

Chuotalk
Software as a
Service

Tralah M
Brian

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What is Chuotalk?

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Chuotalk is a project aimed at designing and developing an integrated School Information and Messaging system that will be deployed following the Software as a Service (**SaaS**) business model over the internet thus allowing us to serve a multiple of Customers(schools) without having to deploy an onsite application for every school/Customer as we would traditionally do.

Objectives

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The Primary Goal is to provide a Solution to the common problem of communication within a learning institution between the different caders of stakeholders:

- Parents
- Teachers
- Staff
- Students

Using the following Mediums:

- Short Messaging Service (SMS) **Primary**
- Email
- VoIP
- Android Push Notifications

We seek to provide one platform to manage and facilitate all kinds of communications that may arise in a school

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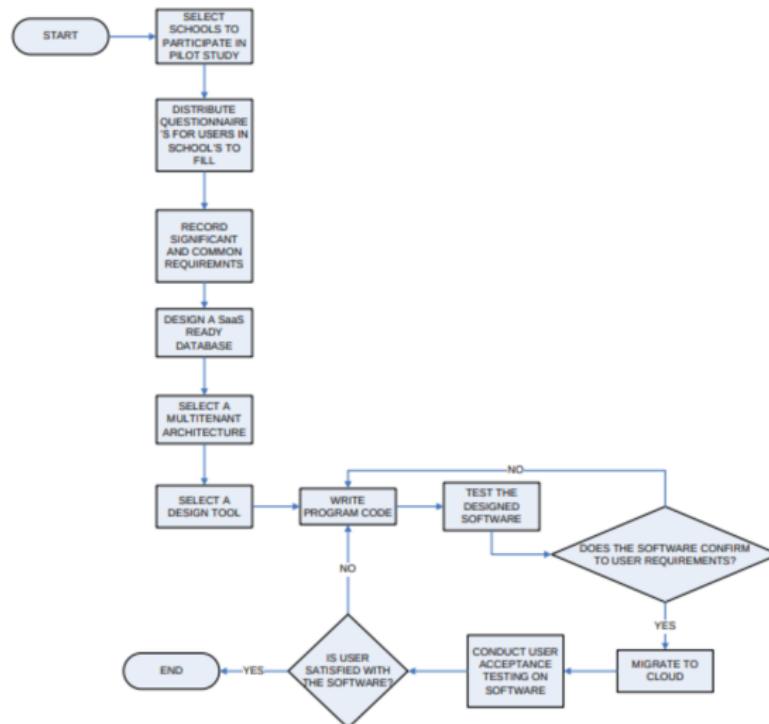


Figure 12 Research Process

The Steps

- 1 Problem identification and motivation
- 2 Definition of objectives
- 3 Development
- 4 Demonstration
- 5 Evaluation
- 6 Communication

Having conducted research in this field by means of *interviews*, *observations*, and survey *questionnaires*, we identified the post-mentioned problems and saw a market niche we could fill and in turn create a viable business strategy.

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Problems Identified

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- Unreliable use of paper printed communications in the form of
 - newsletters
 - Internal memos
 - Summons
 - Financial Communicado
 - Notices and Reminders
- Lack of *verifiable, integral, confidential* and *secure* means of communicating between intended parties.
 - Information passed by paper may not reach the intended recipient.
 - Any third party can intercept the communication and thus alter, skew or corrupt the message altogether resulting in a breach of security and a message that cannot be trusted.
 - The Information may never reach the intended recipient on time during transit .

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The proposed system will adopt the SaaS delivery method, the following factors need to be taken into account:

- The organisation for which the software is to be developed is a school.
- A school has limited funds available to spend on software.
- An average public school in Kenya has around 1000 people.

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At this stage, a multi-tenant, SaaS-ready database that addresses the data needs of multiple schools is designed and developed. The data model has to address the security, performance and scalability needs of the multiple tenants.

In addition, a sharable, SaaS-ready application is designed which securely interacts with the multi-tenant database designed above and serves the individual needs of each school. Although the schools share the same database and application code base, strong data isolation techniques were used to allow schools to access only the data that belong to them. Application interfaces also has to be customised to automatically reflect the individual school profiles.

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Software tools are selected, namely servers, database management system and application development tools, which are suitable for developing SaaS applications.

The system is coded and implemented as per the design specifications (derived from user needs assessment).

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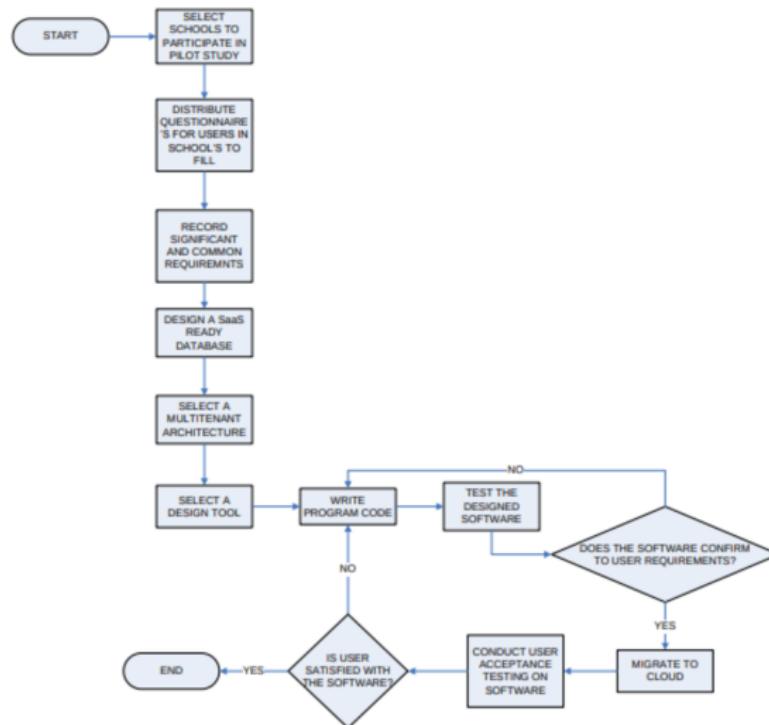


Figure 12 Research Process

User Requirements

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The school management system is a multi-user system. The users of the system and their requirements are described in the following sections.

Principal

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The principal's job is one that carries a lot of responsibility, as he makes a lot of decisions regarding the staff members, students and school as a whole.

The school management system aims to help a principal manage the school more effectively.

A principal should have access to all relevant information regarding each member under his/her management, be it the professional information regarding educators, medical details, academic records, and personal information of students, and professional and personal information of the students' parents and guardians.

Principal View Student

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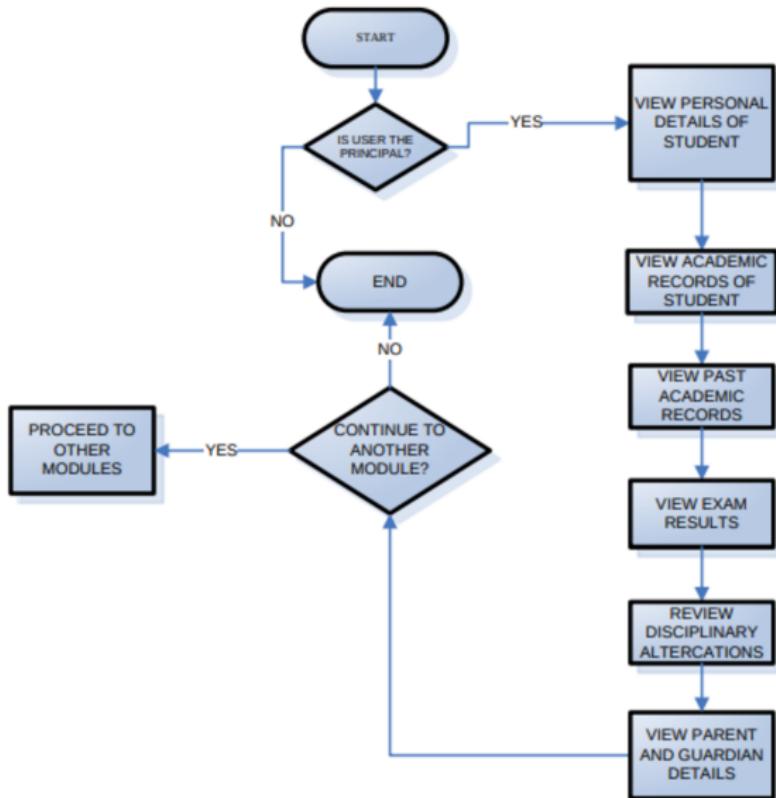
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Principal View Staff

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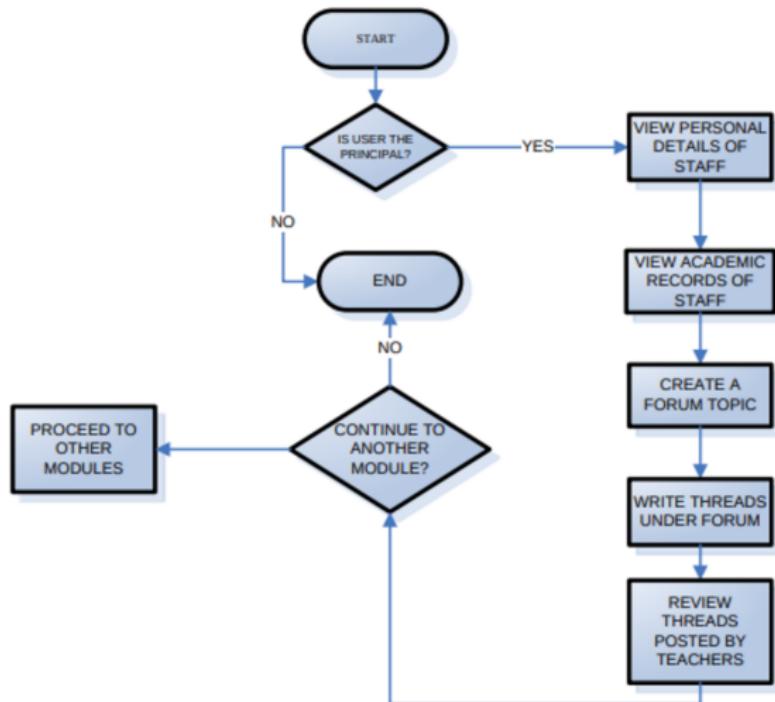


Figure 14 Viewing of staff information by principal

Notification Module

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4.1.1.2 Principal flow chart with respect to school activities

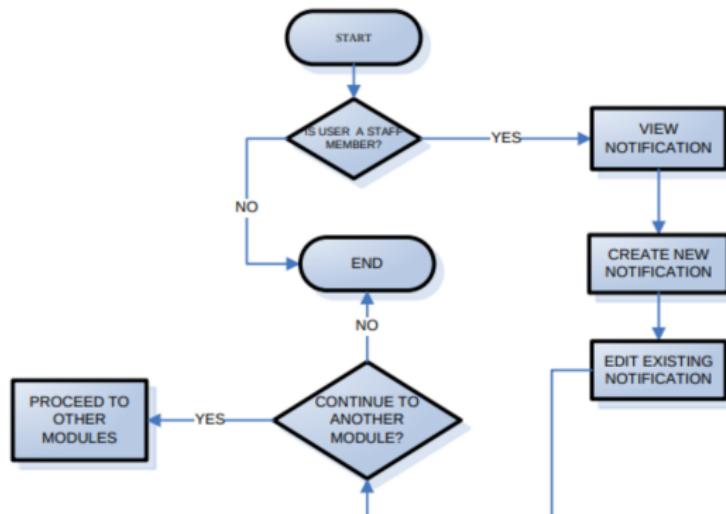


Figure 13 Notification module and how principal enters information

Administrator

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The administrator can be any person who is assigned by the school management to add, edit and delete the records in the school management system.

When using the school management system for the first time, there is great amounts of information that must be completed.

Information such as setting the academic year, entering student medical records, assigning designations to new staff members and so forth are completed so that other users can start using the system effectively.

The School Administrator Journey

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4.1.3.1 Entering staff information

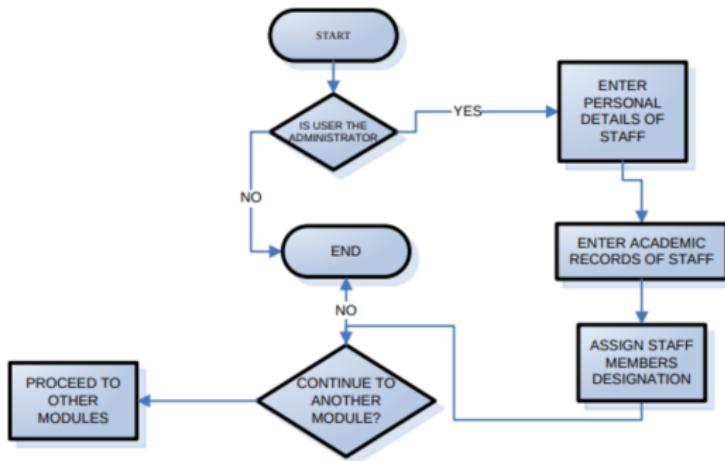


Figure 16 Entering of staff information and assigning of designation by school admin

The School Administrator Journey (contd.)

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An example of information of this sort is the registering of each user by entering the relevant information pertaining to each user.

When the necessary information has been entered a username and password are created.

This password can later be changed when the users log into their accounts.

Educators/Teachers

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The school management system provides an educator with all the information regarding a student.

Through accessing and understanding the data, an educator should have more insight into students and their background.

As mentioned earlier, the types of information include medical records, past academic records, details of the student's parents and those who act as guardians, if applicable.

Teacher views Student Records

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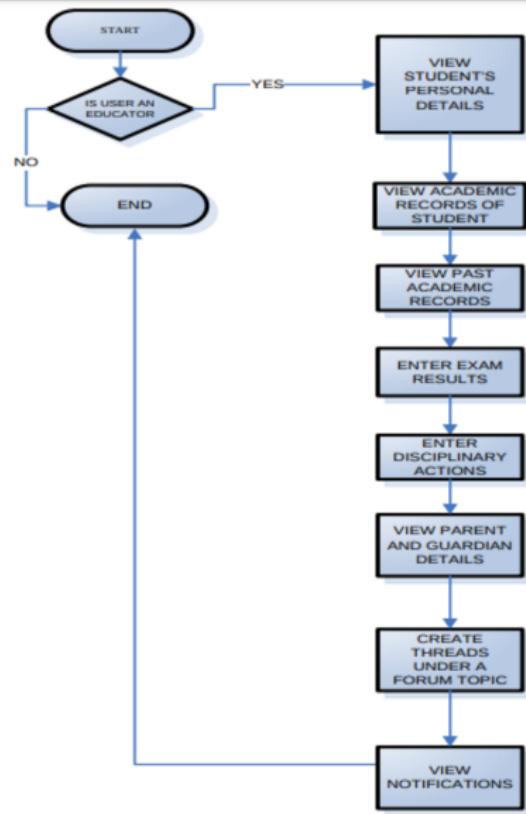
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Site Administrator

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4.1.8 Site administrator

The site administrator is responsible for accepting schools that have requested to use the system.

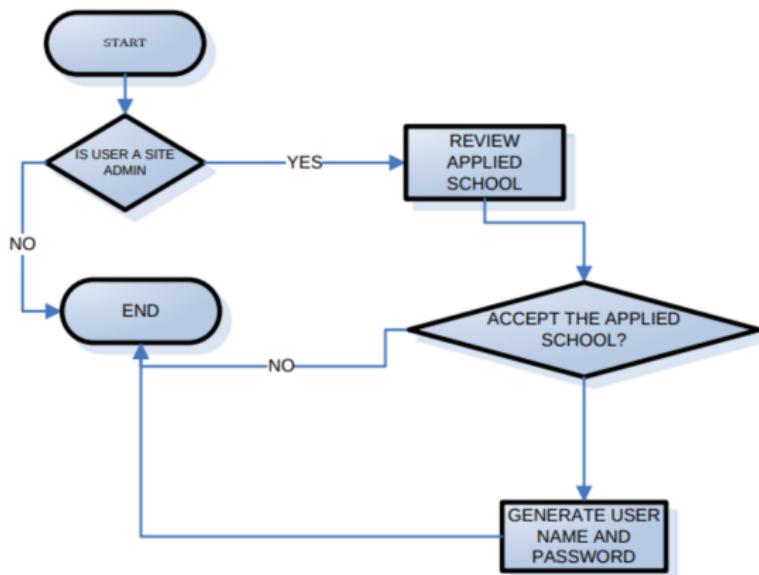


Figure 8: SiteAdmin.png

Parents/Guardians

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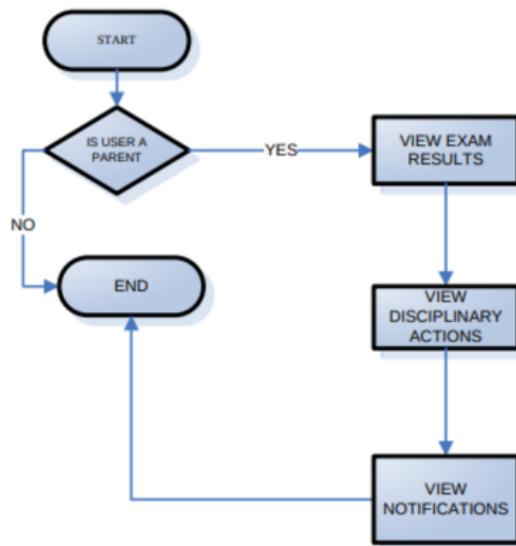
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View student academic and discipline records

notification system of the upcoming events and activities in the school.



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Functional Requirements

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- Security
- Scalability
- Availability/reliability
- Performance
- Configurability
- Flexibility
- Usability
- Interoperability

Security Requirements

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Specific security demands must be met when developing a cloud or SaaS application.

- Firstly, a user must ask a system for permission to access the system and, based on the user right, the system must grant permission.
- Before permission is granted, authentication and verification must be carried out by the system.
- When using the shared database, shared schema method, depending on a user's authentication information, his/her relevant data must be accessed and produced.

Scalability

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Scalability is the ability to add or remove schools without affecting performance.

Reliability

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Reliability refers to the underlying success of any product; a product must be able to deliver the expected performance when a client needs it.

A clearly defined service level agreement (SLA) requires that any SaaS offering must adhere to requirements or face legal action.

Performance

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The performance of software is measured in terms of its ability to act before the client starts thinking about its speed.

Data that are frequently accessed must be cached, which aids in the process of retrieving the data more easily.

Configurability

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Configurability refers to the variations and changes that a client is allowed to make to an application.

Configuration allows users to feel at home and to adopt a more organised approach to an application

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Database Design

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To prevent anomalies, an action known as normalising should be carried out.

Normalising is a set of rules that must be followed to ensure that datum is arranged in a way that anomalies are avoided and that data are saved, retrieved, changed and deleted, all without affecting other data.

Normalising a database helps maintain data isolation and data integrity in a database.

Data Security

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Data isolation means that during multiple transactions by multiple users, the transaction that each user carries out is hidden from the other.

Data isolation ensures that a user's transaction does not interfere with another user's transaction.

Data integrity means that during the update of a field in a database table, only that field is subjected to change and not the entire table.

It is mandatory that during design itself that a table be able to maintain data isolation and data integrity.

User ERD

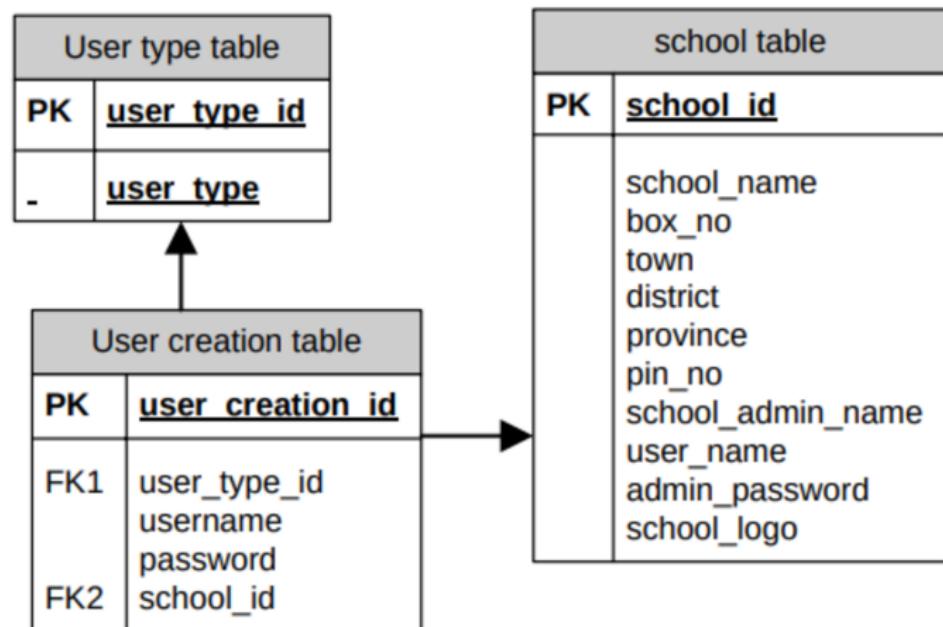


Figure 26 User login

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School ERD

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4.1.3.3 Entering information about the school

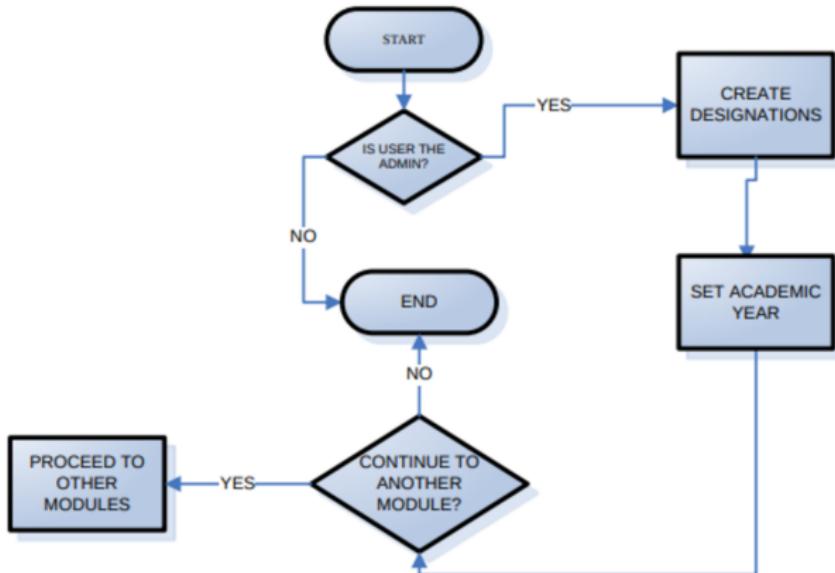


Figure 11. School ERD

School Diagram

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5.2.1 School creation and user login

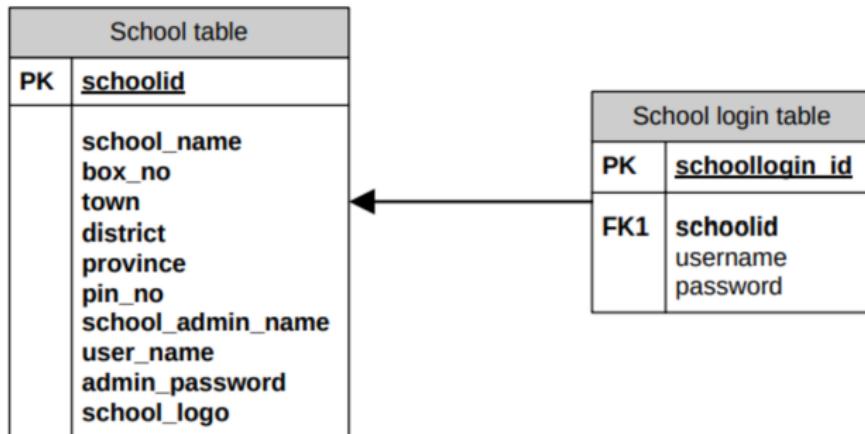


Figure 25 E-R diagram of the school login module

Figure 12: SchoolERD.png

Staff ERD

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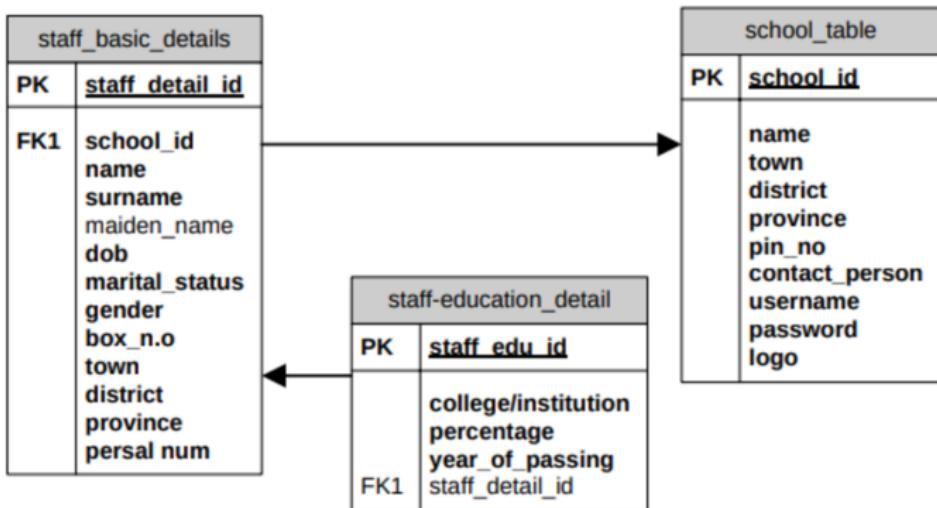


Figure 28 E-R representation of how school admin captures staff information

Figure 13: StaffInfoERD.png

Student Journey

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4.1.7 Students

Students can access their examination results through the system. They can also learn of upcoming events through the online notification system.

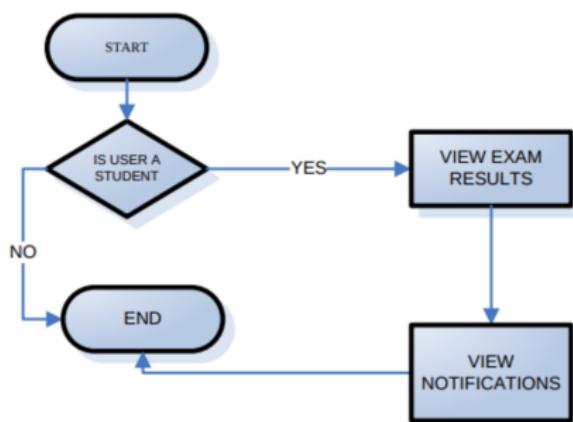


Figure 21 Illustrations of student activities

Figure 15: Student Journey.png

Student Academics

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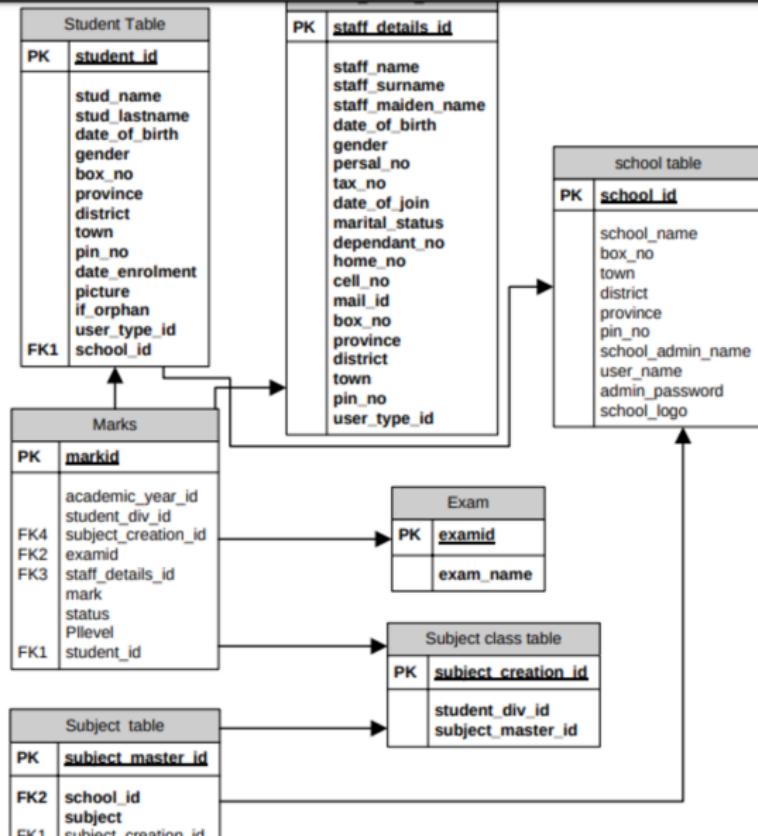
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Student Info

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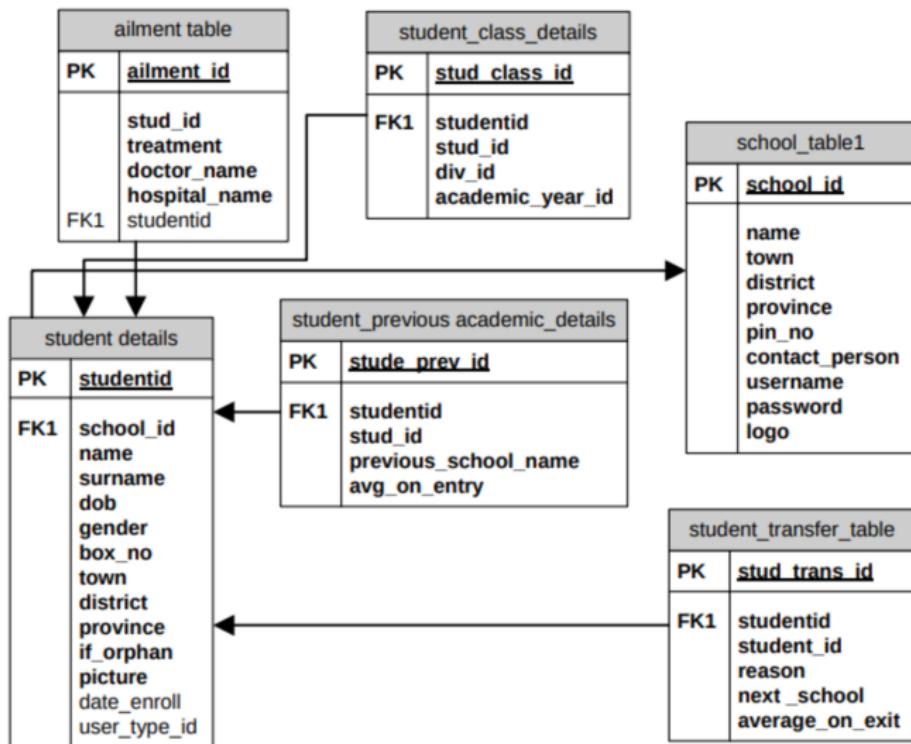


Figure 27 E-R representation of how school admin captures student information

Parent ERD

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