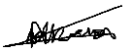
2024 APPLICATIONS DEVELOPMENT PROJECT 1 (APDP101)

PROJECT GROUP NAME: Syntax Club

PROJECT TOPIC TITLE: Learning Management System (LMS)

Project Phase: 0

GROUP MEMBERS

STUDENT NO.	SURNAME & INITIALS	SIGNATURE
21628190	Thabethe, T	
22223368	Langa, V	
22409276	Dhlamini, A	
22415386	Dweni, Liyema	
22430109	Bhovula, L	
22432196	Mpurwana, M	
22450692	Nogwina, P	

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Introduction

In today's rapidly evolving educational environment, integrating technology into learning processes is no longer an option; it is a necessity. The syntax club responding to this will address the challenges faced by matriculants by developing a Learning Management System (LMS). This Platform will not only improve learning outcomes by providing students with access to various educational resources and personalized tutoring services but will also foster communication among students, parents, tutors, and teachers.

Using the power of technology, the LMS aims to reduce the knowledge gap, boost students' confidence, and offer the support that many learners lack. This project provides economic opportunities for tutors and administrators. As Nelson Mandela once said, "Education is the most powerful weapon which you can use to change the world." With this objective, the Syntax club is taking a crucial step towards empowering students and building a brighter future.

Overview of the project topic

Project Organizational Structure

The syntax club will develop a Learning Management System (LMS) to improve matriculants education by providing a digital platform for students, parents, teachers, tutors, and administrators. The LMS will include student progress tracking, attendance monitoring, a communication channel, and a resource library. Students will be able to book consultations, view assessments, and access to a paid tutoring service. Parents will be able to monitor their child's progress and communicate with teacher's. Teachers will manage grades, attendance and communicate with students. Tutors will handle profiles, schedule sessions, manage payments and upload tutoring materials. Administrators will manage user accounts and reset passwords when necessary.

Core Project Management Components

The team will use a cross-functional approach in developing the LMS, this method ensures collaboration among team members and encourages teamwork, knowledge sharing and a comprehensive understanding the project (Organ & Bottorf 2022). The team will collectively plan, analyse, design, and develop the LMS. Effective User Interface/User Experience UI/UX design will be implemented to meet user's needs (Fatima 2022). The team will collectively build the system's functionalities, ensuring quality through Software Quality Assurance (Iyer 2024).

Implementation of Project Management Processes

Clear objectives and user requirements will be drafted during the project management implementation. Each phase will have planned objectives and timelines that will be monitored through regular meetings and a Gantt chart for task management (Ramos 2021). Collaboration will be emphasized with tools like SharePoint for real-time collaboration.

Management of Project Deliverables

Project deliverables will be guided by shared responsibility, with each member contributing to documentation, planning, and development. These deliverables will be continuously reviewed to meet functional standards, allowing the team to create a user-friendly LMS while also increasing their software development and teamwork abilities.

Problem statement

Schools, communities, parents, teachers, the Department of Education, and especially matriculants, are facing a significant crisis. While many matriculates are obtaining good pass matric certificates, their results are often not strong enough to secure university admission, preventing them from furthering their studies. This is caused by several factors, including lack of support and confidence, huge classes big a lot of learners per class etc. These are just some of the variances in learning among learners that the educational system does not accommodate in a country of 62 million with a large youth population. This needs to be addressed. By, offering a variety of study material and audio video aids, so learners that miss their classes because of the reasons stated above can catch up and even have one on one session with tutors for them to get a better understanding of the course material.

The second issue we are trying to address is unemployment. Tutors s will be able to supplement their income through the system and we will hire admin staff as needed to help put food on the table.

SDLC Stages

PLANNING

Planning involves defining the goals, scope, resources, and timeline.

For the planning stage, we identified what exactly were the problems faced by matriculants, which is having a matric certificate that is not good enough for university admission, because of knowledge gap and lack of confidence to reach out for assistance. We also outlined our objectives for creating a learning management system, allocated resources within us to ensure we tackle our project efficiently and lastly, we established a project timeliness using a Gantt Chart for the application's development.

ANALYSIS

This involves identifying and documenting the system requirements to ensure users' needs are met. We gathered requirements by interviewing and surveying stakeholders (parents, teachers, students, tutors). This ensured users' needs are captured. We have appropriately documented these functional and non-functional requirements. We will use this document in the design and development phase to ensure we meet these requirements, like having all subjects available throughout high school, and having tutors vetted dynamically with performance reviews yearly based on a rating system(tutors being rated by students and average marks per student on quizzes) as was requested by parents and students alike.. We as the team found that students prefer choosing their own tutors. To address this preference, we decided to rate tutors based on their experience and qualifications. This rating system will enable students to select tutors based on their ratings to make informed decisions.

DESIGN

This includes the detailed system specification, architecture, and user interface.

We have designed system architecture diagrams, which include use case diagrams and activity diagrams showing the overall structure of the system and interaction. We also designed a text file storage system to handle and store information so that its approach in handling data is effective yet simple. To complement the structure and usability of the applications with the documented requirements. We have generated user interface mockups, and lastly user authentication has been included in the design for the security of the user's data.

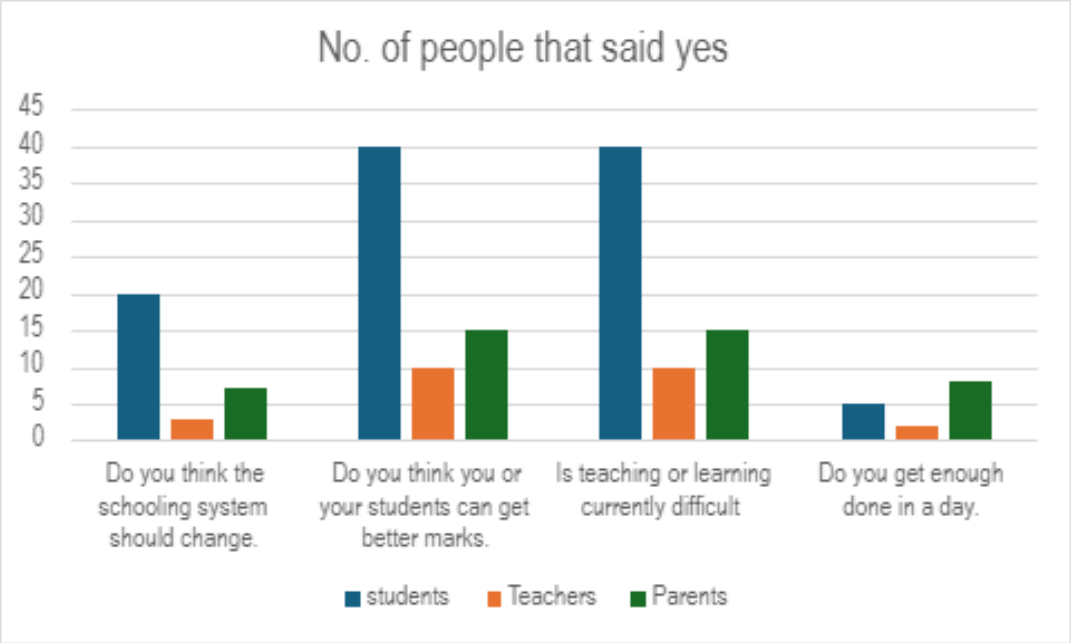
DEVELOPMENT

Development involves coding of the application, integration of components, and system preparation for deployment.

We will implement development by writing code according to design specifications. We will also perform tests to ensure that every system component operates as intended.

Community Engagement

We engaged with the community surrounding the Campuses of Durban University of Technology and found that most of them are keen on an E-tutoring system that will let them study after school at their own pace as shown in the graph below.



For those that agreed with us even though it was a small sample size we went to interview them further which will discuss later in this document.

User Requirements Identification and Documentation

As stated above we spoke to community stakeholders, and this is what they had to say about the project.

Teachers

Mrs. Smith: As A teacher I would like to be able to have a program to auto mark my assessments
Mrs. Dladla: I want a program that allows me to have online parent teacher meetings.
Ms. Mthembu: I would love to message parents easily
Mrs. Smith: On top of uploading our content I would like to have a page dedicated to career guidance.

Tutors

Ms. Khaya: I would love to have a session with up to 15 people.
Ms. Mthethwa: I would like to have a way to track my earnings and projected earnings.
Mrs. Zulu: I would like a way to send reminders to my students.

Parents

Mrs. Hlatshwayo: I would love a way to see my Childs progress
Mrs. Hlatshwayo: I would love to have a way to see how much my child is using the program.
Mrs. Zuma: I would love to see my child's report
Mrs. Zungu: I would love to be able to stay in touch with the teachers

Students

Aphiwe Khaya: I need to be able to be able to ask questions online
Jarred Perkins: I would like to get to see marks instantly.
Jacob Asmal: I would love a way to view video tutorials.
Sindiswa Hlatshwayo: I want to be able to message my teachers.

Functional and Non-Functional requirements documentation

Functional requirements

User Authentication and Registration:

- Users should be able to create accounts using methods like email/password.
- Users should manage their profiles, including personal information and profile pictures.

Course Catalog and Search:

- Users should be able to find courses based on criteria like subject, level, and instructor.

Course Registration and Tracking Progress:

- Users should be able to register on courses and see their progress within each course.

Learning Materials:

- Learning materials such as videos, presentations, quizzes, assignments, and slides should be uploaded by teachers and tutors.

Interactivity and Engagement:

- Quizzes, discussions, assignments, and polls should be used to engage users actively.

Discussion Forums and Communication:

- Users should be able to participate in discussion forums and chat with instructors and other learners from the course.

Instructor Interaction:

- Users should have a way to ask questions and get clarification from course instructors.

Assessment and Grading:

- Support for auto-graded quizzes and assignments, with manual grading options for instructors.

Badges for top performer:

- Top performers will have badges next to their names for those particular subjects.

Non-Functional Requirements

Performance:

- The app should load fast and be responsive to user interactions with no lag.

Security:

- Password masking should be used.

Usability:

- Design a user interface with easy navigation.

Maintainability:

- Write clean code for easy maintenance.
- Plan for future updates.

Compliance:

- Get necessary licenses for offering copyrighted content

Gantt Chart

Task Name	Duration	31-Jul	01-Aug	02-Aug	03-Aug	04-Aug	05-Aug	06-Aug	07-Aug		08-Aug		09-Aug		10-Aug			11-Aug			12-Aug			13-Aug			14-Aug			15-Aug			16-Aug	17-Aug	18-Aug	19-Aug	20-Aug	21-Aug	22-Aug
Gantt Chart	2 Days																																						
Introduction	2 Days																																						
Overview	2 Days																																						
Problem Statement	1 Day																																						
Community Engagement	2 Days																																						
SDLC	8 Days																																						
User Requirements	3 Days																																						
System Requirements	3 Days																																						
Functional and Non-Functional	3 Days																																						
Use Case Diagram	3 Days																																						
Use Case Description	3 Days																																						
Use Case Diagram	3 Days																																						
Prototypes	3 Days																																						
Conclusion	1 Day																																						
Refining	7 Days																																						

	A Dhlamini		All Members
	M Mpurwana		L Bhovula
	V Langa		T Thabethe
	P Nogwina		L Dweni

Use Case Diagram

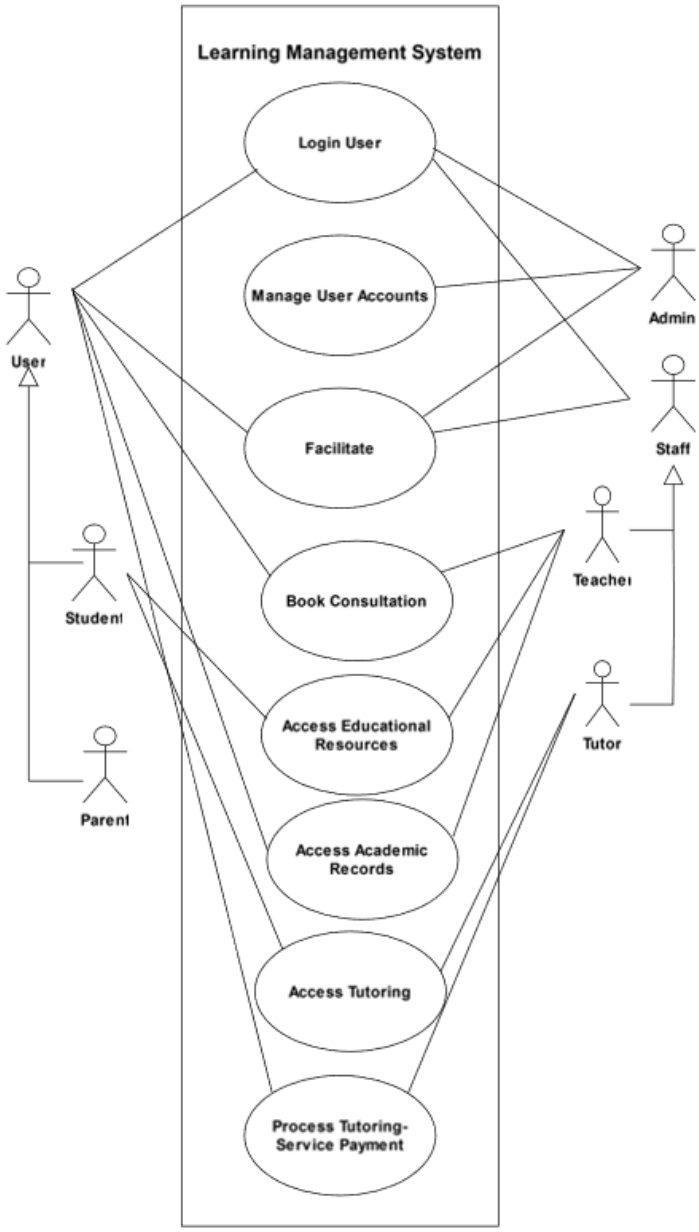


Figure 1: Use Case Diagram

Use Case Description

The **Manage Tutoring and Payments**-use case, shows the essential steps that happen when a student books a tutor and processes a payment through the LMS. The LMS has several sub systems however this use case description focuses on the interactions between tutors and students and handling financial transactions. The templates of fully developed use case descriptions from Swatzinger et al. (2016: 134-139) were used as a guide to develop this use case description.

Use case name:	Manage Tutoring and Payments	
Scenario:	A student books a tutor for a tutoring session.	
Triggering event:	The student needs additional academic support and decides to book a tutoring session through the LMS.	
Brief Description:	A student is using the LMS to book a tutor, select a session and pay the tutor. It involves setting up details and confirming the booking.	
Actors:	Student, Tutor.	
Related use cases:	• Schedule Session. • Manage Payments. • Upload Tutoring Resources.	
Stake holders:	Parent, Student and Tutor.	
Preconditions:	1. The student must log into the LMS. 2. The tutor must have set up their profile, availability, and rates. 3. The payment system must be functional.	
Post1conditions:	1. The tutoring session is scheduled and confirmed. 2. The payment is successfully processed and recorded. 3. The student and the tutor receive confirmation of the booking.	
Flow of activities:	**Student**	**System**
	1. The student navigates to the "Book tutor" section and views available tutors. 2. The student selects a tutor based on availability, experience, and rate. 3. The student views the selected tutor's profile to confirm their needs. 4. The student chooses an available time slot for the tutoring session. 5. The student reviews the session details, including time, duration, and cost. 6. The student pays through the system's integrated payment gateway. 7. Upon successful payment, the student receives a receipt and a confirmation message with the session details.	1.1 System displays a list of available tutors based on the selected subject. 2.1 Display information about the selected tutor, including ratings and experience. 3.1 Display tutor's profile. 4.1 Verify availability on chosen time slot for booking. 5.1 Show prompted content by user. 6.1 Integrates with the gateway to process the student's payment. 7.1Send payment confirmation notification to both the student and tutor.

		7.2 Change tutor schedule status from free to busy.
Exceptional conditions:	4.1 Chosen time slot is busy, please enter different time slot. 6.1 Invalid debit/credit information, re-enter information. 6.2 Insufficient funds, please try gain.	

Table 1: Use Case Description

Activity diagram

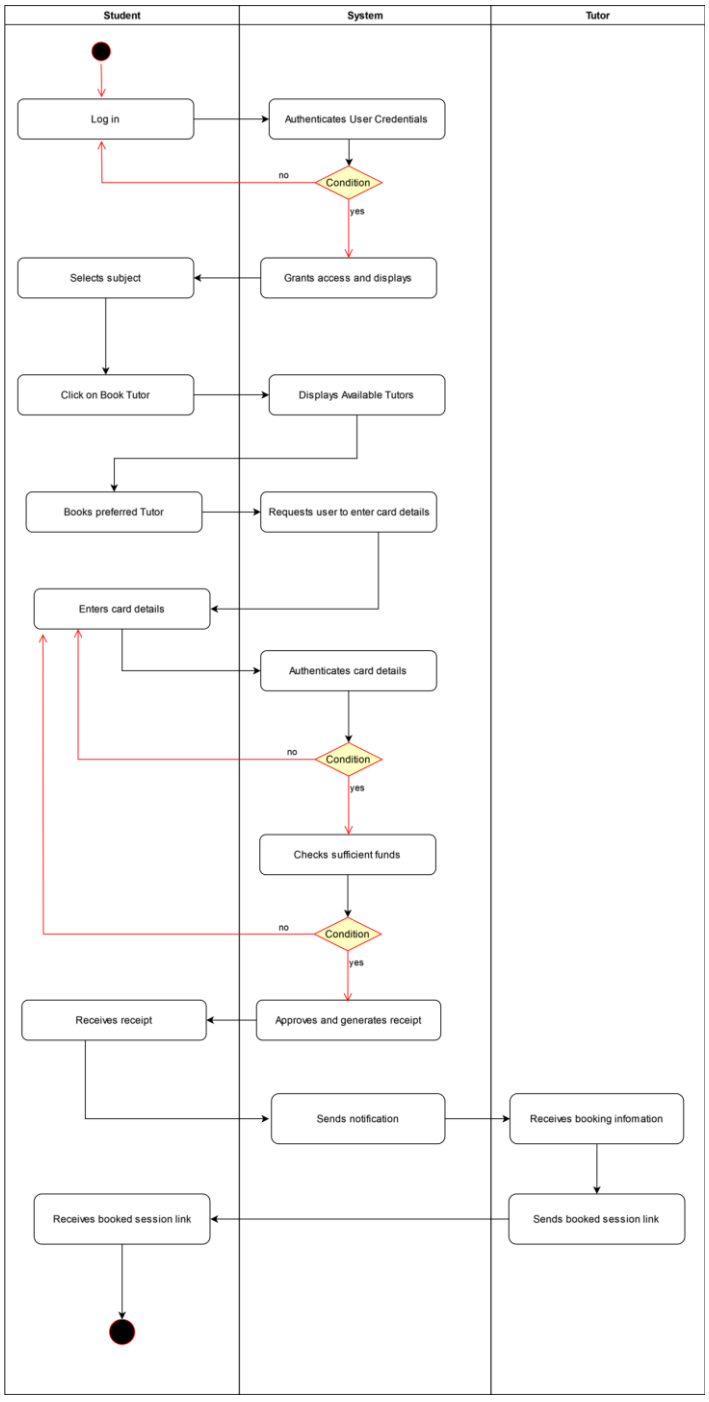


Figure 2: Activity Diagram

Prototypes

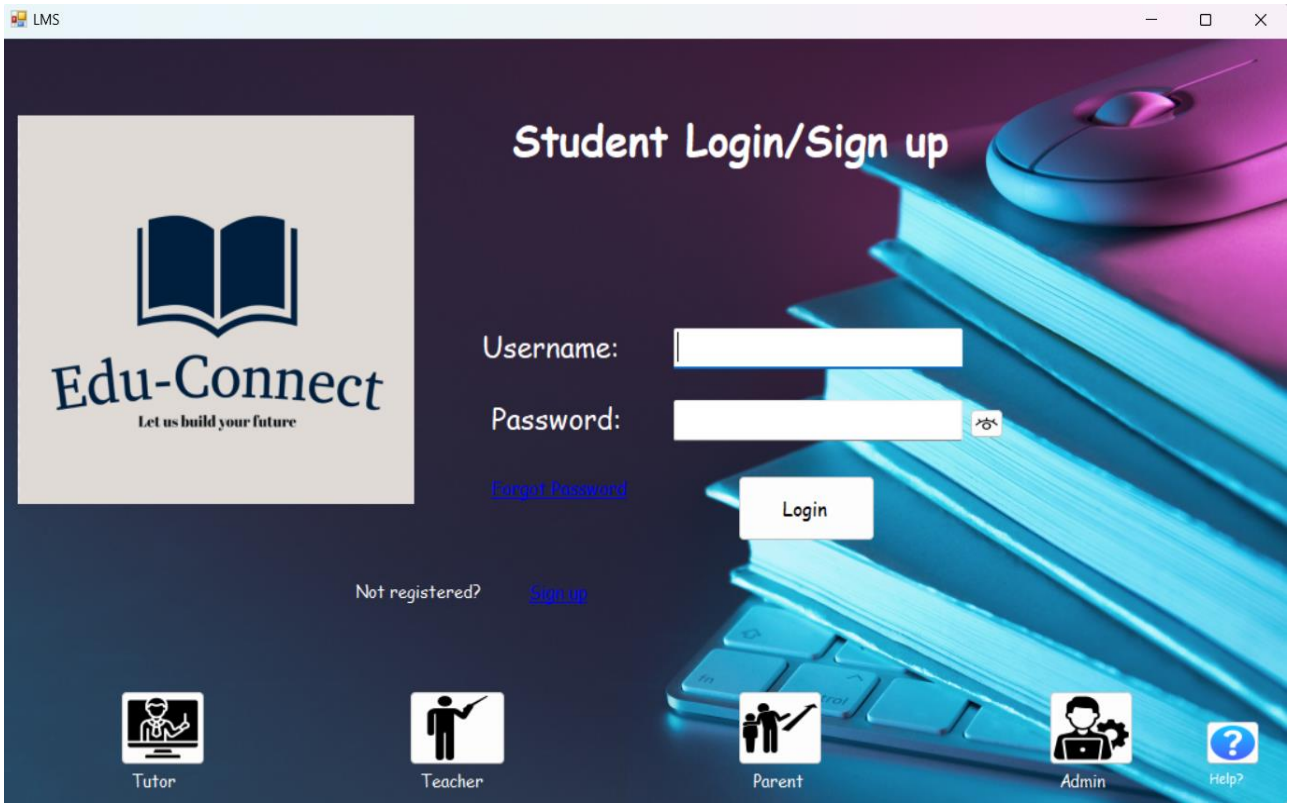


Figure 3: Login Page

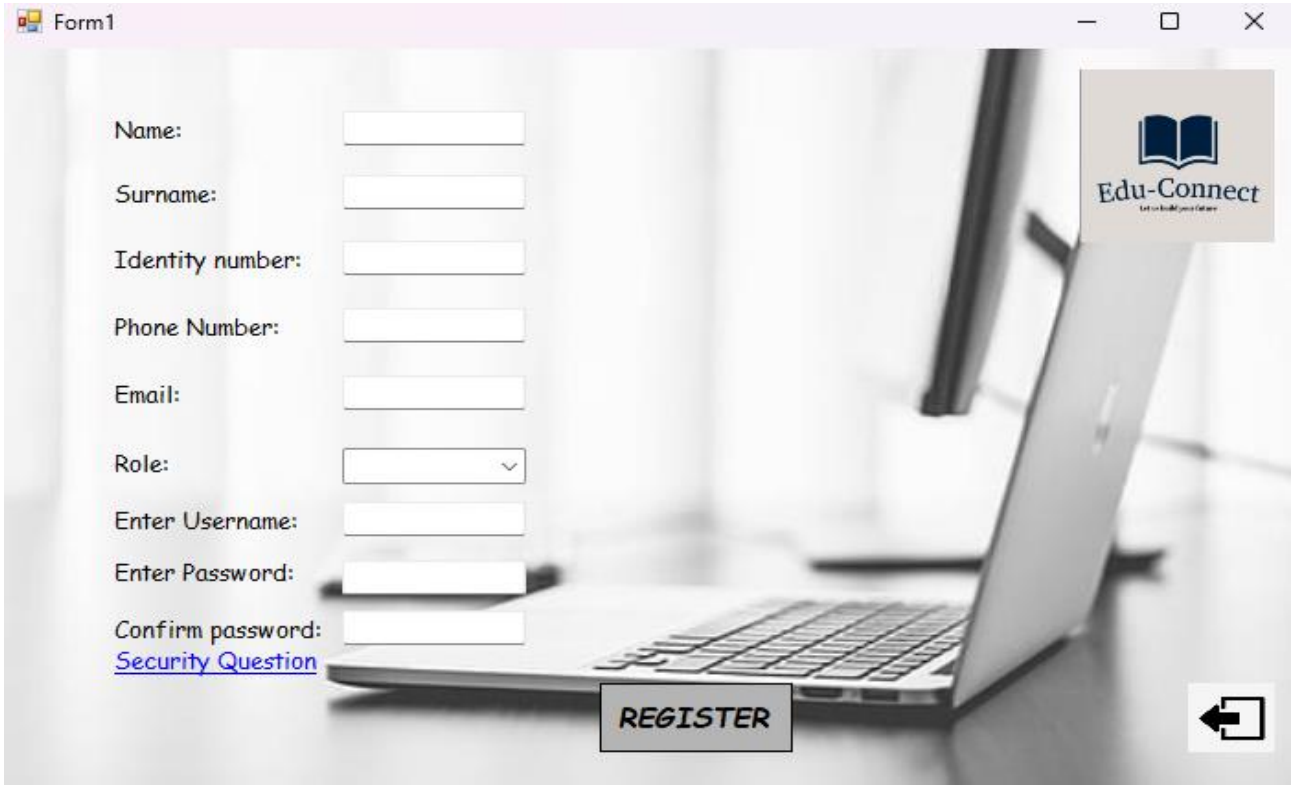


Figure 4: Sign up page

Figure 5: Dashboard

Conclusion

In this project we have set out to create a learner management System. Phase 0 was all about laying down the groundwork for the project by speaking to the relevant stake holders and finding out what it is exactly that they need, to solve the problem which is equal access to educational material and equal footing to getting high marks to access higher education paths.

Within this project we will focus on key areas such as Content Management, Course Management, User Management, Assessment and Evaluation, and lastly Tracking and Reporting. Some other features like messaging and access to video conferencing will be added as well.

Finally, this is software for scholars that will help said scholars reach their full potential. As such this is software that will revolutionize the way the youth learn and interact with their teachers. With the added benefit of getting unemployed teachers involved as tutors to help with the unemployment crisis in this country. There are few people out there that are making it this easy for students to access education in such a way that even if they miss a day of school, they will be able to catch up at home. As was envisioned by the Syntax Club.

Referencing

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Swatzinger , J. W., Jackson, R. B. & Burd, S. D., 2016. Systems Analysis and Design in a changing world. 7th ed. Boston: CENGAGE Learning

Appendix A: PLAGIARISM DECLARATION

(TO BE SIGNED BY EACH GROUP MEMBER FOR EVERY PHASE SUBMISSION)

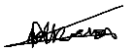
Phase: _____0_____

Group Topic: _____Learning Management System (LMS)_____

Group Name: Syntax Club_____

DECLARATION

1. I know and understand that plagiarism is using another person's work and pretending it is one's own, which is wrong.
2. This group project submission is my own work.
3. I have appropriately referenced the work of other people I have used.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

STUDENT NO.	SURNAME & INITIALS	SIGNATURE
21628190	**Thabethe, T**	
22223368	**Langa, V**	
22409276	**Dhlamini, A**	
22415386	**Dweni, Liyema**	
22430109	**Bhovula, L**	
22432196	**Mpurwana, M**	
22450692	**Nogwina, P**	

Appendix B (Meeting minutes)

Meeting 1

Meeting No	1	**Date**	23/08/24	**Time**	16:40

Topic	Group Introduction
Place	Ritson Campus DB001
Attendees	Phiwokuhle Nogwina Mondli Mpurwana Vukile Langa Lonwabo Bhovula Andiswa Dhlamini Thulani Thabethe Liyema Dweni
Recorded By	Liyema Dweni

Points Discussed

1	Introduction of each team member, including their background and any relevant experience or skills.	
2	Understanding of each member's availability and preferred communication methods.	
3	Establishing how the group will collaborate and make decisions moving forward.	
4	Discussion on the team's strengths and potential challenges.	

Points Agreed

1	Official acceptance of team members.	
2	The team agreed to use platforms such as WhatsApp or Microsoft Teams for daily communication.	
3	It was agreed that decisions would be made collaboratively, with regular check-ins to ensure alignment with project goals.	
4	Agreed to be counteractive & supportive towards each other with any challenges faced.	

Meeting 2

Meeting No	2	**Date**	25/07/24	**Time**	09:00
Topic	Group Project Suggestions				
Place	Microsoft Teams				

Attendees	Phiwokuhle Nogwina Mondli Mpurwana Vukile Langa Lonwabo Bhovula Andiswa Dhlamini Thulani Thabethe Liyema Dweni
Recorded By	Liyema Dweni

Points Discussed

1	First suggestion evaluation: Public Transport system (Taxi)	
2	Second suggestion: Bus Booking System	
3	Third suggestion: Flight Booking System	
4	Fourth suggestion: E-Tutoring System	
5	Firth suggestion: Voting System	
6	Sixth suggestion: Learning Management System	

Points Agreed

1	The group agreed that the key issues in the taxi industry that need addressing are inefficient dispatching, lack of real-time vehicle tracking, and manual fare processing.	
2	The group agreed that the main challenges in the bus transportation industry include managing seat availability, processing bookings efficiently, and providing real-time schedule updates to passengers.	
3	The group agreed that major challenges in the flight booking industry include managing seat availability in real-time, handling cancellations and changes efficiently, and providing a seamless customer experience.	
4	The group agreed that traditional tutoring faces challenges such as scheduling difficulties, limited access to quality tutors, and inefficient tracking of student progress.	

5	The group agreed that the primary issues in traditional voting systems include the potential for human error, inefficiencies in vote counting, and concerns about security and transparency.	
6	The group agreed that the crucial issues in education and training environments that need addressing include inefficient content management, manual grading processes, and challenges in tracking learner progress.	

Meeting 3

Meeting No	3	**Date**	29/07/24	**Time**	11:00
Topic	Overview of Project Planning				
Place	Ritson Campus DB001				
Attendees	Phiwokuhle Nogwina Mondli Mpurwana Vukile Langa Lonwabo Bhovula Andiswa Dhlamini Thulani Thabethe Liyema Dweni				
Recorded By	Liyema Dweni				

Points Discussed

1	Project Scope and Requirements	
2	Timeline and Milestones	
3	Identify key stakeholders and plan how to keep them informed and engaged throughout the project.	
4	Architectural Decisions	
5	Communication Protocols	

Points Agreed

1	Establish a clear and detailed scope document that includes all system functionalities, user roles, and requirements. Agree on a change management process to handle any scope adjustments	

2	Use of project management tools to create a Gantt chart or similar timeline. Agreed on contingency plans for potential delays or issues.	
3	Ensuring that stakeholders' concerns gathered upon research are addressed promptly to maintain their support.	
4	Agreement on the system architecture and design principles, with a clear understanding of how the system will be built and scaled.	
5	Approval of the communication and collaboration plan, ensuring all team members are aligned.	

Meeting 4

Meeting No	4	**Date**	31/07/24	**Time**	13:00
Topic	Project System Selection				
Place	Ritson Campus DB001				
Attendees	Phiwokuhle Nogwina Mondli Mpurwana Vukile Langa Lonwabo Bhovula Andiswa Dhlamini Thulani Thabethe Liyema Dweni				
Recorded By	Liyema Dweni				

Points Discussed

1	The Unified Decision of choosing Learning Management System	
2	How the chosen system will work to solve a particular business problem	
3	The benefits of the Learning Management System	
4	The scope of the system according to the project guidelines	

Points Agreed

1	Upon reviewing the systems, we had saw fit to encapsulate the E-tutoring system under the LMS through team members' unified agreement	
2	A customizable Learning Management System allows educators to design courses that align with their curriculum, ensuring that the content meets educational goals. It also supports diverse learning styles by offering various content types, making the learning experience more engaging and effective.	
3	By integrating with other systems, the Learning Management System can automatically synchronize student data, grades, and attendance records, reducing administrative workload and the potential for errors.	
4	The agreement was to particularly focus on the matriculants rather than the entire high school to avoid duplication of information and unnecessary overload.	

Meeting 5

Meeting No	5	**Date**	2/08/24	**Time**	13:47
Topic	GUI Customization				
Place	Ritson Campus DB002A				
Attendees	Phiwokuhle Nogwina Mondli Mpurwana Vukile Langa Lonwabo Bhovula Andiswa Dhlamini Thulani Thabethe Liyema Dweni				
Recorded By	Liyema Dweni				

Points Discussed

1	How should the LMS (Learning Management System) interface reflect the organization’s brand identity	
2	What is the most intuitive layout for different user groups?	

3	What level of responsiveness is needed to ensure a seamless user experience	
4	Security recovery options.	

Points Agreed

1	Agreement on the primary branding elements to be integrated and the degree of customization required to maintain a consistent organizational identity	
2	Commitment to implementing accessibility features such as easy navigation in learning materials upon pupil mode.	
3	Agreement on the need for a responsive design that provides consistent user experience across all devices and screen sizes.	
4	Recovery options such as 3 security questions after three failed login attempts.	

Meeting 6

Meeting No	6	**Date**	06/08/24	**Time**	12:06
Topic	Use Case ideas & evaluation				
Place	Steve Biko Campus Library				
Attendees	Phiwokuhle Nogwina Mondli Mpurwana Vukile Langa Lonwabo Bhovula Andiswa Dhlamini Thulani Thabethe Liyema Dweni				
Recorded By	Liyema Dweni				

Points Discussed

1	Overview of all potential use cases identified for the e-tutoring system.	
2	Criteria for determining which use cases should be considered core (e.g., essential for user experience, aligned with project goals, high demand from users).	
3	Analysis of user needs and feedback regarding different functionalities	

4	How each use case supports the primary objectives of Learning Management System.	

Points Agreed

1	The group agreed that the following use cases are essential to the system: User Authentication (Login/Registration), accessing Academic Activities, facilitate communication, Manage tutoring & payments.	
2	Certain use cases, such as advanced analytics or gamification features, were discussed but agreed to be less critical at this stage. These may be considered for future iterations based on user feedback and system performance.	
3	The group agreed that the user feedback highlights a strong preference for streamlined access to academic content.	
4	Agreed upon the identified use cases to be precisely aligned with the system objectives.	

Meeting 7

Meeting No	7	**Date**	15/08/24	**Time**	12:06
Topic	Functional & non-Functional requirements evaluation				
Place	Ritson Campus DB001				
Attendees	Phiwokuhle Nogwina Mondli Mpurwana Vukile Langa Lonwabo Bhovula Andiswa Dhlamini Thulani Thabethe Liyema Dweni				
Recorded By	Liyema Dweni				

Points Discussed

1	Overview of the core functional requirements (e.g., user authentication, content management).	
2	Any gaps identified in the functional requirements.	
3	Prioritization of functional requirements based on user needs.	

4	Any proposed changes or additions to the functional requirements.	
5	Overview of the key non-functional requirements (e.g., performance, scalability, usability, security).	
6	Evaluation of the system's scalability as user numbers grow.	
7	Discussion on the user experience, including interface design and ease of use	

Points Agreed

1	Confirmed that the current core functions (e.g., login, content access, progress tracking) meet the basic needs of users.	
2	Identified a gap in the interactive lesson features, which needs enhancement.	
3	Agreed to prioritize improvements in the communication tools for better student-tutor interaction.	
4	Decided to add a feature for tracking student engagement with content as a new functional requirement	
5	Agreed that system performance is satisfactory, but improvements are needed for handling peak loads	
6	Identified the need for enhanced security protocols, especially in data.	
7	Agreed upon the first draft of the GUI design.	