LEVERAGING ON WEB-BASED TECHNOLOGY FOR THE MANAGEMENT OF STUDENTS ON SIWES PROGRAMME IN HIGHER EDUCATIONAL INSTITUTIONS (HEIs):
A CASE STUDY OF AFE BABALOLA UNIVERSITY

Babalola, G.O.1, Adeyemo, O.A.2 and Adewole, L.B.3

1, 2 Department of Mathematical and Physical Sciences, Afe Babalola University, Ado-Ekiti, Ekiti, Nigeria
3 Computer Science Department, Federal University of Oye, Oye-Ekiti, Ekiti, Nigeria.

Abstract

The need to equip Nigerian graduates with the right experience, knowledge and skills required of them in the industry is one of the major reasons for the Student Industrial Workshop Experience Scheme (SIWES) programme. It is also an avenue for students in Higher Educational Institutions (HEIs) to take learning out of the classroom to a more practical environment. However, the conduct of the programme needs thorough supervision in order to ascertain that the aims and objectives of SIWES are met. It was discovered that the existing system of management of students during the SIWES period is far from being effective as it often involves physical visitation of the students by supervisors whilst incurring some operating costs. Besides monitoring, mentoring is another vital role of the supervisor. Furthermore, mentoring has not been feasible due to the effect of varying locations of the duty posts of students. Hence, in order to solve these problems, a web-based solution is proposed in this paper that was designed and implemented using PHP-MYSQL technology.

Keywords: SIWES, Web-Based, PHP, Internet, Technology
Introduction

The Internet according to the Federal Networking Council (FNC) in 1995 is referred to as the global information system that is logically linked together by a globally unique address space based on the internet protocol or its subsequent extensions. It can also be referred to as the global network of computers through various dedicated servers and routers. The internet started as the Advanced Research Projects Agency’s Network (ARPANET), which grew over the years to become a global wide area network of today. Several innovations has been incorporated into the internet such as the World Wide Web through hypertext based technology that enables display of text, graphics, videos, animations and different search and navigation tools.

The web has come to stay and is gradually becoming the major source of interest, application and appeal in the world of Internet technology. It is offering vast platform for developers, vendors, and students at large for applications in various areas such as commerce, health, learning amongst many others.

In the early stage of science and technology education in Nigeria, students often graduate from their respective institutions with little or no technical knowledge or work experience. It was in view of this, that student studying science and technology and related courses in different institutions were mandated to undergo the Student Industrial Work Experience Scheme (SIWES) so as to widen their knowledge and to enable them have technical knowledge or work experience before graduating from their various institutions since the acquisition of practical skill is an antidote to meaningful development in any society (Alice, 2012).

Definition of Web Based System

A web based application can be described in different ways depending on differing point of views. To a user of a web based system, it is a web system that provides the functions and features to give access to 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, 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. A web-based application enables easy flow of information and interaction over the web.
Student Industrial Work Experience Scheme

The Student Industrial Work Experience Scheme (SIWES) was established by the Industrial Training Fund (ITF) in 1973 to solve the problem of lack of adequate practical skills preparatory for employment in industries by Nigerian graduates of tertiary institutions. ITF has operated consistently and painstakingly within the context of its enabling laws, i.e. Decree 47 of 1971. The Scheme exposes students to industry based skills necessary for a smooth transition from the classroom to the industry or areas of application of knowledge acquired. It affords students of tertiary institutions the opportunity of being familiarized and exposed to the needed experience in handling machinery and equipment which are usually not available in the educational institutions. Classroom studies are integrated with learning through hands-on work experiences in a field related to the student’s academic major and career goals. Successful internships foster an experiential learning process that not only promotes career preparation but provides opportunities for learners to develop skills necessary to become leaders in their chosen professions. Afolalu (2009) noted that the industrial growth of a nation determines her economic, social and political growth.

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. 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 the country, in accordance with the education policy of government (Akerejola, 2004).

The productive individual, particularly in this millennium, must be able to combine and utilize the outcomes from the two forms of learning (Know-How Ability and Do-How Capability) for the production of goods and services. This requirement is particularly crucial for individuals pursuing careers in science, engineering and technology (SET) disciplines. (Mafe, 2010)

Afe Babalola University

Afe Babalola University (www.abuad.edu.ng) is a private university established in 2010 to provide quality research and education and to lead by example. In her five year milestones the university has recorded significant progress in the delivery of education and learning. The
university had since developed and implemented e-learning platforms, websites, data center and many other IT infrastructure and services. The students in 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} years of colleges of Sciences, Social and Management Sciences, Law and Engineering of the University have been undertaking the SIWES programme since 2011. They are supervised by an average of 65 -70 lecturers which is financed by the Institution.

The SIWES programme in ABUAD often run for a period of three to six months during which a student is expected to acquire various experiences relevant to his or her course of study. In order to ascertain total participation of students in the process, proper monitoring is being carried out by the various stakeholders involved. The institution on her own part assigns an institution based supervisor while the industry and ITF also assign Industry-based supervisor and ITF Monitoring team respectively. With advancement in technology where information sharing and interaction has gone borderless through the advent of the internet and web-based applications, it is expected that various stakeholders in the SIWES programme utilize this to ensure that quality experiences are being acquired by the students of Afe Babalola University.

**Existing System**

At present, the operations of the SIWES unit of Afe Babalola University are predominantly manual. In order to fully leverage on the advancement in technology to improve the process, we embarked on this research.

In addition to this, it has been observed that SIWES students are often visited once or twice throughout the programme. However, ensuring that student acquire relevant experience requires a regular assessment of their daily activities and this can only be feasible if students are required to report back to the monitoring committee on regular basis, and the monitoring committee can thereafter provide timely advice and mentoring to the students.

Students on the SIWES programme are given log book to fill-in their daily activities to be submitted at the end of the programme and over the years, it was observed that at the end of the programme, supervisors still faults some students’ reports. Some of the challenges the students are faced with are not being posted to where they can really acquire technical know-how in the organization they are attached to. This is a regular occurrence due to lack of visitation and proper mentoring during the course of the programme. In order to avoid these problems, it is imperative that the institution-based SIWES coordinator ensures that the supervisors assigned to supervise
these students visit them as scheduled since proper supervision will help to detect problems the students encounter in their respective duty posts and all these will also help to identify students that did not take part in the exercise (Okolocha, C.C. and Okolocha, C.B., 2012). Hence, the need for means of solving the above problems.

Figure 1: A Paper-based ABUAD Student Log Book sample

**System Design**

The proposed system architecture is a three-tier web application with MySQL as the back end, PHP as the middleware, and html based web-page as the front end. The application consists of various modules for each category of the system users. The figure below shows the high level structural view of the proposed system.
Figure 2: High level Architecture of the proposed system

**Object (Class) Modelling of the Proposed System**

Class modelling 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.

![Object modelling diagram](image)

Figure 3: Object modeling for the proposed system

**Instance Model (Use-Case Model) of the Proposed System**

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.
WEB-BASED SIWES LOGBOOK SYSTEM

STUDENT
- register
- lodge complain and view info
- log daily report
- allocate supervisor
- respond to student request/complain
- manage industrial based supervisor account
- post news

view and comment on student daily log

Industry Based Supervisor
Institution Based Supervisor
ITF Monitoring Team

Figure 4: Use-Case Scenario of the proposed system

Process (Activity) Diagram of the Proposed System

Process (Activity) diagram is an 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.

Process models are processes of the same nature that are classified together into a model. Thus, a process model is a description of a process at the type level. Since the process model is at the type level, a process is an instantiation of it. The same process model is used repeatedly for the development of many applications and thus, has many instantiations. One possible use of a process model is to prescribe how things must/should/could be done in contrast to the process itself which is really what happens. A process model is roughly an anticipation of what the
process will look like. What the process shall be will be determined during actual system development.

The goals of a process model are to be:
Track what actually happens during a process.
Take the point of view of an external observer who looks at the way a process has been performed and determines the improvements that must be made to make it perform more effectively or efficiently.
Define the desired processes and how they should/could/might be performed.
Establish rules, guidelines, and behavior patterns which, if followed, would lead to the desired process performance. They can range from strict enforcement to flexible guidance.
Provide explanations about the rational of processes.
Explore and evaluate the several possible courses of action based on rational arguments.
Establish an explicit link between processes and the requirements that the model needs to fulfill.
Pre-defines points at which data can be extracted for reporting purposes.

Figure 5: Process diagram for the proposed system
Hardware Requirements for the Proposed System

The hardware requirements are the set of component of the system which can be seen or felt. For efficient and effective functioning of the system, the following hardware specifications are recommended for the web server:

- 1 TB Hard disk size
- 64 G RAM (Random Access Memory) size
- Intel Quad core ~2.1GHz each
- A stabilizer of about 1KVA
- A standby Generating Set
- A VGA/EGA Colour Monitor
- An Uninterruptible Power Supply (UPS) unit
- A LaserJet or DeskJet printer
- A Scanner
- External storage device (Flash, Diskette, CD-R etc.)
- Floppy disk drive/ USB port
- Internet Access with high bandwidth

Software Requirements for the Proposed System

The Software Requirement comprises of programs and data that make the hardware to carry out the specified task. The following software packages are required for the application to function.

- SQL (Structured Query Language) Server 2000 or later
- PHP 4.1 or later Software
- Web Server ( IIS, AppServe, WAMP, etc.)
- Operating System (UNIX, Window, etc.)
- Other system requirement includes
- A reliable and up-to-date Antivirus Software
- An internet Connection
Implementation of the Proposed System

The web-based application consists of four main modules which are the Student Module, Staff (Institution-Based Supervisor/ coordinator) Module, Administrator Module, and Industry-based SIWES coordinator.

Figure 6: The SIWES Home Page
Figure 7: Student’s Registration Page

Figure 8: Institution Representative login Page.


**Conclusion**

With this work, Web-Based SIWES Logbook System 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 whether the students are undergoing the program within or outside Nigeria.

The system was developed Using ABUAD SIWES unit as a case study with intent to simplifying the SIWES process both for all stakeholders involved and also to create a unique system that can be deployed in the institution for managing the students’ industrial work experience scheme (SIWES) activities online. It is believed that the new system will leverage on the existing multi-million naira IT investments and platform already in existence towards making the management, mentoring and monitoring of students undertaking the SIWES programme an easier task.

**References**


