

# DEVELOPMENT OF STAFF PROFILING AND IDENTIFICATION SYSTEM

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**Abstract:** This work, development a web platform for profiling staff is a research project conducted solely to manage academic staff profiles, provide an avenue for students to identify their staff by scanning staff unique code. Over time the manual method of profiling staff which involves file record management done by the staff admin officer only. This web platform allows staff to enroll themselves and view other staff profiles in the same department. The agile methodology was employed which allowed us to build this system with a great sense of flexibility in a short time to meet user requirements. It also allowed us to reduce possible risks and create an avenue for modification at every phase. In the course of this research, we found out that a system of this nature will improve the way staff profiles are managed; reduce the turnaround time to complete enrollment forms submitted by the users. The system was developed with programming languages such as python (flask) and Postgresql for the database, at the end of the system will run on the web and be accessed on any device through the web browser that will be delivered.

**Keywords:** Web platform, profiling staff, research project, staff profiles, staff unique code, file record management, great sense of flexibility, user requirement, modification, Postgresql, web browser.

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## I. INTRODUCTION

Over the years, the word 'profiling' has been used for forensic investigation. Although, profiling could have multiple-meaning, used in different contexts. <sup>7</sup> suggested that "profiling is a practice in which certain characteristic of an exact class of person is drawn from their know-how, and data-holdings are rifled for persons with similar traits." This description provides a strong comprehension about profiling is; as a practice of creating a series of processed data, which is applied to individual by methods of facts amplification. With well-detailed profiles based on individuals' data collected, we can confidently construct an online professional identity profile.

This work will emphasis only in Staff profiles in an academic institution. Staff profiling is a way for proper individual identification among groups in the institution. It provides a set of information, attributes, and characteristics belonging to a particular staff. The advances in Information and Communication Technology (ICT) have made possible online applications for profiling that are built using different technologies such as QR codes, fingerprints, etc. This web platform for profiling staff makes it easier for proper identification. The traditional and common method used by students and their colleagues for identifying lecturers, which is the use of a tag where their names are bodily written on and pasted on their respective office doors does not seem to give detailed information about them. Therefore, the need to collect comprehensive data for profiling is very pertinent. It gives their finder or visitors accurate and invaluable information about a particular staff.

### **A. Statement of Problem**

Existing Staff Profiles usually does not give students and co-lecturers with detailed information regarding a staff. Normally, in an academic environment, lecturers' names mostly without their qualifications or relevant information are written on a tag that is pasted on their office doors. Should they leave or change office it will require the departmental admin officer to remove the tag which is, sometimes pinned to the door with nails. Removing those tags would most times leave the door in an awkward look. These and many more reasons were considered by the researcher to design a system that would eliminate what the researcher calls the 'traditional' method of profiling staff. This online system would save the staff the stress of constructing another tag. Also, generating a QR code for each lecturer on sticky notes would be adopted to eliminate this method.

### **B. Aims and Objectives**

The project aim to develop, web base application platform designed for staff profiling and identification among groups. While the objectives to achieve this include:

- i. To identify the weakness of the existing system
- ii. To design the input and output logics of the system using UML diagrams
- iii. To code and construct the system modules using programming languages such as Python and python framework, flask.
- iv. To create user friendly interface for the proposed system.

### **C. Research questions**

The research into the development of a web-based staff profiling system tends to put a lot of questions. The following questions come to mind when building a system for staff profiling:

- i. How can the weakness of the existing system be identified?
- ii. What UML diagrams will be employed in the design of these web platforms for profiling staff?
- iii. What programming language will be adaptive in coding the system module?
- iv. What testing tools were employed to verify the proposed system.

### **D. The Scope of study**

This research covers only Students and Lecturers in a particular Department using Information Technology Department of Federal University of Technology Owerri Imo State as a case Study. It will make use of internet connection, QR code scanner, and sticky notes to print out respective codes for each lecturer. The advent of Smart mobile phones has helped students to have access to internet services at any time. In recent times, there have been mobile QR code scanners that can be freely downloaded from Mobile device play stores and open software vendors. There exists collection of data of lecturers for the profiling ahead of designing this system. The positive/negative effects on the educational system where it is utilized/not utilized will most likely be negligible.

## **II. LITERATURE REVIEW**

### **Conceptual Framework**

Profile is a set of data that denotes a subject. It displays relevant information about someone and sometimes an image for clearer identification. Profiling is the process of discovering unexpected patterns between data in large datasets which can be used to create profiles. When creating profiles, it is important to consider your application process. Profiling is the method of identifying a specific subject or identifying them as a member of a specific group or category and taking some sort of division based on that identification. Based on Oxford Advanced Learner's Dictionary is defined as "the act of collecting useful information about an entity so that one can give a description about it." It is a way of providing meaningful data of someone which is used to build and make an available profile of someone. It is desirable to have common profiling documentation across schools so that they are understandable to end users including students, parents,

potential employers and officials in the college. Profiling is the compilation of profiles to categorize people, based on which prediction can be made on behavior and interest. Educational institutions take effect of their staff profiles in the process of decision-making. However, a compilation of profiles it should be done to avoid redundancy. Meanwhile, educators share a common occupation, they may differ in the nature and extent of employment, whether or not they take on additional responsibilities alongside teaching, and they may differ in the length of time they have worked with their current employer. It is possible that these characteristics influence the construction of professional identity, which leads to a specific professional profile.

Profiling has been viewed in various terms. Its process has been felt in different organizations, in business, and in law agencies. In their paper, <sup>[23]</sup> provide one of the first definitions of a profile that analyzes data retrieval systems in contrast: "Matching is defined by emphasizing the logic behind it. It follows inductive logic in finding clues that increase the profitability of detecting violations compared to random searches. Profiling allows investigators to compare several different pieces of data to assess how close an individual or event is to a predetermined characterization or model of violation. " Consistent with the author's background, the definition is closely related to the scope related to law enforcement.

<sup>[16]</sup> Explained and described profiling in three categories: automatic, non-automatic and autonomous profiling. Computerized profiling is based on a computerized function that collects and aggregates data that evolves into computer science that can largely hijack decision-making advice and prevent humans from making many low-level and even high-level decisions. In contrast, manual profiling is a form of reasoning that does not rely on process automation. Meanwhile, autonomous profiling describes where human roles are minimized and decision-making processes are fully machine-driven <sup>[16]</sup>. In the context of current scientific developments, computer-assisted profiling is not yet a widespread model; rather, it is an example of the next evolution of existing automated profiling.

### Concept of Identification in Staff Profiling

Recognition is an ongoing process where people are often associated with something social. When employees contact an organization, they receive certain organizational characteristics and practices.

<sup>[17]</sup> Emphasize the importance of organization as part of society, and employees who express themselves with their organization have a unique image reflected in the image and character of the organization. In organizations, self-profiles facilitate identity. <sup>[9]</sup> Hypotheses those employees act and think from an organizational perspective that enhances personal and organizational identity. In addition, employees must notify the organization. The harder it is to identify, the sooner and more effective the goals of the organization will be achieved.

Fred (1922) described the identity as a "mental exchange with others" as a medium for the identity of the organization <sup>[26]</sup>. Organizational identification plays a positive role in enhancing employee performance. In every educational institution, the process of identification among staff is considered pertinent. It is, therefore, seen as one of the essential conditions for the efficacy of an organization.

<sup>[29]</sup> Denotes identification of employees as part of the organization to identify with that employee. One of the key standards for identification as described by [4], is worker's opinion of an organization as unique and impressive. To ensure efficient employee management and for proper identification of employees, it is important and necessary for every staff to have a unique identification card. The study discusses the use of ID cards for the identification process. He further describes an ID card as a concise card that can easily be kept in a pocket or wallet; it shows an qualities of person including name (first, last name, last name), age, address, description photo to have body color, hair and eyes.

### A. Theoretical Framework

#### Overview of Technology used for staff profiling

The aid of Technology to support in the handling of staff profiles is not new; it is at least as old as writing. However, over the last 50 years, the growth of technologies has speed up rapidly as a result of digital electronics. The accessible methods reviewed for staff profiling are the use of Barcode and QR code technologies. It is interesting to note that barcode technology is different from QR code technology, although they have few similarities. Before as a scanner or reader, you can scan the code and add the information to the computer screen. The application of these technologies has

been felt in various sectors of the economy, both an educational institution. For this research, the researcher will be studying and working with QR code Technology for the development of staff profiling and identification system [27].

### B. Quick Response (QR) Code

Released in 1994 in Japan by Denso Wave Incorporated, the Rapid Response Code was founded by Toyota's Denso Wave which is a subsidiary of Toyota.

QR codes were used by Denso Wave in car factories to track vehicles and their parts. It was designed to allow fast decoding speeds, hence the name Quick Response Code. The Quick Response Code owes its existence to the development and success of the barcode. Today, quick response codes are used for a variety of tasks in business environments, tracking applications, and for mobile phone users. There are many QR generators available as software or online tools. In addition, QR codes are two-dimensional image sensors that work with a programmed processor [27]. Two-dimensional means scanning both vertically and horizontally. QR codes can store more data than one-dimensional barcodes, showing that QR codes require a more sophisticated reader.<sup>31</sup> A typical one-dimensional barcode can only store less than 100 bytes of data, while QR codes can store up to 2953 bytes( ). The reason why QR codes are mostly used is that QR code is new and unique. In addition, QR codes can instantly connect people to a virtual information and entertainment environment. In addition, the practical and fast functions of QR codes tempt them to use them. In addition, QR codes can send information to mobile phones immediately and from any location [31].



Figure 1: A picture of a QR code (Source: Wikipedia)

The three tetragons positioned using a smaller square are used to uphold the size, orientation and angle of viewing. The dots are used to symbolize the data using digits through an error-correcting algorithm. QR codes are of two types One is static, it performs one-time job, Once this type of code is generated then, we can't change the code again. The second one is dynamic and editable; information can change according to the change of time and needs<sup>10</sup> Apart from these two major types of QR codes, other six types of QR codes exist. A QR code can hold 7089 characters of numeric data, 4296 characters of alphanumeric data, 2953 characters of binary data, and 1817 kanji (Chinese letter) characters. The widespread utilization of mobile devices like smartphones by people in their day-to-day lives, primarily for mobile internet access; Quick Response Code is a passable way to transfer information speedily and professionally. By glance over a Quick Response Code with a mobile device, users can be associated to pertinent web pages or obtain information<sup>17</sup>. These days, QR Codes were used everywhere that involves human activities and transaction. This allows offline media such as magazines, newspapers, business cards, public transport, signatures, t-shirts, or any other media that may contain printed QR codes as advertising media. In addition, QR codes can be used as identification tags or stickers for tracking and tagging purposes<sup>30</sup>.

### C. Reading QR codes

As smartphones have become ubiquitous, so have QR codes. Therefore, reading QR codes is not that complex; hence it is as simple as learning. One choice is to use a read device like hand scanner, or fixed scanner. The expedient devices for reading QR codes are smartphones or tablets equipped with cameras reason it provides high ease of access to users. Reading a QR code on a smartphone involves first installing an application. After the application been installed, selecting the application it activates the smartphone camera with on-screen framing guide. The QR code can then be scanned using the camera. You may need to hold the camera in one place for a while until you hear a beep to indicate that the scan is complete. The smartphone screen links the user to the URL where the information is kept.

### D. Related Works

Self-assessment is an ideal foundation for creating an ideal project. High -power employees are measured, maintained, and maintained in situations that do not affect politics, relationships, or context [22]. Hogan's Great Potential Model demonstrates leadership on three fronts. With the rapid increase in the number of employee recruitment especially in educational institutes, the need for them to be profiled for easy identification cannot be overemphasized. Be it as it may, every employee working within any organization should, therefore, have an identity card. More so, with the surge of internet usage, computer technologies are receiving more and more attention as means of delivering staff profiling. The primary technologies used for profiling staff include barcodes, QR codes, biometric, and electronic identification cards. These technologies most times are incorporated and are used simultaneously in the development of profiling systems. However, QR codes remain the most frequently used computer technology in the profiling process. A distinctive QR code is produced in each member of the staff ID aware system. The QR code can be skimmed through smartphone and it will displayed the facts of the staff Comprises academic qualification, current status to the school, and further personal details. In some cases, a fixed scanner is used for reading QR codes; data read in is processed connected to a PC with cables. In other cases, a handy scanner or a handy terminal are used. Thus, due to the evolution of mobile applications, there have been hundreds of applications designed specifically for reading QR codes using smartphones.

These scanners are designed in a way to allows for high-speed reading. However, certain factors are considered in generating QR codes to ensure compliance with the scanner. Some of the advantages of utilizing computer technology such as QR code technology in developing staff profiling systems include the ability to store a tremendous amount of information, efficient management of staff profile documents, and providing a creative way of engaging members of staff. It also allows scanning from any route for 360 degrees. This will make your device easier to read and reduce the risk of background noise. QR code technology is very unique and useful, it allows more stable data storage, lower deployment costs, easy technology, and wide use and broadband, a free read principle and unzip on the smartphone. These qualities are very attractive for employee recognition projects, especially for universities in emerging countries with imperfect resources. One of the biggest disadvantages of QR codes is people's lack of familiarity with the code. Although QR codes can be found and implemented nearly anywhere, people do not know how to obtain the information they require to use the code. So it is important to provide a manual guide to people in businesses or sectors where the technology is adopted and implemented.

Profiling teachers' sense of professional identity by **Esther T. Canrinus, Michelle Helms-Lorenz, DouweBeijaard, JaapBuitink, and Adriaan Hofman, (2011)**, This study mostly concentration on the upbringing factors contributing to the growth of teachers 'professional identities. Their study showed that professional identity should not be seen as a unified variable. Work well -being, professional commitment and changes in motivation levels were seen as indicators of teachers 'expert identity. Teachers 'professional identity is typically related to how teachers perceive themselves in terms of their ongoing interaction with their context. It is argued here that this interaction is reflected in teachers 'job satisfaction, professional commitment, self-efficacy, and changes in motivation levels. Although teachers have a common profession, they may vary in the type and size of their employment relationship, regardless of whether they perform additional duties in addition to teaching, and may vary in terms of time worked with their current employer. Possibly, these features contribute to the formation of a professional identity, resulting in a specific profile of professional identity. A teacher with a special identity can also choose an assignment with certain characteristics. Whether teachers with different identity profiles differ in these features of the appointment needs to be clarified before these possibilities are further explored.

<sup>2</sup> detailed that expert personality ought to be professed as an outgoing and vibrant process.

<sup>3</sup> opium that in mobile university enrollment system, higher institution administration generates a platform for entry of new people, such that, the user(s) can use their mobile phones to finish the filling of forms regardless of their device operating systems, and other factors. Furthermore, mobile enrolment system increase an enrolment process in the university system. According to <sup>28</sup>, well-built enrolment platform can be used to reduce manual method. It implements in a step-by-step mode of its process, where each process must be completed within the system, as the process manual does, and monitor the content of the process manual, such as how it is supplemented by student the registration form for registration, evaluation and evaluation. a payment system for parents how they handle school transactions.

The writer also talks about the profiling system of teachers which helps in viewing and outline of teacher level by subject, semester, and discipline. The user can select the teacher and then chooses criteria's. It defined Apriori as an algorithm for association rule mining. In other words, is used to find the relation between different items. Online teacher profiling system which was proposed by <sup>27</sup> in teacher assessment provides usefulness and competence to education information system. The system helps the college to appraise every teacher's performance and its accessible profile. The fuzzy set principle applied in assessment criteria for teachers and learner, students' performance was weighed on a uncertain grading scale. A fizzy logic however was proposed by the author for calculating the score of teachers based upon request.

### III. SUMMARY OF LITERATURE REVIEW

**Table 1: A Review of Related Work**

Name of work	Author	Solution proposed/ strength	Approached employed	weakness
Teachers' sense of professional personality	Carinus et al.(2011)	This is use for identifying different professional identity	Two-steps cluster analysis	The responses of these teachers to their interaction are reflected in their change.
University mobile enrollment system:	Blessing O. Ogbuokiri et al (2015)	To show how mobile systems could be used to ensure improved enrollment practices in the university system.	Object-oriented analysis and design	Inability to have a mobile device can prevent students from gaining access to the system.
History of QRcode	Denso wave incorporation	Focused on reading high-speed that captures the desired information	Developed for manufacturing automobile cars	It requires modern gadgets for capturing and scanning
Fuzzy rule-based system and Apriori algorithm (2013)	Attaur Rahman	It provides good education information system. Also evaluates teacher's performance in available profile.	Special algorithm of Fuzzy rule-based system and Apriori Algorithm	It does require much attention as any mistake would alter teachers' assessment computation

Source: Researcher

### IV. METHODOLOGY

Research methodology is an organized way to solve research problems. It is the science of studying how investigation is done appropriately. There are several steps that a researcher often takes when conducting research on a problem. The research method includes the study of various methods that can be used to conduct research such as conducting tests, experiments, surveys, and critical analysis. . It aims to provide a practical research plan and also serves as a guide for the researcher to be active in his or her own query area. Many steps are used for different types of research and the term is generally considered to include research design, data collection, and data analysis. These practices include the waterfall model, spiral model, iterative model, agile model, evolutionary prototyping. These methods may include predefined deliverables and objects which a project team creates and complements to build or maintain an application <sup>32</sup>.

### A. Methodology Adopted

The adopted methodology is the agile methodology and it will be useful in developing this web platform for profiling staff. The agile software development methodology is a lightweight programming method. <sup>18</sup> said Lightweight methodologies have several features, such as pre-coding tests, standard product releases, customer involvement in development, custom code ownership, and redesign. An agile software development process usually starts by defining the users' requirements, scope of problems, opportunities, and values to be addressed. It is a practice that encourages incessant iteration of development and testing throughout the software development lifecycle of the project. This supports proactive preparation, evolutionary development, early implementation, and continuing progress and facilitates quick and scalable response to change.

#### Advantages of agile methodology

- i. It promotes customer satisfaction and user centered design
- ii. It does not require much planning.
- iii. It is has high flexibility and can easily managed
- iv. Even late changes in requirements are welcomed.

#### The disadvantage of agile methodology

- i. It poses a problem when the end-user does not have a clear understanding of software development initially.
- ii. It Lack correct documentation
- iii. Frequent feedbacks, can be very demanding by the customers.
- iv. It can be difficult to implements
- v. It is hard to measure the progress in agile methods

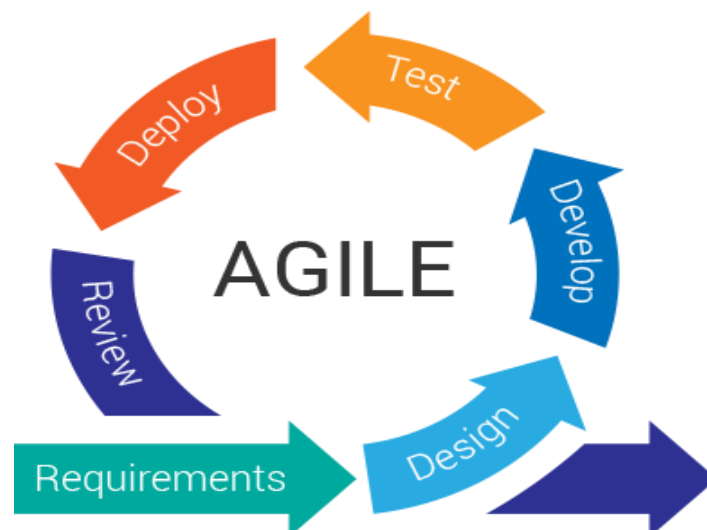


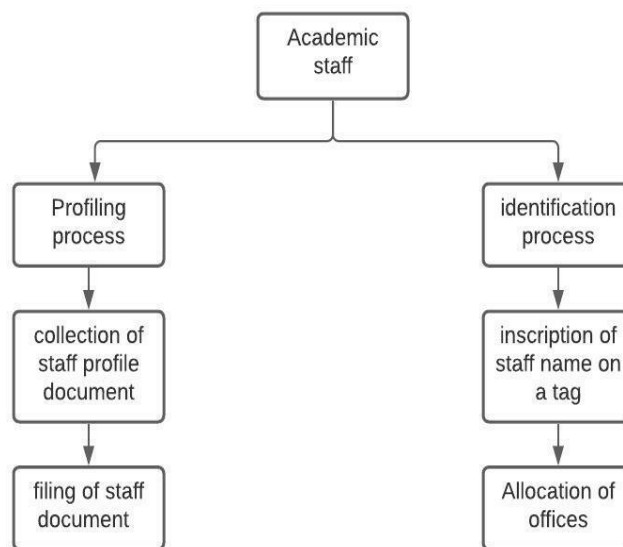
Figure 2: phases of the agile model (source: Wikipedia)

### B. Data Gathering and Techniques

For this research, interviews, and use of observation were used. Interviews methods are most active because it helps the researcher clarify, and explore research opinions better. It is usually an open-ended question so that in-depth information will be collected. The main benefit of a personal interview is that close and direct contact between interviewers and interviewees is involved. The researcher took time to visit the institution to see and capture the raw data and to know how favorable the traditional method of profiling staff has been. This is to achieve development of an efficient web platform for profiling staff.

**C. Analysis of Existing System**

The researcher studied the components of the traditional method of profiling staff and it is only but limited to an individual staff profile document and a tag inscribed with their names, pasted on their various office doors for easy identification by many. Staff information was filed individually with all documents assembled in an office flat file. This profile information is not always made available except its owner, thereby restricting others from knowing comprehensive information about a particular staff. This method establishes relationships from the employer to the employee (staff). Managing and manually handling a large number of staff profiles can be tedious and lacks record efficiency, hence the design of a web platform for profiling staff.



**Figure 3: Diagram of the existing system source: Researcher, 2021.**

**D. Problem faced by the existing system**

The weaknesses in existing system include:

- i. Difficulty in accessing a particular staff data file, thereby causing inconvenience and inefficiency.
- ii. Limited data sharing
- iii. It is time-consuming having to profile many staff one at a time.
- iv. Data redundancy. A tendency that the same information may be duplicated in different files.
- v. Diminished data security and confidentiality.

**E. Tools and Material used**

During the cause of this design, the researcher made use of the following development tools to develop the web platform for staff profiling and identification system.

- i. **HTML:** Hypertext Markup Language is a frontend tool used for creating and structuring sections, paragraphs, headings, links, and block quotes. HTML describes semantically the structure of the website with cues for presentation, hence a markup language.
- ii. **CSS (Bootstrap):** To provide basic styling features to the web platforms, Bootstrap a CSS framework was used. It is used by the researcher to apply the choices of color, size, font, and layout to the design. The bootstrap is a CSS framework that can be added to web applications to make them more appealing to the eyes. It has provided blueprints for structuring your CSS designs to your taste.



- iii. **JavaScript (Vue.js):** It is a scripting language that is used to implement complex features on web pages. It was also used to add interactive behavior to the web platform. Here, a JavaScript framework, vue.js was used to build these web interfaces and one-page applications.
- iv. **Python:** This programming tool was useful at the backend development of this system. It is a high-level programming language that allows the researcher to focus on the core functionality of the application under design. Python however strives for a simpler, less syntax and grammar while giving developers a choice in their coding. Flask is a type of Python framework that was used by the designer.
- v. **Heroku:** it is the platform as a service that enabled the developer to build, run, and operate applications entirely in the cloud. For the deployment of this system, this tool was what the developer used because it is flexible and easy to use.

## V. RESULTS AND DISCUSSIONS

This is the construction of a technology-based solution for the system requirements which were identified in system analysis the objective is to produce a model or blueprint of how the proposed system will look like or work. These include the input design, the output, and the process design. The project is a web-based project that was designed with HTML, CSS, JavaScript, PHP, and MYSQL. All has its functionality in the development of the system. It is an open-source application that have fabulous success at client-server applications.. To run the proposed system, the user is required visit the portal and log in inappropriately with his/her login details provided upon registration. There are three categories of users: administrator, students, and staff. The system is designed in a way that whichever staff that registers into the system first automatically becomes the admin. The administrator is responsible for managing all academic staff profiles, generating a unique token key shared amongst staff for enrollment. He sees all the registered staff, can view and print a comprehensive staff list that was profiled. He is also responsible to assist staff to enroll into the system and also delete any staff from the system as a result of the change of department. Staff could enroll themselves using their corresponding token key generated by the admin. The student who happens to be a user can view the staff profile for verification and identification. Each registered staff is passed to the administrator dashboard. Once a staff is successfully profiled, the system generates a unique QR code for the staff.

### A. Functional requirement

It describes the system and its components. In other words, functional requirements indicate exactly what the system is set out to achieve or should do. For this system such requirements are listed below: the ability to register a staff with a token, profiling a staff, generation of Qrcode for identification, managing user account admin and staff, update and print staff list, ability to allow for a staff profile preview.

### B. Non-functional Requirements

The non-functional requirement of any information system entails that system features such as security, reliability, performance, maintainability, etc. they are persistent qualities and constraints. For this system those non-functional requirements which were achieved include the following:

- a) Usability: points to how easy it is for the system to be used, which involves a great deal of user communication towards understanding how users access the system. This was made possible using prototyping tools like Figma which is easy to understand and navigate user-friendly interfaces.
- b) Reliability: builds a great deal of trust with the users such that they can do whatever the system can offer with no fear that it could not achieve the purpose it was designed for. Users can rely on the features it offers to achieve their aims.
- c) Performance: optimizes the system to perform swiftly. It has low crash possibilities and downtime; files upload and download are relatively seamless with very constant delivery of optimal results.
- d) Speed: the system was designed to allow for fast responsiveness regardless of the weight of the application files which is very light, the pages load very fast on the web browser because the images and files which it is supposed to load are all made to be light and minimally sized.
- e) Security: Security is a very high concern of this system because some of the functions here are highly sensitive. Therefore, the hosting of this software should be done on a very secure server system and set up. Also as a part of the development process, user authentication and authorization were implemented with very secure and trustworthy platforms.

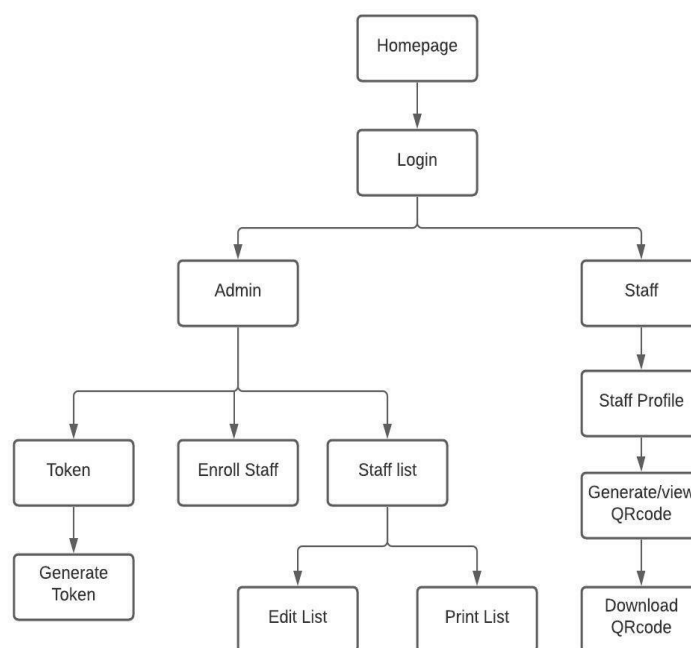
- f) Availability: the system is up and running at all times, places, and on any appropriate device.
- g) Lightweight: The system should consume less and very minimal system resources to avoid overloading the client device.
- h) Backward compatibility: compatibility issues target making the systems not to be problematic to users who access it with older browser versions. This is due to the multiplicity of the personalities who can access the platform. At any point, it should offer the least minimal service.
- i) Maintainability: This entails keeping this application running even in years to come whether by the original creators or any professional employed to manage it. This was achieved with the use of extensive documentation and standard software approaches as adopted by this project team.
- j) Scalability: This system can scale both vertically and horizontally. By vertically it should be able to easily allow for new features and updates to be added to it. Horizontally implies that the system should accommodate any future large influx of users.

**C. System Models**

This is a process-oriented; a system model describes how processes interact. Systems models are used to represent the abstract of the actual system in diagrams. Building software applications that meet standards should be done using different available systems models basically for representing the system's internal working process, interaction with users, expected output and input, its overall setup views, and logic. The following system models were utilized in this project: high-level model diagram, flowchart, use case diagram.

**D. High-Level Diagram**

A high-level diagram makes available an outline of the complete system, identifying the main components that would be developed for the product and interfaces. It shows all the menus that displayed in the web system. It starts according to the diagram below with the homepage, also known as the landing page. The login tab has the admin and staff in it, it describes the user that is responsible for accessing the system. The login tab indicates the various activities that are performed by either the admin or staff at every login.

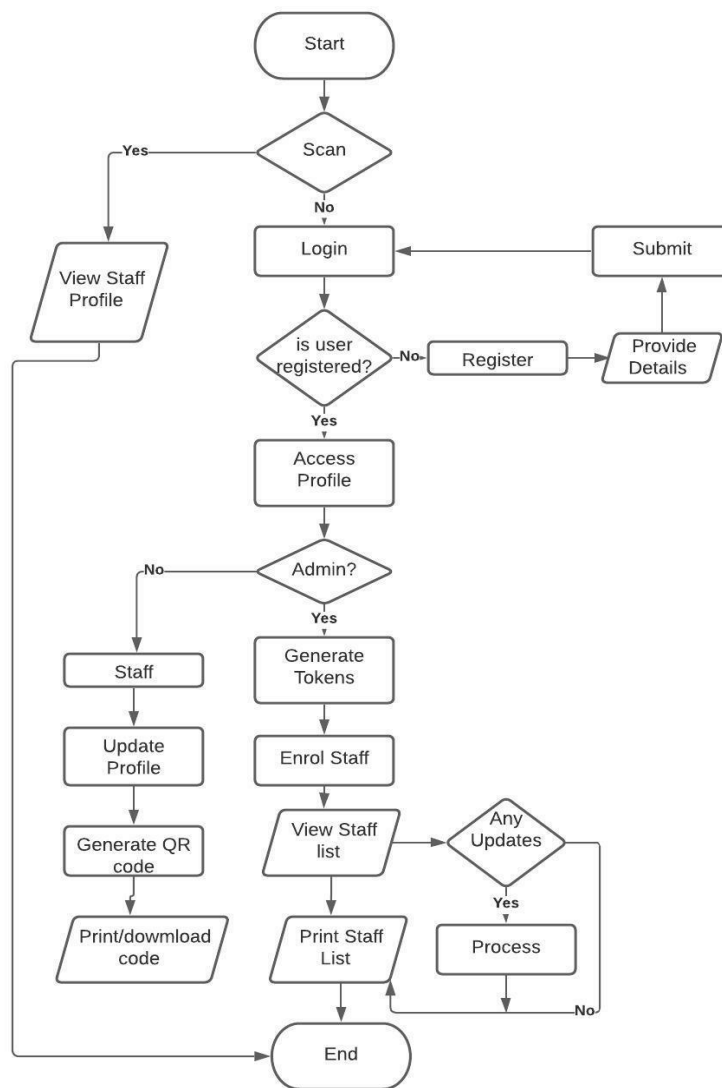


Source: Researcher, 2021

**Figure 4: High-level diagram of Staff profiling system**

**E. Flow Charts**

A flowchart is the diagrammatic representation of an algorithm, a step followed to solve a task. Flowcharts are steps by steps approach in explaining the logic behind the functioning of the system. A flowchart will indicate the conditionals in the systems' streams of events. The flowchart is very necessary for making sure that any system under design is done with a predefined direction of actions or performance in mind. The flowchart of the staff profiling systems below indicates that system users can be admin, staff, and students. As an admin, you require to generate access tokens for registration, view the staff list, and also edit and print the staff list. As a staff, you are required to register with the token, update your biodata and generate your unique QR code. As a student, they view staff profiles for verification and identification.

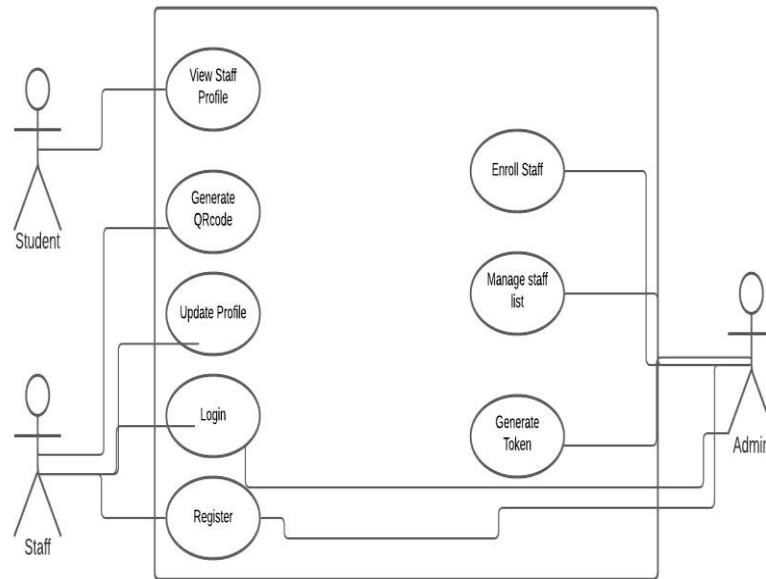


Source: Researcher, 2021

**Figure 5: flowcharts of staff profiling systems**

**Use Case Diagram**

This describes the type of communication/interaction a user makes with the system. For the staff profiling system, the use case diagram is shown below. From the diagram below the system primarily have three users vis a vis: students, staff, and the admin. The student can view the staff profile, while the staff can generate QRcode, update the profile, login, and register. However, the admin can Register, login, enroll staff, manage the staff list and generate tokens.



Source: Researcher, 2021

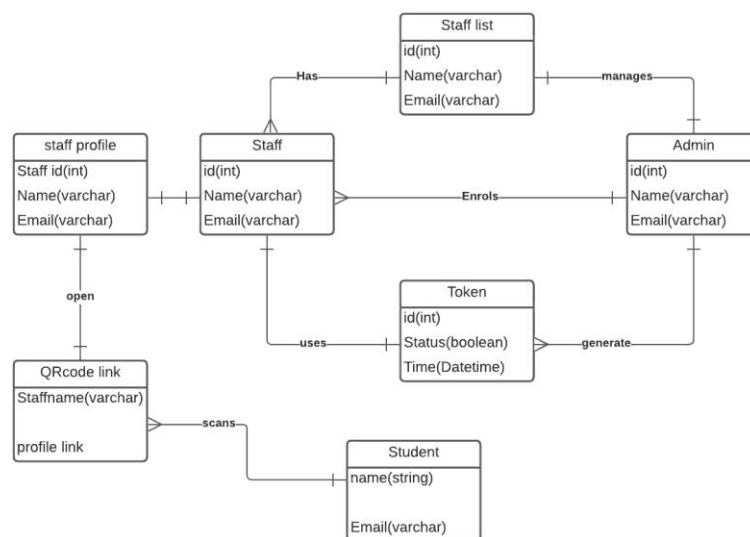
Figure 6: Use case diagram for Staff profiling system

F. Data modeling

Data modeling is a software engineering practice for representing the data and the data elements of a system. It is represented in a graphical format to serve as a blueprint for the actual creation of the system. With data modeling, the system can be pictured by the developer in terms of how the software entity interacts and what type of data it can possess.

Entity Relationship Diagram

An entity-relationship diagram describes interconnected things in a purview of knowledge. A ER model is composed of entity types and specifies dealings that can exist between entities. ER will create a visual representation of the entities as captured by the database of the system and how these entities relate. The ERD of this system is shown below.



Source: Researcher, 2021

Figure 7: Entity-relationship diagram of staff profiling

### G. Database Design

This simply involves organizing data use in the staff profiling system in a way that it can be accessed easily. However, the access methods applied in this depend largely on the processing where online and real-time processing was considered. After a critical examination of various methods of accessing files, the author recommended the random method of accessing for the following reasons:

1. Random file access has the advantage of enabling access to a record directly, without having to access any other records without the file.
2. A random file record can be accessed directly regardless of whether or not the previous records have been accessed.
3. Random file access can enable insertion, deletion, and updating more efficiently since any of these operations do not affect other records within the file.

The database of this project was designed with Postgresql, which is a relational database. It was used because of its capacity to handle the large volume of data and information. Its efficiency to handle queries such as insertion, deletion, search and update makes it very much suitable for online and offline database setup.

**Table 2: User profile**

<b>Id</b>	<b>Field item</b>	<b>Field width</b>	<b>Field type</b>	<b>Constraints</b>
1	Id	50	Varchar	Not Null
2	Email	500	Varchar	Primary key
3	Is_staff		Varchar	Not null
4	Is_admin		Varchar	Not null
5	Date_joined		Datetime	Not null

Source: Researcher

**Table 3: Staff Profile**

<b>Id</b>	<b>Field item</b>	<b>Field Width</b>	<b>Field type</b>	<b>Constraints</b>
1	Staff_id	20	Varchar	Primary key
2	First_name	50	Varchar	Not null
3	Last_name	50	Varchar	Not null
4	Email	50	Text	Not null
5	Phone	20	Varchar	Not null
6	Dept	50	Varchar	Not null
7	Qualification		List	Not null
8	Designation	50	Varchar	Not null
9	Courses		List	Not null
10	Office_location	200	Varchar	Not null
11	Publications		List	
12	Barcorde_url	50	Varchar	Not null
13	Profilepic_url	50	Varchar	Not null
14	Date_created		Datetime	Not null

Source: Researcher

**Table 4: Access Token**

<b>S/no</b>	<b>Field item</b>	<b>Field width</b>	<b>Field type</b>	<b>constraints</b>
1	Id		Integer	Primary key
2	Token	50	String	Not null
3	Is_active		Boolean	Not null
4	Created		Datetime	Not null

Source: Researcher

## H. Program Design

The program was designed on windows Apache – MySQL–Python (Xamp). Python programming language was used

### Hardware Requirements

The hardware requirements of the system are a Dual-core processor or higher processor, Not less than 2GB RAM, Hard disk (150GB minimum), USB Mouse, Printer (laser or Deskjet).

### Software Requirements

The software requirements by the system are Operating system, A web browser eg. Google Chrome, internet explorer or maxilla. Built-in flask webserver (for development), and Gunicorn (for production).

## I. System Implementation

Implementation deals with the process of putting a system into operation. It starts with the end of the design and development phase. It is also a set of programs/modules that run effectively on computers and their accompanying users. For this project, the system implementation procedures are discussed in the sub-topics below.

### Program specification

Program specification involves explaining in detail the functions of each module. The program is comprised of the following modules: Registration module, Admin login module, Staff login module, Authentication module, Access token generation Module.

1. Registration module: This module takes care of every registration process done by the admin and staff in the system.
2. Admin login module: This module takes care of staff visitation to the site, on this module; the admin can log in and perform staff enrollment, view staff list, and print staff list.
3. Staff login module: This module takes care of registered staff. Staff can enroll themselves other than the admin. Here, they can also view other staff lists and also generate their unique QR codes.
4. Authentication Module: this module manages and authenticates every profiled staff in the system.
5. Token generation Module: this module takes care of all access tokens generated for each staff. These tokens are generated by the admin and every staff uses their unique token key to register, hence for subsequent login into the system their login details will be required.

### Implementation procedure

A procedure that ensures proper and standard development of the system was adopted in the implementation phase. This procedure used involves the following:

- i. Analysis of the design diagrams: After a proper user requirements gathering and analysis the system plan that is the system design was produced using different UML tools like use case and the rest to create visual imagery and representation of the entire system to allow for easy and guided development. The analysis design diagram was chosen to ensure the data flow, inputs, and outputs of the systems were represented.
- ii. Choosing units and modules to develop as it pertains to parallel or non-parallel tasks: This process involves breaking the work plan into different groups where similar ones are placed in the same group and activities which could run side by side are identified. At this stage, the system is planned to avoid time wastage in the development process and also allow for responsibilities to be shared among the coders in the team.
- iii. Coding: This involves writing program codes to implement the functionalities of the system. At this stage, the actual program codes are written in the chosen programming language, in this case, CSS, HTML, JAVASCRIPT, and PYTHON. This is done under programming standards like in-code commenting, reusable component building to avoid unnecessary repetition and fast track of the development process.
- iv. Testing: System testing is a crucial aspect of system implementation. When systems are tested the proposed results of the system are tested against the actual result. Testing is a quality assurance procedure for ensuring the system meets requirements and specified standards. Testing will be discussed further, later in this chapter.

- v. Deployment: The staff profiling system is a web-based platform that enables the proper management of staff profiles. It is deployed to run on the web. More on the system deployment is below.

### Program Testing

This is a process of running a test with the same volume of input, output data access, and data implementation that the final application will have to undergo. Kerner (2006) says “is an investigation conducted to provide stakeholders with the information about the quantity of the software product or services under test. Testing is also used to identify defects (evaluated for system failures) using specially developed test data software.

### Unit testing

In this aspect of testing portions of the software are tested to determine whether they are fit for use. The following units were identified and tested:

**Table 5: Test Results**

Unit Tested	Description	Test steps	Expected result:	Actual result:
Registration (register admin)	check if the admin is designated by the department to handle the admin page.	i) Provide staff admin officers details like name, email, and password. ii) Click register.	should be taken to the admin page	PASS
Token	the tokens are used by staff for their registration	i) log in as an admin ii) generate tokens iii) share token to staff	ensure every staff gets the access token	PASS
Login	check if staff can log in.	i) log in as an admin or staff ii) provide staff name, email, and password iii) click login	ensure staff can log in	PASS
Staff biodata form	check if the staff has filled in all required information	i) fill your biodata ii) upload your photo iii) click enroll	ensure all data was filled	PASS
Staff profile		i) scan the QR code ii) view staff profile iii) navigate through the profile and contain staff details.	ensure the code was properly scanned	PASS
Edit and print staff list		i) log in as an admin ii) delete or print staff list	ensure admin can delete and print staff list.	PASS

**Table 6: Discussion of Unit Testing Results carried out**

S/N	ITEM TESTED	PROCEDURES	RESULTS
1	Registration module	Provide staff admin officer details like name, email, and password. Then click register.	At the end of the registration, the admin was able to view his dashboard
2	Access token	Login as admin and generate an access token for staff to register.	In the end, each staff were given an access token to aid their registration process
3	Login	After registration, either the admin or the staff can log in with their login details.	In the end, every staff is expected to log in without hassle.
4	Staff bio-data form	Login for the first time. Fill the biodata form, upload your picture and click enroll button.	At every successful biodata completed the staff QR-code was generated and the staff details saved in the database.
5	View Staff profile	As a staff, log in or scan your QR-code to view your profile. As a student, scan any of the staff QR-codes using the mobile scanner to view staff details.	In the end, the code was properly scanned and staff profile details were obtained.
6	Edit and print staff list	Log in as an admin, view all staff lists. Edit or print staff list.	The staff list was generated and printed.

Source: Researcher

**Program Documentation**

This refers to instructions or specifications written by the system developer on the usage of the system and the program documentation is on a CD ROM which is encompassed during delivery of the system documentation is the very important thing that a programmer should do after programming. It aids in the maintenance of the program thereby prolonging its life span and efficiency it gives the user a guide on how to use the software. With this documentation, we wish to provide a vivid and brief description of how the system will work. The staff profiling system is a web-based system that is built to be deployed on a webserver to the internet and can be accessed by a client browser. Below is a brief description of how the system works

**OUTPUT /INPUT SAMPLE**

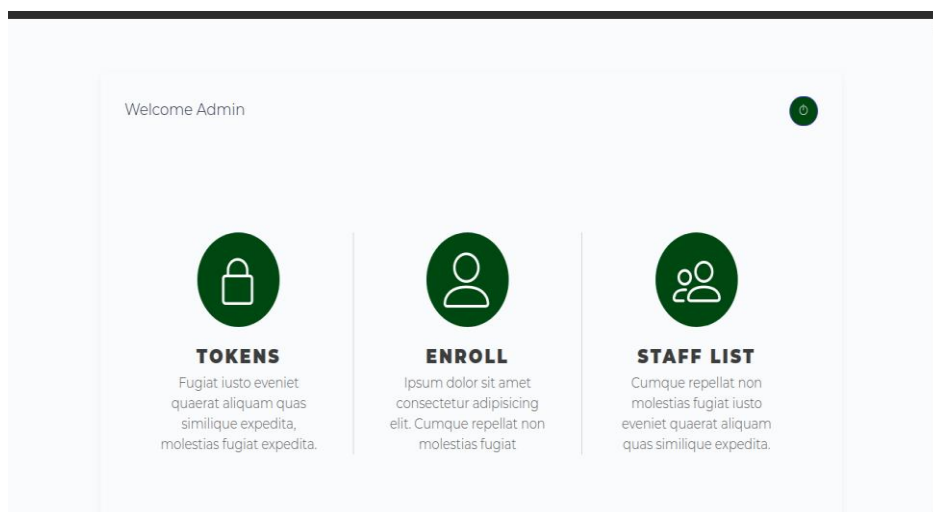
HOMEPAGE: This is the first page the user sees when they enter the web address



**Figure 8: The Homepage**

**Admin Page**

The admin page is the page that provides every system admin (will be designated to department Academic staff officer) with their dashboard. So once on the dashboard, the admin can click any of these tabs – token, enroll and view the staff list.

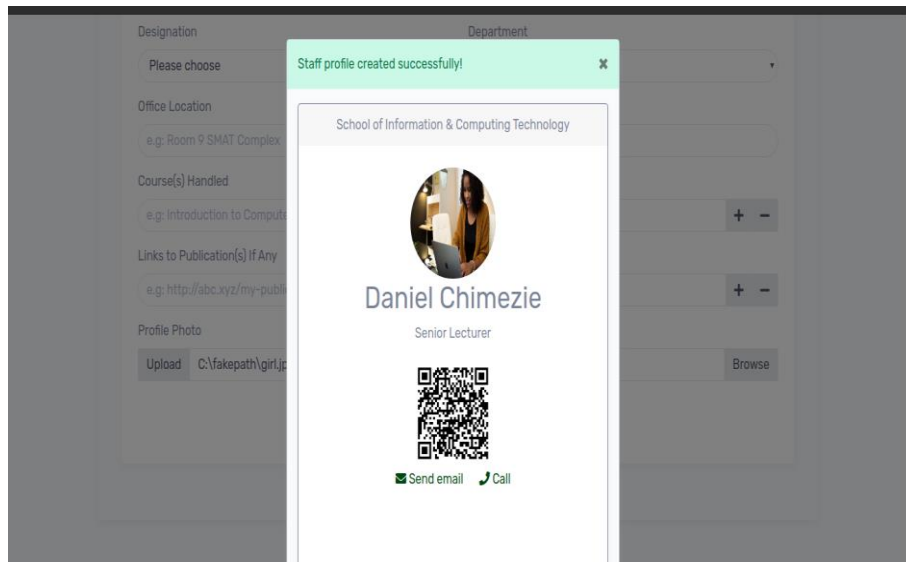


**Figure 9: The Admin Page**



**Staff Profile Page**

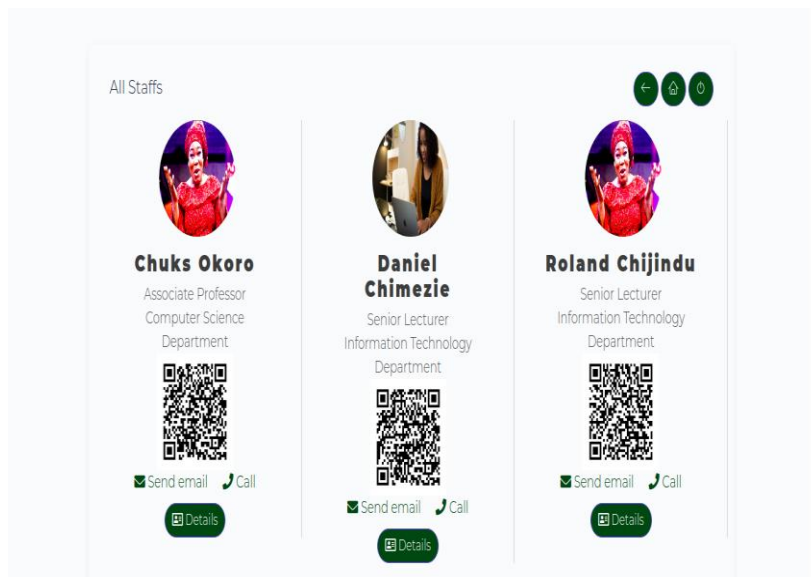
This page provides the form for staff profiling and data inputs. In the end, the system generates a unique code for the staff. Below is a preview of a staff that has been profiled.



**Figure 10: Staff profile page.**

**Staff list page**

This shows the comprehensive list of profiled staff. An admin is responsible for printing and editing the staff list.



**Figure 11: Staff List Page**

**Step by step guide to install and run the program**

The steps are as listed:

- i. install python and Postgresql
- ii. navigate to the project root folder
- iii. run “source venv/bin/activate” to activate the virtual environment

- iv. pip install -r requirements. Text (this install the project requirement and dependencies)
- v. “flask run” to start the development server at port 5000
- vi. Navigate to “localhost:8000” on your web browser to see the app

## VI. CONCLUSION

The staff profiling system provides an easy-to-use way of enrolling academic staff. This system was proposed to provide a platform for students to connect and identify with their staff, have access to their publications and other information of any staff. It was observed that the system through the admin generates access tokens for staff to register themselves, however, the admin can do the enrollment for any staff who wishes so. Information of any staff encoded into a QR-code is closer to the final user (students) for identification. A problem that plagues the process of enrolling staff manually is the task of constraints satisfaction which made us limit the enrollment to specific departments to reduce the constraint load on our algorithm. The system will be highly welcomed and appreciated when it is finally adopted because the responses, we gathered during our user acceptance testing were massively positive. The Python programming language is very flexible and complete, it provided us with a lot of the freedom to come up with codes for the system. The agile methodology offers one the leverage for constant user and developer interfacing. Hence, every resource for developing this web platform from the start to the end was utilized.

To conclude this work, we take into cognizance the importance of having a staff profiled for verification amongst colleagues and students. Having identified the weaknesses that are associated with the manual system of profiling staff, time is of great essence in the profiling process hence the development of this web platform. This system provides an avenue to engage staff in employee management and create opportunities for some students to look up staff publications that could be helpful. Studies have shown consequently that for every number of students admitted into the department, they are however left with no knowledge of their lecturers. Situations such as this can be wholly avoided with the use of this staff profiling system to assist students in identifying with their lecturers easier and better without requiring the normal series meeting a lecturer face to face to ascertain basic information about him. But with this system, for every profiled staff a unique code would be generated which will be downloaded and printed out. This code will be pasted on the doors of each lecturer or at every strategic point where one can easily visit to scan the code. Upon scanning the code, the details and picture of the staff will be shown, as a result, one can either call or drop a mail to the lecturer for inquiry if the case be. This will thereby bring about efficiency on the side of both the students and lecturers alike.

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