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DEVELOPMENT OF ELECTRONIC LOG BOOK SYSTEM FOR STUDENTS' INDUSTRIAL WORK EXPERIENCE SCHEME (CASE STUDY: FEDERAL POLYTECHNIC ILE-OLUJI, ONDO STATE)

Adekunle K. O
Department of Computer Science,
Federal Polytechnic Ile-Oluji,
Ondo State
Nigeria
kadekunle@fedpolel.edu.ng

Ganiyu M.
Department of Computer Science,
Federal Polytechnic Ile-Oluji,
Ondo State
Nigeria
mutganiyu@fedpolel.edu.ng

Enigbokan O.Y
Department of Computer Science,
Federal Polytechnic Ile-Oluji,
Ondo State
Nigeria
opeenigbokan@fedpolel.edu.ng

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Abstract: The motivations and interests of students qualifying for the Students' Industrial Work Experience Scheme (SIWES) have been found to vary, often based on their perceptions of the program's benefits and drawbacks. The importance of an electronic logbook for SIWES cannot be overstated, as it addresses the challenges and risks associated with traditional paper logbooks. This study proposes an electronic logbook system leveraging internet technologies, offering a significant improvement over the current method. This system facilitates the digital recording of daily activities and achievements during Industrial Training (IT) placements. It allows for easy storage and retrieval of IT reports via server queries. The system's is implemented using C#, Net Core as the frontend and SQL Server as the database.

Keywords: Electronic logbook, Industrial Training (IT), Internet Technologies, Digital recording.

I. INTRODUCTION

SIWES, or the Students' Industrial Work Experience Scheme, is a program aimed at equipping students from higher institutions of learning such as Universities, Polytechnics, Monotechnics, and Colleges of Education with the practical skills needed to translate from academic life to the workforce. The main aim of SIWES is to bridge the gap between theoretical knowledge and practical application, enhancing students' readiness for their future careers. Its objectives include providing hands-on experience, reducing the knowledge gap between theory and practice, and preparing students for the professional environments they will encounter after graduation. Additionally, the program seeks to: review and evaluate the current system, create a web-based platform that can electronically record student work submissions, eliminate the communication gap between supervisors and trainees during industrial training and add a notice board to each user's dashboard to serve as a resource for IT students.

Prior to SIWES, employers in Nigeria were concerned that graduates lacked the practical experience necessary for employment [1]. Industrial training, as defined by [2], combines theoretical learning with practical skills in industrial and commercial settings over a specified period. This training can be conducted by both government and private organizations, aiming to expose students to real-world work environments and equipment not available in academic settings. According to [5], the program is a structured, supervised training intervention designed to develop occupational competencies and prepare students for professional work environments post-graduation.

Managed by the Industrial Training Fund (ITF) and funded by the Nigerian federal government through the Ministry of Commerce and Industry, SIWES aims to enhance the relevance of education in fields like engineering and technology by integrating practical experience into the curriculum [7]. It was noted by [4] that the work experience program educates students while they are still in school, allowing them to engage in real-world job situations. For example, library and information science students get hands-on experience with library materials and equipment, cataloging, categorizing, and stamping books.

Students are required to maintain a journal of their training experiences and submit it to their department upon resuming their studies. An industrial supervisor monitors the student's weekly progress and verifies completed assignments. Additionally, a school-based supervisor periodically visits the student's assignment site to check on their progress. At the end of the training, a report is submitted to the ITF office for verification and necessary documentation, as well as payment to participants. Each student keeps a logbook to document their experiences [6] and [9].

II. LITERATURE REVIEW

The Student Industrial Work Experience Scheme has undergone various studies that address its implementation challenges and explore technological advancements aimed at improving its efficiency. Traditional paper logbooks, long used for documenting students' activities during Industrial Training (IT), have faced criticism for being cumbersome and vulnerable to loss or damage. In response, researchers have investigated digital alternatives to enhance record-keeping and monitoring processes. Studies by [1] and [9] highlighted the benefits of electronic logbooks, noting their potential to provide a more reliable and efficient way to track students' progress, reduce data loss, and improve record accuracy, despite challenges such as limited digital infrastructure and resistance to change among stakeholders.

Further research by [4] and [10] emphasized the importance of digital transformation in SIWES, focusing on how digital tools can streamline communication between students, supervisors, and institutions, and enhance real-time monitoring of student activities. These studies also underscored the need for adequate training and support to fully harness the benefits of digital systems. Additionally, [3] explored the technological advances in creating robust electronic logbook systems using MySQL, HTML, CSS, and JavaScript, which not only improve data management but also enhance user experience for students, ultimately boosting the overall efficiency of the SIWES program.

III. METHODOLOGY

A. System Development Model

Software development life cycle using waterfall model was used for the development of this system, each stage of the model was complemented before advancing to the next stage. The adopted model for the development of this system is presented in Fig. 1 below.

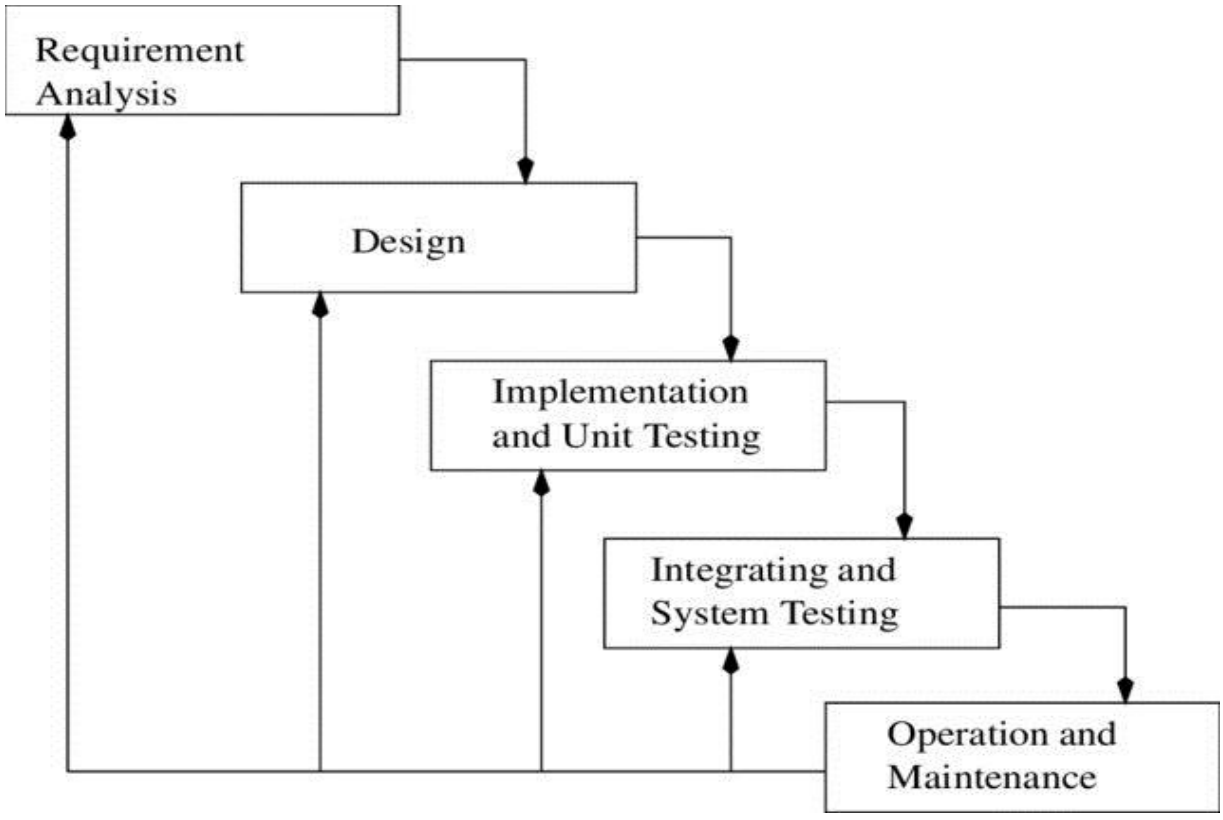

Fig. 1 System Development Model

B. Requirement Analysis

At this stage, a comprehensive stakeholders' data gathering was carried out to affirm the exact needs and functions of each users of the Electronic Log Book System. Extensive research into existing log book systems was carried out to identify gaps and opportunities for improvement. Furthermore, functional requirements were defined, encompassing the implementation of electronic log book system. Understanding and documenting the system's requirements, including functional and non-functional requirements was achieved in this phase.

C. Design

i. System Architecture

This shows the high-level structure of the system, including the division of the system into subsystems or modules, and specifying how these components are interacting. The Fig. 2 below shows the architecture of the Electronic Log book System for Students' Industrial Work Experience Scheme. The system is subdivided into actors which represent the users of the system, procedures which show the activities or actions that can be performed by the actors and lastly the database that stores the records of the system. The architecture is presented below.

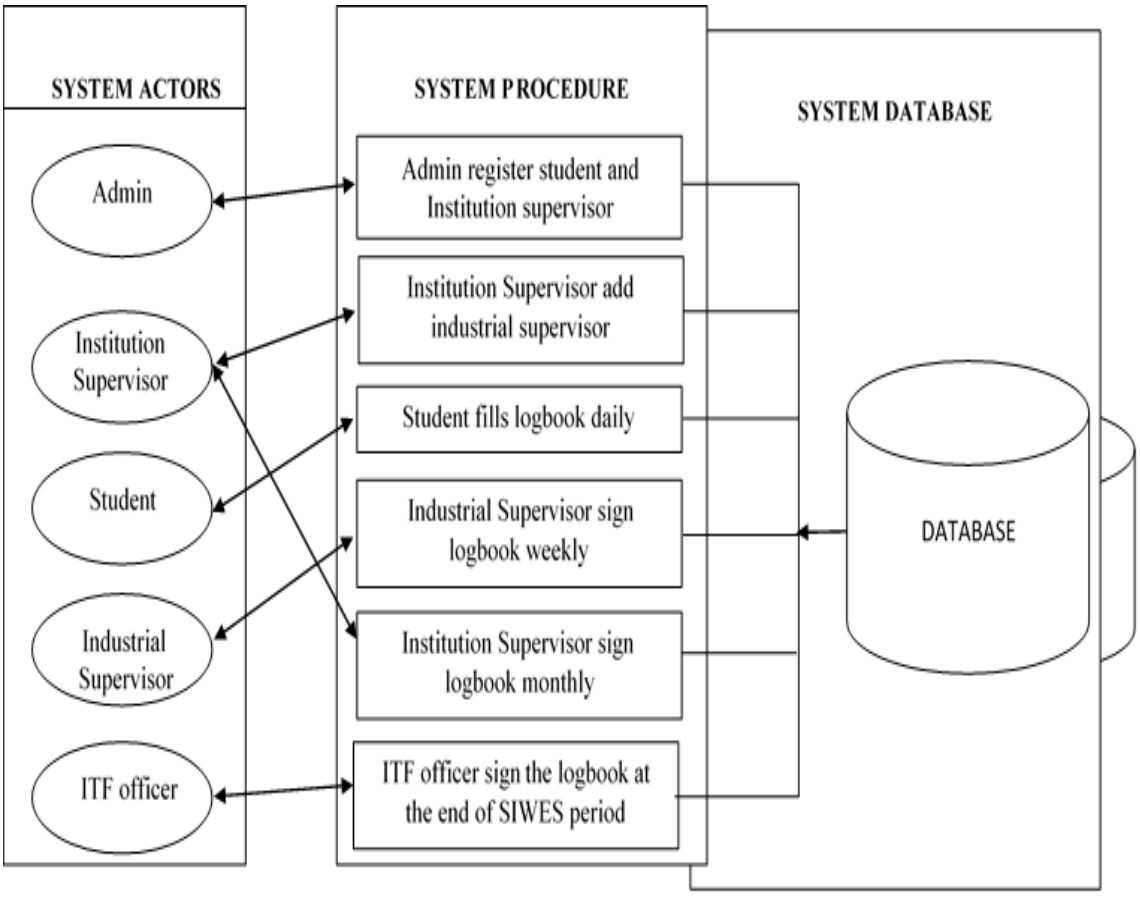

Fig. 2 System Design Architecture

ii. System Flowchart

The system flowchart depicts the operational flow control of the system. It shows how the process flows from the beginning of filling the electronic logbook by the student through the online approval stages by both Industrial-based and Institution-based supervisors as well as Industrial Training Funds officer until the final stage of submission back to the Institution.

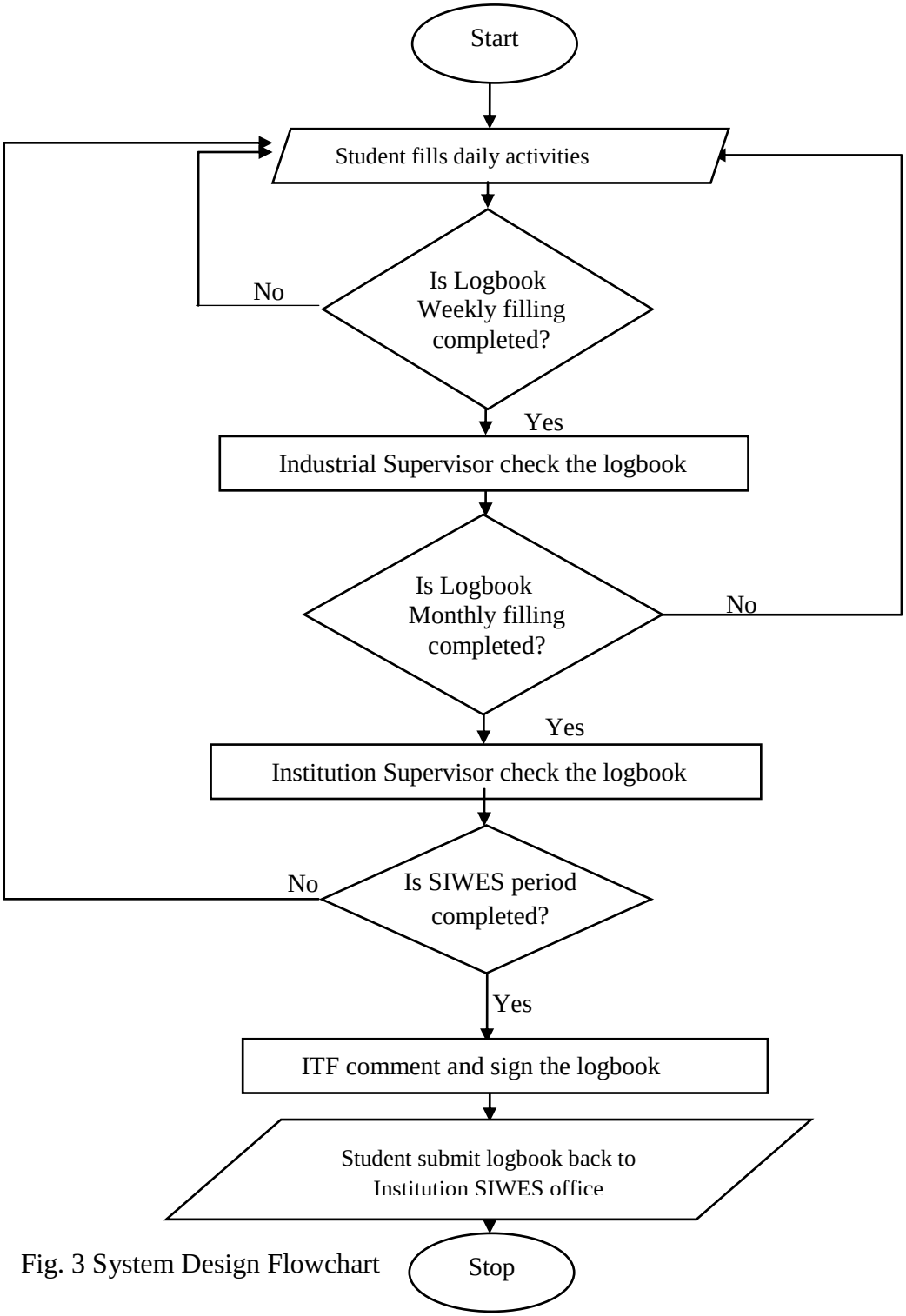

Fig. 3 System Design Flowchart

Algorithm: Electronic Logbook System Workflow

1. START
    2. STUDENT fills in the daily activities
    3. REPEAT step 2 for a week
    4. SUBMIT to Industrial-based supervisor
    5. IF weekly filling is complete THEN
    6. APPROVE by Industrial-based supervisor
    7. ELSE complete the weekly filling
    8. REPEAT steps 4 – 7 for a month
        9. SUBMIT to Institution-based supervisor
        10. NED IF
        11. IF monthly filling is complete THEN
        12. APPROVE by Institution-based supervisor
13. ELSE complete the monthly filling
        14. REPEAT steps 9 – 12 for the months of SIWES
        15. SUBMIT to Industrial Training Funds Supervisor
        16. END IF
        17. IF period of SIWES filling is complete THEN
        18. APPROVE by Industrial Training Funds Supervisor
        19. ELSE complete the monthly filling
        20. SUBMIT to Institution
        21. END iF
    22. STOP

IV. IMPLEMENTATION AND TESTING

This phase began with the designing of the users frontend using C# programming language and backend using SQL. This is where users will interact with the system as well as storing the records. It includes the layout of screens, navigation paths, and user workflows. This is especially important in software systems where user experience is critical. This interface design was followed by coding and it was ended with modular testing. The system was temporarily hosted at esiwes.ctrtechnologies.ng for the purpose of live testing.

V. RESULTS

The developed Electronic Log Book System operation processes are discussed as follow.

A. Admin login module

This module will allow the system admin to access the system by supplying his/her login details for authentication and authorization.

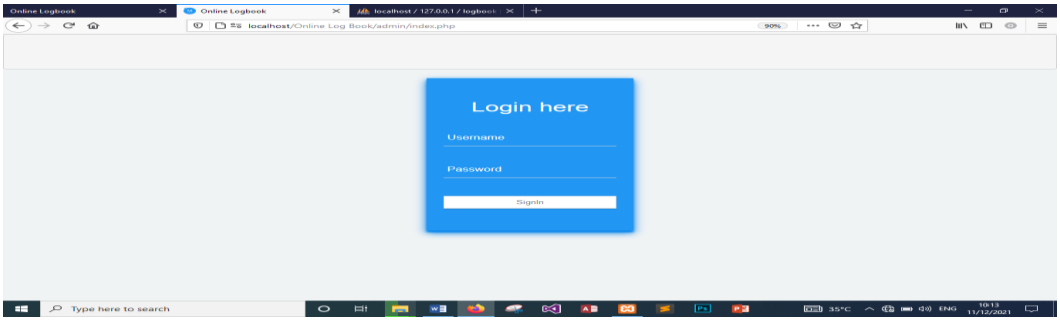

Fig. 4 Admin Login Page

B. Admin Dashboard

This module displays all the links in the system design where administrators can navigate from one page to others based on the task to perform. From this page, admin can add student and view his/her page, add Institution-based Supervisor and view his/her page, add Industrial-based Supervisor and view his/her page, add Industrial Training Funds Supervisor and view his/her page as well as viewing the Log Book page.

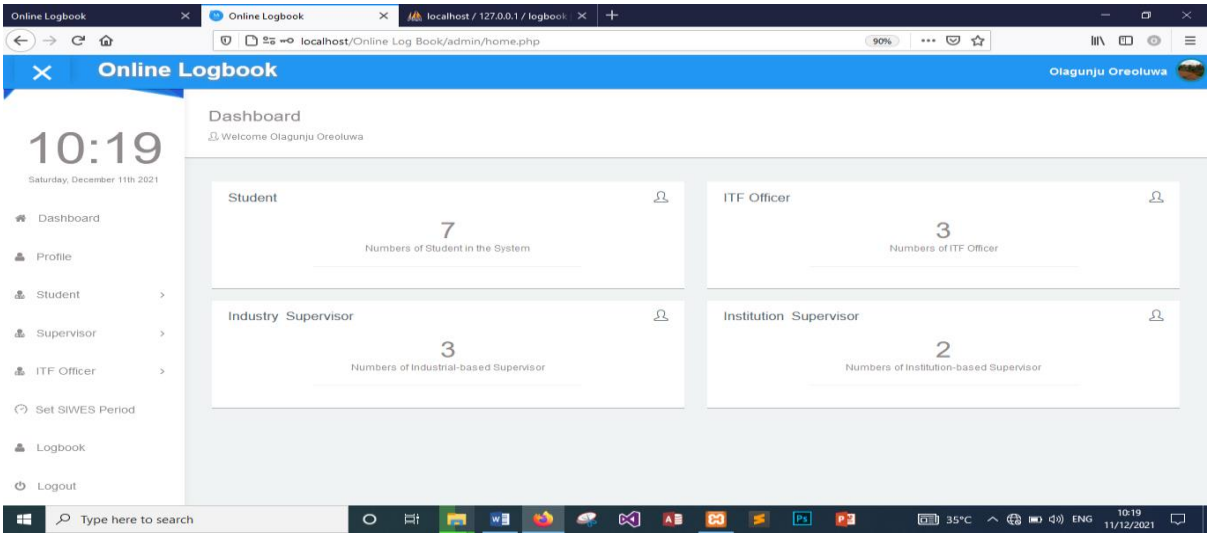

Fig. 5 Admin Dashboard

C. Client (Student) Side

This module consists of several interfaces that students can use. Some of the forms on this module are Placement interface which shows the location where the training is taking place, Student windows that displays all the students on the Electronic Log Book System, Basic Form which is used to capture the students biodata, Log Book which is the core of the application contains several pages for electronically capture the day-to-day activities of the students. Few of the interfaces are in the Figures below.

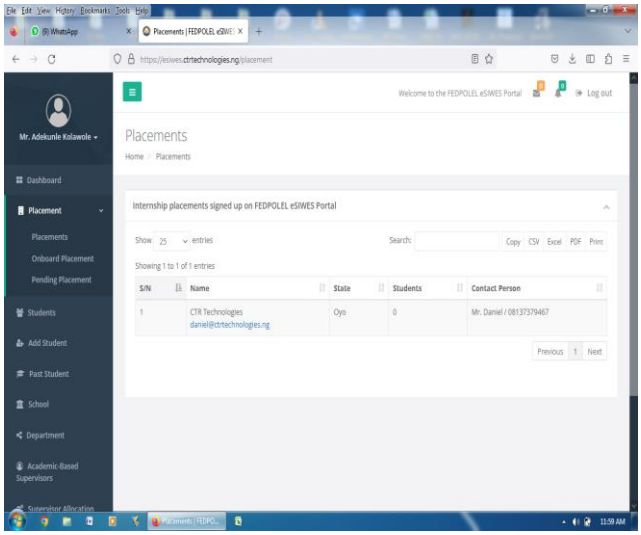

Fig. 6 Placement Page

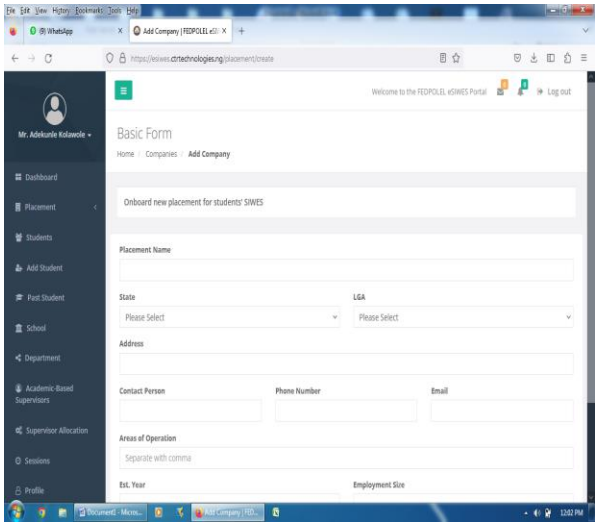

Fig. 7 Basic Form Page

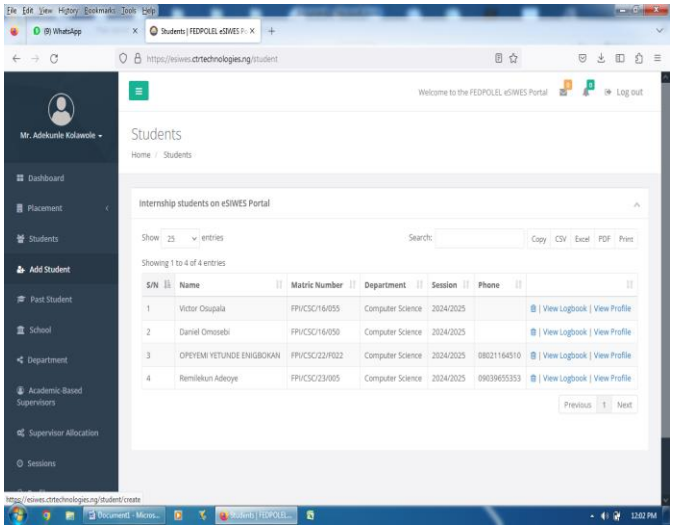

Fig. 8 Student Page

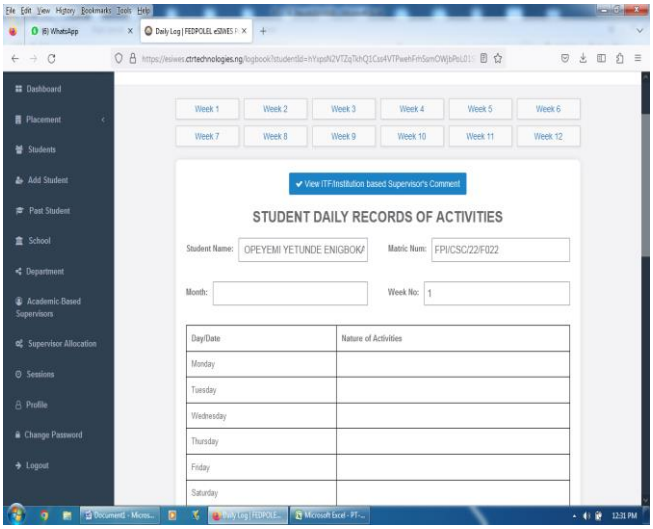

Fig. 9 Log Book Page

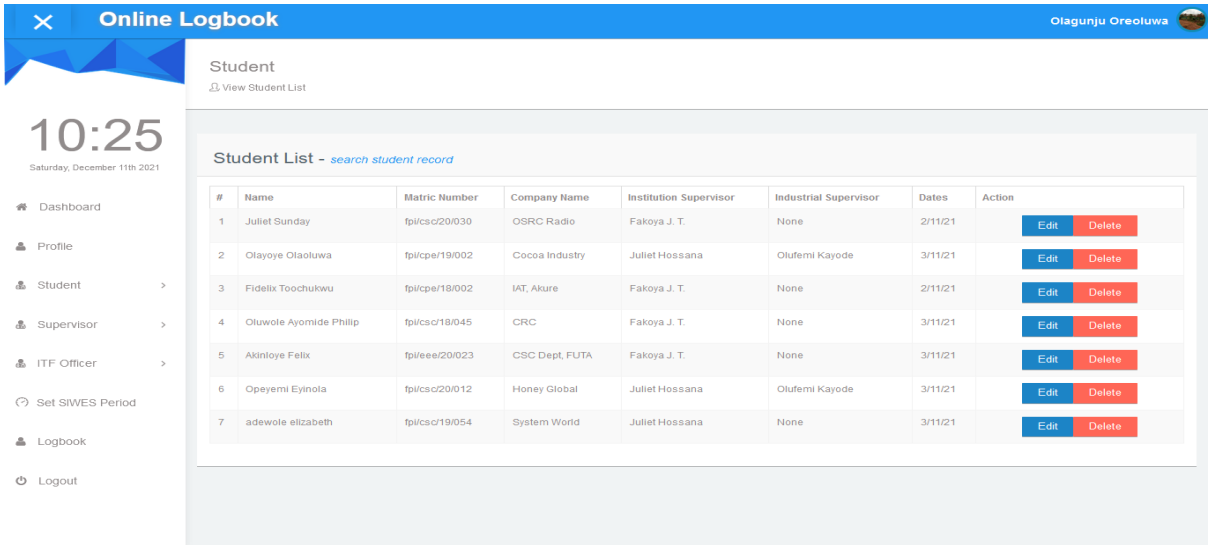

Fig. 10 View Student Page

VI. CONCLUSION

The research achievements encompass the successful creation of an automated Electronic Logbook, featuring a user-friendly interface developed with web technologies. This includes the seamless integration of the database with application endpoints, the development of a scalable and reliable system, and the collaborative efforts of the project team, all contributing to a positive impact on modern society.

The introduction of electronic information retrieval significantly overcomes the limitations of the current manual Logbook approach, enhancing speed, accuracy, and the efficiency of accessing information from a centralized database. By implementing an automated Online Logbook System, the entire process of submission, review, and publication becomes streamlined, offering

a much faster alternative to the manual method. Furthermore, the data stored in the online system is securely maintained in a database, ensuring its availability and integrity for as long as required.

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