



# **Development of e-SIWES Portal: A Web based Platform for Student Industrial Work Experience Scheme (SIWES) Management**

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## **ABSTRACT**

We developed the e-SIWES portal in order to enhance the manual task of carrying out SIWES activities such as registration, dissemination of information, filling of log book for students' day-to-day activities and supervision/assessment by lecturers and industry based supervisors. The portal is web-based and allows all tasks to be carried out using the personal computer and the Internet. We digitized the SIWES logbook and assessment forms for filling by students and grading by the supervisors electronically. This will allow supervisors to be assigned immediately the students commence their industrial training and facilitate their monitoring in real-time. With the e-SIWES portal, important messages can be broadcast to all students at once and on a prompt and regular basis.

## **General Terms**

Portal, Web, Software Engineering et. al.

## **Keywords**

Database, ITF, Portal, SIWES, UML etc

## **1. INTRODUCTION**

In the early stage of science and technology education in Nigeria, students were graduating from their respective institutions with little or no technical knowledge or working experience. It was in view of this that students studying science and technology related courses in different institutions were mandated to undergo the Student Industrial Work Experience Scheme (SIWES) so as to widen their horizons and to enable them have technical knowledge or working experience before graduating from their various institutions [1].

The Student Industrial Work Experience Scheme (SIWES) was established by the Industrial Training Fund (ITF) in 1973. ITF has operated consistently and painstakingly within the context of its enabling laws, i.e. Decree 47 of 1971. The objective for which the Fund was established has been pursued vigorously and efficaciously. In the three decades of its existence, the ITF has not only raised training consciousness in the economy, but has also helped in generating a corps of skilled indigenous manpower which has been manning and managing various sectors of the national

economy [1]. Participation in SIWES has become a necessary pre-condition for the award of Diploma and Degree certificates in specific disciplines in most institutions of higher learning in Nigeria[2].

A portal system can be described in different ways depending on differing point of views. To a user of a portal, it is a web system that provides the functions and features to authenticate and identify users. It provides an easy, intuitive, personalized and user-customizable web-interface for facilitating access to information and services that are of primary relevance and interests to them. However, to the organization that sets up the portal, it is a system that helps the organization to catalogue or organize collections of different and multiple sources of information for dissemination to many users according to their specific privileges, needs and interests. Therefore, the main purpose for setting up a portal is to bring vast information and resources available from many sources to many users in an effective manner [3].

There have been several efforts in Nigeria and in other parts of the world to build portal systems that can facilitate administration and learning in higher institutions.

SIWESFEDPOLYOKO is a portal system hosted by the Federal Polytechnic, Oko in Anambra State, Nigeria. It is designed to help the students who are undergoing their four months SIWES training to connect back to the Institution. The blogsite on the portal helps students to keep abreast of what is required of them while on SIWES training and gives them necessary information as regards their on going academic program[4].

At the University of Hong Kong (HKU), the Computer Centre set up a Campus Portal in 2003 based on the uPortal of JA-SIG to enable convenient and effective communications among University members. However, a new HKU Portal was launched on October 25, 2010. This is a newly developed enterprise-type portal for accessing the SIS (Student Information System) and HCM (Human Capital Management System). Also, the University Library set up MyLibrary which is the Library services portal. The HKU portal provides a single-sign-on entry to the e-mail and other university-wide network communications functions. At the same time, the portal provides personalized interface to the computer applications for supporting e-learning, e-administration, online library services and other services that are commonly needed and important to the daily life of



individual students and staff members. The portal also allows individual users to include their interested Internet information resources as part of their own tailored Campus Portal service [5].

The Management Information Systems department, Hisar Campus, Bogazici University, Istanbul, developed a learning portal management system for training their employees. The main objective of the portal is to provide an electronic platform for those who aim to get their learning solutions online. It is a flexible system that can be used by other companies (small, medium sized or large) for training purposes. It can also be used by instructors and students of colleges and universities for online lecturing [6]. Our current work is solely developed for electronic and web based management of SIWES activities in Nigeria.

## 2. SYSTEM REQUIREMENT ANALYSIS

A requirement states what a product or service is intended to perform. It takes into consideration the attributes and characteristics that a system is expected to possess so as to meet the need of a user. The portal system is developed to digitize all manual activities carried out by students, lecturers, industry-based supervisors, SIWES coordinators and the administrators during the course of the SIWES. These activities may be independent or inter-related for the user groups. The following are the functional requirements for the SIWES portal.

- i.) The administrator creates the profiles of students that are eligible to go for the SIWES program.
- ii.) The system generates a list of the students that are eligible to go for the SIWES program.
- iii.) Students log in to the portal and are identified with unique matriculation number and password (registration number) as assigned by the school and as stored in the database.
- iv.) Students can fill their logbooks, edit them and view their logbook entry per week. They can also send and receive mails through the portal mailbox.
- v.) Lecturers supervise activities of students on SIWES and comment and grade them on weekly basis.
- vi.) Industry-based supervisors can monitor activities of students on SIWES in their company and comment and grade their logbooks weekly.
- vii.) SIWES coordinator assigns a set of students to a supervisor from the institution.
- viii.) Administrator creates user accounts for all user groups.

Scanned students' logbook in hardcopy is shown in Figure 1.

WEEK PROGRESS SHEET		
DAY	DATE	DESCRIPTION OF WORK DONE
MONDAY		
TUESDAY		
WEDNESDAY		
THURSDAY		
FRIDAY		
SATURDAY		

Fig 1: Scanned students' logbook

## 3. SYSTEM DESIGN AND MODELING

Software system design is a creative activity in which software components and their relationships, based on a customer's requirements are identified. It is the process of defining the component modules, interfaces and the architecture of the system to satisfy the user requirements. Modeling is the process of abstracting a significant part of the real world. Software design models show the objects and object classes and relationships between these entities. In the object oriented analysis and design, Unified Modeling Language (UML) is used to model several components and sub modules. The UML diagrams used in the design and modeling of the SIWES portal are; Use case diagram, Class diagram, Sequence diagram and Activity diagram.

### 3.1 Use Case Diagram

The use case model of the UML is used to specify the functionality of the system from the users' point of view and show the way the system and the users interact to achieve its stated functions and perform its goal. Figure 2 shows the use case diagram for the SIWES portal.

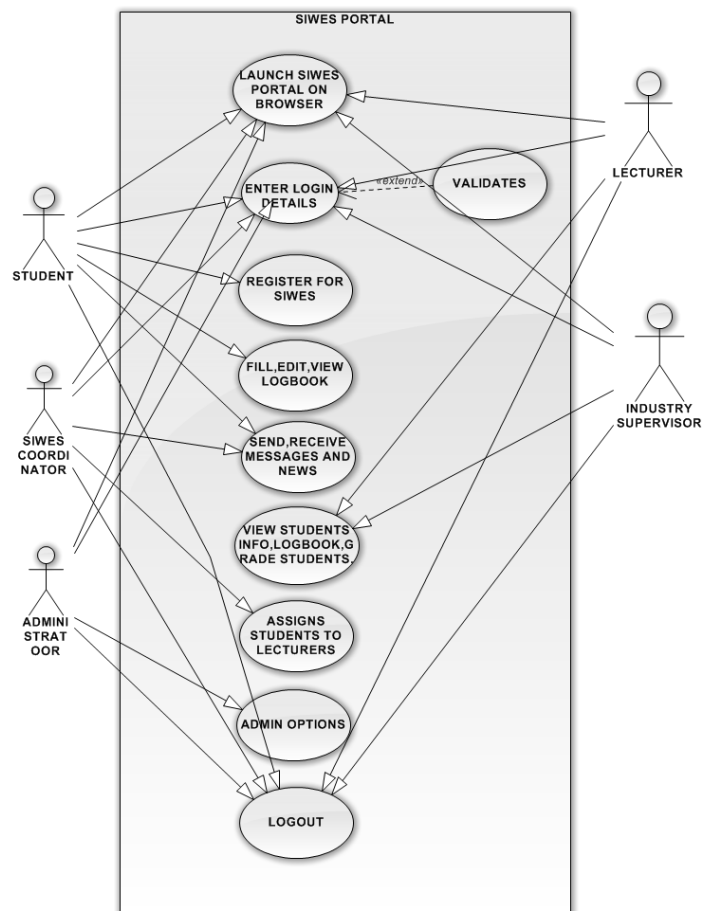


Fig 2 : Use Case model of SIWES portal



### 3.2 Sequence Diagram

Sequence diagrams show the relationships between the objects participating in a given use case and they help to identify interaction between objects. Figure 3 describes the sequence diagram of the student (a use case actor), the portal system and the database.

In Figure 3, for the student to log into the portal, the database checks for user authentication and grants the user access into the system. He can then register for SIWES, fill his logbook, view the logbook or send and receive messages.

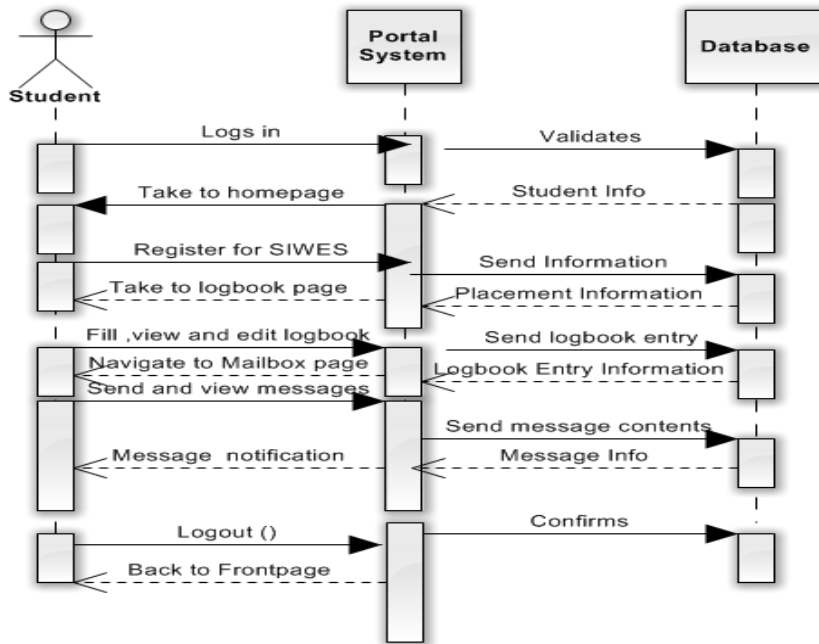


Fig 3: Sequence diagram for student, SIWES portal and database

### 3.3 Activity Diagram

Activity diagram is another important diagram in UML to describe dynamic aspects of the system. Activity diagram is basically a flow chart to represent the flow from one activity to another. The activity can be described as an operation of the system, therefore, the control flow is drawn from one operation to another. This flow can be sequential, branched or concurrent [7]. Figure 4 shows the activity diagram of a student navigating through the SIWES portal.

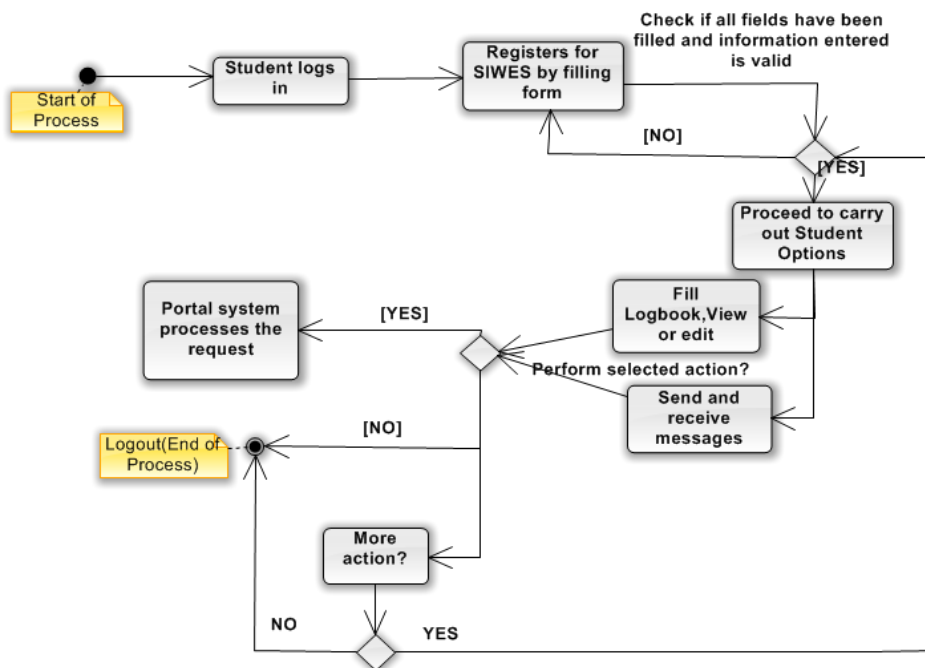


Fig 4: Students activity diagram



### 3.4 Class Diagram

Class diagrams are the most popular UML diagrams used by the object oriented community. It describes the objects in a system and their relationships. Class diagram consists of attributes and functions. A single class diagram describes a specific aspect of the system and the collection of class diagrams represents the whole system. Basically the class diagram represents the static view of a system [8]. The class diagram for the SIWES portal is shown in Figure 5.

### 3.5 User or Web Interface Design

The Web portals are primarily made up of dynamic web pages. Dynamic means that the user interacts more with the web site, beyond just reading the pages and the web site responds accordingly. Usually, a web server delivers the web pages that have been built and hosted on the server, has an IP address and might have a domain name [9].

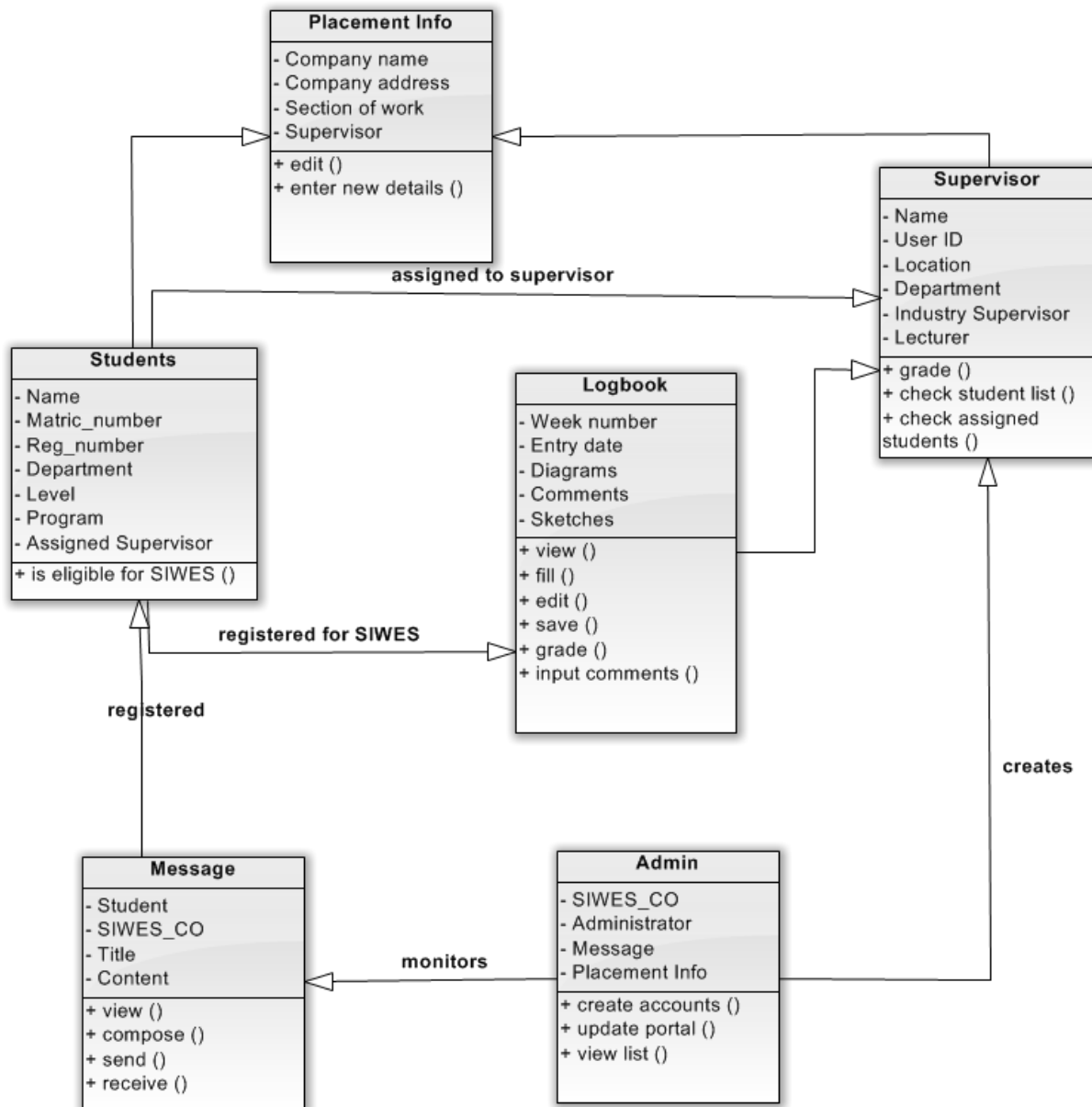


Fig 5: Class diagram of SIWES portal



The SIWES portal contains about a total of 30 web pages (Figure 6) ranging from the Home page, About page, Team page, Student page, FAQ's, Lecturer login page, Industry-Based-Supervisor login page, Admin Page, SIWES coordinator page and so on.

The pages are designed using a text editor known as Notepad++ and Adobe Dreamweaver which both provide PHP, HTML and CSS capabilities. Also, jQuery was used to ensure that empty fields are not sent to the web browser in processing a form.

### 3.6 Database Design

Databases are central to web portals. A database can hold almost any collection of information you may want to search and update, such as a user list, names of products or a list of various items. The database used in this work is MySQL which is a relational database. It is accessed using the graphical user interface provided by the phpMyadmin tool. The phpMyAdmin allows MySQL database to be administered through the web browser.

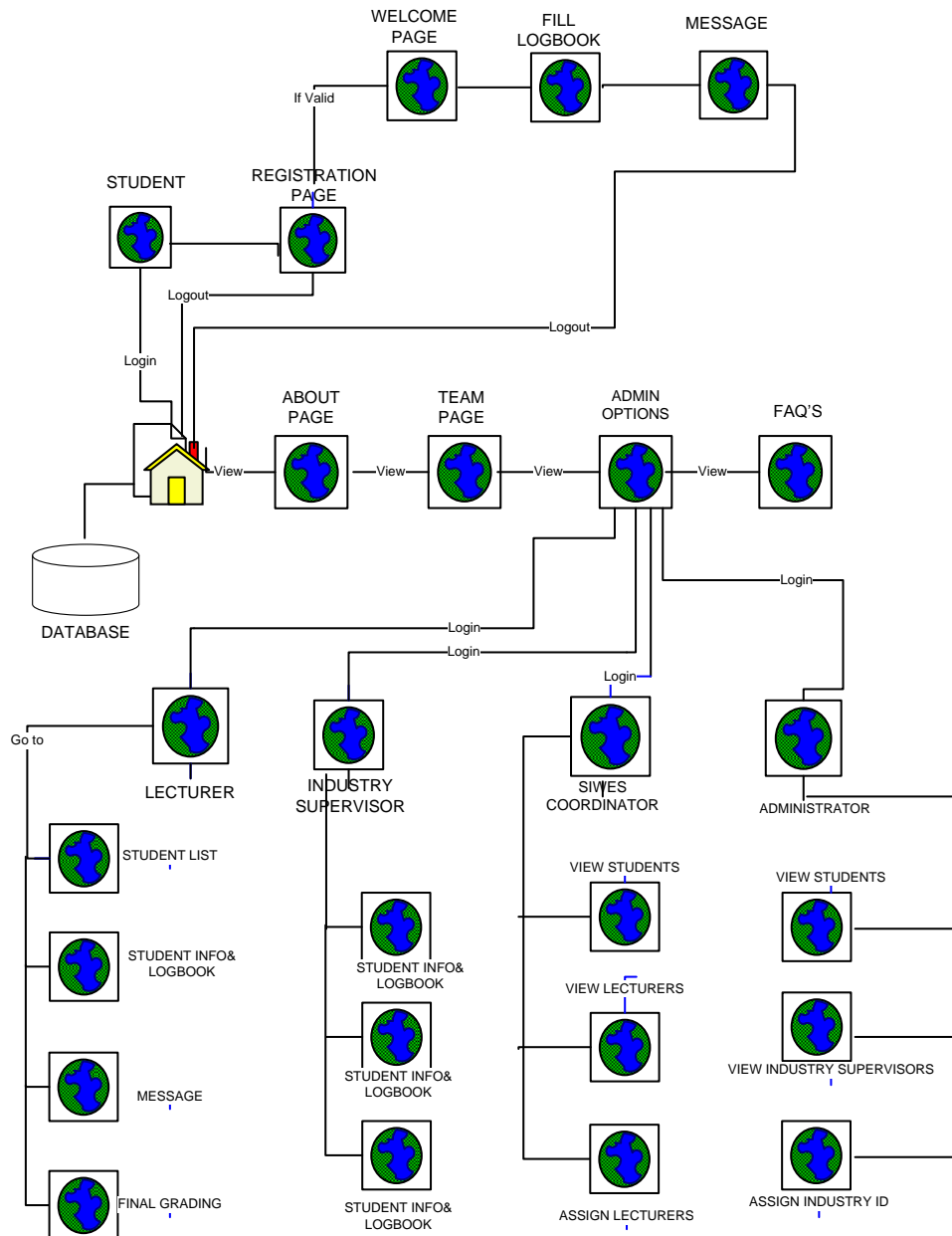
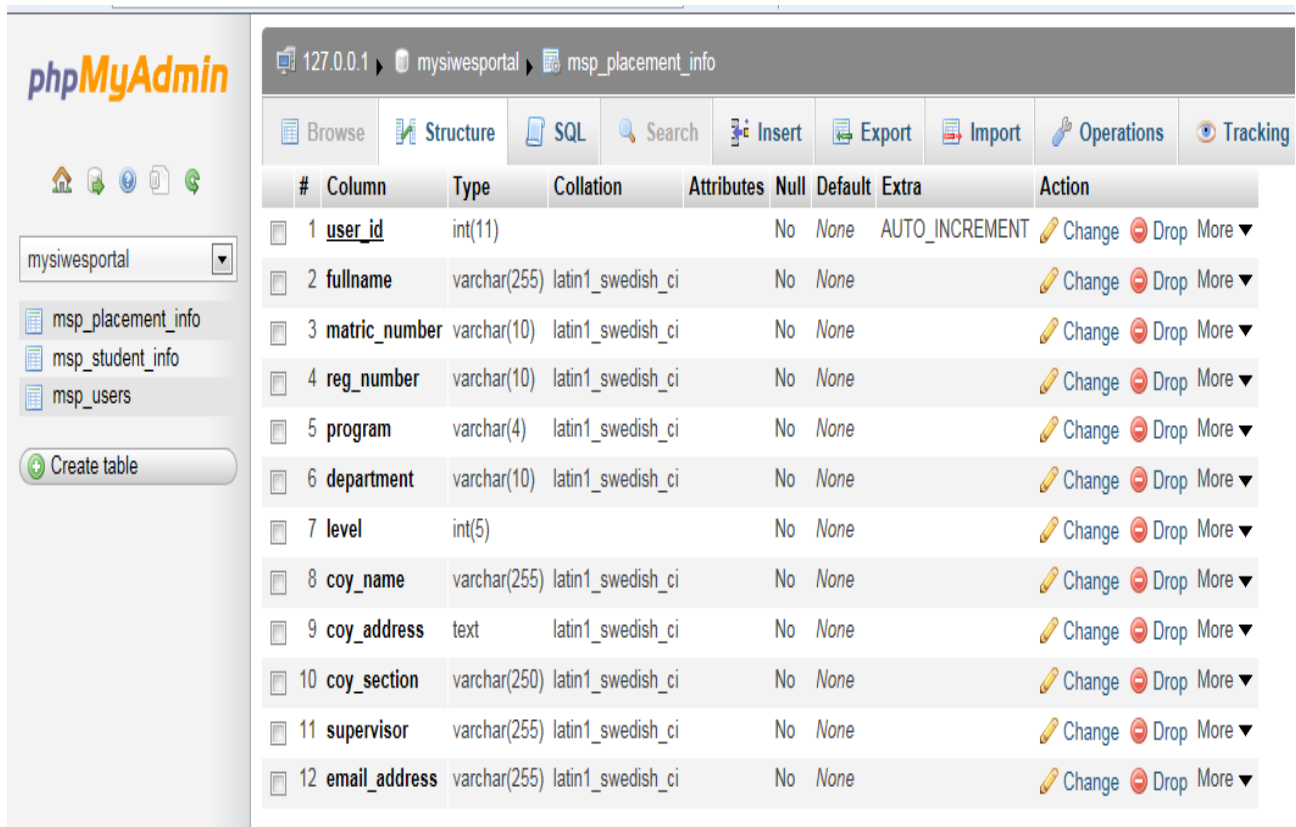


Fig 6: Interconnection of SIWES portal pages

The database created for the SIWES portal is named ‘mysiwesportal’ and it contains about 11 tables. A table is a database object used to keep data. The structure of one of the tables named “msp\_placement\_info” is shown in Figure 7.

## 5. CONCLUSION

With this work, SIWES portal is no longer a conceptual system within the mere realm of imagination. It is now a tangible platform for efficient web based administration of SIWES tasks either the students are undergoing the program within or outside Nigeria.



#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	user_id	int(11)			No	None	AUTO_INCREMENT	Change Drop More
2	fullname	varchar(255)	latin1_swedish_ci		No	None		Change Drop More
3	matric_number	varchar(10)	latin1_swedish_ci		No	None		Change Drop More
4	reg_number	varchar(10)	latin1_swedish_ci		No	None		Change Drop More
5	program	varchar(4)	latin1_swedish_ci		No	None		Change Drop More
6	department	varchar(10)	latin1_swedish_ci		No	None		Change Drop More
7	level	int(5)			No	None		Change Drop More
8	coy_name	varchar(255)	latin1_swedish_ci		No	None		Change Drop More
9	coy_address	text	latin1_swedish_ci		No	None		Change Drop More
10	coy_section	varchar(250)	latin1_swedish_ci		No	None		Change Drop More
11	supervisor	varchar(255)	latin1_swedish_ci		No	None		Change Drop More
12	email_address	varchar(255)	latin1_swedish_ci		No	None		Change Drop More

Fig 7: Placement information table

## 4. IMPLEMENTATION AND TEST RESULTS

The SIWES portal system why being implemented was test run in Google Chrome browser. The implementation modules has successfully transformed all SIWES administrative tasks from being manual activities to digitized ones on a dynamic website. Some of the modules in the portal that are shown in Figure 8 are Login, Registration, StudentPage and Logbook. Meanwhile, there are several other modules in the portal. The portal which was initially tested using the Google Chrome as the default browser was further tested on the Internet Explorer browser. This is to estimate the ease with which the portal can be moved from one system or environment to another. The result of this test is shown in Figure 9. Since the error is due to the cascaded style sheet implementation in the code, it was corrected and the expected look on this interface was obtained. Other errors such as syntax and logical errors were appropriately fixed so as to ensure an itch free deployment of the portal.

Quite a number of students in both public and private higher institutions currently travel abroad to undertake the SIWES program. This is actually a very good development both for the country and for the students. However, monitoring such students has always been a very tedious task. The newly developed SIWES portal is a timely and adequate solution to this problem and host of other administrative based challenges that have bedeviled the SIWES program over the years. For the next phase of this work, the portal will be deployed and an extensive usability evaluation will be carried out. This will help us to undertake a comparative evaluation of the existing manual approach and the electronic approach to SIWES management using the portal.



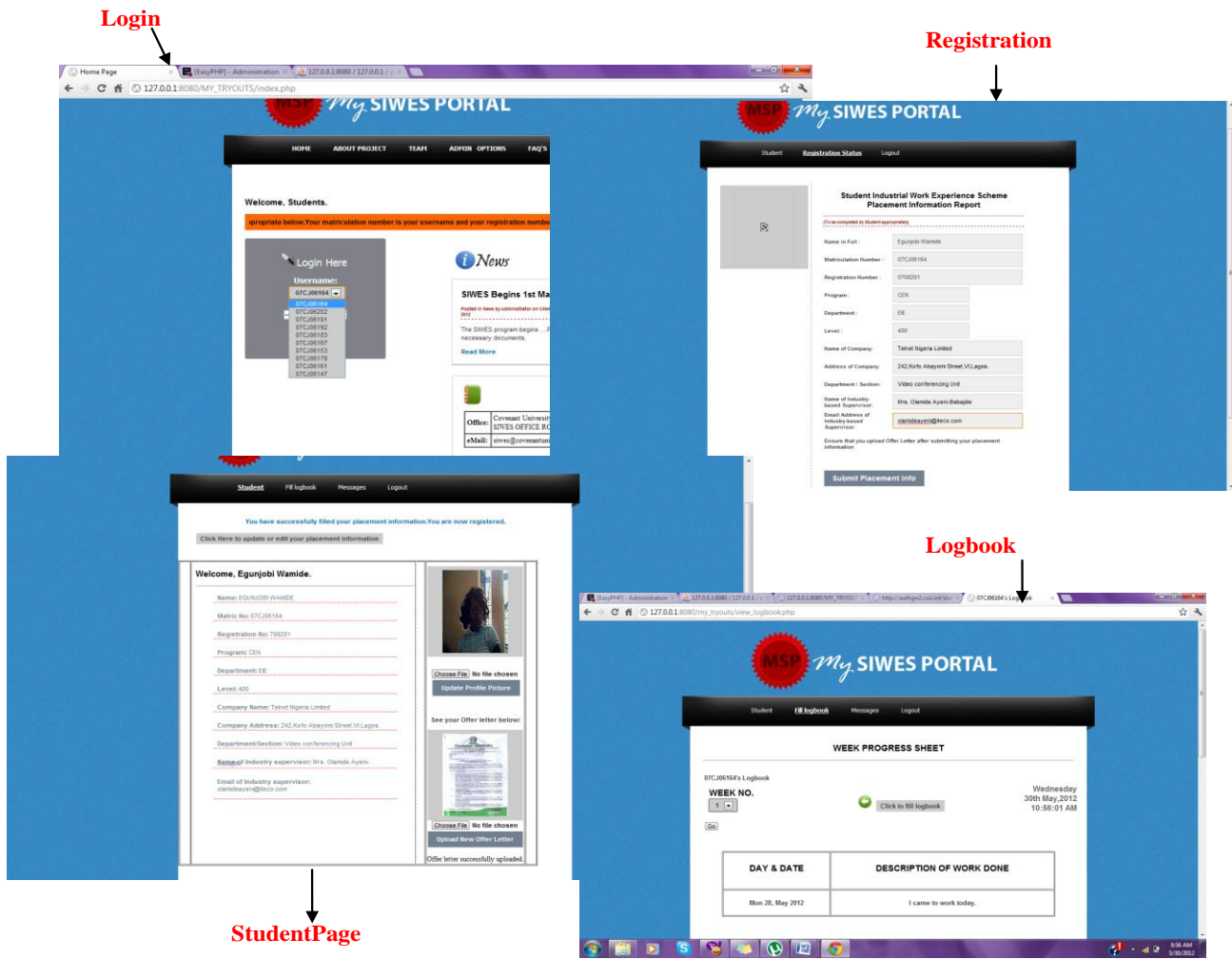


Fig 8 : Implementation interfaces of SIWES portal modules

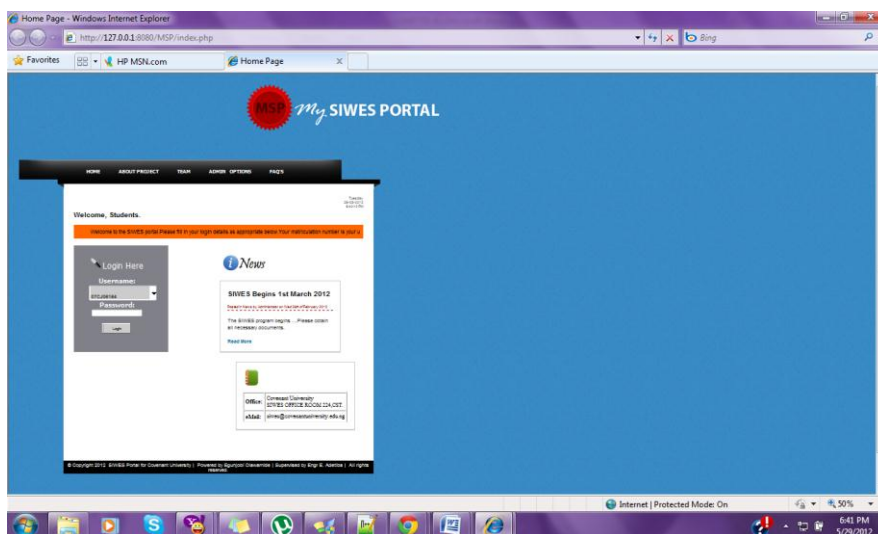


Fig 9: Cascaded style sheet error on the login page



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