E-Learning management Approach

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***Abstract*—This report aims to provide an in-depth analysis of e-learning management approaches and their effectiveness in improving student learning outcomes. The report will examine the current state of e-learning in education, the benefits and challenges of e-learning management approaches, and best practices for implementing and maintaining an effective e-learning system. Additionally, the report will provide case studies and examples of successful e-learning management approach in various educational settings.**

The e-learning management approach (ELMA) project aimed to design and develop a user-friendly and effective platform for delivering education online. The approach is a comprehensive solution for managing and delivering educational content to students. The system was built using a variety of technologies, including Figma online tools then developed user interface, and frontend using Javascript, React js, Next js, and Tailwind CSS for designing. We have used Next js API which React Library-based Full stack library. Node js runtime environment-based Javascript Language. MySQL to manage the database. The system includes a variety of features and functionalities that allow educators and teachers to easily create, manage, deliver, and evaluate educational content in a variety of formats. The system also includes tools for taking notes, assessing student progress, and providing feedback, as well as tools for communication and collaboration between students and educators. The approach presents a promising way to enhance the quality of e-learning programs while reducing costs and time investments.

***Index Terms*—Taking Notes, Group Study, and Progress Monitoring.**

I. Introduction

The E-Learning Management Approach (ELMA) is a web-based platform that allows to create and manage users, creating and managing of online courses, track student progress, deliver content, and evaluate quizzes. The project was initiated to address the need for a more efficient and effective way to deliver education to a diverse student population. The ELMA is intended to be user-friendly and intuitive, with a focus on ease of use and accessibility. The system is also highly customizable.

The increasing popularity of online education has led to the development of various e-learning management systems. These systems are designed to facilitate online learning by providing tools and resources for students, teachers, and administrators. The goal of this project was to develop an e-learning management approach that addresses the needs of students, teachers, and administrators and enhances the online learning experience.

1) The E-Learning management approach is a web application for creating and managing users, creating and managing online courses, tracking student progress, delivering content, and evaluating quizzes.
2) A flexible learning solution that you can by using this approach learners are able to learn anywhere anytime in any situation.
3) This project has three panels:1. Admin panel 2. Instructor panel and 3. Student panel.

II. Literature Review

The e-learning management approach has gained significant attention in recent years, especially with the increased adoption of online learning due to the COVID-19 pandemic. This literature review highlights the key findings and insights from previous research on e-learning management.

The e-learning management approach has become an increasingly popular method of delivering education due to its many benefits. One of the most significant advantages is the flexibility it offers to learners. According to Liu and Liu (2021), e-learning management allows learners to learn at their own pace and schedule, which can be particularly beneficial for adult learners who have work or family obligations. Moreover, e-learning management can improve student engagement and motivation. Hsu and Wang (2019) found that interactive learning tools, such as videos, quizzes, and simulations, can help learners to better understand complex concepts and stay engaged with the material.

The e-learning management approach involves the use of various strategies and techniques to manage the learning process. It encompasses the management of the learning environment, instructional design, content development, assessment, and evaluation. E-learning management aims to create an effective and efficient learning experience for learners. According to Al-Fraihat et al. (2020), the e-learning management approach is crucial for the success of e-learning programs.

Another advantage of e-learning management is its cost-effectiveness. Kim and Bonk (2020) found that e-learning management can be a cost-effective way to deliver high-quality education, as it reduces costs associated with traditional classroom-based education, such as travel expenses, classroom rental fees, and printing costs.

E-learning management also provides educators with valuable data on student performance. Zhang, Han, and Zhang (2020) found that e-learning management systems can be used to collect data on student engagement, performance, and progress, which can help educators to identify areas where students may be struggling and provide additional support as needed.

Several strategies have been employed to manage e-learning. One such strategy is the use of learning management systems (LMS). An LMS is a software application used to manage, deliver and track e-learning content. According to Pappas (2018), an LMS enables instructors to create and deliver e-learning content, monitor learner progress, and provide feedback. An LMS also enables learners to access e-learning content, participate in online discussions, and track their progress.

This literature suggests that e-learning management is a promising approach to education that offers flexibility, cost-effectiveness, and improved student engagement and performance.

III. Goal Of the study

we want to make the education system more simple and always accessible. We believe that education is the key to unlocking human potential, and we are committed to helping people reach their full potential through the power of e-learning. We believe that learning should be interactive, collaborative, and fun, and we have designed our platform to reflect those values. By using this approach learners will be able to learn anywhere anytime in any situation.

IV. RESEARCH METHODOLOGY

In this section, we have shown our proposed methods, procedures, Testing and evaluation.

A. Programming Languages and Resources

Firstly, we developed a prototype of our project or system using Figma online tools then we developed a user interface or front-end using JavaScript, React JS, Next JS, and Tailwind CSS for design. For back-end development, we have used Next JS API which React-JS Library-based Full stack library. Node JS runtime environment-based Javascript Language. MySQL to manage the database.

B. Proposed Methodology

The iterative model is a software development methodology that involves repeating a series of development and testing cycles, with each cycle building upon the previous one. This approach is particularly useful for complex projects, such as e-learning management systems, where requirements may change frequently and feedback from users is critical.

Why do we use Iterative Model? The iterative model is well-suited for e-learning management approach projects because it allows for requirements gathering in stages, rapid development and feedback, flexibility and adaptability, and quality assurance at every stage of the development process.

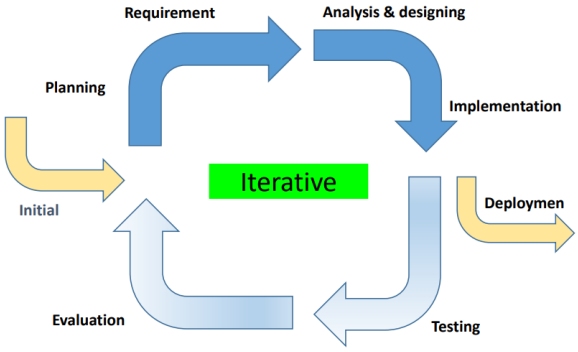

Fig. 1. Iterative Methodology

C. Specification and Requirements

Our system has various types of requirements to access it. These are:

- Hardware requirements
- Software requirements

We have tried to sort out the best hardware and software requirements for the system. Here are the requirements:

Hardware Requirements:

The hardware requirements to access our system is given below:

- Dual Core Processor and Above.
- Minimum 2GB RAM
- Minimum 4GB storage
- Internet Connection

Software Requirements

Prototype Design

- Design UI/UX using Figma online tools

Frontend Development

- JavaScript
- React Js
- Next Js
- Tailwind CSS

Backend Development

- Nodejs
- Next Js API

Database Development

- MySql

D. Diagrams Of The System

Diagrams are an essential tool in the development of a Learning Management System project. They can help ensure effective communication, planning, implementation, testing, and maintenance of the project.

E. Use Case Diagram

A use case diagram is a graphical view of the user's possible interaction with the system modules and features. Here is the use case diagram of our system.

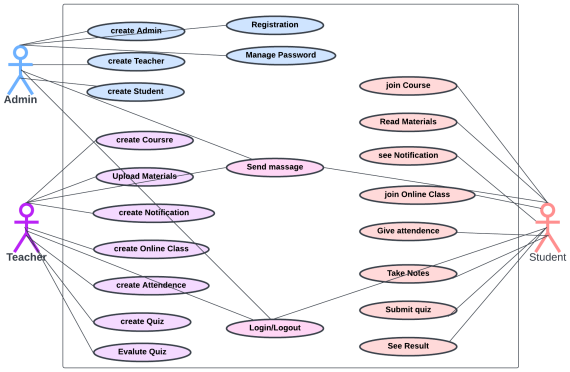

Fig. 2. Use Case Diagram

F. Zero Level DFD

Zero Level DFD: Provides an overview of the system's major components and the flow of data between them

Fig. 3. Zero Level DFD

G. One Level DFD

One Level DFD: Provides a more detailed view of the system's functionality and the flow of data between different modules.

H. Second Level DFD

Second Level DFD: Provides an even more detailed view of the system's functionality, including the flow of data between different sub-modules.

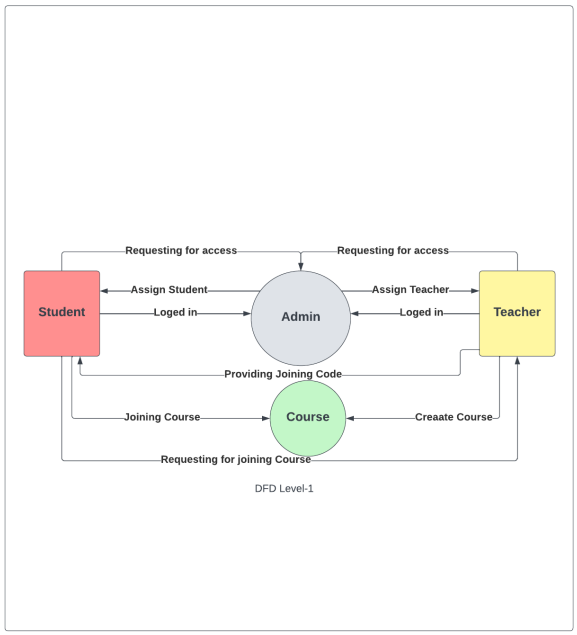

Fig. 4. One Level DFD

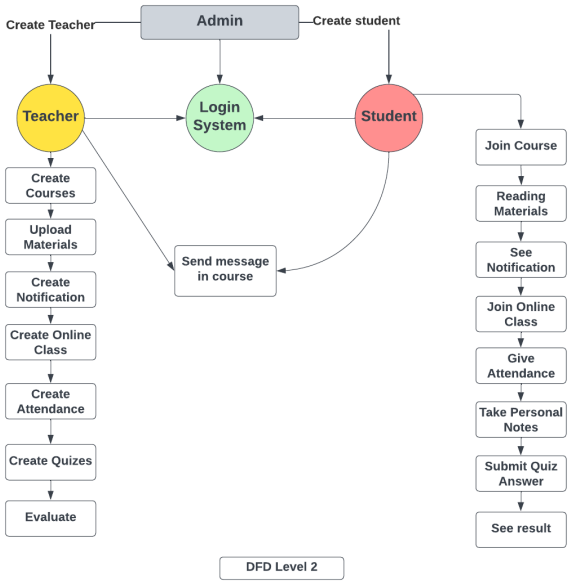

Fig. 5. Second Level DFD

I. ER Diagram

The ERD for the e-learning management system is designed to show the relationships between different entities in the system. These entities include students, courses, content, and assessments. The ERD shows how these entities are related to each other, and the types of relationships that exist between them.

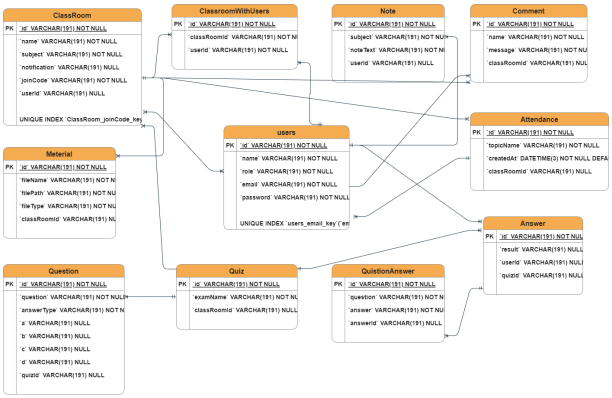

Fig. 6. ER Diagram

J. Design Process

The first step in system interface design is to conduct user research to understand the needs, goals, and behaviors of the users. Based on the user research, define the requirements for the system interface. Identify the features and functions that are necessary to meet the needs of the users. Use these requirements to create a design brief. Here we make our planning and system layout thoughts scratching. Right after that, we moved to Figma for making screen layout mockups and making connections between the layouts. From here we test this prototype from some user perspectives. Then we finalize the mockups and started to front-end design.

K. Frontend Development

Front-end development refers to the creation of the user interface and user experience of a website or web application. It involves the use of various programming languages, frameworks, and tools to develop the client side of a web application that is visible and interactive to users. For front-end development firstly, we developed a prototype of our project or system using Figma online tools then we developed a user interface or front-end using JavaScript, React JS, Next JS, and Tailwind CSS for designing.

L. Backend Development

Back-end development refers to the creation of the server side of a web application, which handles the logic and processing that takes place on the server, as opposed to the client side which is visible and interactive to users. Back-end development involves the use of various programming languages, frameworks, and tools to create the back-end logic of a web application. For back-end development, we have used Next JS API which React-JS Library-based Full stack library. Node JS run-time environment-based Javascript Language. MySQL to manage the database.

M. System Designs

Designing a system for an ELMA (E-Learning Management Approach) involves several key components. In this approach, there have 3 types of Users. 1st Admin who can manage users and see the activity of classes. 2nd Teacher who can create classes and manage the online class as well as attendance and so more. 3rd Student who can join the class appears in the examination and so more. In this section, we are going to introduce our system all interface designs, and their functionality.

N. Test Case

A test case is a set of steps or conditions that are designed to evaluate the functionality and performance of a system. Test cases help to ensure that the e-learning platform is functioning properly and meeting the intended requirements. In the case of an e-learning management approach project, having well-designed test cases is crucial to ensure that the e-learning system meets the needs and expectations of the users. By executing test cases, any issues or bugs in the system can be identified and addressed before the platform is released to users.

Firstly we verify the functionality of creating and managing a user's account in our System. then Verify that created users can log in to our system using their login credentials. If a user enters invalid login credentials, the system should display an error message indicating that the login information is incorrect. Ensure that authorized users can create new courses in our system.

Error handling: effective error handling is essential for our website to ensure that users have a positive experience and can successfully use the platform. By providing clear error messages and instructions on how to correct issues, users can feel supported and engaged with the learning material.

By testing these, we ensured that the e-learning management approach(ELMA) is working as intended, providing accurate and relevant search results, and delivering a seamless and comfortable user experience.

O. Future directions and potential advancements

The e-learning management system has a lot of potential for future development. Some possible future enhancements include:

- Integration with other systems: E-learning management systems could be designed to integrate with other systems, such as learning analytics platforms, student information systems, and assessment tools. This could improve the efficiency of data management and enhance the overall user experience.
- Implementing machine learning algorithms: Machine learning algorithms to personalize the learning experience for each student.

TABLE I
TEST CASE FOR CREATE USERS ACCOUNT

Test Case: 01							
Sl	Test Case	Test Field	Test Scenario	Test data	Expected Result	Exctual Result	St
01	Create Account	Name	Enter the user name	Gias	Should be create	It's Executed	Pa
02			Keep empty user name field		Please fill out this field	It's Executed	Pa
03		Email	Enter a valid email	mdgias@ gmail.com	Should be create	It's Executed	Pa
04			Enter a invalid email .	mdgias@ .com	Should not be create	It's Executed	Pa
05			Enter a email without @ sign	mdgias gmail.com	Please enter a email with @ sign	It's Executed	Pa
06			Keep empty email field		Please fill out this field	It's Executed	Pa
07		User Type	please select a type in the list	Student	Should be create	It's Executed	Pa
08			Keep empty email field		Should not be create	It's Executed	Pa
09		Pass.	Enter a password.	gias@123	Should be create	It's Executed	Pa
10			Keep empty pass. field		Should not be create	It's Executed	Pa
11		Conf. Pass.	Enter same password.	gias@123	Should be create	It's Executed	Pa
12			Enter wrong password.	gias123	Should not be create	It's Executed	Pa

TABLE II
TEST CASE FOR MANAGE USERS

Test Case: 02						
Sl	Test Case	Test Field	Test Scenario	Test data	Expected Result	Exctual Result
01	Manage users	Delete users	Click the delete button	Clicked	Should be delete	It's Executed
03		Change password	Enter a password.	gias@123	Should be change	It's Executed
04			Enter same password.	gias@123	Pass. matched. Should be change	It's Executed
06			Enter wrong password.	gias123	Pass. does not match. Should not be change	It's Executed
			Keep empty pass. field		Should not be change	It's Executed

TABLE III
TEST CASE FOR CREATE CLASS

Test Case: 04						
Sl	Test Case	Test Field	Test Scenario	Test data	Expected Result	Exctual Result
01	Create Class	Class Name	Enter a class name	CSE-437	Should be create	It's Executed
02			Keep empty class name field		Please fill out this field	It's Executed
03		Class Subject	Enter a class name	Information system & design	Should be create	It's Executed
04			Keep empty sub. name field		Please fill out this field	It's Executed

- Searching: Implementing search and navigation options for better preferences, quick results, and finding specific information.
- Adding Gamification: Gamification features to make the learning experience more engaging and interactive.
- Virtual Reality: Integrating the system with other educational tools, such as virtual reality and augmented reality.

V. RESULT ANALYSIS AND DISCUSSION

The e-learning management approach involves the management of the learning environment, instructional design, content development, assessment, and evaluation. The project found that the use of the E-Learning management approach(ELMA), instructional design models, and assessment and evaluation methods are effective strategies for managing e-learning programs. The project emphasizes the importance of using a systematic approach to the design and development of e-learning content and highlights the importance of taking notes, group study, assessment, and evaluation in progress monitoring that can be used to improve the e-learning program.

VI. CONCLUSION

This e-learning management approach is a comprehensive solution for managing and delivering educational content to students. The system will improve the overall educational experience for students by providing them with a more interactive, adaptive, and engaging learning environment. Moreover, it leverages the power of technology to facilitate collaborative learning, provide real-time feedback, and support continuous improvement The system is technically, operationally, and economically feasible, and will be developed using widely available technologies and development tools.

VII. ACKNOWLEDGEMENT

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