate the progress made, and a retrospective is

conducted to identify areas for improvement. Scrum's structured yet flexible nature aligns well with the iterative and adaptive approach of Agile, ensuring that user feedback and evolving requirements are continuously integrated into the development process. This allowed the project to remain adaptable, with regular assessment and refinement of the Learning Assessment System as it evolved.

### **3.3 Requirement Engineering**

Requirement engineering is the process of defining, documenting, and maintaining the requirements for a software system. It involves several key activities, including requirements elicitation, analysis, specification, validation, and management.

Requirements Engineering ensures that the problem a client wants solved is clearly defined and the solution is both accurate and effective. Essentially, Requirements Engineering transforms a real-world problem into a clear specification for a highly functional solution.

#### **3.3.1 Process of Requirement Engineering**

Requirements Engineering determines the requirements of software according to the needs of customers. Requirements engineering process includes:

- 1. Requirements Elicitation:** Requirements elicitation involves gathering requirements from stakeholders through various techniques such as interviews, surveys, and observations. For the Learning Assessment System, requirements were collected from potential users (students and administrators) and educational institutions.

2. **Requirements Analysis:** This step involves analyzing the gathered requirements to ensure they are complete, consistent, and feasible. For the Learning Assessment System, this included identifying key functionalities such as user login, test-taking, score viewing, retaking tests, and test management by administrators.
3. **Requirements Specification:** The analyzed requirements are documented in a clear and detailed manner. For the Learning Assessment System, a Software Requirements Specification was created, outlining all functional and non-functional requirements.
4. **Requirements Validation:** This involves reviewing the requirements with stakeholders to ensure they accurately reflect their needs and expectations. For the Learning Assessment System, validation sessions were conducted with representatives from the user groups to confirm the requirements.
5. **Requirements Management:** This ongoing process involves tracking and managing changes to the requirements throughout the project lifecycle. For the Learning Assessment System, a requirements management tool was used to document and track any changes or updates to the requirements.

### **3.4 Requirement Specification**

A software requirements specification (SRS) is an extensive description of the planned software to be designed. It describes in detail what the proposed software will render and how it is supposed to perform. The SRS serves as a blueprint for both the development team and stakeholders, ensuring that all parties have a clear understanding of the system's requirements and expectations. It plays a crucial

role in guiding the design, development, and testing phases of the software lifecycle.

The SRS of the Learning Assessment System is divided into two main categories: functional requirements and non-functional requirements.

### **3.4.1 Functional Requirements**

A functional requirement describes the functionality of a software and its components. Functionality is defined as a set of software behavior, inputs, and output. This section consists of the functional requirements for the Learning Assessment System.

- 1. User Management:** The system allows for the management of user accounts by administrators.
- 2. Test Management:** Administrators can add, remove, and manage tests.
- 3. User Interaction:** Users can log in, take tests, view scores, and retake tests if necessary.
- 4. Feedback Mechanism:** Users can provide feedback, and administrators can review this feedback.

### **3.4.2 Non-Functional Requirements**

Non-functional requirements specify the criteria that can be used to judge the operation of a software system, rather than specific behaviors. These requirements ensure the software is reliable, efficient, and maintainable. For the Learning Assessment System, the non-functional requirements include:

- 1. Performance:** The system should provide a quick response to user actions.
- 2. Scalability:** The system should be able to handle increasing volumes of data and users.

3. **Reliability:** The system should perform consistently over time.
4. **Availability:** The system should be available 24/7 with minimal downtime.
5. **Recoverability:** The system should be able to recover quickly in the event of a failure.

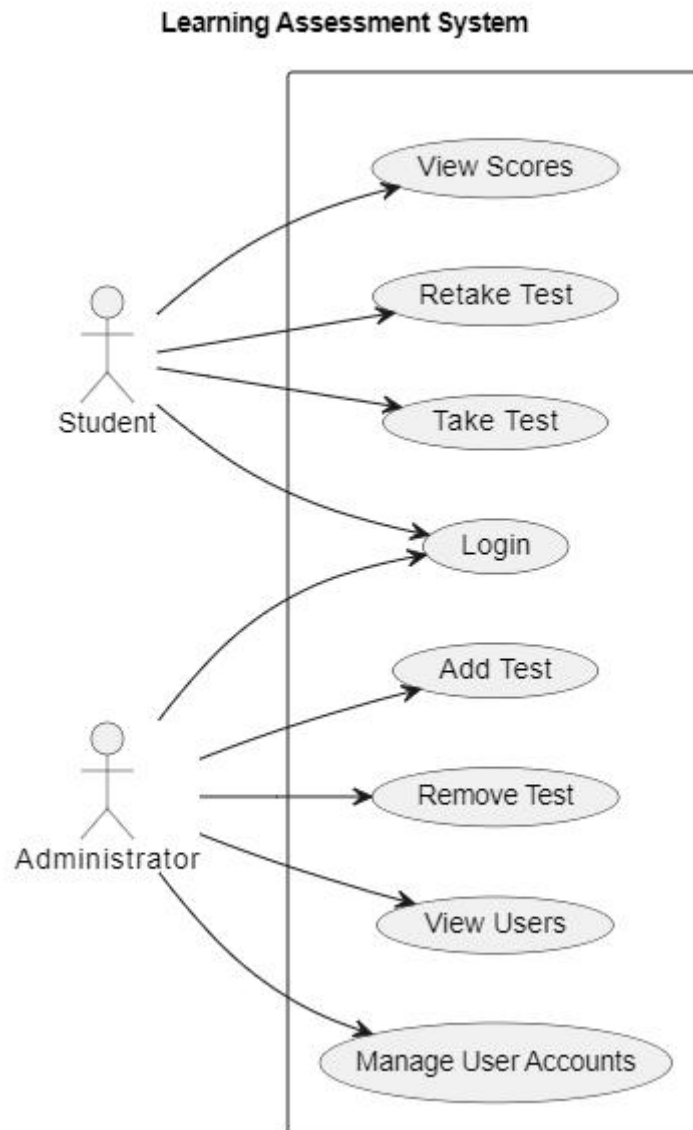
### **3.5 System Design**

The system design involves creating models and diagrams to represent the system's architecture, data flow, and relationships. This phase focuses on creating a structured framework that defines the architecture, components, interfaces, and data necessary for the Learning Assessment System. The goal is to ensure the system is robust, scalable, and maintainable. Key design tools and methodologies used include Use Case diagrams, Data Flow Diagrams (DFD), and Entity Relationship Diagrams (ERD).

#### **3.5.1 Use Case Diagram**

A use case diagram depicts a unit of functionality of a system. The essential goal of the use case diagram is to aid development teams in visualizing the functional requirements of the software, including the relationship of actors (e.g., students, administrators) to primary processes, as well as the relationships between different use cases. In this project, use case diagrams were employed during the requirements gathering phase to graphically represent the system's functional requirements.





**Figure 3.2:** Use Case Diagram

**1. Student:**

- **Sign Up/Login:** The student can create an account or log in to access the system. Once authenticated, the student gains access to the platform's core features.
- **Take Test:** After logging in, the student can view available tests and initiate them. The system allows the student to answer questions and submit the test for grading.

- **View Results:** Upon completion of the test, the student can review their scores and performance feedback provided by the system.
- **Send Feedback:** The student can submit feedback about their experience with the system, including any issues or suggestions for improvement.

## 2. Instructor:

- **Login:** The instructor logs in to the system with their credentials, gaining access to administrative functionalities.
- **Create/Edit Test:** The instructor can create new tests by entering questions, setting correct answers, and defining the test's structure. They can also edit or update existing tests.
- **View Student Performance:** The instructor can monitor students' performance by reviewing test results and analyzing student progress over time. This allows them to identify areas where students may need additional support.
- **View Feedback:** The instructor can review the feedback submitted by students to assess the effectiveness of the tests and make improvements.

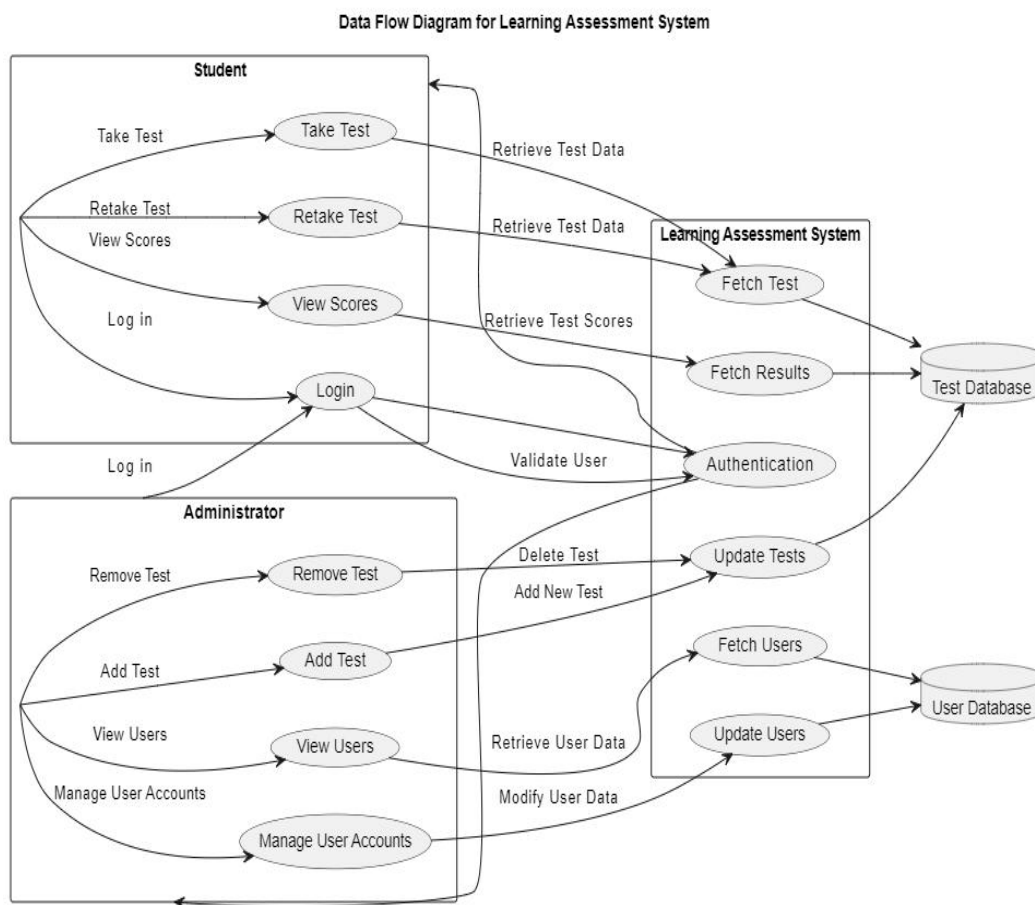
## 3. Administrator:

- **Login:** The administrator logs in to manage the system's overall operation.
- **Manage Users:** The administrator can add, edit, or delete user accounts, including both students and instructors. They ensure the system's users are properly authenticated and authorized.
- **Manage Tests:** The administrator can also manage tests by creating, editing, or deleting them. They oversee the content and ensure it aligns with the system's standards.

- **View System Feedback:** The administrator has access to all user feedback, including feedback from both students and instructors. This helps them maintain the system's functionality and improve its usability.

### 3.5.2 Data Flow Diagram

Data Flow Diagram (DFD) is a visual representation of the information flow through a process or system. DFDs help you better understand process or system operations to discover potential problems, improve efficiency, and develop better processes. Creating a Data Flow Diagram (DFD) involves illustrating the flow of data within your Learning Assessment System.



**Figure 3.3:** Data Flow Diagram

**Data Flow:**

- Student and Administrator are represented as separate rectangles containing their interactions with the system.
- Learning Assessment System contains the processes within the system.
- Test Database and User Database are represented as databases where the system stores and retrieves data.
- Arrows indicate the direction of data flow between processes and data stores.

**3.5.3 Entity Relationship Diagram**

An entity relationship diagram (ERD) is a graphical representation of database tables and their relationships to each other, usually used in software development projects regarding the organization of data within the databases or information systems. In the context of an Learning Assessment System., an ERD helps illustrate the relationships between key entities such as Students, and Administrators.

Entity Relationship Diagram for Learning Assessment System

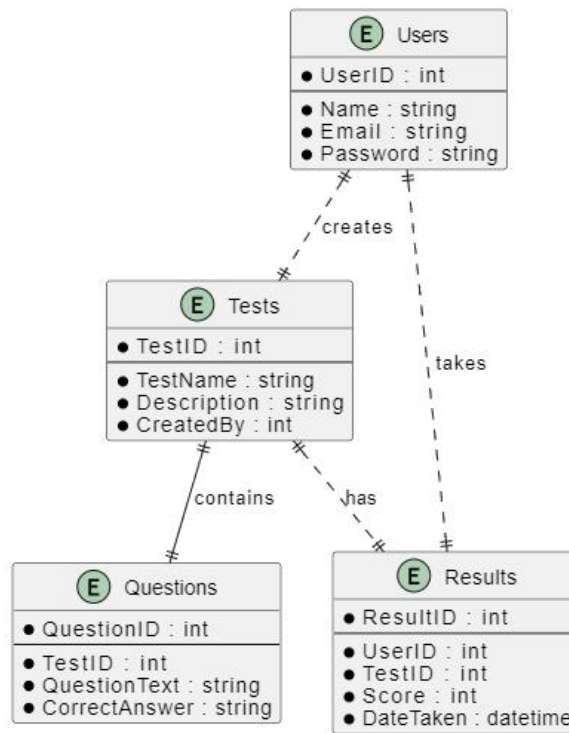


Figure 3.4: Entity Relationship Diagram

#### ERD Explanation:

- **Users:** This entity represents the users of the system. Each user has a unique ID, name, email, and password.
- **Tests:** This entity represents the tests in the system. Each test has a unique ID, name, description, and the ID of the user who created it.
- **Questions:** This entity represents the questions associated with each test. Each question has a unique ID, the ID of the test it belongs to, the question text, and the correct answer.
- **Results:** This entity represents the results of tests taken by users. Each result has a unique ID, the ID of the user who took the test, the ID of the test, the score, and the date the test was taken.

#### Relationships:

- A User can take multiple Results.

- A Test can contain multiple Questions.
- A User can create multiple Tests.
- A Test can have multiple Results.

### **3.6 Summary**

This Chapter focuses on the analysis and design of the Learning Assessment System. It begins by outlining the adoption of the Agile software development model for its iterative and flexible approach, ensuring adaptability to evolving requirements and close alignment with user expectations through continuous feedback. The chapter then dives into requirement engineering, emphasizing activities such as elicitation, analysis, specification, validation, and management to capture and define stakeholder needs effectively.

The requirement specification section outlines functional requirements (user management, test management, user interactions, feedback mechanisms) and non-functional requirements (performance, scalability, reliability, availability, recoverability). System design methodologies, including Use Case diagrams, Data Flow Diagrams (DFD), and Entity Relationship Diagrams (ERD), are employed to visualize system architecture, data flow, and database relationships.

Overall, Chapter Three provides a structured framework for developing an efficient and user-friendly online testing platform, ensuring that the Learning Assessment System meets its objectives through thorough analysis.

## **CHAPTER FOUR**

### **SYSTEM IMPLEMENTATION**

#### **4.0 Introduction**

This chapter provides a detailed overview of the implementation process of the Learning Assessment System. It covers the technical tools and technologies utilized in the development, the testing methodologies employed to ensure system functionality, the system requirements necessary for deployment, and the evaluation methods used to gather feedback from stakeholders. This chapter aims to provide a comprehensive understanding of the implementation phase, highlighting the key components that contributed to the successful development and deployment of the Learning Assessment System.

#### **4.1 Technical Tools Used**

In The developing of the Learning Assessment System a variety of tools or technologies were used to ensure a flexible functionality, a friendly user interface scalability, and ease of use this tools was selected to meet my systems requirement and enhance the development process. Below is an outline of the main technologies used and their roles:

##### **1. Programming Language: PHP**

PHP is a widely-used open-source scripting language that is especially suited for web development. It is embedded within HTML and can be executed on the server side to create dynamic web pages.

##### **Features:**

**Server-Side Scripting:** Handles client requests, manages sessions, and interacts with the database efficiently.

**Cross-Platform Compatibility:** Runs on various operating systems, including Windows, Linux, and macOS.

## **2. Database: MySQL**

MySQL is a relational database management system (RDBMS) that stores all necessary data, including user information, questions, options, results, and feedback.

### **Features:**

**Scalability:** Handles large volumes of data and concurrent users efficiently.

**Complex Queries:** Supports complex queries, indexing, and joins for efficient data retrieval and manipulation.

## **3. Web Server: Apache**

Apache HTTP Server is an open source and a flexible web server that hosts the application and serves web pages on the internet to users.

### **Features:**

**Security:** Provides robust security features, including authentication, access control, and SSL/TLS support.

**Customizability:** Offers extensive modules and configuration options for customizing server behavior.

**Performance:** Efficiently handles multiple client requests and delivers content quickly.

## **4. Front-end Technologies: HTML, CSS, JavaScript**

These technologies form the backbone of the user interface, ensuring that web pages are structured, styled, and interactive.

### **Features:**



**HTML:** Structures content and elements on web pages.

**CSS:** Styles web pages to create visually appealing layouts and designs.

**JavaScript:** Enables dynamic content updates, interactive elements, and client-side validation.

## 5. Integrated Development Environment (IDE): Visual Studio Code

Visual Studio Code is a powerful IDE that provides a comprehensive environment for coding, debugging, and testing the application.

### Features:

**Syntax Highlighting:** Improves code readability and reduces errors through color-coded syntax.

**Extensions:** Offers a wide range of extensions and plugins for enhancing development productivity.

**Integrated Terminal:** Provides a built-in terminal for executing commands and running scripts directly from the IDE.

**Debugging Tools:** Includes debugging capabilities for identifying and fixing issues in the code.

## 4.2 System Testing

System testing tests the integration of each module in the system. It also tests to find discrepancies between the system and its original objective, and current specification. The following table outlines the test cases used to verify the functionality of the Learning Assessment System:

**Table 4.1:** Report for System Testing

ID	FUNCTION	DESCRIPTION	EXPECTED RESULT	ACTUAL RESULT	STATUS
1.	Sign up	User create new account	New user added to the system	User was added to the system	Successful
2.	User login	User tries to log in with valid credentials	User is successfully logged in	User was successfully logged in	Successful
3.	User login	User tries to log in with invalid credentials	Error message displayed	Error message was displayed	Successful
4.	Take test	User attempts to start a test	Test is successfully initiated	Test was successfully initiated	Successful
5.	View ranking	User attempts to view their rank	Scores and ranks are displayed	Scores were displayed	Successful
6.	View history	User attempts to view history	History is displayed	History was displayed	Successful
7.	Send feedback	User tries to send feedback	Feedback form is displayed	Feedback was sent to admin	Successful
8.	Admin login	Admin tries to login with valid credentials	Admin successfully logs in	Admin was successfully logged in	Successful
9.	Admin	Admin tries to	Error message	Error message	Successful

	login	login with invalid credentials	displayed	was displayed	
10.	Add test	Admin adds a new test to the system	New test is added	New test was added to the system	Successful
11.	Delete test	Admin deletes a test in the system	Test is removed	Test was deleted from the system	Successful
12.	View Feedback	Admin attempts to view user feedback	User feedback is displayed	User feedback was displayed	Successful
13.	View users	Admin attempts to view user	List of users is displayed	All users was displayed	Successful
14.	Delete user	Admin tries to delete a user	User is removed	User was removed from the system	Successful
15.	Admin sign out	Admin attempts to sign out	Admin signed out	Admin was signed out	Successful

### 4.3 System Requirements

The system requirements needed for optimal performance and usage of the Learning Assessment System, both software and hardware requirements are needed. These requirements ensure that the system operates efficiently, providing

users with a seamless experience. Below are the detailed software and hardware requirements:

#### **4.3.1 Software Requirements**

- **Operating System:** Windows 10 or later, macOS, or Linux
- **Web Browser:** Google Chrome, Mozilla Firefox, Microsoft Edge, or Safari
- **Web Server:** Apache 2.4 or higher
- **PHP:** Version 7.4 or higher
- **Database:** MySQL 5.7 or higher

#### **4.3.2 Hardware Requirements**

- **Processor:** Dual-core processor or higher
- **RAM:** Minimum 4 GB
- **Storage:** Minimum 5 GB of available disk space
- **Network:** Reliable internet connection

#### **4.4 System Evaluation**

The evaluation of the Learning Assessment System was conducted to determine its effectiveness, usability, and overall satisfaction among its users. The evaluation aimed to gather valuable insights that could guide future improvements and ensure the system meets the needs of its users. This process involved structured feedback collection through surveys and interviews with students, instructors, and administrators.

## 1. Students

**Ease of Navigation:** Students generally found the system intuitive and easy to use, allowing them to focus on assessments without technical distractions.

**Instant Feedback:** The immediate results and feedback on assessments were highly appreciated, as they helped students understand their performance and areas needing improvement.

## 2. Instructors

**Test Management:** Instructors valued the streamlined process for creating and managing tests, which saved them time and effort.

**Performance Monitoring:** The ability to track and monitor student performance was seen as a significant advantage for providing targeted support.

## 3. Administrators

**System Reliability:** Administrators found the system robust and reliable, with minimal downtime and issues, facilitating smooth operations.

**User Management:** The system's user management capabilities were praised for their efficiency in handling user accounts and permissions.

### 4.4.1 Overall Evaluation

The feedback received from all users was overwhelmingly positive, indicating that the Learning Assessment System effectively meets user needs and expectations. Key strengths include ease of use, robust functionality, and efficient user management. However, the evaluation also highlighted several areas for future enhancements:

- **User Interface Design:** Improving the visual appeal and responsiveness of the interface to enhance user engagement and accessibility.

- **Advanced Features:** Implementing more sophisticated analytics and reporting tools to provide deeper insights into performance metrics.
- **Security Enhancements:** Strengthening security protocols to safeguard user data and ensure compliance with data protection standards.

The evaluation process provided valuable insights into the strengths and weaknesses of the Learning Assessment System. The feedback gathered will guide future development efforts, ensuring the system continues to evolve and meet the dynamic needs of its users. By addressing the identified areas for improvement, the System can enhance user satisfaction and maintain its position as a reliable and effective tool for learning assessment.

#### **4.5 Summary**

In this chapter, I discussed the implementation of the Learning Assessment System, focusing on the technical tools like PHP, MySQL, Apache, and front-end technologies that provided the foundation for a scalable and user-friendly platform. The system underwent rigorous testing, which confirmed successful performance across all key functions, demonstrating its readiness for deployment.

System requirements were defined to ensure optimal user experience, while the system evaluation gathered positive feedback from students, instructors, and administrators. The system was praised for its ease of use, reliability, and functionality, with recommendations highlighting opportunities for enhancing the user interface, analytics, and security. These insights will guide future improvements to better meet user needs

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATION**

#### **5.0 Introduction**

This chapter presents a summary of the Learning Assessment System project, the conclusions drawn from its development and testing, and recommendations for future improvements. The goal is to provide a view of the project's achievements and recommend improvements that could benefit future versions of the system.

#### **5.1 Summary**

The Learning Assessment System project was developed to provide an efficient and user-friendly platform for managing and delivering assessments to students. It started by identifying the challenges faced in traditional assessment methods, particularly the inefficiencies in managing tests and delivering timely feedback. In response, the system aimed to offer a more automated, accessible, and streamlined approach for educational institutions.

The project involved a thorough review of existing online assessment systems, analyzing their strengths, weaknesses, and key features. This research informed the design of the Learning Assessment System, ensuring it was both modern and practical. The design process focused on creating a secure and scalable architecture, combining a robust backend for managing users, questions, and results, with a well-structured and intuitive frontend interface. Key design elements also included user data protection and reliability, emphasizing security as a critical factor in the system's development.

The implementation phase utilized technologies such as PHP for server-side scripting, MySQL for database management, and Apache as the web server. Throughout the development, rigorous testing procedures were applied to ensure the system functioned as expected. These tests verified that the system met its objectives and that users could navigate the platform effectively.

## **5.2 Conclusion**

The Learning Assessment System successfully met its goals of providing a user-friendly and efficient platform for managing and taking assessments. The system's core functionalities user management, test creation, test-taking, and result processing were implemented effectively using PHP, MySQL, Apache, and front-end technologies like HTML, CSS, and JavaScript.

Throughout its development, the system was tested to ensure it was both functional and reliable. User feedback indicated that the system ability and provided value to students, instructors, and administrators alike. Despite its success, there are opportunities for further improvements, particularly in enhancing the user interface, expanding reporting and analytics features, and strengthening security.

Overall, the project demonstrated the successful application of web development technologies in solving real-world problems in the educational domain, achieving a functional and robust assessment system that meets the needs of its users.



### 5.3 Recommendations

Based on the experiences and feedback gathered during the project, These enhancements will help improve the functionality and security of the system, making it more adaptable to the evolving needs of its users while ensuring a more seamless experience

- i. **User Interface Improvements:** The system could benefit from a more modern and visually engaging interface to improve the user experience, particularly for students.
- ii. **Advanced Analytics and Reporting:** Adding more detailed analytics tools for instructors would allow for better tracking of student progress and deeper insights into performance trends.
- iii. **Enhanced Security Features:** Future versions of the system should incorporate stronger security measures, such as multi-factor authentication, advanced encryption techniques, and secure session management to better protect user data.
- iv. **Mobile Responsiveness:** Ensuring the system is fully responsive on mobile devices would broaden its accessibility, allowing users to interact with the system across a wider range of devices.
- v. **Scalability:** As the system grows, ensuring scalability to accommodate larger datasets and more concurrent users will be essential.

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## APPENDIX A

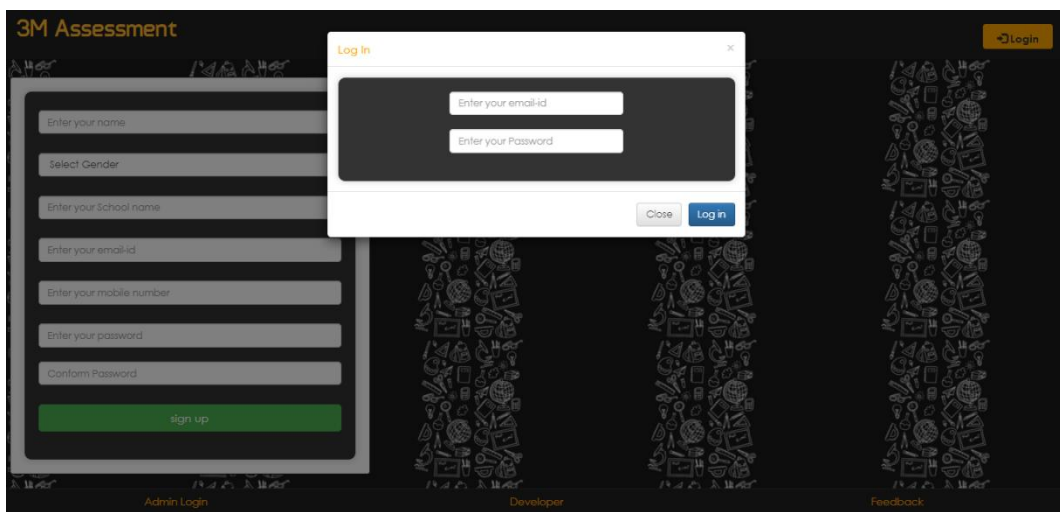
Figure 3.4 below shows the student registration page where the student fills in the necessary information for creating an account on the assessment system, the login button above at the top right is for student with accounts to login.



The screenshot shows the '3M Assessment' student registration page. On the left, there is a white registration form with the following fields: 'Enter your name', 'Select Gender' (a dropdown menu), 'Enter your School name', 'Enter your email-id', 'Enter your mobile number', 'Enter your password', and 'Confirm Password'. A green 'sign up' button is at the bottom of the form. To the right of the form is a dark grey area with a vertical pattern of small white icons. At the top right, there is a yellow 'Login' button. At the bottom, there are three links: 'Admin Login', 'Developer', and 'Feedback'.

**Figure 5.1:** Student registration page

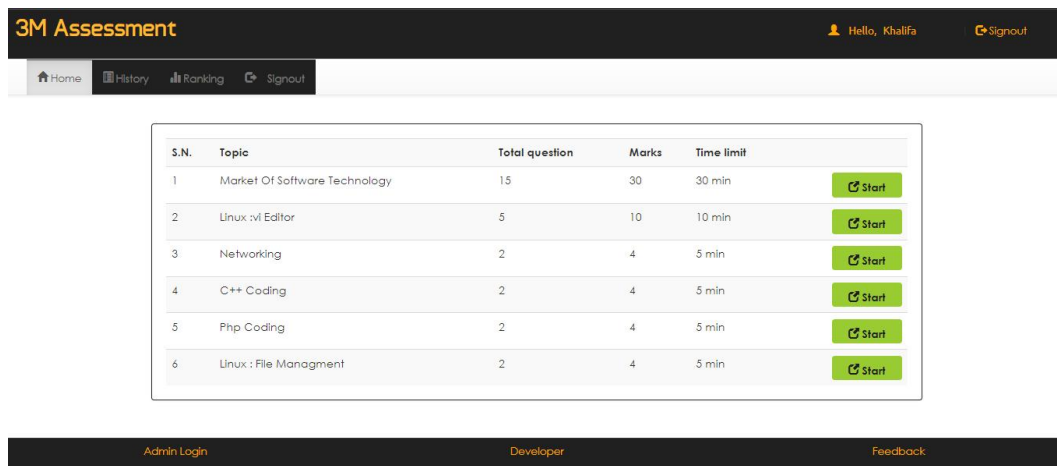
The Image below on Figure 3.5 shows the user login module where the user is required to fill in the fields with details used in creating the account. To login successful



The screenshot shows the '3M Assessment' user login page. It features the same registration form as in Figure 5.1 on the left. Overlaid on the form is a white 'Log In' modal window. This modal has two input fields: 'Enter your email-id' and 'Enter your Password'. At the bottom of the modal are two buttons: a grey 'Close' button and a blue 'log in' button. The background of the page is dark grey with a vertical pattern of small white icons. At the top right, there is a yellow 'Login' button. At the bottom, there are three links: 'Admin Login', 'Developer', and 'Feedback'.

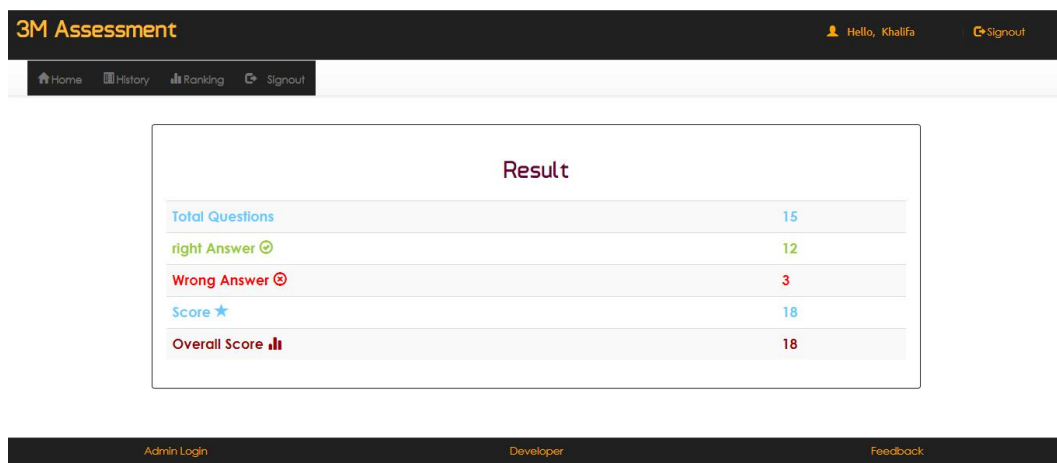
**Figure 5.2:** User Login Page

The image below shows the user dashboard where a user is to pick a particular test to start from the list of test, and a navigation bar to navigate through features like ranking and test history and also signout button at the top



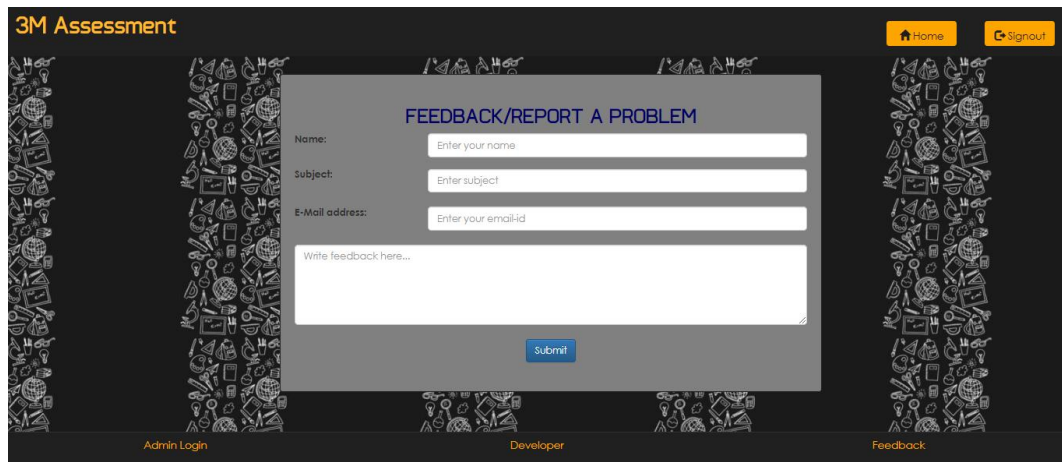
**Figure 5.3: Start Test Page**

Figure 5.7 the user result page appears at the end of the test it shows the total questions, right and wrong answers and the user scores.



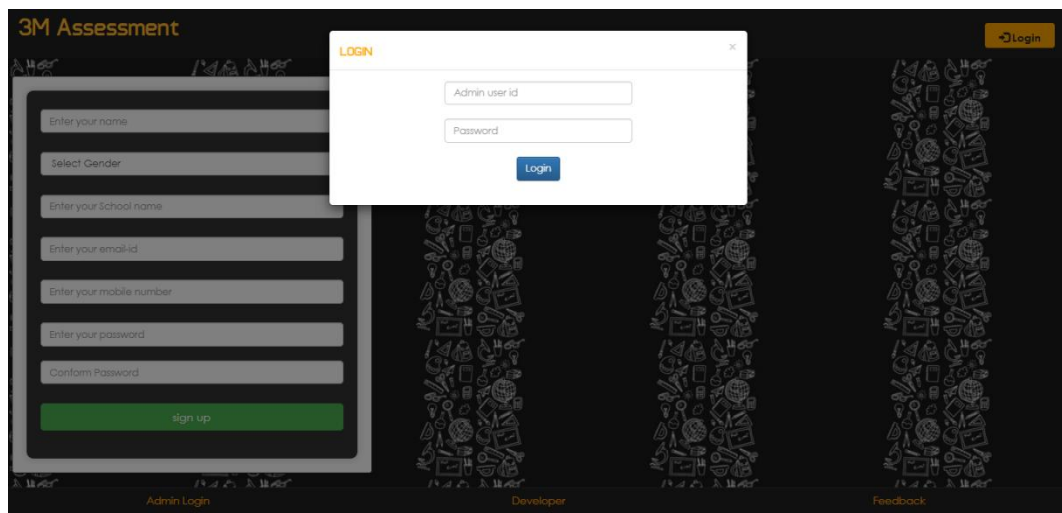
**Figure 5.4: User Result Page**

Figure 5.8 below is the feedback page where a user can give a complain or report a problem to the admin to help enhance or improve the system.



**Figure 5.5: Feedback Page**

Figure 5.9 shows the admin login module where the admin uses the correct user name and password to get validated to view the admin pages which is restricted to students.



**Figure 5.6: Admin Login**

The user management page is being accessed by the admin where the admin sees the list of users and is able to delete a user.

S.N.	Name	Gender	School	Email	Mobile
1	Mark Zukarburg	M	Stanford	ceo@facebook.com	987654321
2	Khalifa	M	Alqalam University	khalifa@gmail.com	70419666
3	Mudathir	M	Alqalam University	mudathir@gmail.com	502411200

**Figure 5.7: User Management Page**

Figure below is the test delete page where the admin is permitted to delete added test.

S.N.	Topic	Total question	Marks	Time limit
1	Market Of Software Technology	15	30	30 min
2	Linux :vi Editor	5	10	10 min
3	Networking	2	4	5 min
4	C++ Coding	2	4	5 min
5	Php Coding	2	4	5 min
6	Linux : File Managment	2	4	5 min

**Figure 5.8: Delete Test Page**

Figure 6.2 is the add test page and form which is been added by the admin, the admin add test topics and test questions adding what option is the correct option and also assign marks to each question

**Figure 5.9:** Admin Add Page

The Figure below is the developer module showing information about the developer

**Figure 6.0:** Developer Module



## **APPENDIX B**

<https://github.com/khalifaMMM12/Assessment-system.git>