



A Web-Enabled S.I.W.E.S Management System for the Directorate of Industrial Placement at The Federal Polytechnic Bida, Niger State, Nigeria

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ABSTRACT

The Students Industrial Work Experience Scheme (S.I.W.E.S) is a mandatory programme that must be undergone by all students of The Federal Polytechnic Bida for a duration not less than sixteen (16) weeks. It is however observed that the management of S.I.W.E.S activities is faced with a lot of challenges as a result of manual approach in the management and coordination of the activities. Some of the challenges amongst others are non-availability of enough man-power to attend to the very large population of students, huge cost of production of SIWES materials (LOG-BOOK), non-availability of sufficient fund to conduct adequate supervision of the students undergoing S.I.W.E.S. As a result of these challenges, the objective of S.I.W.E.S is being undermined. As a way of finding solution to the aforementioned challenges, this research therefore developed a cross-platform and responsive web-enabled S.I.W.E.S Management System, a computerized system that provides an alternative approach for an effective and efficient management and coordination of S.I.W.E.S activities. The client-side/web interface pages (front-end) were developed with “Bootstrap 3” front-end framework for cross-platform and responsiveness. The “Bootstrap 3” contains HTML5 (Hyper Text Markup Language), CSS3 (Cascade Style Sheet), and JavaScript. For the back-end, XAMPP was used as web server with support for PHP as a scripting language and MySQL for working memory functional database. The system was tested and found to be effective and efficient in the overall management and coordination of SIWES activities.

Keywords: Back-end, Cross-platform, Electronic, Front-end, Responsive-web.

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1. INTRODUCTION

The student Industrial Work Experience Scheme (SIWES) is a programme required to be undertaken by all students of Tertiary Institutions in Nigeria pursuing courses in specialized engineering, technical, business, applied sciences, and applied arts (ITF, 2004; Aminu, 2012). According to Aminu (2012), SIWES is generic, cutting across programmes in the Universities, Polytechnics and Colleges of Education. The Industrial Training Fund (ITF) is the regulatory body that established the SIWES in 1973, the body oversees the activities of SIWES, which were designed to bridge the gap between the “Gown and Town”, by exposing the students to the industrial environment, in order to acquire practical experience that will enable them develop occupational



competencies, skills for national economic and technological development after graduation. The SIWES started in 1974 with 748 students from 11 institutions of higher learning, by 1978, the scope of participation in the scheme had increased to about 5,000 students from 32 institutions. From 2003 to 2011 the number of institutions that participated in the scheme improved up to 215 while the number of students increased to 610,122 (ITF, 2011; Aminu, 2012).

Currently, the scheme has witnessed rapid expansion in the number of participating institutions and students, thereby making the management and coordination of SIWES activities very challenging, and this has undermine the goal of the SIWES. Some of the challenges are non-availability of enough man-power to attend to large population of students, huge cost of production of SIWES materials (LOG-BOOK), non-availability of sufficient fund to conduct adequate supervision of the students undergoing SIWES.

1.1 Research Aim and Objectives

This research is aimed at providing a platform where SIWES activities can be done electronically for efficiency and effectiveness, and the objectives are:

- (a) To develop a cross-platform and responsive web-enabled S.I.W.E.S Management System.
- (b) To implement the development in (a).

2. REVIEW OF RELATED WORK

Amir, Choo, Masita and Noor (2011) developed a Web Based Industrial Training Management System that replaces the manual system of industrial training activities. The system allows an online activities in the area of students' registration, mailing processes, announcement and evaluation of the industrial training. The system was developed using PHP, JavaScript and HTML as the programming tools, and MySQL as the database to store data. The limitation is that the system cannot generate SIWES letter, and it is not a responsive web-based system, as it cannot be used on all web-enabled devices.

Emmanuel, Victor, Victoria and Anthony (2012), developed an e-SIWES Portal for the enhancement of SIWES activities such as registration, dissemination of information, filling of log book, supervision /assessment by lecturers and industry based supervisors. The e-SIWES portal was developed using Notepad++ and Adobe Dreamweaver that provide PHP, HTML and CSS capabilities, and the relational database used was MYSQL. The limitation is that the system cannot generate SIWES letter, and it is not a responsive web-based system, as it cannot be used on all web-enabled devices.

Analysis of the Existing Manual System

The existing manual system of managing and coordinating SIWES involves the under listed physical activities:

- (a) **Collection of SIWES letter:** Every prospective SIWES student is expected to physically collect SIWES letter for industrial placement from designated officers known as SIWES Coordinators in the departments. The issuance of this letter is laborious and time wasting, as a long queue of students is observed during the period of collection.
- (b) **Registration and Collection of Industrial Placement Information Form and Logbook:** The registration and collection of this items are physically done. This has also been observed very tedious due to the very large population of students to be attended to. Also the production of SIWES logbook involves huge sum of money.



- (c) **Information Dissemination:** Information and messages are physically communicated to the students, this is found to be ineffective, as it has been observed that the information may not get to some of the students in good time.
- (d) **Filling of Logbook:** The filling of weekly activities into the logbook is done manually. This has been observed contributing to students not filling the logbook as at when due, as a result of ineffective monitoring.
- (e) **Supervision:** The supervision of students undergoing SIWES is done physically by visitation to students at their places of SIWES spread all over the country. This approach is very tedious, as it involves long distance journey and late visitation to the students on SIWES.

3. DATA COLLECTION AND RESEARCH METHODOLOGY

The review and study of the existing related web-based SIWES management systems was investigated. A face-to-face interview was conducted with the Directorate of Industrial Placement (DIP), where relevant materials for the management and coordination of SIWES activities were obtained.

3.1 Design and Modelling of the New System

Software design models show the objects and object classes and relationships between the entities. In the object oriented analysis, Unified Modelling Language (UML) is used to model several components and sub-modules. The UML diagrams used in the design and modelling of the prototype web-enable SIWES system are Use Case Diagram and Activity Diagram.

3.2 Use Case Diagram

The Use Case Diagram shows the system functionality from the user's end (student) to indicate the interaction between the users and the system.

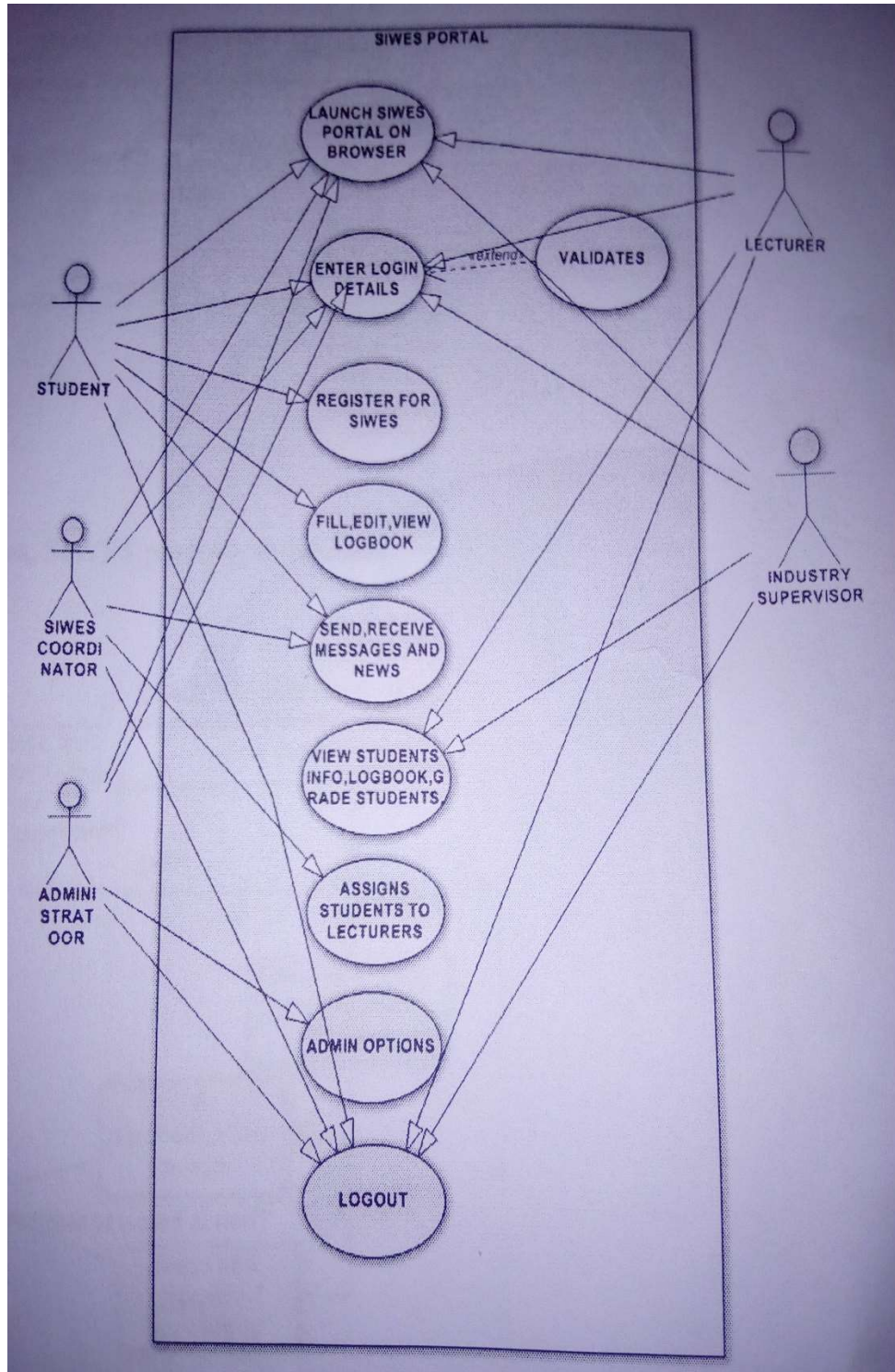


Figure 1: Use Case Model of the SIWES System (Adopted: Emmanuel et al, 2012)

3.3 Activity Diagram/System Architecture

The Activity Diagram represents the flow of activities within a system. The flow can be sequential, branched or concurrent, (Donald, 2003). The figure 2 below shows the flow of activities from the user's end (student).

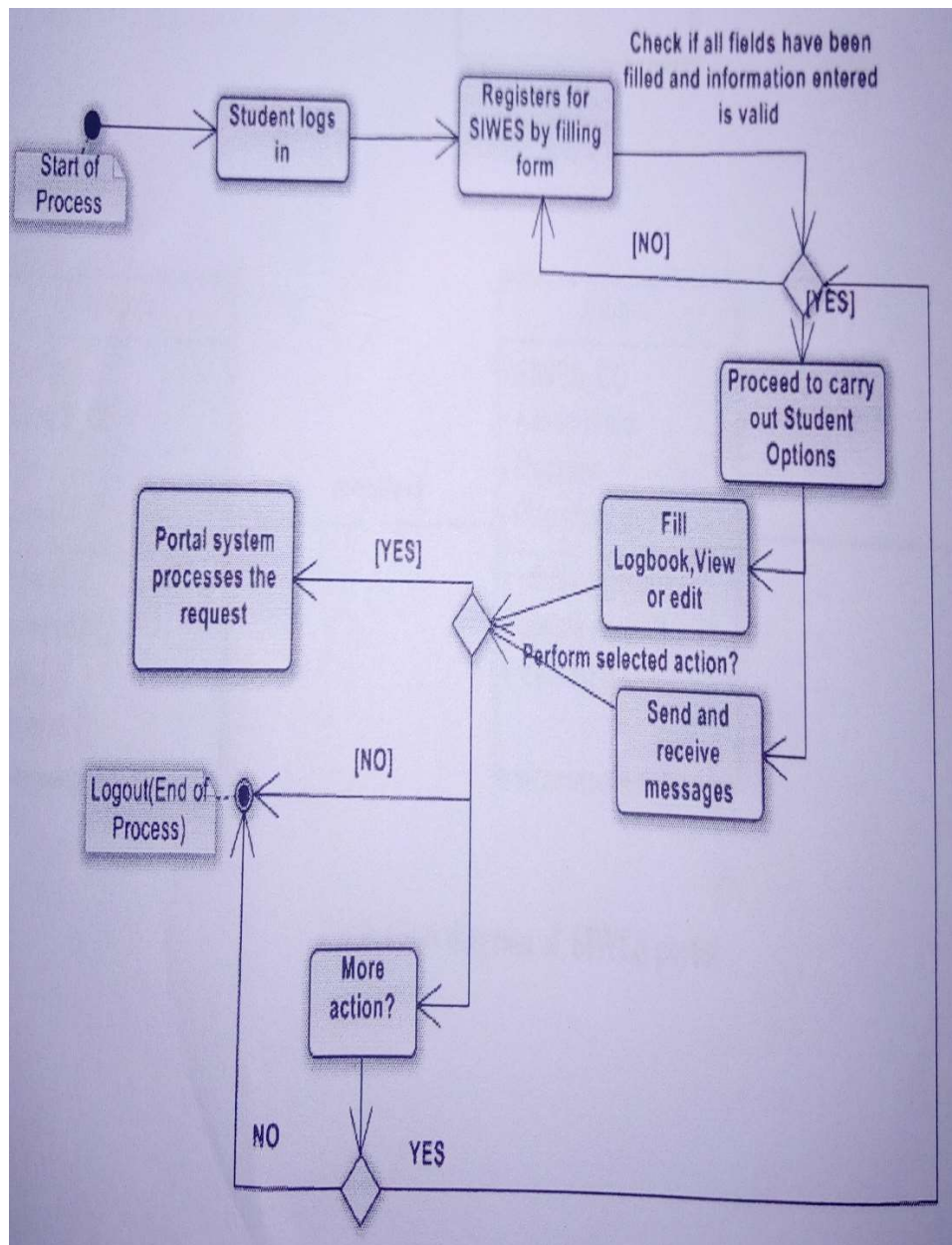


Figure 2: Activity Diagram/System Architecture (Adopted: Emmanuel et al, 2012)



3.4 Input Design

The input to the system from the user (Students and Administrator) is majorly the user's actions and responses on the web pages of the system website. The actions and responses involve the user's selecting the relevant SIWES activities (Registration, Filling of Logbook, Monitoring/supervision)

3.5 Output Design

The output is what the user will see on the screen, it contains the outcome of the processed data/input. The output design is projected in form of interfaces which is interactive with the users, the interface is projected using the Hypertext Transfer Protocol (HTTP).

3.6 Storage Design

The proposed system will have a fully dynamic and functional database. The database will be created using XAMPP and queried using MySQL. As shown in figure 3, the web-based SIWES System consists of seven (7) databases with the tables: Admin, Bank, Biodata, Message, Placement, User, Week.

The Admin table consists of login information about the SIWES administrators (DIP, Coordinators), the bank table consists of records of bank details of the students, the biodata table consists of registration information about the users (students), the message table contains the records of messages or information for the students, the placement table consists of records about the organization, the user table consists of login information about the users (students), the week table consists of description of weekly activities.

4. SYSTEM IMPLEMENTATION

The implementation was carried out on a system running Microsoft Windows 7 Ultimate platform / Microsoft Windows 8 platform. Being a responsive web application, the client-side/user/web interface pages were encoded and implemented using "Bootstrap 3" front-end framework for (cross-platform/responsive-web). The "Bootstrap 3" contains HTML5 (Hyper Text Markup Language), CSS3 (Cascade Style Sheet), and JavaScript. For the back-end, XAMPP was used as web server with support for PHP as a scripting language and MySQL for working memory functional database.

4.1 System Modules

The system is designed in various modules with various buttons and links to navigate through the entire system. The major operational modules of the system are explained below.

The Home Page: The home page is the first page that a user (student or administrator) sees when the application is launched, it has four main menus/modules (Admin, Student, Profile, Logout). As shown in figure 3 below, every menu/module has its related sub-modules/links for various SIWES activities that can be performed by the users (administrators or students).

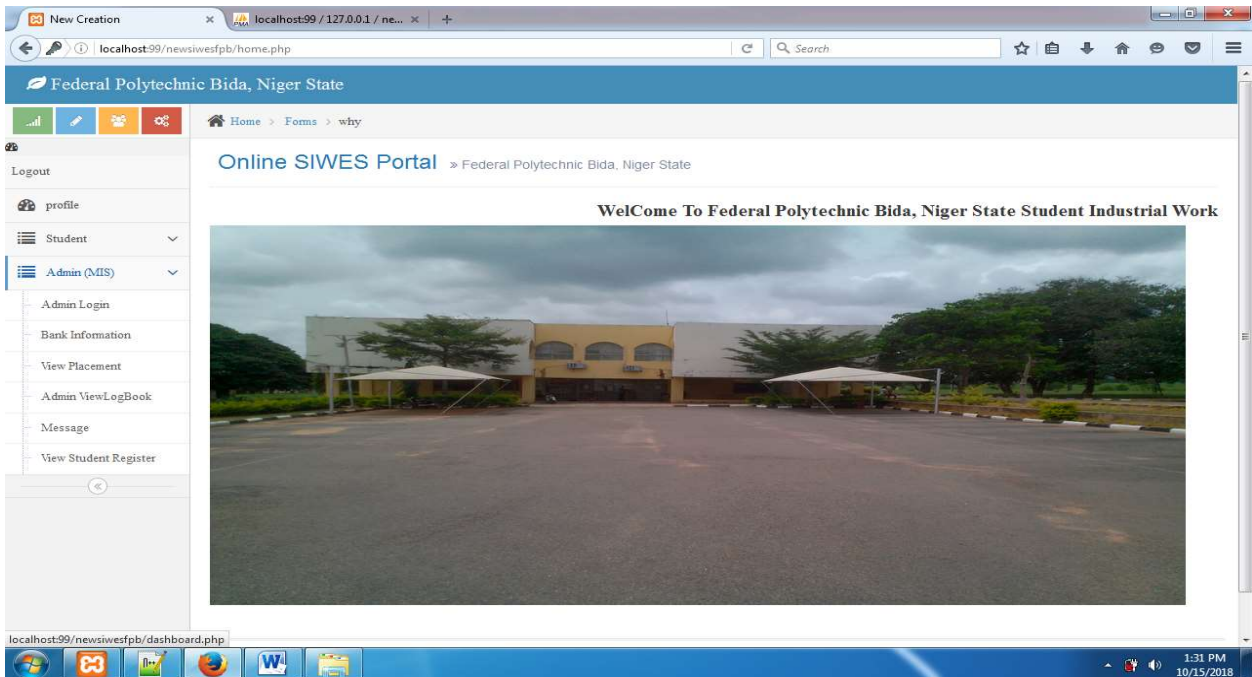
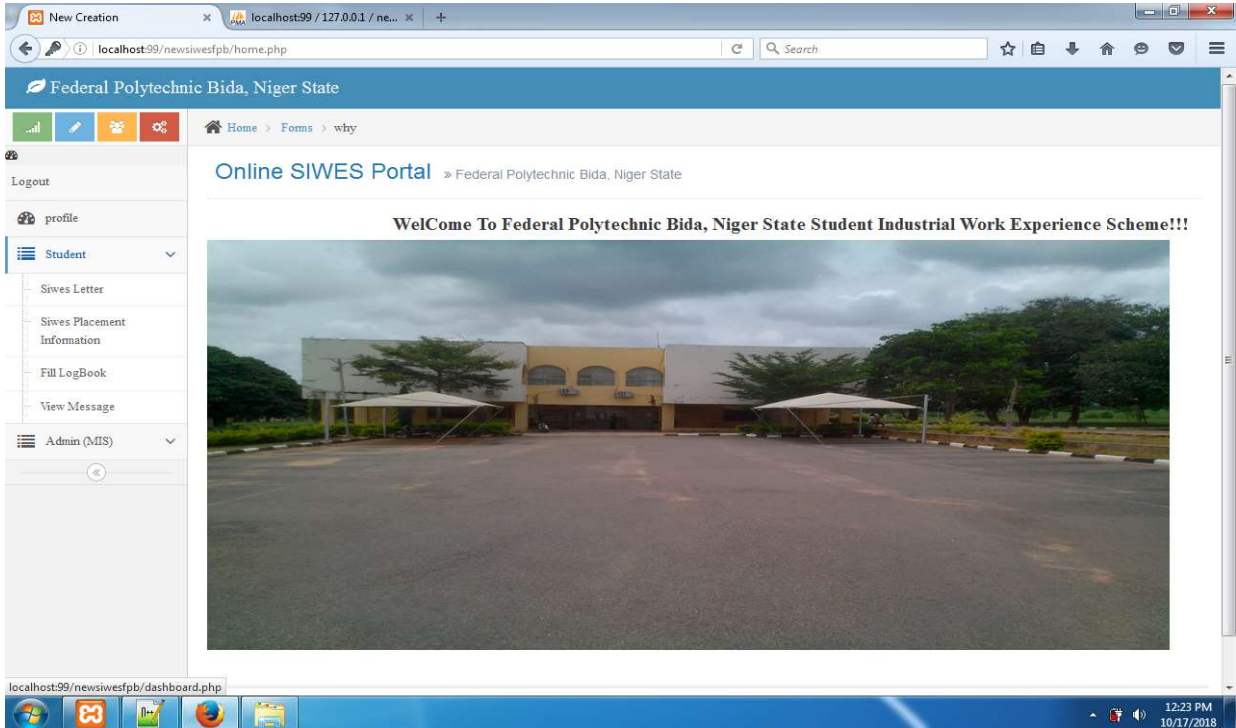


Figure 3a&b: The home page of the Web-Enabled SIWES Management System



Registration Page: Access to the web-enabled SIWES management system requires users' authentication and authorization. Since users access the system remotely, therefore a built-in security system forces users to register and login first. To register, a user (student) supplies the information via an html form as shown in figure 4 below.

The screenshot shows a web browser window with the URL `localhost:99/newsiwesfpi/dashboard.php`. The page title is "Online SIWES Portal" for the Federal Polytechnic Bida, Niger State. The registration form contains the following fields and values:

Field	Value
Surname	ALAO
Othername	KAZEEM AKINBOLA
Gender	Male
Marital Status	Single
State	Lagos
Department	Computer Science
Email Address	andzeem14@gmail.com
Phone Number	09036318009
Matric Number	2017/800009cs
Password	[masked]
Confirm Password	[masked]

At the bottom of the form are two buttons: "Submit" and "Reset".

Figure 4: Sample of how a user fills in registration form

Login Page: Existing or registered user (Administrators or Students) can login by supplying valid username and password details into an html form and submitting it as shown in figure 5 below. The user will be allowed access to the system if the authentication is successful.

The screenshot shows the 'Student Login' page for the Federal Polytechnic Bida, Niger State. The page has a teal background. At the top center is the institution's logo. Below the logo, the text reads 'Federal Polytechnic Bida, Niger State' and 'Industrial Work Experience Scheme Portal'. The main content area is a white box with a blue border. It features a 'Student Login' heading, a text input field containing '2017/800009cs', a password input field with masked characters, a 'Remember Me' checkbox, and a blue 'Login' button. Below the login fields, there is a section for social media login with the text 'Or Login Using' and icons for Facebook, Twitter, and Google+. At the bottom of the white box, there are two links: 'Back' with a right-pointing arrow and 'Create Account' with a right-pointing arrow.The screenshot shows the 'Administrative Login' page for the Federal Polytechnic Bida, Niger State. The page has a purple background. At the top center is the institution's logo. Below the logo, the text reads 'Federal Polytechnic Bida, Niger State' and 'Student Industrial Work Experience Scheme (Administrative)'. The main content area is a white box with a blue border. It features an 'Administrative Login' heading, a text input field containing 'admin', a password input field with masked characters, a 'Remember Me' checkbox, and a blue 'Login' button. Below the login fields, there is a section for social media login with the text 'Or Login Using' and icons for Facebook, Twitter, and Google+.

Figure 5: Sample of how a registered/existing user supplies login information



Placement Information Page: This page as shown on figure 6 is a form containing the details about the organization that have accepted the students for SIWES and the students' bank account details.

The screenshot shows a web browser window displaying the 'Online SIWES Portal' for Federal Polytechnic Bida, Niger State. The page title is 'Online SIWES Portal' and the breadcrumb is 'Federal Polytechnic Bida, Niger State'. The main content area is titled 'Student Placement Information' and contains the following fields:

Name Of Organization	PERFECT COMPUTERS
Road/Street of Organization	FEDERAL POLYTECHNIC BIDA ROAD
Address Of Organization	SUITE B12, ETSU YAHAYA SHOPPING COMPLEX
Organization Town/City	BIDA, NIGER STATE

At the bottom of the form are 'Submit' and 'Reset' buttons.

The screenshot shows the 'Bank Information' form on the 'Online SIWES Portal'. The page title is 'Online SIWES Portal' and the breadcrumb is 'Federal Polytechnic Bida, Niger State'. The main content area is titled 'Bank Information' and contains the following fields:

Select Bank Type	First Bank PLC
Account Name	ALAO KAZEEM AKINBOLA
Account Number	08036318009

At the bottom of the form are 'Submit' and 'Reset' buttons. Below the form, there is a copyright notice: 'Copyright © 2017' with social media icons for Facebook, Twitter, and LinkedIn.

Figure 6: Sample of how a SIWES placement information form is filled.



Logbook Page: This page as shown in figure 8 allows the student to fill the weekly activities into the logbook.

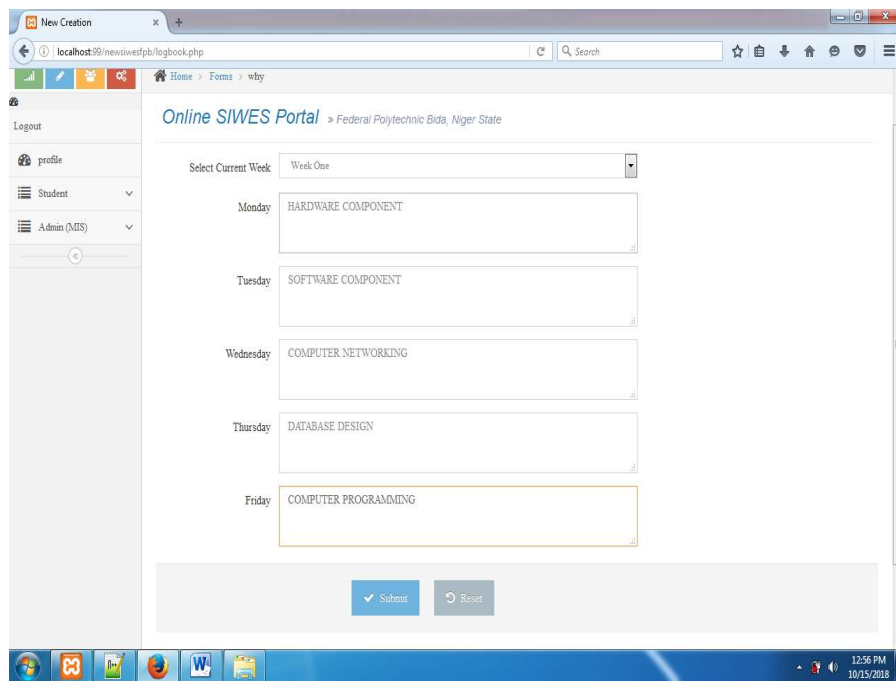
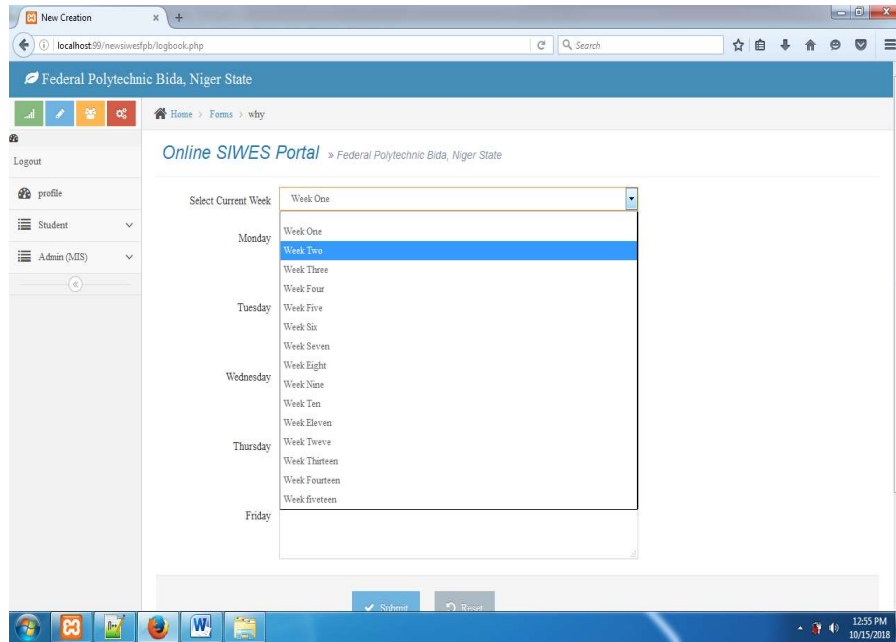


Figure 7: Sample of how weekly activities is filled in the logbook.



Message/Information Page: This page as shown in figure 8 allows the administrators (DIP, Coordinators) to send information to the students currently undergoing SIWES.

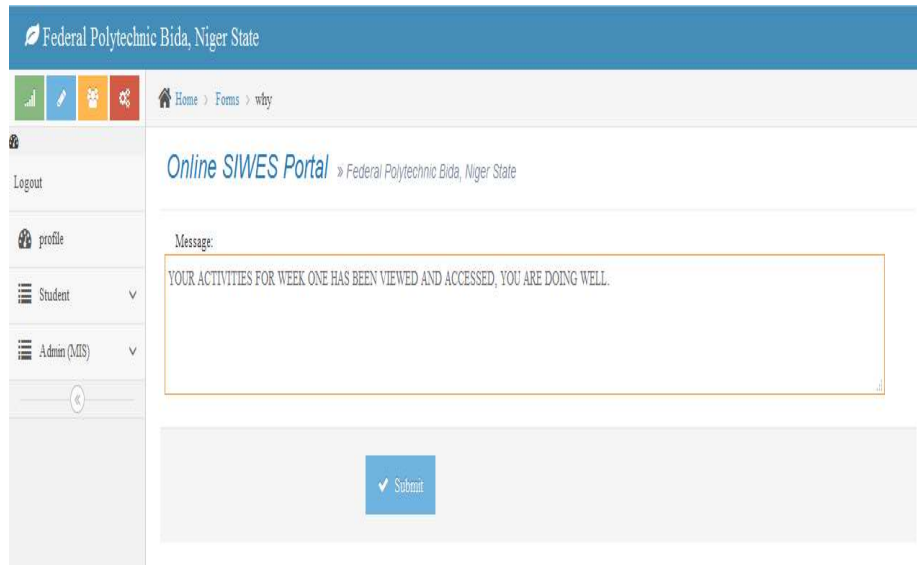


Figure 8: Sample of how information is sent to the students.

Results/Output of the New System

The output page as shown in figure 9 is the output interface that will display whenever the administrators (DIP, Coordinators) view the profile of a registered SIWES student.

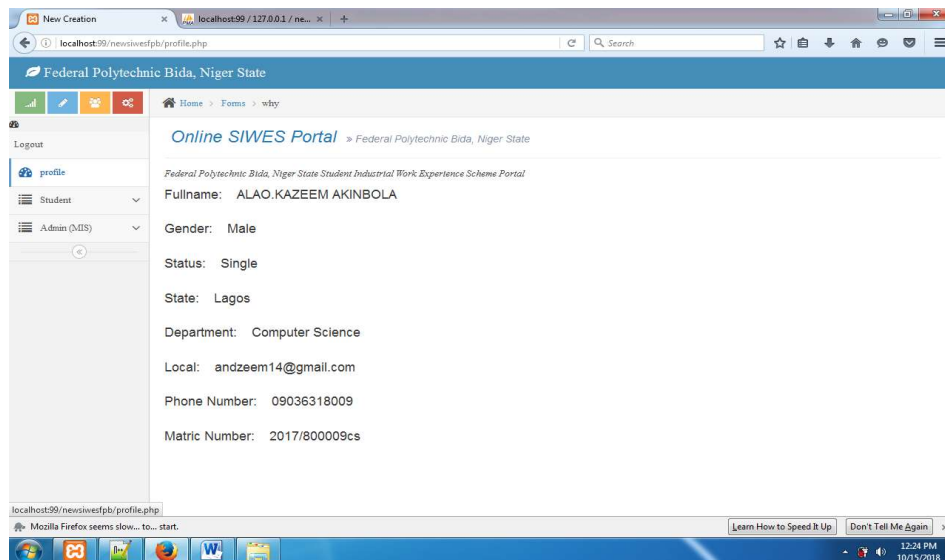


Figure 9: Registered student profile



The output page as shown in figure 10 is the electronic SIWES letter that can be printed after a student has duly registered for SIWES.

THE FEDERAL POLYTECHNIC, BIDA
 (Established as Bida College Of Technology In 1977)
OFFICE OF THE RECTOR
 INDUSTRIAL PLACEMENT UNIT
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DR. ABUBAKAR A. DZUKOGI; B.A(BUK),M.SC(UNILAG)Ph.d (BSU)
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OUR REF:
 YOUR REF:

FPB/REC/IPU/13/1/012



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23rd April, 2018. Sir/Madam

REQUEST FOR 2017/2018 SIWES PLACEMENT

MR./MRS./MISS ALAO.KAZEEM AKINBOLA Mat. No 2017/800009cs.

The aboved named National Diploma One (ND1) Student From the Department.....is being introduced to your organization for 2017/2018 Students Industrial Work Experience Scheme (SIWES) Placement.

It is the policy of National Board For Technical Education (NBTE) and Industrial Training Fund (ITF), that ND Students of Schools of engineering, Environmental Technology, and Applied Art and Science acquire a four(4)month SIWES attachment as a pre-requisite for the award of National Diploma. The programme is expected to commence in October, 2nd 2018 - January, 18th 2019.

The programme is funded by ITF. However, your organization may provide some allowances to the students to enable them cushion some difficulties they may encounter in the course of training.

One of the objectives of the polytechnic system is to produce skilled manpower for the speedy development of the Nation's economy and thus we count on your assistance to attain this objective.

Thanking you in anticipation of your usual co-operation and accept the assurances of any Rector's highest regard.

Yours faithfully,



 Idris Alhaji Yabagi
 Director-Industrial Placement Office
 for:RECTOR

Figure 10: Sample of digitalized SIWES letter



The output page as shown in figure 11 is the output interface that will display whenever the administrators (DIP, Coordinators) view the bank account detail of a registered SIWES student.

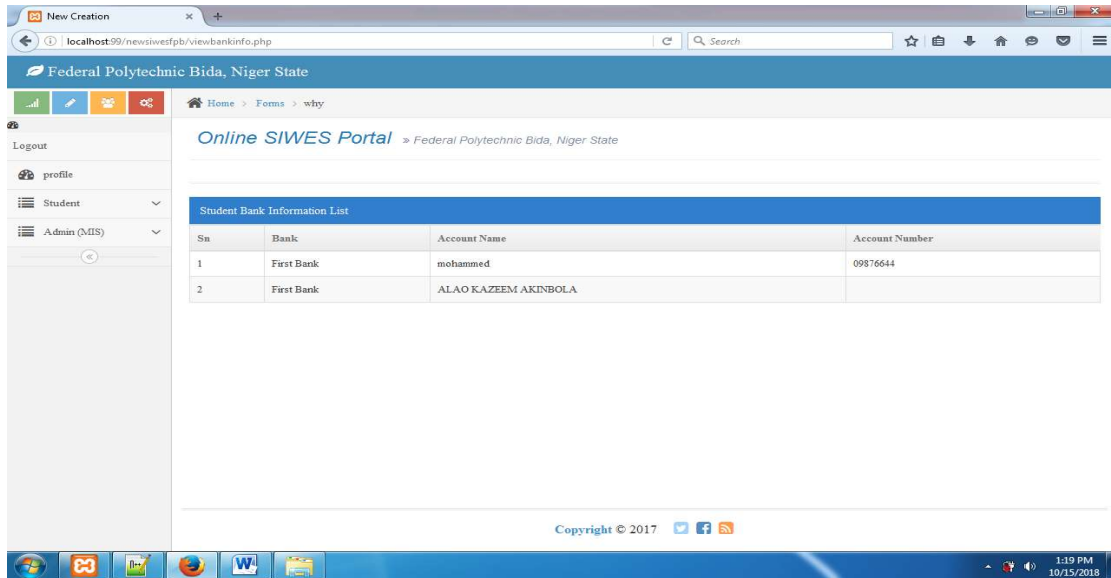


Figure 11: Registered Student Bank Account details

The output page as shown in figure 12 is the output interface that will display whenever the administrators (DIP, Coordinators) view the submitted electronic SIWES placement information form by the students.

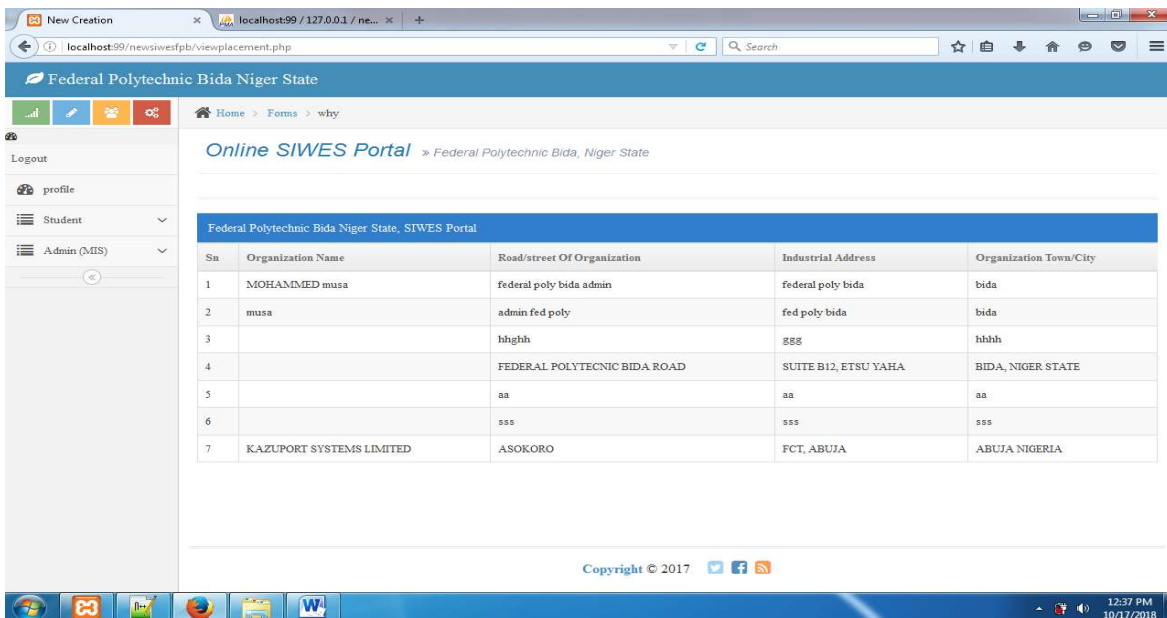


Figure 12: SIWES placement information



The output page as shown in figure 13 is the output interface that will display whenever the administrators (DIP, Coordinators) view the list of all registered students for SIWES, this is equivalent to SIWES master placement list.

Sn	Matric Number	Surname	Othername	Gender	Status	State	Department	Email	Phone Number	Password
1	1234	mu	b	Male	Married	Niger	Mass Communication	bida	0998887766	1234
2	admin	isah halitu	a	Male	Married	Niger	Mechanical Engineering	bida	0998887766	admin
3	12/23456	ALAO	KAZEEM	Male	Marned	Sokoto	Computer Science	EDO	08036318009	Abimbola1
4	12/12345	musa	mohamme	Male	Single	Niger	Computer Science	musa@gmail.com	090675433221	12345
5	123456	m	mm	Male	Single	Lagos	Computer Science	m@gmail.com	08870	123
6	17/1050202cs	alao	kazeem	Male	Marned	Lagos	Computer Science	alao@gmail.co	0802346578	12345678
7	2017/800009cs	ALAO	KAZEEM AKINBOLA	Male	Single	Lagos	Computer Science	andzeem14@gmail.com	09036318009	nishatamin

Figure 13: List of registered students/SIWES Master List

The output page as shown in figure 14 is the output interface that will display whenever the administrators (DIP, Coordinators) view the weekly activities filled in the logbook by the students for supervision, monitoring and assessment.

Sn	Week	Week Date Start	Monday	Tuesday	Wednesday	Thursday	Friday
1	Week Two	28-09-2017	introduction to the member of the organization	introduction to computer system	introduction to some basic component in computer system	identification of some basic component	introduction to the computer cable
2	Week One	2018/07/23	ermtg	gfgghs	ddef	vbv	xodd
3	Week One	2018/10/14	hardware	software	monitor	cpu	cvvfrfg
4	Week One	2018/10/15	HARDWARE COMPONENT	SOFTWARE COMPONENT	COMPUTER NETWORKING	DATABASE DESIGN	COMPUTER PROGRAMMING

Figure 14: Weekly activities filled in the logbook for assessment.



5. CONCLUSION

This research work has explored the challenges faced with the manual approach of managing and coordinating the various activities of SIWES. It has also provided solutions to some of the identified challenges by the development of a prototype web-enabled SIWES management system thereby making the management and coordinating of SIWES activities more effective and efficient.

6. RECOMMENDATIONS

- (a) The optimum utilization of the system can be achieved by integrating the system into the portal of the Federal Polytechnic Bida where Directorate of Industrial Placement and prospective SIWES students can easily have access to the system.
- (b) Further research can be conducted for more areas of improving the efficiency and effectiveness of the system for the enhancement of the performance of the system.

REFERENCES

1. Aminu, A. T., (2012). Prospect of Industrial Training in Nigeria. Department of Public Administration, The Polytechnic of Sokoto, Sokoto State.
2. Amir,N., Choo, B. S., Masita, A. J., Noor, A. C. M. (2013). A Web Based Industrial Training Management System. Department of Computer Science, Faculty of Science and Technology, University of Science and Technology Malaysia (KUSTEM).
3. Emmanuel, A., Victor, O. M., Victoria, O. E., Anthony T. O. (2012). Development of e-SIWES Portal: A Web Based Platform for Student Industrial Work Experience Scheme(SIWES) Management. *International Journal of Applied Information System (IJAIS)*. Volume 3, No. 8.
4. Donald, B. (2003). UML Basics, Part II: Activity Diagram. Available at: http://www.ibm.com/developerworks/rational/library/content/RationalEdge/sep03/f_umlbasics_db.pdf