E-SCHOOL MANAGEMENT SYSTEM

PURPOSE

The software design document describes both the architecture and system design of the E-SCHOOL management system. The documentation will be used as a reference for the implementation of the system.
The documentation will be used as a reference for the development of our web based application for individuals such as user interface designers and programmers with the technical background.

It is a document that describes the scope of the system, the different functionalities, the interface descriptions and other information related to the system.

SCOPE

The E-SCHOOL management system is to be mainly used by students in different stages of learning and by the teachers that is the staff. The system shall aid student and staff registration, student grading, staff updating of content. The students will be able to do studies, have quizzes and be graded by the staff.

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1. PROBLEM STATEMENT

Due to the Covid crisis it has been evident that one of the most affected group are the students.

It is proving to be hard to get access to educational materials remotely or even to keep up with the rest who have access to the materials.

With restrictions on movement students have been left to find a way to solve this crisis to make sure they are left behind and the teachers have had to find other sources of income to keep their livelihood.

This has proved to be so regardless of the dangers they are exposed to such poor health conditions all the while trying to earn a living

2. GLOSSARY

Acronyms and Abbreviations

CSS : Cascading Style Sheets

HTML : Hypertext Markup Language

CGI : Computer Generated Imagery

MB : Mega Byte

SQL : Structured Query Language

3. **SOLUTION DESIGN**.

The system is made up of several modules which include registration, login, attend class, upload class, download class, past papers and notes, view class, past papers and notes.

It is to be a web-based application capable of tackling the major components in e-learning. Students and the teachers are to access the system through a web browser however with different sections in the system.

This system is to enable students have access to school material in a regulated and watched manner by the teachers that is the progress of the student is closely monitored by their teachers. The e-school management system will enable students to interact with their teachers remotely for convenience. It also will allow students to keep focused and relevant to their studies in the current lockdown situations.

The system will allow students to chat and help out the others in case of difficulty. For well advanced students in a particular section, they will have an opportunity to earn a little something when they offer help to their peers.

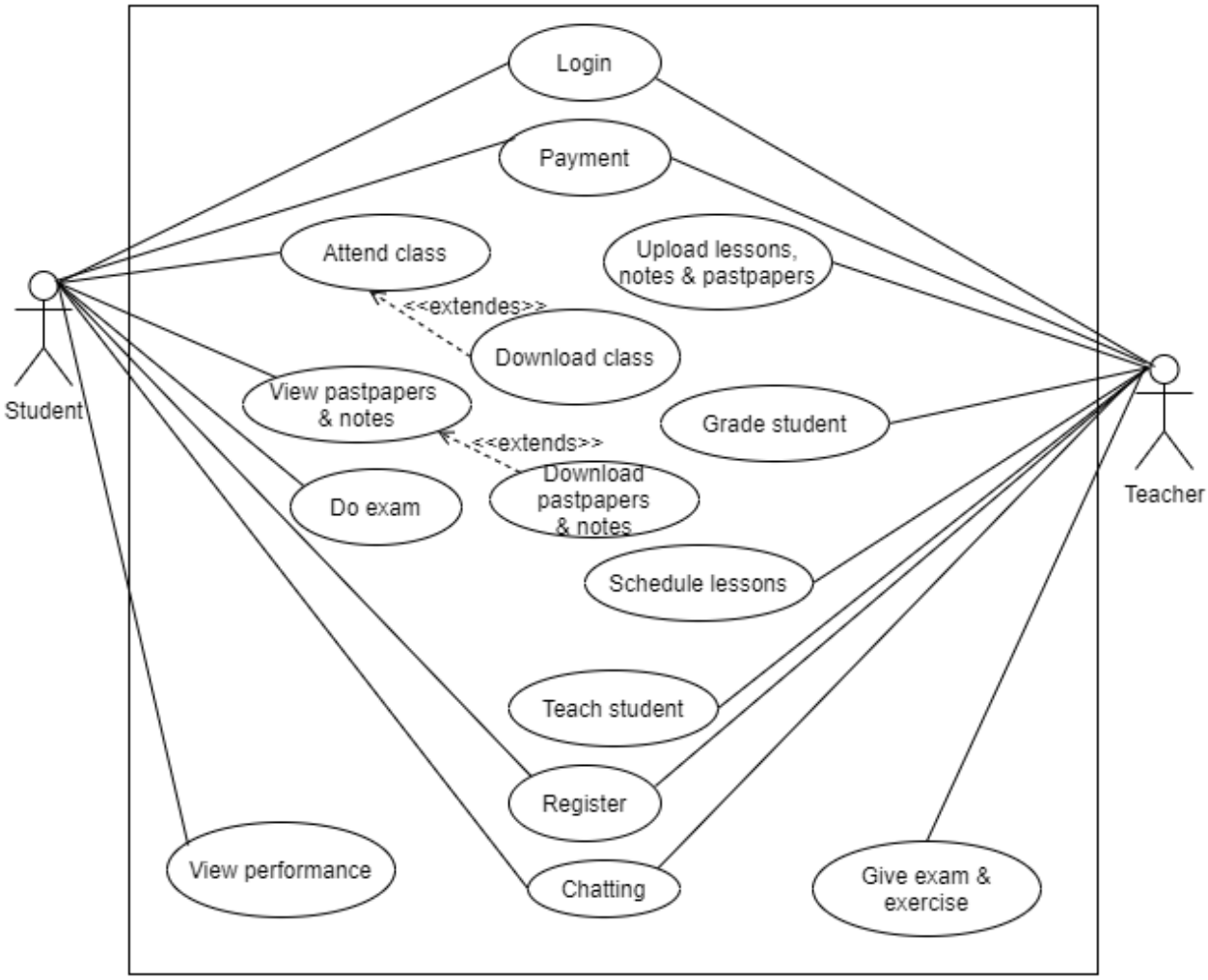
The system will also allow teachers to chat and communicate in case of collaborations for better content delivery in class sessions.

This web-based system also has the potential to be later integrated into a mobile application for easy access.

An intranet will be set up to enable students and teachers who can’t afford an internet connection to ably join the platform and contribute.

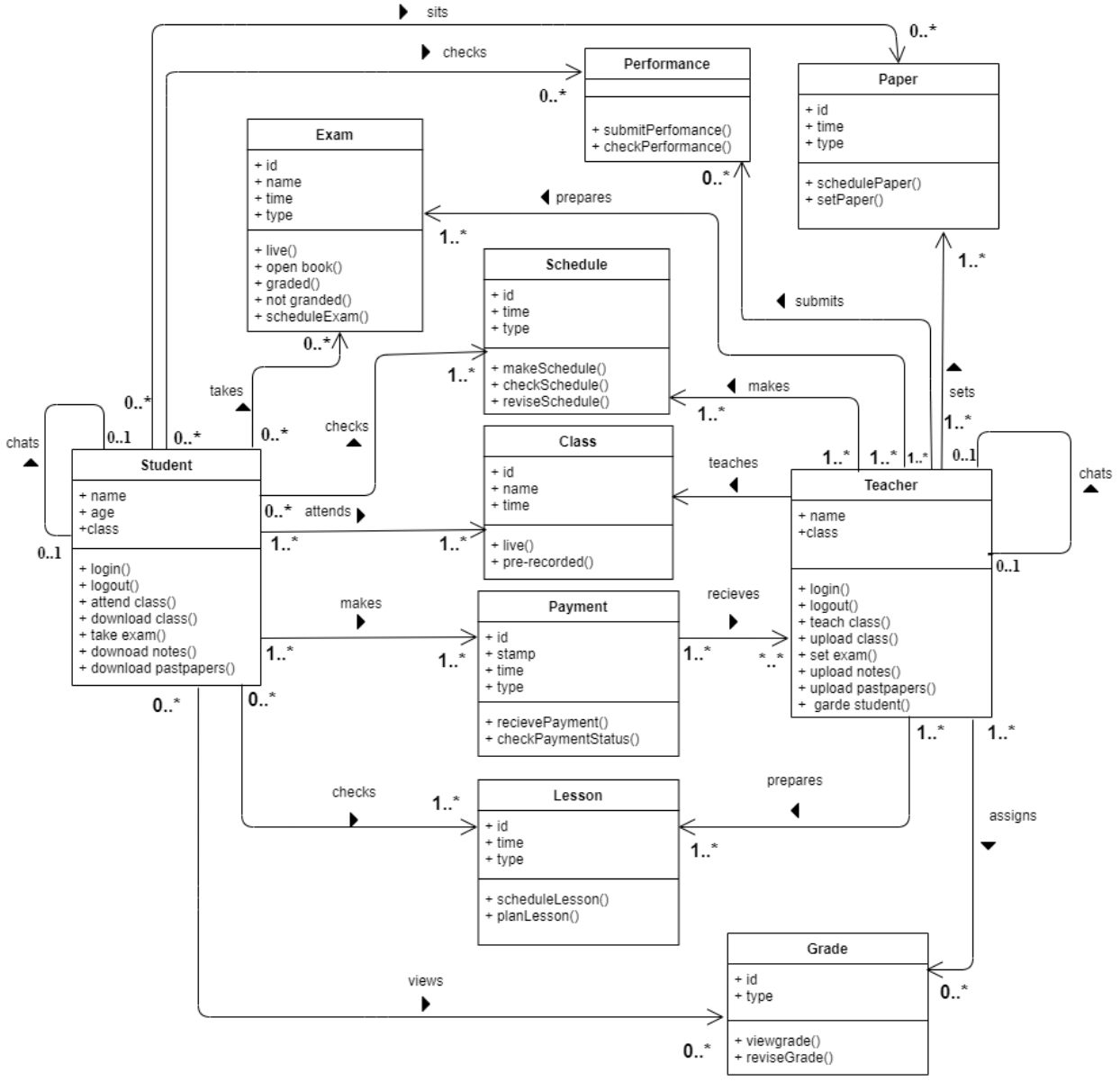
The system will make use of the sync (synchronize) technology to sync a user’s information such as past classes, notes downloaded, people chatted with to a google drive or storage space to enable students or staff who take long to come back to the system know where they left off.

4. SYSTEM USE CASES



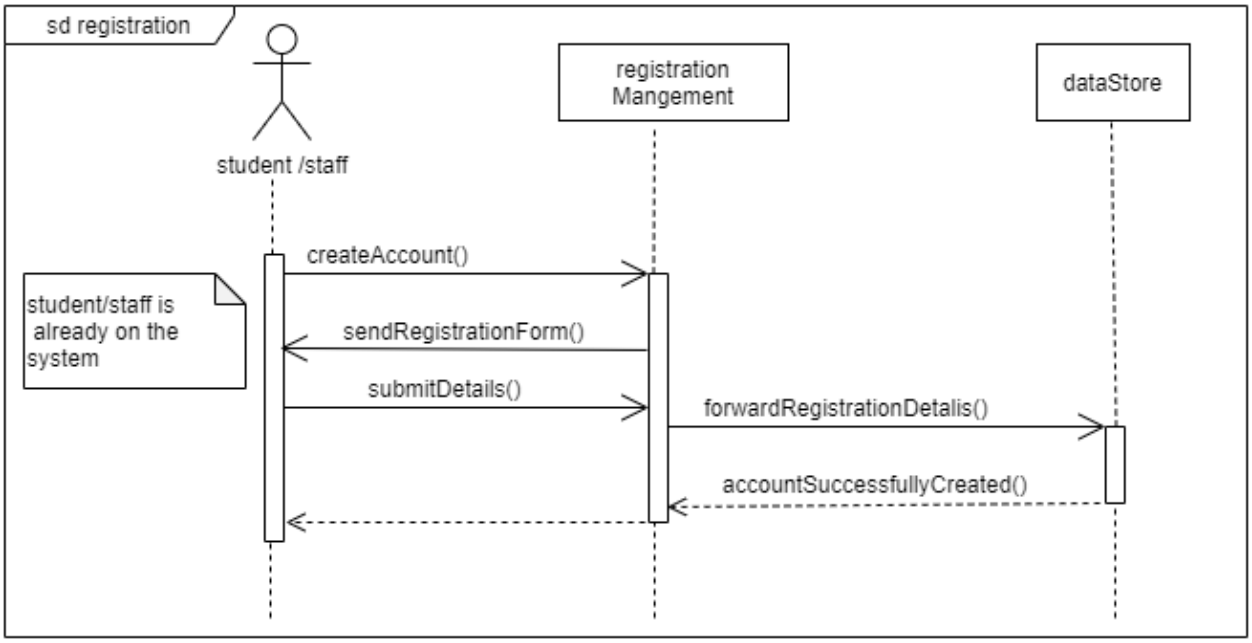
5. DESIGN OVERVIEW

Class diagram

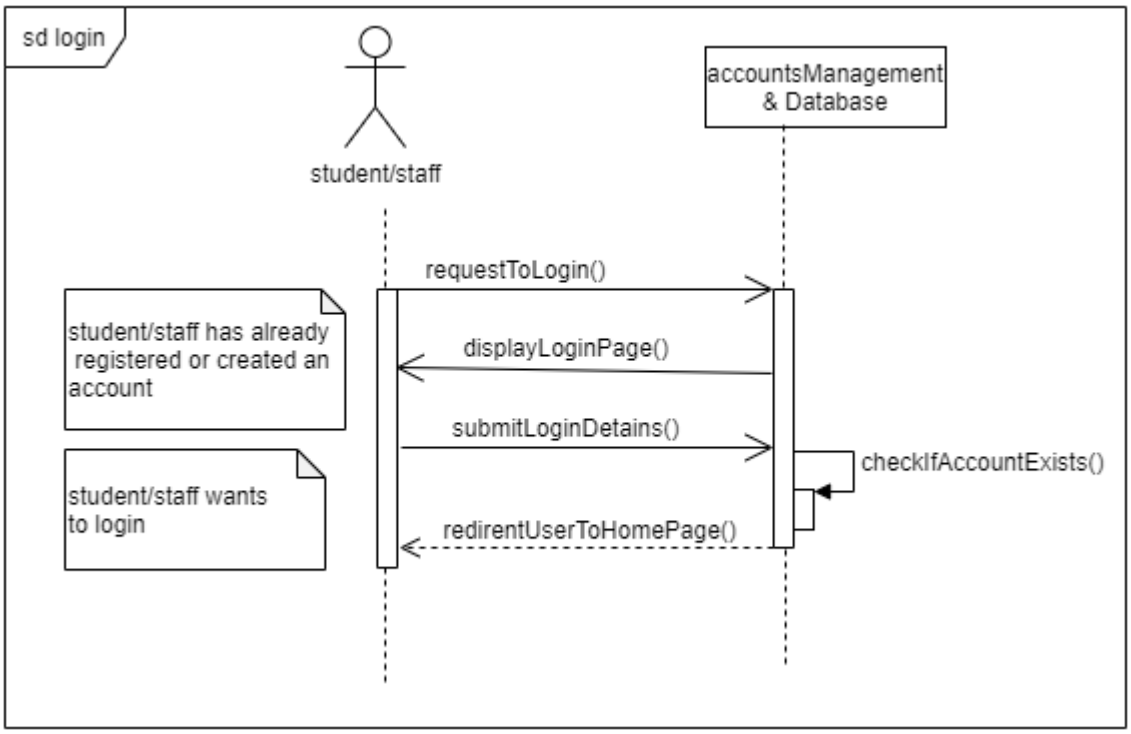


Sample sequence diagrams

Use case realization for registration



Use case realization for login



6. DATA DECRIPTION

Data is obtained in mainly obtained in two stages for each member type

- **Student/staff registration**

The system takes the initiative to retrieve all the information from the member and store it in a database. At this level, the member can be able to create an account which they can customize to their liking. With an account they can ably indulge in the different parts of the system such as classes, notes, exams. Captured information includes, full name, type of member (student or staff), level of education.

- **Student Enrolment**

At this level, information about the new member to a class is captured. This data includes the members' name, age, address, level of education, referral name in case they were referred by someone, email if available / phone number. This kind of information is captured by the system.

- **Staff verification**

The system retrieves information from the staff such as levels they teach, subjects they teach, their teacher verification (this is to actually verify they are professional teachers), school taught in before. This information is stored in the database for reference if need be.

7. ANALYSIS

SWOT analysis
Strength

- Good at web design by the team.
- Availability of e-payment systems to be integrated in the system
- Internet is being distributed by government for educational systems hence giving more internet access to students and teachers at cheaper prices.
- Availability of cheap accessories such as smart phones that can be used to access the system and presence of cheap internet cafes with computers for access.
- Easy accessibility through browsers that are readily available such as chrome, explorer

Weaknesses

- Some students and teachers are illiterate on how to use computers even the basics of computers operations.
- Also, some teachers and students are still inclined to the original setting of education that involves a classroom setting a physical presence.
- The team members are not well advanced with all the technology needed for development like machine learning models and have to learn on the go.
- Limited time for the development of the system to a functioning MVP.
- Advertising the system is another major factor as most of the students and teachers in our communities aren't willing are biased to the system due to environment factors.

Threats

- Aggressive web competition hiking end user fees hence making students and teachers not to be involved in such kind of systems.
- Other e-learning facilities being better than some others breaks the morale for these students and teachers to join any and also leads to very steep competition.
- Refusal of students and teachers to join such a platform because they are uneducated on its operations to fully trust it.
- A possibility of not having a working MVP in the allocated short time period.

Opportunities

- The system will be in position for expansion hence allowing more students and teachers to access the it
- Having a variety of references for such a system for example MUELE.
- Government's awareness for the need to address the educational crisis in the country giving such a system a stem of support.

8. FEASIBILITY

Operational Feasibility

The system will be available 24/7 after hosting, hence members can access it at any given point. The user interface will be user friendly as it will be a matter of click, type and use of common icons for proper data visualization.
The system will be accessed anywhere as along as one has an internet access since it is only accessible through the browser.
Also, more functionality like quick updates, alert messages and offline working which at later stage will be synchronized on accessing the system.

Technical Feasibility

Cloud Services will be used hence no data will be lost in case of physical occurrences.
Software and hardware required to develop such a system are available in place
Backups will be done on google drive or the cloud to ensure that no data losses are had.

Economic Feasibility

No much costs involved since all team members are willing to work for free and a free hosting site is being used.
Therefore, only costs for external developer, domain names and other related services to be purchased. Division of these costs.

Hardware and Software and others

Internet	347,000
Cloud servers / Google drive space	1,000,000
Maintenance	200,000
Others(including but not limited to advertising)	400,000
Total	1,947,000

Schedule Feasibility

The working system is to take approximately three months when all the services working as required. Success will be measured every day and hence by five days a ready to do live will be attained.

Phase 1	Tasks	Activities
First week	MVP	Registration Login Interface Design Database Design

Second Week	MVP	Chats Downloading files Uploading files
Third and Forth weeks	MVP	Live chat and assistance History checking Live class sessions

Phase 2	Tasks	Activities
First Month	Review of last month's work	Email system incoperation System Testing System Updates Further Integration
Second month	Monitoring	System monitoring System Review
Over time	Maintenance	Maintenance

9. INTERFACES

External Interfaces

User Interfaces

- Front- end software/framework: React.js. The developer has to know how to use the framework for the designing of the product.
- Back-end: SQL+, Django.

Hardware Interfaces

- A browser which supports HTML and JavaScript, CSS and CGI.
- The system should have these hardware requirements minimum of:
  - Memory: 20MB or above
  - Hard Disk Drive: 100MB or above

Software Interfaces

- Operating System: windows and IOS
- Front End: HTML, CSS, JavaScript, React.js
- Back End: SQL+, Python
- Database: Postgress

3.2.4 Communications Interfaces

- This project will support all types of browsers.
- Through chat boxes and a live chat session
- Through live class sessions between teachers and students
- Communication is done through internet and intranet mail or Telephones and email.

Human interface

The graphical user interface for the E-SCHOOL Management System will have a home page which provides details of the e-school management system
To log in the system, there will be two panels, the client's student and the teachers and the administrator panel. Both the client and administrator panels will have a lightweight web layout, where all functionalities shall be grouped logically into thematic units according to the units they are associated with.
Both client panels have menus that have associated activities

Special consideration shall be given for the applications ergonomics with main concept being to provide proper visual grouping of elements, with minimal effort required in terms of user action.
Only one tab or link can be selected by the user at any one time. Where appropriate, each tab or links contents are further divided into sections, according to a particular logical and functional grouping

Prototype is at https://pr.to/TOPZTT/

https://pr.to/8ERHNM/

SCREEN IMAGES

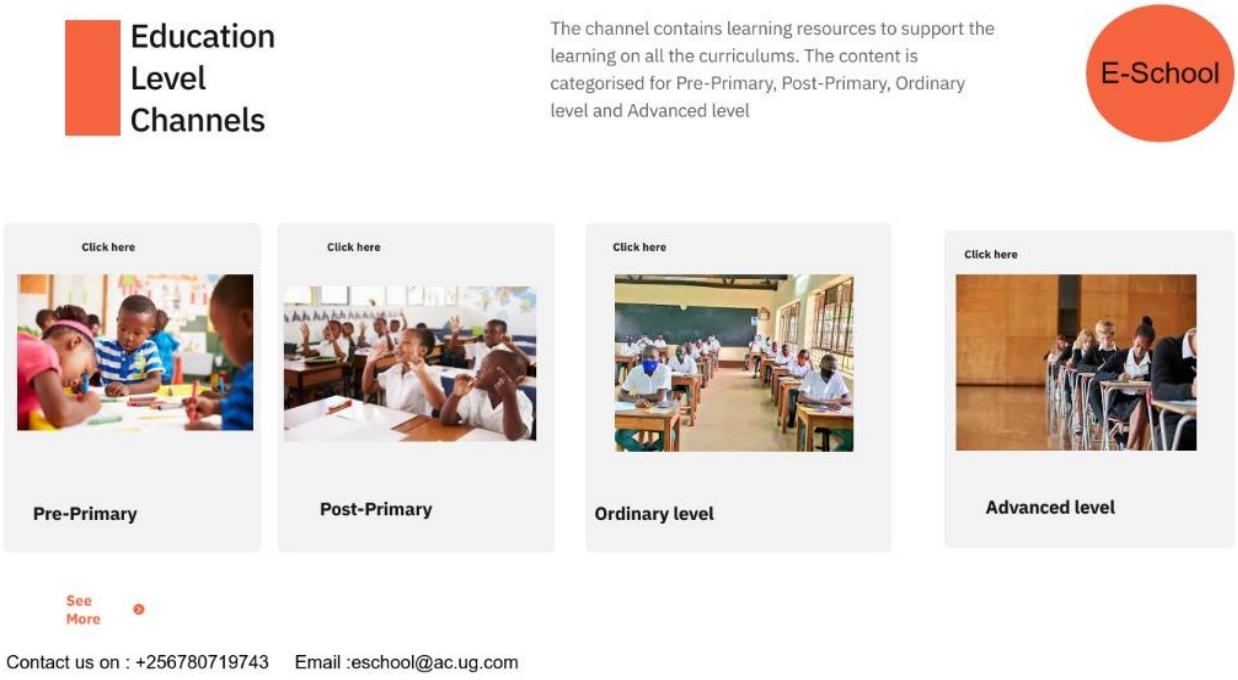


Fig1. First page.

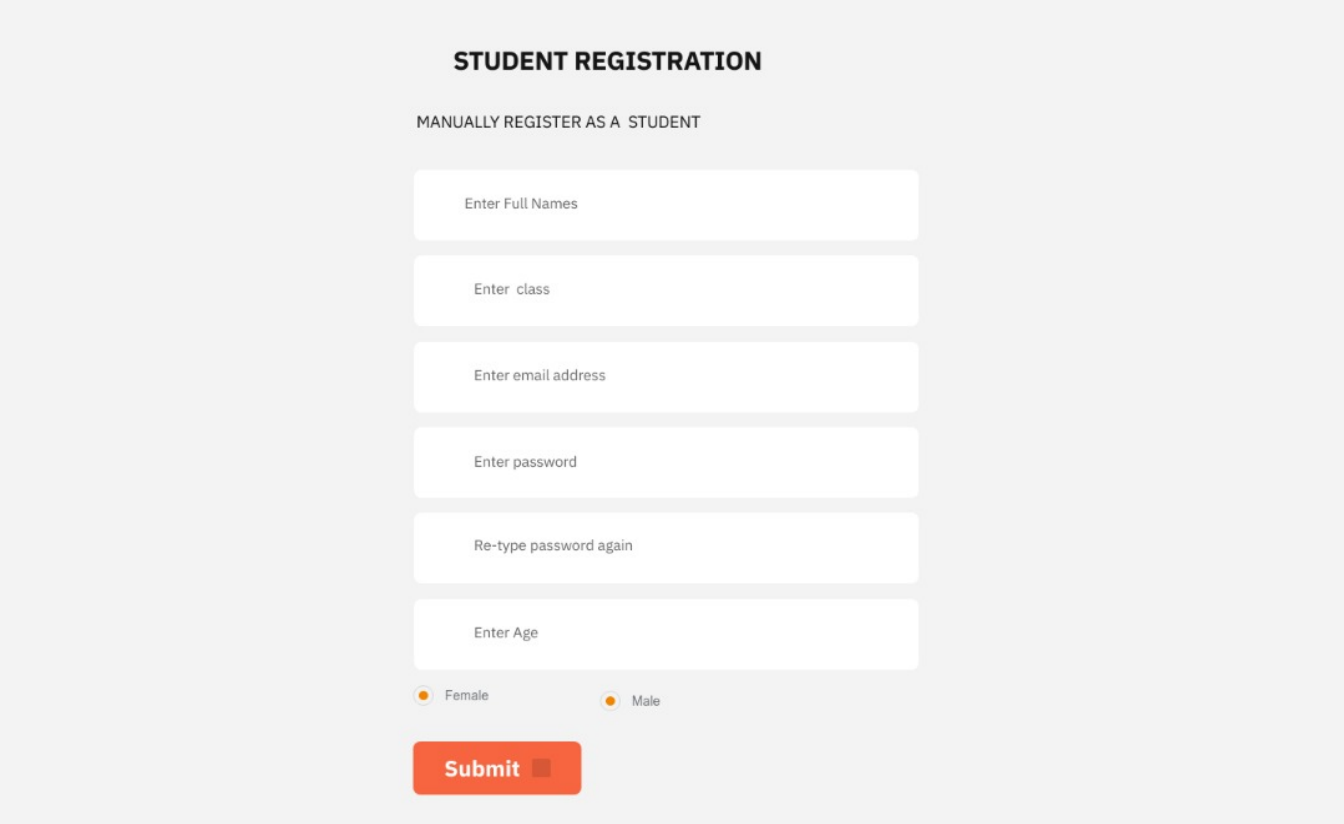


Fig2. Student registration page

Fig3. Student Login

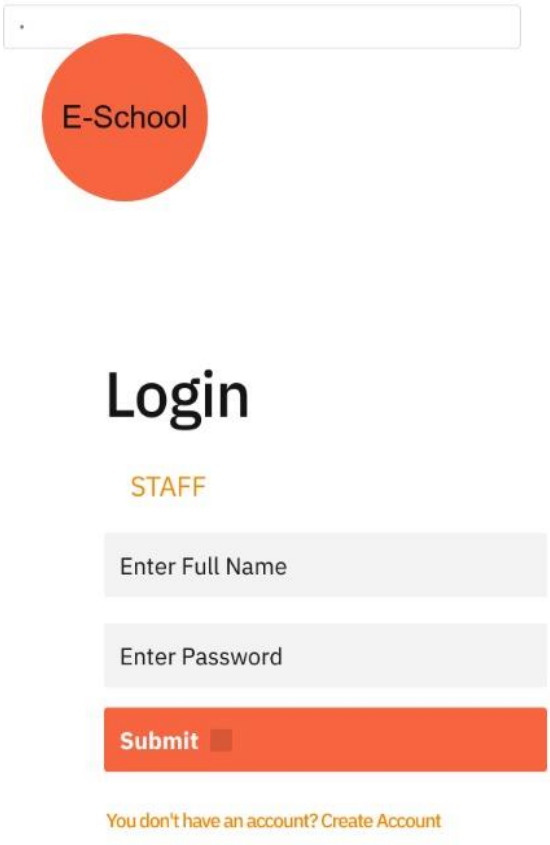


Fig 4. Staff login

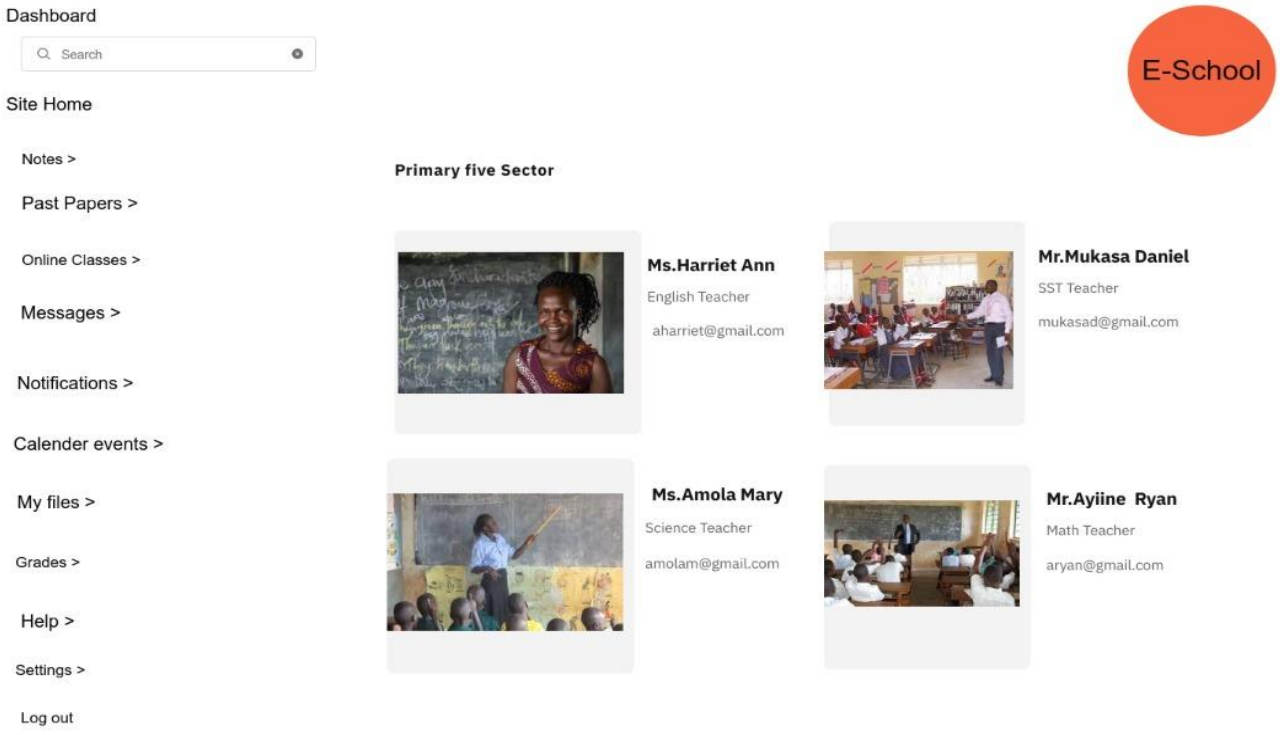


Fig5. Student Dashboard

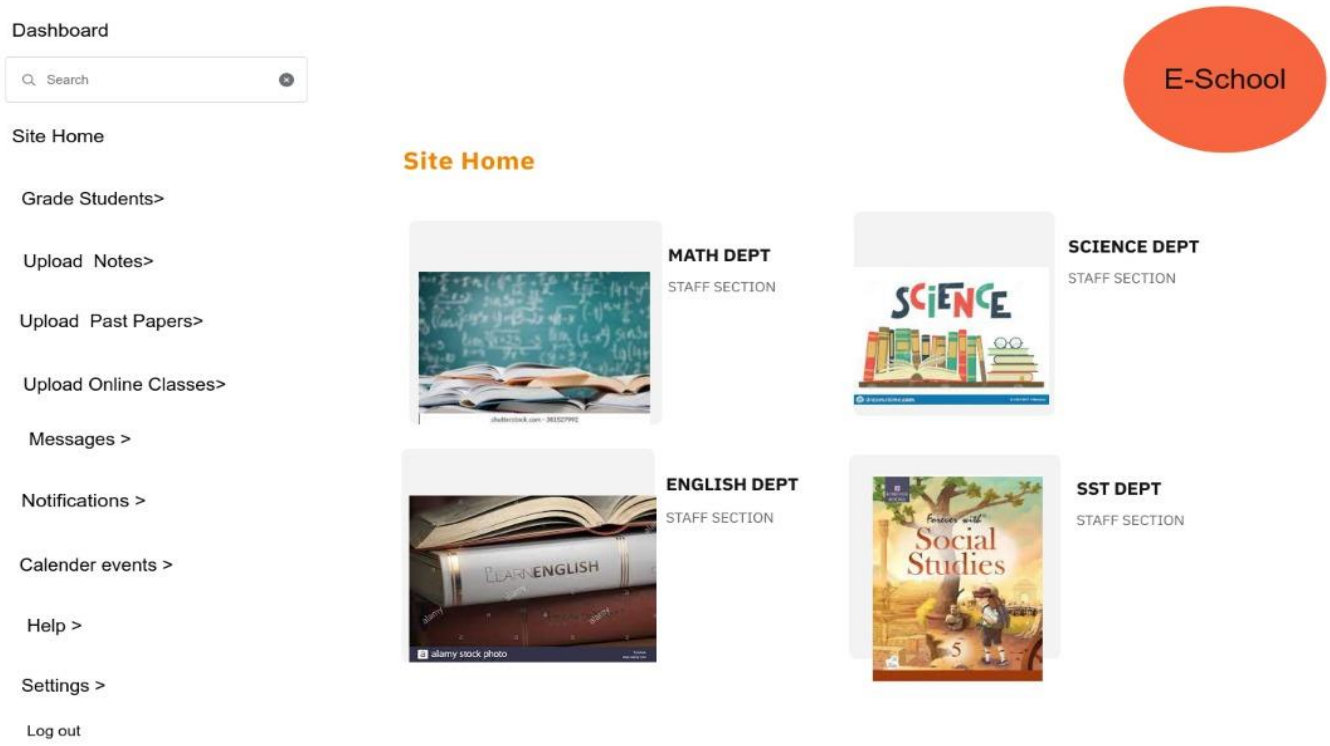


Fig 6. Staffs Dashboard.

10.SYSTEM FEATURES

Description and priority

The e-school management system maintains information on sessions, attendance details, personal preferences, location. This is a very high priority feature because it aids in the management of the vital e-learning system operations. The system features are as depicted in the use case above

Database

The system will operate on a cloud-based database/ Google drive storage. This means that the system will be available at all times anywhere in case there is an internet connection.

Client/Server

This is primarily the architecture or logical division of the application and the server. All data will reside at the server sites while all applications execute at the client sites

The features that are available to the Admin are:

- Can Add/Delete and Update session details
- Update schedule
- Manage student and teacher details

The features that are available to the Teacher/ staff are:

- View profile history
- View previous sessions
- Upload new/ Delete old sessions /content/papers/reading material
- Request for more sessions
- Makes enquiries.
- View sessions allocated
- Can view class details.
- View student details
- Mark the student's performance and growth
- Make report on student's growth

The features that are available to the students are:

- View session history
- Make enquiry

- Download classes/ reading materials
- Add/Delete/Change session, session time.
- View schedule
- View profile details
- View class details

11.NON-FUNCTIONAL REQUIREMENTS

11.1 Performance Requirements.

- NFR01 The system is should be capable enough to handle 1000 users simultaneously without any complications
- NFR02 All backups shall be done at 2:00 am every second Thursday of a Fortnight to an archival storage
- NFR03 The system should load within 2 seconds not including browser rendering time and shall be able to respond in not more than 3 seconds to any user requests.
- NFR04 Any missed information, notifications by a user offline shall be displayed in not more than 20 seconds when reconnected

11.2 Safety Requirements

- NFR05 Users shall have an option of changing password or getting a new one incase they forget their passwords
- NFR06 The system shall have a recovery procedure in case it crashes to ensure no data is lost.

11.3 Security Requirements

- NFR07 The system shall store encrypted password forms for any registered user
- NFR08 The system shall prompt users to change their passwords every 6 months
- NFR09 The system shall not allow any unauthorized user to log in
- NFR10 The system shall only allow people to access information depending on their level of authentication

11.4 SOFTWARE QUALITY ATTRIBUTES

11.4.1 Usability

- NFR11 The system shall use conventionally recognized icons to represent parts of it such as a file, a group, making it easy to use and understand.
- NFR12 The system shall not auto fill any text in an input field
- NFR13 The system shall auto correct to the closest correct word in an input field
- NFR14 The first page of the system shall have a document of how to use the system. This will be seen after any user registers

11.4.2 Reliability

- NFR15 The system shall keep copies of any payments made by the customers
- NFR16 The system shall be functional as long user has an internet connection
- NFR17 In case of any system fault or failure, the system shall not take more than 1 hour to restore
- NFR18 The system shall do thorough validations of user inputs to avoid incorrect storage of records
- NFR19 The system shall give feedback in case of completed or unfinished transactions or requests by the user.

11.4.3 Maintainability

- NFR20 Maintenance of the system shall be done on a regular basis at a time with the fewest users
- NFR21 The system shall inform users a head of time in case a maintenance check has been scheduled

11.4.4 Portability & supportability

- NFR22 The system shall be able to work perfectly regardless of the operating system or device because it is browser based

11.5 OTHER REQUIREMENTS

- NFR23 The system shall use the least time possible to do the regular backups and maintenance routines
- NFR24 The system shall be easy to integrate with any existing systems without any system failures
- NFR25 The system shall have the capacity to scale in case of increased users without compromising itself.
- NFR26 The system shall be have browser as the clients
- NFR27 The system shall have a cloud-based server
- NFR28 The system shall be available all the time if user has an internet connection and it's not during a maintenance or backup routine.
- NFR29 The system shall be modified with only minor changes to the previous system