# A Mobile Students' Industrial Work Experience Scheme Logbook Application

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**Abstract** Monitoring of students who are undergoing the Students' Industrial Work Experience Scheme (SIWES) program by school-based supervisors is a difficult task because the current paper based logbook system currently employed is not adequate enough to determine how well students are undergoing the program. It is difficult for school-based supervisors to know whether students actually filled their logbooks daily, showing what they have done or whether they filled it all at the end of a long period of time which means that such entries are very likely to be fraudulent. Which is why school-supervisors try to visit students on the program to physically monitor such students, however due to distance and other logistical issues school-based supervisors are only able to visit such students once or at most twice or sometimes never. The application was developed following the incremental model. Node.Js was used for the backend, MongoDB was used as the database while React Native was used to create the front-end. This application helps school-based supervisors monitor students on the SIWES program more effectively and also makes grading and commenting on logbook entries a lot easier. It can therefore be deployed to tertiary institutions in Nigeria to assist them in the running of their respective SIWES programmes.

*Keywords: SIWES, logbooks, school-based supervisors, tertiary institutions, Nigeria*

## 1. Introduction

The Industrial Training Fund (ITF) was created in 1971 with the promulgation of decree 47 of 1971. ITF was charged with the responsibilities of manpower training and development in general, with the specific mandate to promote skills acquisition in Industry and Commerce. [1] noted that the Students' Industrial Work Experience Scheme (SIWES) was created in 1974 by the ITF to bridge the identified gap between theory and practice in our tertiary institutions. Before the advent of the Students' Industrial Work Experience Scheme (SIWES), students studying practical courses especially in science and technology were being set out with little or no practical knowledge of their various courses of study. The SIWES program is a compulsory graduation requirement for all Nigerian university students offering certain courses. In preparation for this program, such students are required to visit the departments in their various institutions in charge of it in order for the department to prepare them for their industrial training. They are also required to go in order to collect documents that they are to fill during the course of their industrial training. One of such documents is the Logbook. The logbook is a book that contains the daily activities done by the student during the course of industrial training. The student is required to fill the logbook daily and the student is also required to give it to the industry-based supervisor to sign and comment weekly and then at the end of the industrial program, the student is to submit it back to school. Each year, higher institutions spend a lot of money in order to print these logbooks, money that could be put into better use if the logbook application is put into place. The work of marking these logbooks by the lecturers is also made difficult, as for them to mark the logbooks they would have to wait until all students have finished their industrial training, be it 6 months or 3 months and this can be very cumbersome on the lecturers and would also take a lot of time. Supervisors in most cases have to travel down to wherever each student is doing his/her Industrial training in order to inspect and some of these distances could be quite far. In travelling, supervisors encounter a lot of stress and also expose themselves to unforetold risks. Due to this, supervisors tend to visit students just once leading to inadequate monitoring of students' activities. When students resume after their Industrial Training, they submit their IT logbook in hardcopy which can be prone to theft and also destruction by natural disasters. The study aims at developing an electronic logbook in the form of a mobile application that would serve as a better alternative to the paper logbook system that is currently being used in the higher institutions in Nigeria.

## 2. Related Works

Industrial training is a bridge from the classroom to the workplace [2]. [3] defined industrial training as an opportunity to test skills, interests and career choices in real work situations while obtaining an edge on "inexperienced" job market competitors. The industrial training program has become a necessity for students to partake in order to complete their educational program, especially students of the Science, Engineering, and Technology disciplines. [4] evaluated students in various areas which can be summarized into three main areas which are attitude, communication and work attitude before and after the industrial training program. The results showed that the average score of the students increased from 48% - 63% before the Industrial Training to 89% - 95% after the Industrial Training [4]. Over the years the industrial training has been very beneficial to students, [5] noted that students see the industrial training as a means to land their first job, [6] found that students view internships as a valuable learning experience through which they receive an academic grade and also financial compensation. The advantages of Industrial Training include:

Industrial training provides a platform that renders practical knowledge of all they have been taught in school

Students are trained, tutored and mentored by trained and seasoned professionals

Industrial Training helps students to gain valuable work experience for some students this might be the first time of them in a working environment in the real world

In this current world where "who you know" matters a lot, industrial training provides a platform for students to network with professionals who are years ahead of them

A lot of companies use industrial training as a means to recruit new staff. Industrial Training thereby provides job opportunities for students once they graduate.

Related works include [7] designing and developing a web-based SIWES management system for Covenant University, The system was developed to computerize the analogue activities carried out throughout the process of a student embarking on the SIWES program. Also, The Abubakar Tafawa Balewa University (ATBU) Bauchi designed and developed a web-based SIWES portal for students involved or to be involved in the program. Students are given personal login details. All documents that would need to be filled by said students while on the program are available for download on the web portal except the logbook. A brief electronic copy of a SIWES orientation is also available to students. The Federal University of Technology Owerri created a SIWES form on a web page that was integrated into the default students' portal. Students that are to embark on the program are required to login to their portal, to then click on SIWES and then clicking on SIWES form. There the student would then fill out a SIWES placement form before then printing out an acknowledgement slip [8]. The limitation of these systems is that students are not able to fill their logbook online. This system can only be used to register students that are embarking on the SIWES program.

## 3. Materials and Methods

The system is a SIWES (Students' Industrial Work Experience Scheme) logbook mobile application that allows the filling and grading of the SIWES logbook over a mobile application. The system has four sets of users – the administrator, the school-based supervisor, industry-based supervisor, and the student. The administrator is able to create accounts for school-based supervisor and also view the number of supervisors under him as well as the number of students supervised by each of the supervisors. The school-based supervisor is able to create accounts for students that are to embark on the SIWES program and also grade and give feedback and comments on the logbook filled by the students. The industry-based supervisor is able to comment on the logbook filled by the student under him and will also be able to approve or disapprove entries made into the logbook by the student. The student is able to fill the SIWES logbook and submit it as necessary.

### 3.1. Entity Relationship Diagram

An entity-relationship diagram (or E-R diagram) is a detailed, logical and graphical representation of the entities, associations, and data for an organization or business area; it is a model of entities, the association between those entities and the attributes of both the entities and their associations [9]. An entity is a person, place, object, event, or concept in the user environment about which the organization wishes to maintain data [9]. Attributes are descriptive properties associated with each entity type. This is shown in Figure 1.

### 3.2. Use Case Diagram

A use case diagram is a graphical diagram that enumerates requirements documentation use cases and actors (usually users and external systems) and showing relations between them [10]. An actor is an external entity that interacts with the system. It is someone or something that exchanges information with the system [9]. This is shown in Figure 2.

### 3.3. Data Flow Diagram

Figure 3 describes how data flows in the system.

### 3.4. Requirements

The functional requirements are as follows:
- Students should be required to fill out their logbook daily after which no further edits can be made.
- Industry-based supervisors should be privy to the students' logbook and also be able to make comments.
- School-based supervisors should be able to grade and comment on the entries submitted by each students and also be able to view the comments of the industry-based supervisor.

As for the non-functional requirements the system should be relatively easy to use, little time must be used to train all users involved.

In order for the mobile application to perform efficiently, the minimum operating system version that should run the software is the Android 4.1 (Jelly Bean) if it is an android device and iOS 9 if it is an iPhone, on the hardware front, the device must have at least 1 GB of RAM. Training would be given to students as needed, however it is expected that minimal training will be required as the application was developed to be relatively easy to use.
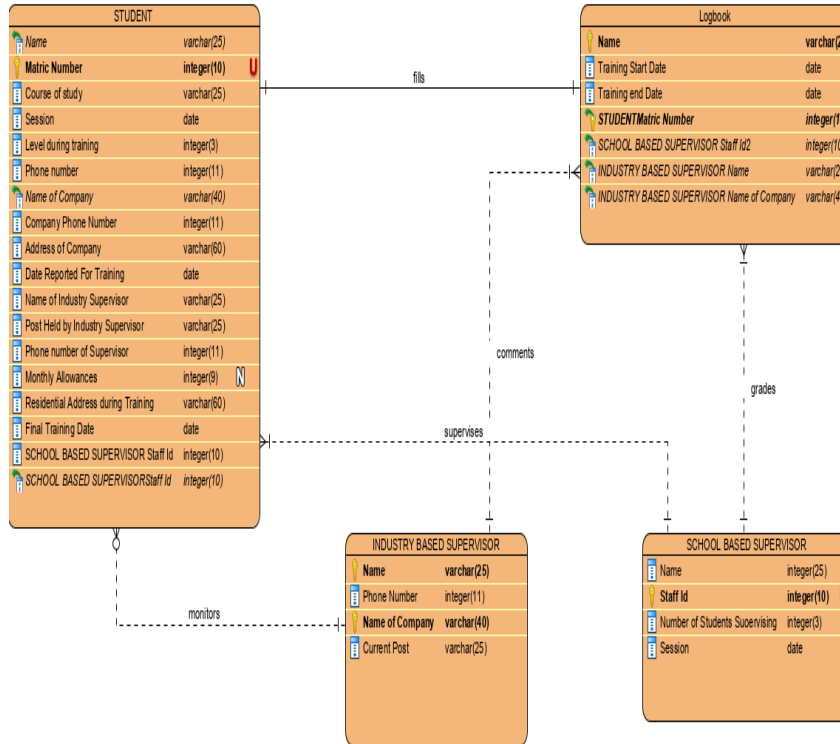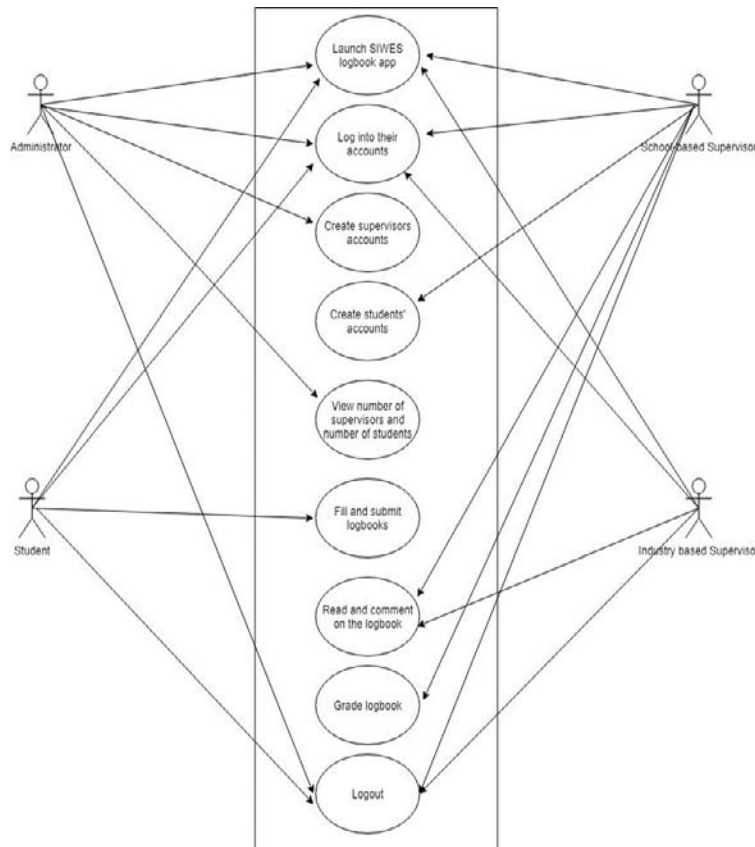


**Figure 1.** Entity Relationship Diagram
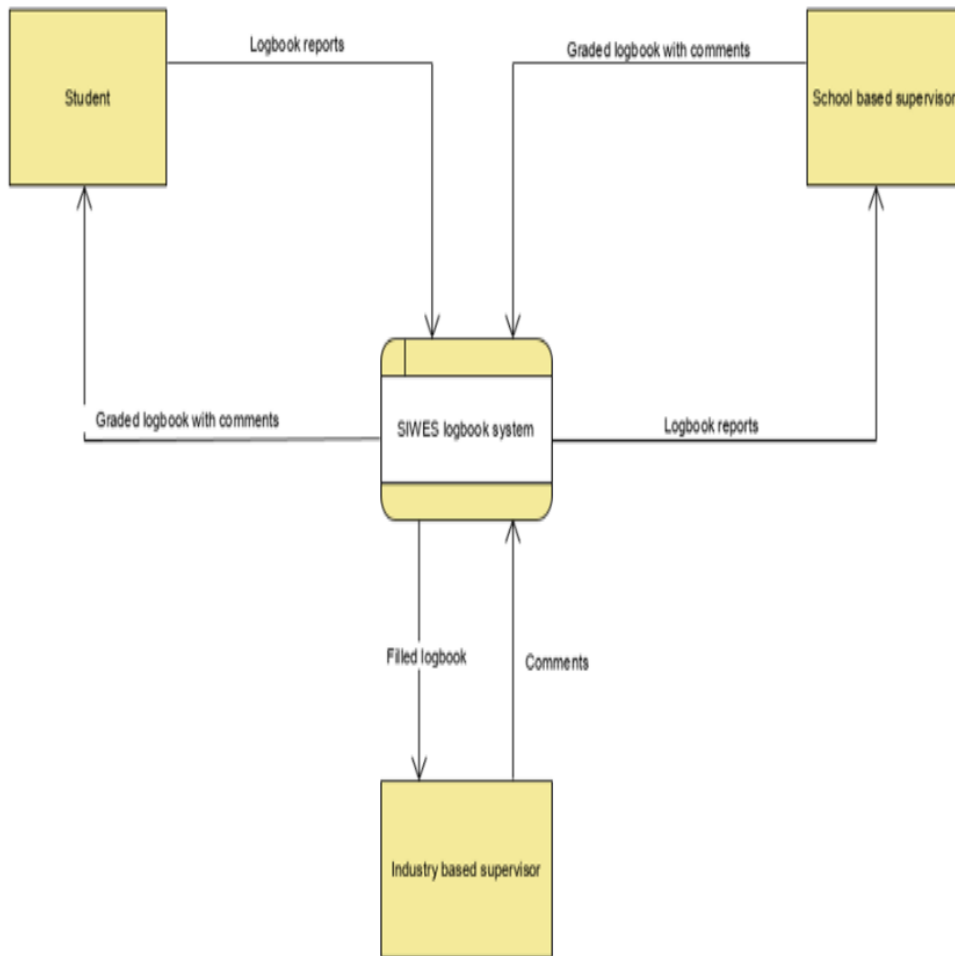


**Figure 2.** Use Case Diagram

**Figure 3.** Data Flow Diagram

# 4. Results and Discussions

This section discusses the results obtained from the proposed system. The various screens that each type of user (administrator, school-based supervisor, industry-based supervisor and student) will encounter are illustrated below.

The application was implemented using React Native to build the front-end of the application while Node.Js was used to build the back-end and MongoDB was the database used.



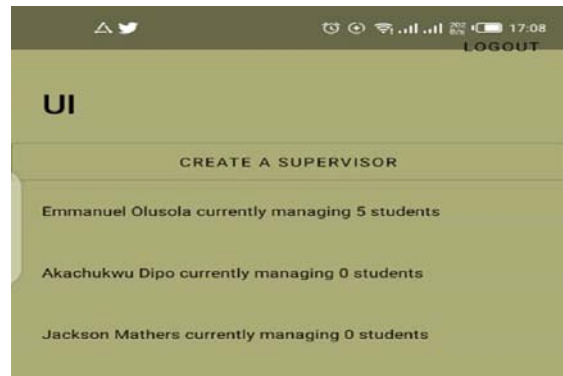**Figure 4.** Home Page



**Figure 1** Admin Home Page

Once a user, any of the aforementioned users opens the app, the user is presented with the home page as shown in Figure 4. Figure 5 shows the interface that the administrator meets after logging in. At the top of this page is the name of the administrator. The administrator is able to view the list of supervisors under him and how many students each of them is supervising. The administrator is also able to create new supervisor accounts. Figure 6 is the interface shown when a new school-based supervisor account is about to be created. Figure 7 is the interface shown when a supervisor is about to log in. Both the industry supervisor and school-based supervisor make use of this interface to log in. Both sets of accounts are differentiated by a dropdown menu to indicate what type of supervisor they are. Figure 8 is the

interface a supervisor would meet after logging in. The name of the supervisor is shown at the top left corner, the students that the supervisor is currently supervising is shown next. The supervisor is able to click on any of them and see the reports that have been sent to him or her. When the supervisor clicks on a student, Figure 9 shows the interface that comes up. The name along with the matric number of the student is on top of the page then the number of logbook entries that the student has sent along with the expected number of entries is also shown. This platform enables the school-based supervisors to score (a maximum of 5 and a minimum of 1) and comment on each post as shown in Figure 10. When a student logs in for the very first time, he or she is shown a form that he or she is required to fill before their SIWES program can commence. The form collects data about the student's SIWES placement. Data such as the industry-supervisor's biodata, date the student started etc. are submitted by the student to the school-based supervisor. The form is shown in Figure 11. Once the student has filled the form, the student can then go on to submitting his or her logbook entries with the addition of pictures if need be as shown in Figure 12.
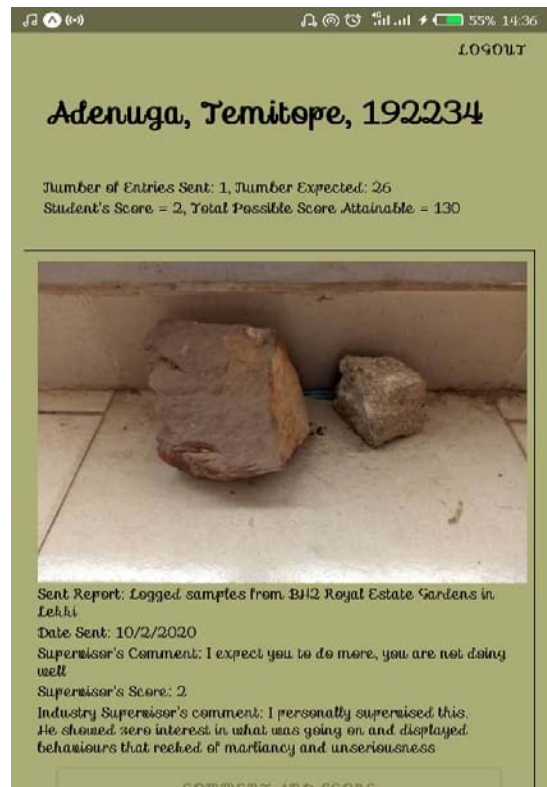


**Figure 6.** Supervisor Being Created



**Figure 7.** Supervisor Logging In



**Figure 8.** supervisor's Home Page
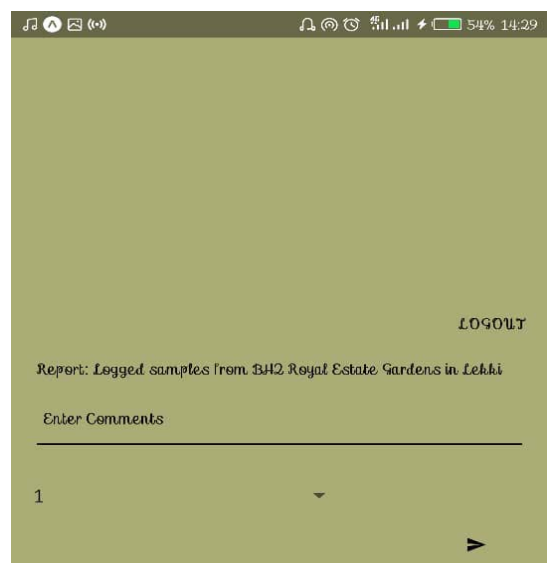


**Figure 9.** Supervisor's view of a student logbook entries



**Figure 10.** Supervisor scoring and commenting

**Figure 11.** Student's SIWES form

## 5. Conclusion

There are no limits to the advantages that technology has brought about. One of the inventions that technology brought about was the smartphone. Smartphones have enabled us to do a lot of things with reduced difficulty. The SIWES logbook mobile application is built to replace the current paper-based logbook format been used in higher institutions in Nigeria. Students are able to submit their logbook entries with the aid of the system. The system enables the school-based supervisors to better monitor students that are on the SIWES program. The system also makes the grading of the logbook easier. This application can be improved upon by extending its functionalities to not just focus on the industrial placement students alone but also on students that are engaged in any form of distance or online learning programs.

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**Figure 12.** Student Home Page