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Article

BRAINIAC: The Planning Process for the E-Learning Platform with Text Summarisation Tools

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***Abstract*— This paper presents the planning process for the BRAINIAC, an e-learning platform with text summarisation tools. The evolution of technology in education happens gradually throughout daily lives, from the old traditional method to the digital process, making the educational experience easier and more convenient. E-learning, which uses electronic devices and digital resources, has become essential, especially during the COVID-19 pandemic. Despite the widespread use of e-learning platforms such as Moodle, Google Classroom, Blackboard, and Udemy, it still lacks an integrated text summarisation tool. This tool is vital for helping learners efficiently process and comprehend extensive textual information. This project, Brainiac, aims to develop an e-learning platform, which is a web-based application that incorporates Artificial Intelligence (AI) and Natural Language Processing (NLP) for text summarization. The methodology used to ensure the development process runs smoothly for this project is the Agile Model. The research objectives are to identify gaps in existing e-learning platforms, propose a robust security framework for Brainiac, and evaluate its accuracy and compatibility through thorough testing. Hence, Brainiac aims to enhance learning, improve comprehension, and save time for users, thus significantly enhancing the overall effectiveness of digital education. The implication of Brainiac could revolutionise digital education by improving information processing and comprehension, ultimately enhancing learning efficiency and user experience. In conclusion, Brainiac's text summarisation tools significantly advance e-learning, offering a transformative approach to improving information processing, comprehension, and overall educational efficiency.**

***Keywords*— E-learning; education; text summarisation; natural language processing (NLP)**

I. INTRODUCTION

The evolution of technology in education happens gradually throughout daily lives, from the old traditional method to the digital process, making the educational experience easier and more convenient. Education is compulsory for every level of age, especially in this fast-evolving technology era. Implementing and using current learning methods that align with the technology that can benefit both instructors and learners is essential. One of the current advancements is the development of a Learning Management System (LMS), a software application that facilitates the education sector, especially in handling and ensuring education can be delivered more efficiently, which also can be called e-learning. E-learning is electronic learning that utilises electronic gadgets to

facilitate education. It is “a technology-mediated learning approach of great potential from the educational perspective” [1]. In other words, e-learning is a promising platform because of its accessibility, engagement and efficiency. The benefits are that it can break down geographical barriers, allowing students worldwide to access educational content and interact, regardless of location, proving its flexibility. However, the emergence of e-learning sped up globally during the COVID-19 pandemic outbreak in 2019. Institutions worldwide have started to use e-learning platforms to ensure students receive proper education even during an outbreak, making teaching and learning more accessible, engaging, and effective. This shows the limitations of traditional learning methods. Findings by [2] reveal that teaching and learning quality was not as good as now, and students’ mental health was the most affected during that time. This is because of the lack of features needed. Over the years, e-learning has not become an option anymore but a necessary medium to use and have. E-learning platforms emerged as an alternative for students to improve their study performance and learning experience. It also allows students to engage with the content at their own pace. Convinced that the Learning Management System (LMS) is the future of education, several institutions and universities have been using a variety of e-learning platforms [3]. However, its effectiveness depends on the student’s adoption and utilisation of the platform.

Several examples of e-learning platforms or Learning Management Systems include Moodle, Google Classroom, Blackboard, and Udemy. Educators and students can stay connected using the platform. Studies by [4] show that the Moodle platform positively influenced teaching activities by significantly improving student performance compared to traditional courses, as studies on e-learning users showed enhanced progress and a shift in their perception of homework tasks compared to conventional methods, highlighting the advantages of this modern approach. Regardless of the widely used e-learning platforms, these platforms still have limitations and do not provide specific functions for students to access on one platform, especially text summarisation tools, which makes users need to access another platform or a third-party website to use them, which make user depends on third-party tools which make learning process becomes complicated. Research by [5] found that high dropout and failure rates in Morocco's e-learning system indicate a need for personalised learning tools and support, suggesting that tailored solutions could enhance learner motivation and outcomes, with future research comparing these systems to those in Europe and America. Studies by [6] show understanding learner satisfaction with e-learning systems is essential for improving quality by identifying key factors. Still, much of the existing research ignores the differences among learners and factors, which shows a need for more studies to enhance satisfaction through personalised approaches to improve e-learning. Text summarisation tools and technology help learners, especially students, efficiently process a large volume of textual information into a concise summary of educational materials using an automatic summary generator. This function can help users, especially students, to concentrate on the main point, which is critical ideas of a material given by their instructor or a research material. These can improve users’ understanding and optimise their time efficiently. According to [7], students express concerns about privacy breaches stemming from excessive data collection and the potential for AI to generate misunderstandings or misleading information. They also worry that reliance on AI might impede their ability to learn independently and think critically. However, this AI-integrated text summariser can enhance students' understanding of context, making online or face-to-face interactions with peers and teachers more engaging and effective. By facilitating more transparent comprehension and promoting active participation, the text summarizer supports students in developing critical thinking skills while mitigating concerns about AI's impact on independent learning.

Brainiac is an initiative to build a platform that consists of the regular functions of an e-learning platform directly incorporated with text summarisation tools that use Artificial Intelligence (AI) using the Natural Language Processing (NLP) method. Artificial Intelligence refers to machines that can understand, communicate and process human language, while Natural Language Processing (NLP) is a subfield for AI. Summarisation is a crucial NLP task that condenses large volumes of information into short summaries [8]. Integrating these for text summarisation into an e-learning platform has exciting potential to improve lagging learning experiences. This project aims to promote the integration and flexibility of education in the digital era by utilising technology in the learning process.

The problem that will be addressed is the challenge of processing information effectively. E-learning platforms often provide extensive text-based content, which can be challenging for students to process efficiently. Learners who are students must deal with lengthy articles, lectures, research papers, and course materials, resulting in a vast amount of information that can be difficult to go through and can hinder knowledge absorption. “Information overload caused exhaustion” [9]. With lots of information, prioritising key points and distinguishing them from supporting elements might not be easy. Learners frequently struggle with assembling complex ideas through these vast materials, resulting in frustration reading unnecessary information, affecting their ability to understand materials fully. According to [10], studies on college students in Kuwait during the COVID-19 pandemic showed that information overload (IO) increased due to the ease of creating, sharing, and duplicating information online. This shows that students face information overload, especially during the use of e-learning, which relates to modern learning methods that combine both learning methods, which are face-to-face and e-learning methods. While students must engage deeply with the material, the sheer volume of text can make it challenging to quickly identify and focus on the most critical information. This can impact their ability to engage with and apply the material effectively. Integrating summarisation tools within e-learning platforms can support students in their learning process by helping them quickly identify vital concepts. These tools do not replace the need for thorough engagement with the material but enhance students' ability to prioritise and focus on essential information. Studies by [11] say two main summarisation methods are extractive summarisation, which selects existing sentences, and abstractive summarisation, which creates new phrases; the extractive approach automatically condenses documents to clarify central ideas and enhance readability while retaining essential content for better user comprehension. This approach

can facilitate more profound understanding, critical thinking, and better long-term knowledge retention. Staying information in long-term memory and recalling it when needed is crucial for learners, especially students. Effective knowledge retention is when learners can apply what they have learned. For example, students can apply and recall what they have learned in class to answer exam questions or use it in real-world situations. Summarising content helps shorten lengthy materials and makes it easier to remember. Streamlining the initial stages of content review and summarisation tools can help students manage their study time more effectively and improve their learning experience.

Our work addresses the following research questions: What are the gaps in the existing e-learning platforms? How can Brainiacs be protected from threats? How can Brainiac be ensured that it works well?

This research aims to investigate the gaps between existing e-learning platforms, propose and provide a reliable security framework for Brainiac, and evaluate its accuracy and compatibility by thorough testing.

This project is about an e-learning platform for online learners and educators that provides a text summarisation tool to assist in summarising textual information, whether text, PDF, or other document formats. This e-learning platform will be open and accessible to all users who sign up and log into the system. Registered users can access a customisable dashboard to manage their subjects, tasks, activities, and documents. However, there is a limitation to what the unregistered user can do. The user must create and log in using the registered account to access the platform. After logging in, the user will be displayed with their user dashboard, which shows all their added courses, tasks, recent activities, folders, and documents. Users can add, edit, delete, import, and export files into or out of the platform. A registered user can use this platform's text summarisation tool without limitations. This allows users to freely summarise their preferred content, such as extended text and documents, without restrictions. Even though this is an e-learning platform, no online communication features, such as video or ordinary calls, will be provided. This platform will focus on providing users with a user-friendly and convenient yet conducive e-learning space. This platform uses an online learning system that helps users retrieve, organise, and review their learning content.

This initiative aims to create an e-learning platform to facilitate the education sector, as learning online and self-learning are becoming significant activities in the education stream. Providing an e-learning platform that offers text summarisation tools helps users optimise their study time and enhances their productivity. The text summarization tool that implements AI can ease learning and save time for other tasks. The user does not have to read multiple pages and condense lengthy documents into concise summaries to highlight the key points.

This paper is structured in sections and organised as follows: the first section, with an introduction, includes background information on e-learning and text summarisation tools, a problem statement, a research question, a research objective, scope, and project significance. This is followed by a literature review of the existing system, a comparison of each system, weaknesses, an overview of the web-based system, and security elements. The methodology section will cover the project research approach and tools in greater detail, followed by results and conclusion. The final section is acknowledgement and references.

II. EXISTING SYSTEM

A LMS is a platform designed to facilitate education delivery and can be used in academic and corporate environments to smooth the learning process. Despite its platforms offering many features, none integrates a built-in text summarisation tool, which is essential in helping learners process large volumes of data and ineffective knowledge retention. According to [12], most students familiar with web-based tools benefit from e-learning techniques that enrich their educational experience and expand learning environments, enabling them to construct knowledge through practical engagement with virtual learning systems (VLSs) while addressing challenges in traditional science education, such as the struggle to connect theoretical concepts with real-world applications and the tendency to rely on memorisation rather than critical thinking. It emphasises that students proficient with web-based tools can improve their educational experiences through e-learning, utilising techniques and virtual learning systems (VLSs) that offer interactive applications linking theoretical concepts to real-world situations, enhancing understanding and encouraging critical thinking over rote memorisation. In the research by [13], traditional methods like filtration were used to address information overload. Still, they often fell short with large datasets, leading to Faceted Search (FS), which effectively organises search results into topics and provides multiple filters for quicker access. Building on these approaches, this e-learning platform with integrated text summarisation also addresses this issue by introducing text summarisers as an alternative solution, helping users efficiently process large amounts of information by condensing content into critical points for easier comprehension.

No existing e-learning platform offers a text summarisation function in the system. E-learning platforms like Moodle, Google Classroom, Blackboard, and Udemy provide various functionalities for educational needs but lack built-in text summarisation tools. Studies by [14] state that a text summarizer is essential as it processes text data to remove noise and irrelevant content. It enables advanced semantic analysis techniques to extract meaningful insights and focus on educational substance for improved student comprehension and engagement. Research by [15] states that unstructured text data is analysed to extract insights. It is an essential foundation in summarisation, which condenses information into concise, meaningful summaries for easier comprehension across various sectors. Research paper [16] highlights the significance of e-learning and the role of artificial intelligence, particularly neural networks, in analysing multimedia resources and personalising educational pathways, ultimately leading to the development of intelligent, adaptive platforms that enhance the interactivity and engagement of online learning experiences. E-learning platforms frequently feature video lectures, quizzes, discussion forums, and downloadable materials. Accredited courses and graded assignments are available on some platforms. According to a study by [17], the pros and cons of e-learning from the perspectives of UAE university students reveal that 81% find e-learning engaging, 80% appreciate

improved communication with peers and teachers, and its flexibility and accessibility enhance the overall learning experience. However, to address its limitations and further boost student engagement, introducing new features, such as a text summariser, is essential for making learning more accessible and flexible. Below are the existing systems of e-learning platforms.

A. Moodle

Moodle is an open-source learning management system that is used widely by institutions all over the world. Figure 1 shows the interface of the Moodle website. It includes course management tools, forums and communication functions, quizzes and assignment submissions. With modules incorporating lessons, assignments, tests, forums, and resources, Moodle allows instructors to design their course structures. Many content forms, such as text documents, videos, external links, and multimedia, are supported. The asynchronous forum function in Moodle facilitates communication between students also between students and educators. To keep consumers updated, it also has notification and messaging features. Instructors can create tests with various question formats such as multiple choice, true/false, and short answers, as well as constraints like time restrictions and grading systems. Tools for submitting assignments handle several file formats and provide comments.

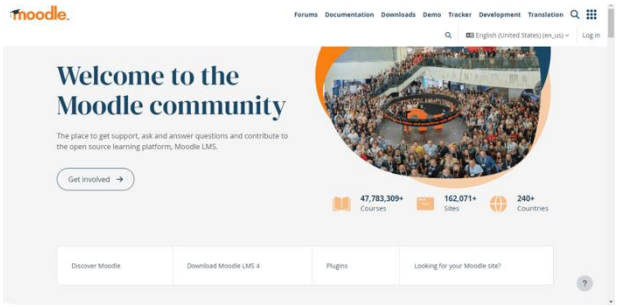

Figure 1. Interface of Moodle website

B. Google Classroom

Google Classroom is an online learning management system that is free, designed and developed by Google to foster effective communication and collaboration between instructors and learners. Figure 2 shows the Google Classroom interface. As it promotes a paperless classroom, it smoothens education delivery with full integration with other built-in Google apps like Google Drive, Gmail, and Google Meet. This platform has assignment management that allows educators to create, upload, and grade assignments efficiently, and they can upload various materials formats from Google Drive. Users can collaborate with Google Docs, Google Sheets, Google Slides, and Google Forms for collaborative projects or assessments. It also facilitates communications through its integrated announcements, comments, and notification space on the platform so that users can stay connected.

Figure 2. Interface of Google Classroom.

C. Blackboard

Several educational institutions use Blackboard as their LMS, and this platform is popular among higher education institutions. Figure 3 shows the interface of the Blackboard website. It excels in content delivery in documents, videos, quizzes, links to external resources, discussion forums, assignment submission, grading systems, and communication tools. It includes robust assessment tools for creating and managing tests, quizzes, and surveys, with detailed analytics and automated grading options. Blackboard primarily targets to serve professors and students in educational institutions by delivering and managing online courses. However, its cost can be prohibitive for smaller institutions or individual educators, and the broad array of features may present a steep learning curve for new users.

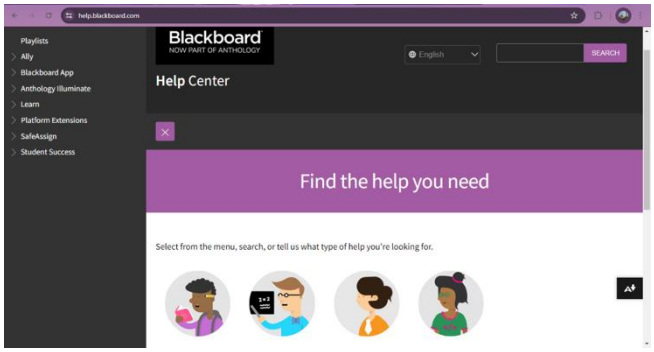

Figure 3. Interface of Blackboard website

C. Udemy

Udemy offers online courses covering a wide range of subjects. Figure 4 shows the interface of Udemy.

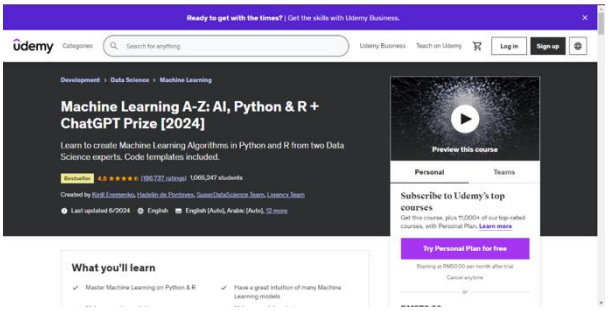

Figure 4. Interface of Udemy

Educators can create and sell courses by uploading video lectures, downloadable materials, and tests. They can earn financially based on course enrolments. Learners can purchase individual courses or sign up for subscription plans to access a broader course. Then, they can receive professional certificates upon completing the courses. Features like Q&A sections, direct messaging, and course announcements are offered. This platform covers a broad range of subjects and skills, which differs from the other e-learning platforms as it caters to various needs, especially professional ones. It is trendy among learners who want to acquire knowledge and skills at their own pace as it is flexible.

However, despite the widely used and adopted of these platforms, they still lack a text summarisation tool function. This limitation makes users rely on external tools or platforms that can summarise large volumes of text, complicating the learning process.

III. COMPARISON OF EACH EXISTING SYSTEM

Table I compares each existing system's features, services, and functionalities.

TABLE I. COMPARISON OF EACH EXISTING SYSTEM

Existing System / Feature	Moodle	Google Classroom	Blackboard	Udemy
Login Page	Yes	Yes	Yes	Yes
User Interface	Customisable, Open source	Streamlined, User-friendly	Proprietary, User-friendly	Streamlined, Proprietary
Assessment Tools	Quizzes, assignments, various question types	Assignments, quizzes, Google Forms integration	Tests, quizzes, surveys, detailed analytics	Quizzes, assignments, certificates of completion
Collaboration Features	Forums, Groups	Comments, Shared Documents	Forums, Groups	Limited
Target Audience	Educational Institutions	K-12, Higher Education	Educational Institutions	Professionals, Lifelong Learners
Cost	Free (Open source)	Free	Paid Plans	Paid Courses
Text Summarisation	No	No	No	No

Table I highlights the comparative features, services, and functionalities of four leading e-learning systems: Moodle, Google Classroom, Blackboard, and Udemy. Each system has distinct attributes to cater to different educational contexts and user needs. All four platforms provide a login page for secure access. Moodle offers a customisable, open-source interface, which allows for extensive modifications but may require more technical expertise. Google Classroom is known for its streamlined, user-friendly design, while Blackboard and Udemy also provide streamlined, proprietary interfaces. However, Blackboard focuses more on institutional needs and Udemy's on professional development. All four platforms provide a login page for secure access. Moodle is notable for its customisable, open-source user interface. It offers a broad range of assessment tools, including quizzes, assignments, and various question types, and features forums and groups for collaboration. With its streamlined and user-friendly interface, Google Classroom integrates assignments and quizzes with Google Forms, supports comments and shared documents for collaboration, and is designed for K-12 and higher education environments. Blackboard, characterised by its proprietary user interface, offers a comprehensive suite of assessment tools such as tests, quizzes, surveys, detailed analytics, forums, and group functionalities, making it suitable for educational institutions needing extensive evaluation capabilities. Udemy features a streamlined, proprietary interface focused on professional and lifelong learning, with quizzes, assignments, and certificates of completion for its paid courses. Despite their strengths, none of these platforms include text summarisation tools, highlighting a notable gap that the proposed e-learning platform aims to address by incorporating such a feature to enhance content processing and support improved learning outcomes.

IV. WEAKNESS IN THE EXISTING SYSTEM

The current e-learning platform has many weaknesses as the evolution of technology daily introduces lots of newness in technology. Several weaknesses to be highlighted here that can hinder the learning experience are information overload, limited interactivity, and reliance on passive learning methods. Primarily, the lack of built-in summarisation tools in the platform contributes to information overload for learners. This is because it is hard to identify and extract key points from large, lengthy text-based materials. For instance, studies by [18] state that most postgraduate scholars point out that information overload impacts their research performance. Mainly, they face an excessive number of information resources, difficulty in identifying the main points in their studies and inability to process this information, which leads to wasted time, higher costs, lower-quality research, and negatively impacts personal health by fostering isolation, stifling creativity, and decreasing productivity, making it challenging to process important information efficiently. Secondly, the lack of interactive elements to engage users and reliance on passive learning lead to disinterest and disengagement of users. "Students engaged with their studies are more likely to be successful" [19]. This highlights the need for more engaging learning experiences. Some platforms offer minimal tools featured in their platform, not to mention some inconvenient interfaces. Because of these shortcomings in the current platforms, there is an obvious need for innovation in e-learning, which led to the development of Brainiac's particular method with integrated summarising tools.

V. OVERVIEW OF WEB-BASED SYSTEM

A web-based application system provides advantages in the education sector, as it is accessible in any location, can accommodate many users on a large scale, and has easy updates and maintenance. As stated by [20], “it allows all work to be done in a single platform anywhere”. Web-based application systems offer seamless integration of tools, including text summarisation tools.

VI. SECURITY ELEMENTS IN THE SYSTEM

Security is indeed an important element in e-learning platforms. Essential measures include access control, data encryption, and user authentication. Common threats such as data breaches, hacking, and phishing attacks lead to a need for solid security implementation.

A. Access Control

Implementing access control to restrict access based on specific users for specific roles is essential to minimise the risk of unauthorised access. This will allow different users with different privileges who can only see content relevant to their roles, preventing privilege escalations.

B. Data Encryption

Encrypting data at rest and in transit is needed to protect sensitive data from being exposed, modified, and illegally used. This can help by using complex cryptography techniques in encryption, as the data needs to be decrypted even if intercepted by unauthorised parties. This helps to ensure the data has not been tampered with at rest or in transit, which protects the confidentiality and integrity of data.

C. User Authentication

Implementing Two-Factor Authentication (2FA) and the limitation of attempts will add an extra layer of security to the website. This requires the user's second verification factor, a code sent to the user’s email address and password while logging into the platform. Next, enforce vital password complexity while creating the password, with a specific minimum length of characters, a combination of uppercase and lowercase letters, numbers, and special characters. Doing this can reduce the number of attempts and brute-force attacks into the system.

VII. METHODOLOGY

This chapter covers the research methodology and the tools used during the development of the Brainiac: E-learning platform with the Text Summarisation tool, as well as its justification. The method chosen will be implemented to ensure the project's development is fulfilled, developed, and delivered smoothly on time. Moreover, creating and developing an e-learning platform is crucial. Therefore, several phases and cycles will be implemented, which will also be discussed in this chapter. A thorough and efficient plan for managing the process of developing a project is essential, especially when building an application that can understand and process human language. Therefore, choosing a suitable methodology model will ensure that a well-developed system is developed. A few methodology models of the Software Development Life Cycle (SDLC) approach can be used, including waterfall, agile, and spiral models. Considering the project scale, durations, requirements, workloads, and time flexibility, the methodology used for this project, Brainiac: E-Learning with Text Summarization Tool, is an Agile Model. Figure 5 shows phases in Agile methodology, which include planning, designing, developing, testing, deploying, reviewing, and launching.

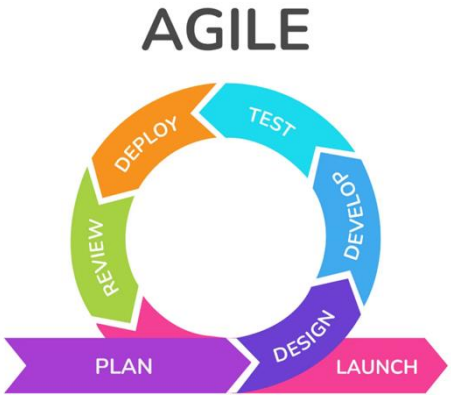

Figure 5. Phases in Agile Methodology

As a popular framework for managing software development projects, including Natural Language Processing-based ones, Agile methodology is significant for this project because it promotes flexibility, rapid prototyping, and close communication. According to [21], Agile methodologies emphasise flexibility, collaboration, and customer involvement, resulting in shorter development cycles that facilitate quicker releases and feedback, enhancing alignment with user needs and fostering adaptability to respond effectively to changes and challenges. It encourages rapid and flexible response to change as the project progresses, which is essential for the dynamic nature of an e-learning platform because new content and features might be identified and need to be added during the project's development. Its rapid prototyping promotes the creation of functional prototypes early during the development process, which enables users to test and give feedback; it also allows developers to incorporate user feedback and learn from experiences to ensure the project outcomes align with user needs. Furthermore, Agile also promotes improved communication between developers and users, tutors and learners. Frequent communication, rapid prototyping, and flexibility help identify and address issues early, mitigating project risks and ensuring continuous improvement leads to a more effective e-learning platform. Then, phases in Agile methodology will be explored, which include planning, designing, developing, testing, deploying, reviewing for maintenance, and launching.

The planning phase is crucial to set up a solid starting point for the project. Defining the project scope and objectives, understanding target users, developing prioritised features, and estimating the workload for the development process are part of the phase. The primary goal of this project is to create an NLP-based text summarisation tool integrated into an e-learning platform called Brainiac. The objectives of this project include investigating the gaps in existing e-learning platforms by conducting a thorough analysis of current e-learning platforms to identify limitations and areas for improvement.

Next, a reliable security framework for Brainiac must be provided to ensure the platform is secure and protects user data. Lastly, it evaluates the system's accuracy and compatibility by performing several types of testing to ensure the platform's summarisation tool is accurate and integrates well with other functionalities. The target users are learners, who are students, instructors who are lecturers, tutors or teachers, and administrators. The prioritised features for the system address the identified gaps and align with security and evaluation objectives: user login page, course browsing, upload content, text summarisation tool, user authentication, user roles, dashboard and analytics, feedback space, and user profile customisation. Assessing the development effort is essential for effective resource allocation and time management. The project is divided into chunks, allowing for frequent reassessment and adjustment, starting with core elements and moving to advanced features. A timeline is set to track progress and ensure timely delivery.

The project transitions from concept to visual and structural design in the design phase. This involves creating a conceptual model for the Brainiac platform that represents the system's architecture and user interface. A vital part of this process is outlining the functional requirements and how each feature will interact within the system. This phase will dive deeper into the prototype outline of the system to acquaint the upcoming phases of the Brainiac: E-learning platform with the Text Summarization tool system. A conceptual design for the web-based application system will be proposed and chosen for logical phase design. In contrast, no physical phase design will be implemented as the outcomes to show proven specifications to the client will be transformed into physical implementation. The design will be documented in use case diagrams, demonstrating how each type of user will interact with the system. This visual representation helps ensure the platform's logical structure meets user needs before moving to the development phase. Additionally, the design phase includes the creation of an Entity Relationship Diagram (ERD), which visually maps out the relationships between various data entities within the system. These diagrams provide a blueprint for the development team's system creation.

Table II shows the users' roles: administrator, instructor, and learner. The table shows the corresponding user with its role in the project.

Figure 6 shows the Use Case Diagram for Brainiac, which illustrates the user's roles throughout the system. Figure 7 shows the Entity Relationship Diagram for Brainiac, which illustrates the entities and their attributes throughout the system.

TABLE II. SYSTEM'S USER AND ROLE

User	**Role Description**
Administrator	Manage user account and role.
	Update system
	Setting access
	System Performance Monitoring
	System Configuration
	Implement Security Measures
	Review feedback
Instructor (lecturer, tutor, teacher)	Register and Login
	Create course
	Upload content
	Utilise text summarization
	Give feedback
	Track learner progress
	Upload files in digital storage.
	Manage learner enrollment
Learner (student)	Register and Login
	Enrol Content
	Access Content
	Utilise text summarization
	Upload files in digital storage.
	Interact with learning materials.
	Give feedback
	Complete assessment

The development phase marks the start of coding and system integration. In this phase, the implementation of features that were defined during the design phase will be performed. Development projects are broken down into small increments or sprints. Brainiac's development will begin with essential components like the login system, user authentication, and course browsing. Once the core functionality is complete, we will implement the more advanced features, such as the text summarisation tool and the feedback space. Development follows an iterative process, where smaller modules are built, tested, and refined. This allows for flexibility, enabling adjustments based on real-time feedback. Several programming languages could be used to perform the coding and other development process for the system.

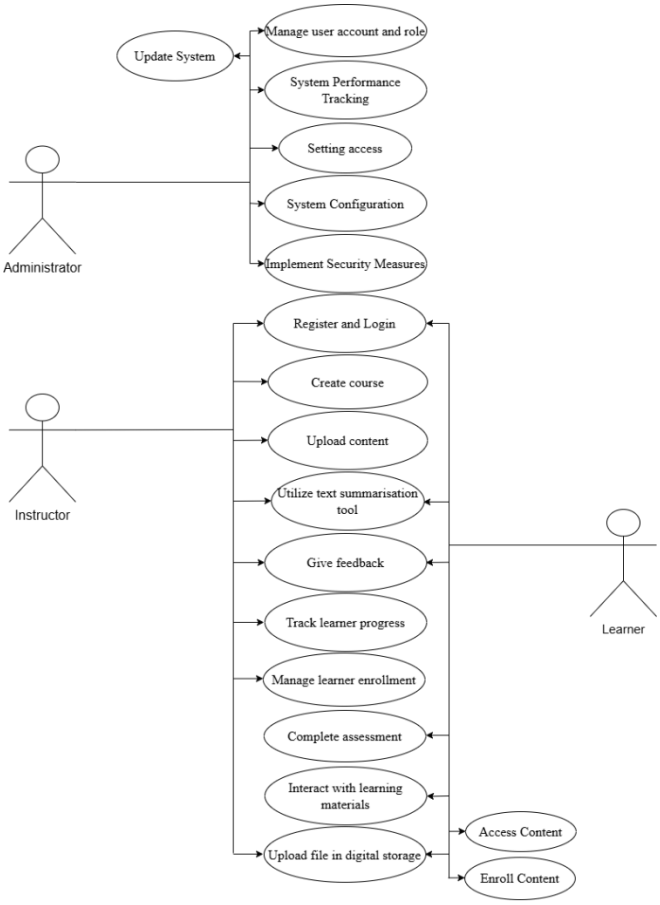

Figure 6. Use Case Diagram for Brainiac

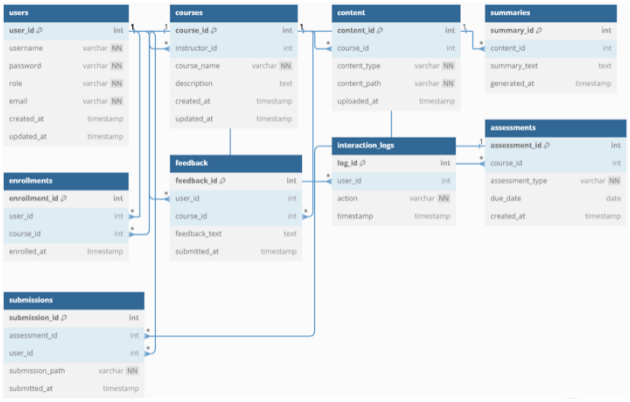

Figure 7. Entity Relationship Diagram

Table III shows the project software requirement that will be used:

TABLE III. SOFTWARE REQUIREMENTS

Item	Applied for
Methods	
Use Case	Requirements capturing
Tools	
Canva	UX Design
Visual Studio Code	IDE
Languages	
NLTK	Text Summarisation tool
MySQL	Database
HTML, CSS, JavaScript	Front-End Web Applications
PHP	Back-End Web Applications

The testing phase is crucial to ensure the system functions as intended, is bug-free, and meets user expectations. For Brainiac, multiple types of testing will be conducted, including unit testing, integration testing, and user acceptance testing. Each feature, mainly the text summarisation tool, will undergo rigorous testing to ensure it delivers accurate results and integrates well with the platform's other functionalities. Security testing is also a significant part of this phase. Ensuring the system is secure and user data is protected is a top priority. The testing phase involves validating the system's performance under various scenarios, identifying vulnerabilities, and resolving issues to enhance security. Once the system has passed the testing phase, the deployment phase begins. In this phase, the Brainiac e-learning platform will be deployed to a production environment, where it will be accessible to its target users. During deployment, the platform is configured for real-world usage, and the necessary resources, such as servers and databases, are put in place to support the platform's functionality. Before full launch, a soft deployment or beta testing may be conducted to gather feedback from a limited group of users. This allows the team to identify any final issues and make last-minute adjustments.

After the system is deployed, the review phase ensures the platform meets its original goals and user expectations. Feedback is collected from users regarding the platform's usability, functionality, and overall experience. The review process includes analysing performance metrics, user feedback, and system logs to identify areas for improvement. In addition to user feedback, the review phase provides performance and security audits to confirm that the system runs smoothly and securely in the production environment. Any issues identified during this phase are documented, and a plan is created to address them in future updates. During the launch phase, the project team monitors the platform for any unexpected issues or user feedback that may arise. A post-launch support plan is implemented to handle any immediate concerns, ensuring a smooth transition from deployment to the entire operation.

This section focuses on the design phase of the Brainiac e-learning platform, detailing how the system is structured and developed to meet user needs and project objectives. The agile development approach divides the Brainiac project into iterative phases, starting with careful planning and moving through design, development, testing, deployment, and finally, launch. Each phase builds on the previous one, allowing for adjustments and improvements based on real-time feedback, user needs, and security requirements. This iterative method ensures that the Brainiac e-learning platform, with its NLP-based text summarisation tool, is functional, user-friendly, secure, and adaptable to the evolving needs of the users.

VIII. RESULT

This chapter discusses expected results, the graphic user interface (GUI), or system interface design for the system development. The user interface will be shown in detail. The interface design of the system is tailored to meet user specifications and enhance overall usability. This ensures that the implementation phases are based on these interface design drafts. The designs, however, are subject to changes as they evolve during the development processes. Below are the key

interfaces for the Brainiac: E-learning platform with Text Summarisation tool.

The main page serves as the entry point for users. It welcomes users with a clean and modern design featuring the platform's logo, providing an overview of the platform, as shown in Figure 8.

Figure 8. The main page for Brainiac

The login page enables registered users to access their accounts securely. It includes fields for username and password, with options for password recovery and creating a new account, as shown in Figure 9.

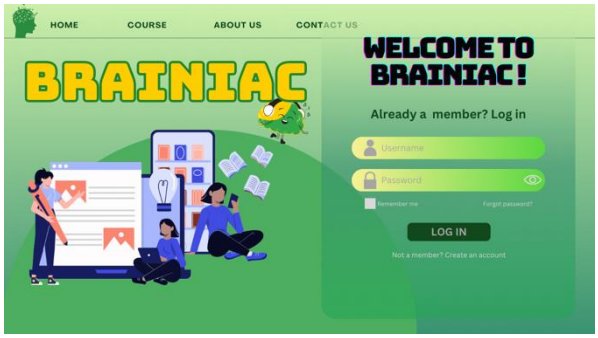

Figure 9. The Log-in page for Brainiac

The sign-up page facilitates new user registrations, allowing them to create accounts on the platform, as shown in Figure 10. The page design is one-by-one and user-friendly, guiding users through the registration process quickly.

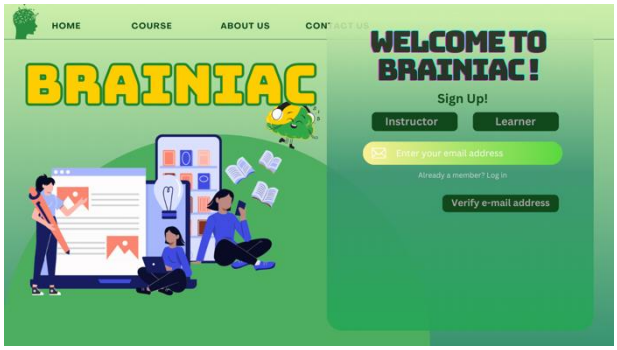

Figure 10. The Sign-up page for Brainiac

The instructor dashboard page serves as a dashboard for instructors to manage their activities on the platform, as shown in Figure 11.

Figure 11. The instructor page for Brainiac user

The learner dashboard page serves as a dashboard for learners to manage their activities on the platform, as shown in Figure 12.

Figure 12. The learner page for Brainiac user

The text summarisation page is a crucial feature of the Brainiac platform, allowing users to input lengthy documents or text passages and receive concise summaries. The page includes an input field where users can paste or upload their text and options to customise the summarisation process in bullet points or paragraphs, as shown in Figure 13.

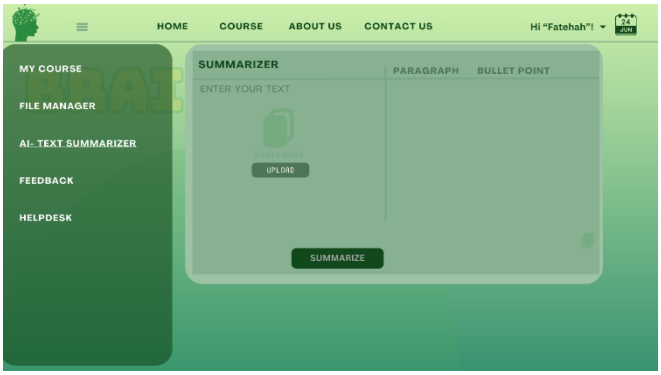

Figure 13. The summarisation page for Brainiac

IX. CONCLUSION

This research provides a comprehensive analysis of existing e-learning platforms, detailing their features, weaknesses, security elements and areas for improvement. It starts by highlighting the fundamental role of LMS in facilitating education across academic and corporate environments. Despite their varied functionalities, these platforms lack integrated text summarisation tools, crucial for aiding learners

to process large volumes of information and retain knowledge effectively.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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