

An Accessible Student Life Cycle Management System Featuring Motivation And Productivity

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Engineering
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B.Sc. in Computer Science

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Declaration

It is hereby declared that

1. The report submitted is my/our own original work while completing degree at Brac University.
2. The report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. We have acknowledged all main sources of help.

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Abstract

This report presents a complete road map to build a prototype of the Student Lifecycle Management System (SLMS) featuring accessibility, teacher-student interaction, motivation, and productivity. In this era, SLMS is the representative of a university. This provides essential features for students, faculty, and administrative staff to carry out their respective academic and operational tasks. Because of the necessity of SLMS in the modern era, this must need to be accessible for all types of students, including students with disabilities. This should be the source of motivation and productivity for the students. In this report, I identified several limitations present in the SLMS of BRAC University. Through research and analysis, I found that these issues can be addressed by implementing appropriate measures. Based on this understanding, I propose a plan to develop a prototype that tackles some of these limitations. My prototype will address accessibility, teacher-student communication, motivation, and productivity. I provided the details about my methodology, required tools, and a time-based complete plan for building the prototype.

Keywords: Student Lifecycle Management System (SLMS), Accessibility, Teacher-student interaction, Motivation, Productivity, Prototype development

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Chapter 1

Introduction

In today's world, the Internet is part and parcel of our lives. From industrial jobs to day-to-day tasks, we heavily depend on the Internet. For this, it is essential for any organization to run both online and offline simultaneously. In this era, we can see most of the universities have their online websites. Besides, many universities provide online degree programs. A significant part of the university program is student life cycle management. During the completion of the programs, there are various works and responsibilities that the university has to bear. For example, keep the student's academic information, provide the student with the right courses, provide the necessary learning materials, interaction between faculty and student, etc. To address this, the student life-cycle management system has been developed. The Student Life-cycle Management System (SLMS) is a platform where students can view and manage their academic credentials. This management system not only helps the students but also helps the universities to manage student-related work conveniently.

Like the offline support, this student life-cycle management system (SLMS) must be accessible or usable by all types of students. In addition to the general student, a significant number of students have disabilities like vision, hearing, mobility, and cognitive disabilities. If SLMS is inaccessible or unusable by these students, it will hamper the overall productivity and reputation of a university. The student who has various types of disabilities will be deprived of getting the benefit. An SLMS is the exact representation of the universities' services in the virtual world or internet. That is why any problem or defect present in SLMS will make the reputation of that university bad. Besides the accessibility, many universities can provide various tools for motivating the student and increasing their productivity. Features like gamification elements for motivation, personal goal setting, and tools for applying productivity techniques like Pomodoro can give a better student experience. Better SLMS is not only important for the student but also has a significant impact on building the university's reputation.

1.1 Background

A successful student life cycle management system is necessary for students, faculty, and administrative staff. This system can provide efficiency, increase productivity, streamline the workflow, and improve the overall performance of the university.

Broadly, there are three types of stakeholders: students, faculty, and administrative staff. The student life cycle management system provides features that successfully satisfy these three types of stakeholders.

1.1.1 Features for the student:

A student life cycle management system provides various features for the students who are admitted or wish to admit to university. Some notable features are provided below:

Program Discovery and Information: Students that are not admitted and wish to admit can search for available courses, programs, degrees, and the requirements for admission. This is more efficient and convenient compared to the old manual process. Through this digitization, both stakeholders, students, and universities, get benefits.

Online Application Portal: This feature handles the online application submission process. In the various stages of education, students were required to submit their application online. For example, when a student wishes to be admitted to university, he or she has to submit the essential documents. Before the modern era, this process was done through manual submission. Nowadays, this process is done using a modern Student Life-cycle Management System.

Payment: Students can pay using the modern SLMS. Before the modern system, students had to manually pay their tuition fee, application fee, and other related fees. Because of this modern technology, students can pay digitally through SLMS.

Information Center: Many modern SLMS have a place for providing information. Students get various information and updates related to their university. For example, after submitting their application form, they can be informed about the status of the application. Similarly, admitted students can access relevant information related to their concerns, needs, and further activities.

Communication Portal: Students can communicate with the concerned authority through the communication portal. Before the modern era, this communication was done manually, or in other words, directly meeting with the person at the university. Nowadays, many universities have their dedicated space for communicating with the students. From the student perspective, this is a great convenience for saving time, especially for international students.

Course Registration & Enrollment: Once admitted, students use the SLMS to register for their required courses. The system streamlines the entire enrollment process. For example, at my university (BRAC University), we can take our courses online through SLMS. This makes course enrollment more efficient and convenient for both students and administrators.

Academic planning and progress: SLMS provides academic plans and informa-

tion related to the completion of various undergraduate, graduate, and postgraduate programs. Besides, it also provides students with their academic progress report. This report includes CGPA, completed credits, remaining credits, and various other relevant information for assessing and evaluating the students' academic progress.

Learning Management System (LMS): Many universities integrate LMS with SLMS. LMS includes various features for helping the student to learn. This includes features to conduct the classes, provide learning materials, a place for submitting evaluations like assignments and quizzes, and other necessary tools for learning.

Profile management: SLMS provides the capability to see, manage, and change the personal information of the student. Students can update their personal information according to their needs.

Library and resource access: Many universities provide library access through SLMS. This integration saves a lot of time for the student.

Year planner and academic calendar: The SLMS provides the academic plan, including important dates and deadlines. This helps students manage their education effectively and plan all activities, including vacations.

1.1.2 Features for the faculties:

Student life cycle management system provides various features for the faculties to manage their students efficiently. Below are the notable features in this context—

Student profile access: Through SLMS, faculty can view their students' profiles. This feature provides faculty with more in-depth insights and more knowledge about the students. This helps faculty to teach their students efficiently and make meaningful connections.

Performance evaluation: Various features like attendance tracking, grade management, and other evaluation tools allow faculty to evaluate the student efficiently. Compared to manual processes in the past, this is more accurate and less error-prone.

Curriculum & Syllabus Management: Some SLMS provide features for the faculty to manage their course syllabus and curriculum. Because of this feature, faculty can upload course outlines and other resources related to the course.

1.1.3 Features for the administrative staff:

Modern SLMS provides features for administrative staff to manage and conduct the operation efficiently. Some key features related to administrative staff are given below—

Application review and processing:

Staff can review submitted applications and choose the qualified candidate for admission. Using digital SLMS, this process is now much quicker and more efficient.

Course and curricula management:

The job of managing courses is now done through SLMS. SLMS provides necessary features for adding, editing, managing, and removing courses.

Payment handling:

SLMS provides features to efficiently manage payment. Because of the online payment feature, the payment can be made and managed online within SLMS. Furthermore, if a student is awarded a scholarship or other type of waiver, this can be easily managed through SLMS.

These are some notable features that are typically provided by a modern SLMS. In addition to this feature, many universities could have their own specific features or requirements.

1.2 Motivation:

My main motive for developing SLMS is to make SLMS accessible for all types of students and improve the overall productivity of the student. A successful SLMS must be accessible for all the students. If SLMS doesn't follow the appropriate guidelines of accessibility, it will not be accessible for all types of students. The idea of improving accessibility for the student came from my own experience. As a visually impaired student, I am very dependent on the SLMS of my university (BRAC University). BRAC University really did an excellent job for developing their new SLMS Connect. Indeed, it has numerous modern features, but in my opinion, I believe that there is some room for improvement. As a visually impaired student, I have encountered some issues while using this system. This drives me to develop a project that will be more accessible for the student. Besides, more modern features could be added to make the SLMS a source of motivation and productivity for the student. Mainly, for improving accessibility and productivity for the student, I am pursuing the development of this project. This is not a replacement but a small project to demonstrate the area of improvement that can be made for the betterment of the student.

1.3 Problem statement:

This project aims to address the problem of accessibility and productivity of the SLMS of BRAC University. As I am a visually impaired student, I identified several accessibility issues that could hinder any person with a disability from using the website. If the website is not accessible, screen reader users like me will not be able to use the website like the non-disabled people. This is because blind people must need to rely on keyboard navigation. In simple terms, I can say that keyboard nav-

igation is crucial for a website to be accessible for disabled people. Besides, there is no teacher-student communication through SLMS, no gamification element for motivation, and no tools for implementing various productivity techniques such as Pomodoro. Lack of accessibility support, students with visual impairment are facing problems accessing university websites. Absent of a gamification element will not make the SLMS suitable for productivity. In this case, the student needs to go to another platform for productivity. The absence of features like a web timer to set time and support resource-based productivity techniques may prevent students from using methods such as the Pomodoro Technique inside the SLMS. This will hinder both their productivity and the overall usefulness of the SLMS. Here are the key limitations of SLMS of BRAC University.

Lack of accessibility support:

SLMS has significant limitations regarding accessibility support. Firstly, the website is not completely accessible by keyboard. I have taken two screenshots of SLMS of BRAC university website that shown in the figure 1 and 2 in this project. Figer 1 shows the condition of the SLMS for non-disabled people. The class Schedule is nicely formatted and displayed. For sighted people, it is very easy to see the class routine. But for blind and visually impaired person like me, I have to navigate the class routine using the keyboard. This class routine is not accessible by keyboard shown in Figure 2. I attempted to use the keyboard to focus on the class routine, but it did not gain focus. I needed to take assistance from other people to read the class routine. This is a key limitation that I have found from the SLMS of BRAC University website.

The screenshot shows a web browser window for the BRAC University SLMS. The URL is connect.bracu.ac.bd/student/schedule. The page title is "Student / Class and Exam Schedule". On the left, there is a sidebar with navigation links: Advising, Class and Exam Schedule (which is selected and highlighted in blue), Scholarship & Waiver, Course Drop Application, Semester Drop Application, Grade Sheet, Probation, and Payslip. The main content area displays the "Class and Exam Schedule" for FALL 2025. It features a grid showing class times, days, and room numbers. For example, on Sunday, CSE391-01-ADR-FT11-04L is listed from 11:00 AM - 12:20 PM. On Tuesday, CSE489-01-ADR-FT11-04L is listed from 11:00 AM - 12:20 PM. On Saturday, CSE424L-01-FT11-03L is listed from 11:00 AM - 1:50 PM. The grid continues for other days and times. At the bottom of the page, there is a footer with the text "2025 © BRAC University. All rights reserved." and "Developed By bracIT".

Figure 1.1: Visibility for non-disabled people

The screenshot shows the BRAC University SLMS interface. On the left, there's a sidebar with various student lifecycle management options like Advising, Class and Exam Schedule, Scholarship & Waiver, Course Drop Application, Semester Drop Application, Grade Sheet, Probation, and Payslip. The main content area is titled 'Class and Exam Schedule' for 'FALL 2025'. It displays a weekly class schedule from Sunday to Saturday. A prominent red box highlights a portion of the grid where several class entries have been crossed out with a red 'X'. Above this red box, the text 'Not accessible area' is displayed in red. The schedule includes classes like CSE391-01-ADR-FT11-04L, CSE489-01-ADR-FT11-04L, CSE424L-01-FT11-03L, CSE391-01-ADR-FT11-04L, CSE424-01-AAR-10A-04C, CSE391L-01-FT11-04L, HUM101-32-THAQ-09G-28C, and HUM101-32-THAQ-09G-28C.

Figure 1.2: Visibility for disabled people

No teacher-student communication through SLMS:

In SLMS, there is no feature for direct communication between students and teachers. In the BRAC university, communication is usually done through another platform or email.

Absence of gamification element:

The SLMS of BRAC University is effective in providing the necessary tools for students. Despite this success, there is no gamification element for motivating the student to achieve their goal. I believe that by adding a gamification element, students will be more motivated for their studies.

Lack of Productivity Tools:

The SLMS of BRAC University includes many tools that support activities related to the completion of degrees and courses for students. But for applying productivity-related techniques like Pomodoro, the appropriate tools are not present. By adding appropriate tools, SLMS can be enhanced and user friendly for the students.

1.4 Objective:

This project aims to enhance the accessibility and productivity of the SLMS of BRAC University. By ensuring proper accessibility features, students with disabilities will be able to use the website properly and enjoy equal benefits from it. Another key objective of this project is to establish student-teacher life communication through messaging. To increase the productivity of the students, this project will incorporate gamification elements to increase motivation. Lastly, this project will

introduce tools for implementing various productivity techniques such as Pomodoro. With improved accessibility and integrated productivity tools, students will be able to work more effectively without relying on external platforms. Finally, the SLMS will become more inclusive, engaging, and useful for all students.

1.5 Methodology in brief:

I am developing this whole project as a solo developer. My methodology will be centered around developing the project independently. I might not require any group or collaboration to develop this project. For testing, I will try to find out volunteers like me (visually impaired) to improve BRAC university website based on their feedback. Due to the time constraints of my project, I need to plan my tasks carefully. I will break down the larger task into smaller, manageable parts and allocate my available time accordingly. Below is a brief explanation of my methodology.

1.5.1 Problem identification:

First, I will find out the problems present on the SLMS website of BRAC university. The purpose of this problem identification is to analyze the issue in detail. I have a vague understanding about the problem, but the details report and specifically identifying the problem are crucial for developing my project. To identify the problem, first, I have to gain knowledge about it. I am born visually impaired and studying computer science. I am familiar with the tools and technology that visually impaired people use to navigate the website. These tools include screen readers, magnifiers, keyboard navigation, etc. However, to properly identify the problem, I need to deepen my understanding. For gaining knowledge, I will try to explore as many resources as possible related to accessibility. I will complete the Digital Accessibility Foundations Free Online Course provided by the World Wide Web Consortium (W3C), Web Accessibility Initiative (WAI), and the United Nations Educational, Scientific and Cultural Organization (UNESCO), and Institute for Information Technologies in Education (IITE). Upon completing the course, I will have gained the necessary knowledge to identify problems more effectively. To identify problems, I will use both automated and manual methods. I will use appropriate tools to navigate the website and manually observe the key issues that I face during this navigation. This will serve as the guide for improving accessibility in my project. Besides, to find out more problems with accuracy and in more detail, I will use the available accessibility checker tools. After carefully finding details about each problem, I will document the problem for addressing in my project. As a user of the current SLMS of BRAC University, I know there are no features for communication between student and teacher directly. Besides, gamification elements for motivation and tools to implement the productivity techniques are also not present.

1.5.2 Building the actual project:

The crucial step after problem identification is to take a step towards building the actual project. A step-by-step, systematic approach is essential for building a successful project. If the proper steps are not followed in the correct order, both time

and energy may be wasted. For instance, jumping straight into coding without first outlining detailed requirements can lead to inefficiencies. Below are the significant steps that I need to follow chronologically.

Requirement documentation:

Though I have a vague idea about what I will build and what features will be included, I have to be detailed and specific about the features that I will implement in my project. To achieve this, I must thoroughly document each functional and non-functional requirement. In the case of accessibility, I have to exclusively write down what features I wish to include in my project for accessibility. Based on my project objective, I will analyze and document every functional and nonfunctional requirement in detail. This step will act as a strong guide and basis for other upcoming steps. This documentation will act as my compass, providing directions for the entire project.

Design:

After documenting all the requirements, I will proceed to make the design of the project. An efficient design can save a lot of time and provide clarity in the future steps. Since my project has various parts and components, I need a specific design for each part. In this connection, we can divide the designing process into two categories: front end and back-end design. The front-end part of my website is the visible part that users can see and interact with. This part is significant for better user experience and implementation of accessibility. The back-end part of the website is responsible for managing data, ensuring server-side logic, and handling the application's core functionality.

Front-end:

For the front-end part of my project, I will implement wireframes, mock-ups, and prototypes. Wireframes are the very basic design of my website. Here, only the core elements and functions are visible. Beautification is not focused on at this stage. This is the building block for making mock-ups and prototypes. Mock-ups are the static representation of the actual design of the website. Based on the wireframe, mock-ups are built to finalize the product design, suitable color selection, layout, etc. For finalizing the product, I will build a prototype. A prototype is the interactive version of the final website or product. I will design a prototype before moving to build the actual project.

Back-end:

Back-end part is responsible for holding databases, managing server-side logic, and maintaining the core functionality of the website. For ensuring accuracy, I need various strategies for each of these parts.

Database design:

The database is the center for holding all kinds of data for my website. For my website, I will primarily deal with the structured data, so I will stick to the MySQL database. To design the database, I will begin with an Entity-Relationship (ER) diagram.

For my website, I will primarily work with structured data, so I will stick to MySQL database. To design the database, I will begin with an ER diagram.

This is the diagram that explains the logical relationship between the data. For more clarity, I will design an Extended Entity Relationship (EER) diagram. After the completion of EER, I will build the schema of the database. Schema is the logical blueprint or structure of the database. The schema displays everything available in the database, including tables, relationships, primary keys, and foreign keys. The only difference is that actual data are not included in the schema. Finally, to make the database efficient, I will normalize the database. According to my observation, 3F normalization will be sufficient for my project.

Server-side logic and APIs:

Developing the design for back-end site logic and API is essential. For complete visualization of back-end logic, I will use a component diagram. A component diagram is a static logical view that expresses the structure of any software. In my case, I will use a component diagram to design the complete structure of my server-side logic of my website. Besides, I will create documentation for APIs. For each API endpoint, I will document the behavior of each API.

1.5.3 Building the project:

After designing, I will start to build my actual project. By following the requirements and design, I will build the whole project. Since I am the only one who is working on this project, I need to be responsible for accountability and project management. For efficient development, I will use Agile methodology. Inside the Agile methodology, I think using the iterative approach is the most appropriate. In this methodology, I build one feature at a time, and after each feature is completed, previously developed features are revisited and refined. The main advantage of this methodology is the ability to continuously improve features through iterative updates. This methodology focuses more on improving the quality of the product compared to other methodologies. Ensuring better quality is crucial for developing the accessibility of my website. Another related methodology that I could use is the incremental methodology. In this methodology, the project is built through modulation. In simple words, a prototype or basic version is built first. After the initial version, new features are added from time to time according to the needs. This approach is good, but I prefer the iterative approach. This is because in the iterative approach, I get a chance to update the existing features that I already built. This is crucial because to make my website truly accessible, I need to get real feedback from myself and other people with disabilities.

Tech stack and tools:

Using proper tech stack and an appropriate tool is crucial for the development of the project. Here are the tech stack and relevant tools that I will use for my project.

Front-end Framework:

For the front-end part, I am using the Next.JS framework. Next.JS is a React-based framework that supports both front end and back-end development. I am choosing Next.JS for an efficient routing system, server-side rendering for performance, and simplicity of use. My second choice would be React. The reason I am not using React is the lack of server-side rendering and no default root configuration. There are other frameworks available for front-end development. One of the frameworks for developing front-end is Flutter. This is an excellent framework because of cross-platform support. I am not choosing this framework because it has its own ecosystem. Flutter is based on the Dart programming language, which I am not using in my project. For styling, I am using Tailwind CSS. Tailwind CSS is a utility-based CSS framework used for styling the web page. These frameworks provide ready-made utility classes that can be easily implemented to style the website properly. The main motive for choosing this framework is simplicity and control. Tailwind CSS provides ready-made classes that are closely related to actual CSS. This gives full control similar to developing the design using raw CSS. On top of this, Tailwind CSS provides abstraction that helps to prevent CSS errors. Besides this framework, there are other frameworks available, like Bootstrap. Bootstrap provides ready-made classes to implement the design easily. The problem with Bootstrap is the lack of control. Because of abstraction, Bootstrap fails to provide the level of control like Tailwind CSS. For this, I think Tailwind CSS is the best option for my project.

Back-end framework:

For handling the back-end, I am using the Express framework. The main motive behind this framework is the scalability and other advanced features. It is possible to handle the back-end using Next.JS alone. But for scalability and separation of concern, it is essential to use a back-end framework to handle the server-side logic for my project. For the back-end, various frameworks are available, like Express, Spring Boot, Flask, Django, etc. I am using Express because this is most compatible with my front-end framework. Express is a JavaScript-based back-end framework. So, in one language, I can manage both front end and back-end together. Flask might be a good choice, but it is not as compatible as Express. On the other hand, Django provides extended functionality and more default security compared to Express. Since the back end of my project is relatively simple and advanced security is outside the scope, I have chosen not to use the Django framework.

Database:

For handling my data, I am using a MySQL database. MySQL is a perfect choice for structured data. In my project, I am mostly dealing with structured data. For

this, MySQL is the best choice. There are other databases like PostgreSQL. This database is more suitable for security. On the other hand, MySQL is more suitable for high performance. For this, I preferred MySQL over PostgreSQL in my project. For the performance, there are other NoSQL databases like MongoDB. The problem with this type of database is they are not suitable for handling structured data. They are more flexible, which can create problems on my website.

Building plan and progress:

Since the project duration is one year, I divided the whole time into 12 sprints. Below is my detailed plan for each of the sprints. Among these 12, 4 sprints are completed, and 8 sprints are left to complete. In the Table 1.1 below, I am describing my detail plan to complete this project.

In summary, I can say that I have identified the problem and created a road map to build my project. Now, I need to work on this plan for completing the project.

1.6 Scopes and Challenges:

This project focuses on integrating accessibility features, communication tools, and productivity enhancements into the existing SLMS to create a more inclusive and efficient platform for students and teachers. The primary stakeholder of this project is the student. Besides, there will be features for benefiting the teacher and administrative staff partially. The following elements are included in the scope of this project—

Improved accessibility:

This project will address the accessibility of the students, teachers, and administrative staff. By ensuring the standard like WCAG, people with disabilities will be able to use the website like normal people.

Teacher-student communication:

This project includes a feature for live chat between teacher and student.

Gamification element:

This project will include a gamification element for the student for motivation. Productivity tools: This project will have the necessary tools for the student to implement productivity techniques like Pomodoro.

In this project, I have to exclude some important key aspects for various constraints. These exclusions are given below—

Not a complete system:

Table 1.1: Activity plan of the project.

Number	Name	Description	Completed
1	Learning and researching about tech stacks and technologies	First, I started researching about best technology and tech stack to use for my project. I came across many technologies from which I have picked the best one according to my knowledge.	Yes
2	Learning about accessibility and identifying the problem.	I started to learn more about accessibility and the best practices and guidelines for improving accessibility. From here I got the idea to improve the accessibility of my university's SLMS.	Yes
3	Learning more about accessibility and applying the knowledge.	I gained more knowledge related to accessibility. For gaining practical experience, I have joined the RSAA 2025 Accessibility Fellowship. Here I learn to apply my knowledge of evaluating accessibility by writing a comprehensive report about the RSAA 2025 event.	Yes
4	Create a complete road map to build the project.	Finally, I have gathered all scattered thoughts and am making a solid road map for building my project.	Yes
5	Requirement documentation and design.	I plan to write down all the requirements for my project and complete the designs.	No
6	Build the basic version of my project.	Here, I plan to build the first version of my project, incorporating basic features.	No
7	Rigorous testing.	After building the first prototype of my project, I will test it manually and using various automated and AI tools.	No
8	Improve and complete the project.	After finding the issue, I will fix the part of the project. Then, I will complete all the requirements and build all the necessary features.	No
9	Taking feedback from real users.	I will take feedback from all kinds of people. I will try to take as much feedback as possible.	No
10	Applying the findings from the feedback.	I will improve my website based on the feedback provided by the users.	No
11	Make my project ready for production.	I will make my project production-ready for deployment.	No
12	Finalize my project.	I will finalize the project and resolve any issues as they appear. Then I will document my whole project.	No

This project does not aim to develop a fully functional or duplicate version of the existing SLMS of BRAC University. Instead, it focuses specifically on addressing identified issues related to accessibility and student productivity. It should be viewed as a small-scale initiative that demonstrates possible improvements, serving as a part of a larger project scope rather than a standalone system.

Security:

Ensuring security is not the scope of this project. I will incorporate the basic security features that are standard but will not incorporate any extra layer of security. The SLMS of BRAC University is more secure compared to my project.

Payment:

I am primarily focusing on the accessibility and productivity side of the student. Handling or managing payment is not inside the scope of this project.

1.6.1 Estimated challenges:

Ensuring full accessibility of all kinds:

It is challenging for me to incorporate all types of accessibility. As a visually impaired student, I will be able to provide best effort in visual accessibility. But my effort will be limited for other types of accessibility like hearing cognitive or mobility.

Balancing gamification with distraction:

Adding gamification element to SLMS is a great idea for motivating students. Despite this greatness, there is a challenge of balancing motivation and distraction. Adding too much gamification element could distract students from actual study. I need to find a sweet spot between motivation and distraction.

Making gamification element also accessible:

Since this project focuses on improving accessibility, it is crucial to make the gamification part also accessible for all types of students. I have to find out creative idea to make the gamification element accessible.

Time and manpower constraint:

The time duration for this project is one year. This is a very short time for developing project on a large scale. I am also developing the entire project by myself. For one person, developing everything is very difficult and time consuming. From designing to testing, I have to look up all the sides of this project.

Chapter 2

Literature Review

2.1 Preliminaries:

Before discussing the existing research related to this project, it is important to clarify several key terms that are essential to understand the findings of the research. The important key terms are given below.

Student Lifecycle Management System (SLMS):

A Student Lifecycle Management System is a digital platform created to support various stages of a student's academic journey. This support includes admission, course registration, assessment, and graduation. It integrates features related to administration and learning.

Accessibility:

In the context of digital products, accessibility refers to the design and development of digital platforms, such as websites and learning systems, in a way to ensure products can be used effectively by all individuals, including those with disabilities. Accessibility follows international standards and guidelines, such as the Web Content Accessibility Guidelines (WCAG) and ISO/IEC 40500:2012. These guidelines provide measurable criteria to make digital content perceivable, operable, understandable, and robust for every user.

Gamification:

Gamification is the process of adding elements of games to make a task more interactive, enjoyable, and motivating. In the educational context, gamification aims to increase students' intrinsic motivation and active participation in learning activities by making them more interactive and enjoyable.

Intrinsic Motivation:

Intrinsic motivation refers to the internal drive or interest in engaging in a task for its own sake, due to interest, enjoyment, or personal satisfaction, rather than external rewards or pressures.

Productivity:

Productivity is the state or quality of being productive. In the context of student learning, productivity refers to the effective and efficient use of time and effort to achieve academic goals. It involves completing tasks within established deadlines. Techniques such as the Pomodoro Technique, which divides work into short time intervals separated by breaks, have been shown to enhance concentration and academic performance.

Time Management:

Time management is the process of planning and controlling how much time to spend on specific tasks. It is a significant factor affecting student success and overall performance.

2.2 Review of Existing Research:

Many research has been done related to improving the accessibility and quality of SLMS. Below is some relevant researches related to my project.

Accessibility:

For improving accessibility of SLMS, many researches have been conducted. In the literature review of Campoverde-Molina, 9140 universities from 67 countries websites are evaluated based on the various accessibility standard like ISO/IEC 40500:2012 and Section 508. [4] This review is based on 42 chosen papers. In the review, they have evaluated 38,416 web pages, 91,421 YouTube videos, and 28,395 PDF documents. They have found some common issues like adaptability, compatibility, distinguishability, input assistance, keyboard access, navigation, predictability, readability, and text alternatives. This type of research suggests that there is a place for improvement related to accessibility in SLMS. In another study of Akram, the accessibility of the Arabic versions of 33 Saudi public and private university websites was evaluated based on the criteria from Web Content Accessibility Guidelines, (WCAG) 1.0, and 2.0. [3] This evaluation is done using two automated accessibility evaluation tools, AChecker and TAW, which evaluate the website using WCAG criteria. The website is evaluated against 38 success criteria from the Web Content Accessibility Guidelines (WCAG). Various issues related to accessibility are detected by these tools. The study found that AChecker identified 11% known problems and 89% likely or potential problems, while TAW identified 26% accessibility problems and 74% warnings. Potential problems and warnings indicate that automated evaluation is not enough for detecting all accessibility issues.

Gamification:

Various studies have been conducted to measure the improvement of students' performance after applying gamification elements to their learning activities. Manzano-León conducted a systematic literature review of 14 experimental studies using the

PRISMA method found that educational gamification positively impacts students' motivation, engagement, and academic performance. [2] Gamification is recognized as an effective learning strategy by most of the studies. However, further research is needed to address learners' needs and challenges in gamified environments. Besides, studies by Liuyufeng, Gamification can improve the intrinsic motivation of the student. [5] Though this amount is not significant, this could be a source for improving the student's motivation.

Productivity:

For improving the productivity of the student, various research has been conducted. A research related to optimizing student performance Suggest that Effective time management is one of the key indicator of better student performance. [6] For efficient time management, there are various productivity techniques like Pomodoro. Another research suggests that Pomodoro technique can improve the student performance. [1] In this research, student using Pomodoro technique has shown improvement in writing.

2.3 Summary of Key Findings:

In summary, this research indicates that accessibility, motivation, and productivity of the students can be improved by taking necessary steps. For improving accessibility, there are various criteria and guidelines that can be used. Gamification element can be easily integrated to improve the intrinsic motivation of the student. Providing appropriate tools for applying productivity techniques can significantly improve the performance of the student.

Bibliography

- [1] W. E. Septiani, S. Sulistyaningsih, and A. Syakur, “The effectiveness of pomodoro technique on students’ descriptive text writing quality,” *Jurnal Basicedu*, vol. 6, no. 2, 2020.
- [2] A. Manzano-León et al., “Between level up and game over: A systematic literature review of gamification in education,” *Sustainability*, vol. 13, no. 4, p. 2247, 2021.
- [3] M. Akram, G. A. Ali, A. Sulaiman, and M. ul Hassan, “Accessibility evaluation of arabic university websites for compliance with success criteria of wcag 1.0 and wcag 2.0,” *Universal Access in the Information Society*, vol. 22, no. 4, pp. 1199–1214, 2023.
- [4] M. Campoverde-Molina, S. Luján-Mora, and L. Valverde, “Accessibility of university websites worldwide: A systematic literature review,” *Universal Access in the Information Society*, vol. 22, no. 1, pp. 133–168, 2023.
- [5] L. Li, K. F. Hew, and J. Du, “Gamification enhances student intrinsic motivation, perceptions of autonomy and relatedness, but minimal impact on competency: A meta-analysis and systematic review,” *Educational technology research and development*, vol. 72, no. 2, pp. 765–796, 2024.
- [6] R. Lin and G. Chen, “Optimizing student performance: The impact of time management strategies,” *Sādhanā*, vol. 50, no. 3, p. 169, 2025.