CHAPTER ONE

1.1 INTRODUCTION

The Students Industrial Work Experience Scheme (SIWES) is the accepted skills training programme, which forms part of the approved minimum academic standards in the various degree programmes for all the Nigerian Universities. It is an effort to bridge the gap existing between theory and practice of engineering and technology, sciences, agriculture, medical, management and other professional educational management and other professional educational programmes in the

Nigerian tertiary institutions. It is aimed at exposing students to machines and equipment, professional work areas and workers in industries and other organizations. The minimum duration for the programme as directed by the Industrial Training Fund (ITF) and the Nigerian Universities Commission (NUC) is 6 months. The Scheme is a tripartite programme involving the students, the universities and the industry (employers of labour). It is funded by the Federal Government of Nigeria and jointly coordinated by ITF and NUC.9

1.2 OBJECTIVES OF SIWES

The objectives of the Students Industrial Work Experience Scheme (SIWES) include;

i.   Will provide students the opportunity to test their interest in a particular career before permanent commitments are made.

ii.   Students will develop skills in the application of theory to practical work situations.

iii.   Will provide students the opportunity to test their aptitude for a particular career before permanent commitments are made.

iv.   Students will develop skills and techniques directly applicable to their careers.

v. Will aid students in adjusting from college to full-time employment.

vi. Will provide students the opportunity to develop attitudes conducive to effective interpersonal relationships.

vii. Will increase a student's sense of responsibility.

viii. Students will be prepared to enter into full-time employment in their area of specialization upon graduation.

ix. Students will acquire good work habits.

x. Students will develop employment records/references that will enhance employment opportunities.

xi. Will provide students the opportunity to understand informal organizational interrelationships.

xii. Will reduce student dropouts.

xiii. Students will be able to outline at least five specific goals with several staff members by comparing performance with job duties and develop a draft plan with staff to accomplish performance needs, supervision plan and rewards.

xiv. Students will be able to develop a draft agency or project budget and will be able to identify methods of obtaining revenue to support the budget.

xv. Students will be able to provide tools to use in prioritizing tasks of an assigned project and create with staff a tentative schedule for completion based on these tasks.

xvi. Students will be able to develop a model policy that gives current front-line leaders the permission and expectation to work with other staff on conflict resolution and explain how this works to current front line leaders.

xvii.   Students will be able to describe different skills leaders can use to foster commitment and collaboration with both internal and external constituents.

1.3 BODIES INVOLVED IN THE MANAGEMENT OF SIWES

The bodies involved are:

i.   The Federal Government of Nigeria

ii.   Industrial Training Fund (ITF)

Other Supervising Agencies are:

i.   National University Commission (NUC)

ii.   National Board for Technical Education (NBTE)

iii.   National Council for Colleges of Education (NCCE).

The functions of these agencies above include

i.   Ensure adequate funding of the scheme.

ii.   Establish SIWES and accredit SIWES unit in the approved institutions.

iii.   Formulate policies ad guideline for participating bodies and institutions as well as appointing SIWES coordinators and supporting staff.

iv.   Supervise students at their places of attachment and sign their log-book and ITF Forms.

v.   Vet and process student's log-books and forward same to ITF Area office

vi.   Ensure payment of Allowances for the students and supervisors

CHAPTER TWO

2.1 BACKGROUND OF EMERGING PLATFORMS LIMITED

Emerging Platforms is a Nigerian company that builds innovative of information technology solutions with focus on but not limited to the education sector. It was founded by Mr. Aina Kola. The company aims to identify problems, leverage technology to create massively impactful solutions and proactively seek to scale them to sustainable entities. Emerging Platforms builds solutions to problems in security, cloud platforms, education while offering consulting and advisory services. The company boasts of being a fully agile organisation focusing on getting basic functionality of solutions to the customers in as little time as possible while making improvements in optimized increments.

2.2 STRUCTURE OF EMERGING PLATFORMS LIMITED

The company is divided into different teams that are setup to complete specific tasks.

i. Business Development / Sales Team: The Business Development team take care of advertisement, company branding and product placements. They are usually the first team to begin communication with clients. All issues concerning payments for services rendered are communicated to the clients via this team.

ii. Business Solutions Analysis (BSA) Team: The Business Solutions Analysis Team takes care of requirements gathering and analysis of customer problems. Preliminary solutions are drawn up and share with the Software Development and Platform Administrative team for scrutiny, further analysis and development.

iii. Software Development (SD) Team: The software development team is made up of agile developers skilled in different programming languages for different platforms.

Solutions are brought from the Business Solutions Analysis team, analysed and scrutinized. The recommended changes are sent back for approval by the BSA team before development begins.

iv. Platform Administrative Team: Emerging platforms products and services like iLearn and other Software-as-a-Service (SaaS) systems are managed by platform administrators. The contents on all platforms have to be analysed and approved by the Platform Administrative team before they can be uploaded.

v. Human Resources (HR) and Administrative Team: The Human Resources (HR) and Administrative Team undertake hiring of new staff, approve procurements and address staff problems. They also take care of maintenance of company assets.

vi. Internal Control: The Internal Control office makes sure all the units work smoothly. All requisitions for financing have to be approved by this office. The office makes sure rules are kept in the on/off office grounds. Disciplinary action against any staff can be carried out by this office.

vii. Project Management (PM) Team: A project manager is assigned for every project the company undertakes. The project manager divides development tasks into iterations and sets deadlines for delivery. The project manager works directly with the software development team to ascertain logistic problems the developer may face and finds solutions to make sure the deadlines are met. He/she makes requisitions for project resources if needed and can interface with the customer to discuss problems and solutions.

viii.   Technical Implementation (TI) Team: The TI team takes care of solutions involving hardware and networking. They handle all company servers and internet facilities. They also ensure security of company computers.

2.3 PRODUCTS AND SERVICES RENDERED

2.3.1 iLEARN

iLearn is a distance learning platform that can be tailored for subscribing institutions. iLearn is the current e-learning platform used by the National Open University of Nigeria (NOUN). It is currently being adapted to run on other conventional universities in Nigeria.

2.3.2 End User Certificate Issuance and Management System (ECIMS)

This is a platform developed and maintained for the Office of the National Security Adviser (ONSA), Nigeria by Emerging Platforms. It is a multi-agency enterprise system that allows agencies that participate in the issuance of End User Certificates (EUCs) to importers of controlled items to avoid speed bottlenecks and curtail corrupt practices. The solution currently spans ten government ministries and agencies.

2.3.3 ICT infrastructure for Kano University of Science and Technology (KUST)

Following efforts to enhance ICT services by the aforementioned university, Emerging Platforms was engaged to design and deploy a full ICT infrastructure that comprised of wireless cloud and internet, deployment and development to a Computer Based Testing (CBT) platform and provision of a dynamic website that can be found at http://kustwudil.edu.ng

CHAPTER THREE

3.1 SKILLS ACQUIRED FROM PLACE OF ATTACHMENT

I was assigned the Job of Software Developer for most of the time during my internship program. I also worked with other teams to understand their processes. I worked with the software development team to provide solutions to various client problems while asking questions and learning from the procedures followed by its members. The skills I learned during the internship period are outlined below.

3.1.1 THE LARAVEL PHP FRAMEWORK

Laravel is a PHP framework that emphasizes development with agile methodologies. It is a framework that follows the Model-View-Controller (MVC) pattern. The pattern allows abstraction of the different aspects of a web application. Using the framework allows a developer to focus on problem solving by building abstractions on top of the raw PHP language. It also promotes the use of PHP PSR (0, 2, 4) standards. It uses composer for installation and package management which allows developers to pull in existing packages that solve problems to avoid *reinventing the wheel*. It is an open-source project that is actively being managed by Taylor Otwell, a PHP developer that created the framework.

The framework makes code reuse easier by emphasizing Domain Driven Development (DDD) where application logic is abstracted from the database and request-response systems. It does this using an Inversion of Control (IoC) container that uses dependency injection to resolve the classes needed to execute code after they are type-hinted in the method signature. Application logic can therefore be changed without affecting other parts of the system. It also promotes Test-Driven Development (TDD) making unit testing easier using PHPUnit.

Like many other web frameworks, Laravel uses the model-view-controller (MVC) pattern for code structure

    i.   Controllers: Handle all incoming HTTP requests and return suitable responses.

    ii.   Views: Render the HTML output.

    iii.   Models: Encapsulate Business Logic, such as interaction with the database.

Important features to be noted in Laravel include:

i. Model-View-Controller Based System

ii. Extremely Light Weight, does not force any convention

iii. *Eloquent* – An Object Record Model (ORM) used as an abstraction layer for database access

iv. Form and Data Validation

v. Event-driven code execution

vi. Job Scheduling

vii. Caching

viii. Blade templating – Blade is a system developed for Laravel that allows developers to modularize HTML markup encouraging code reuse. It allows data from PHP to be injected into views.

Considering that I was well vested in the PHP language before my internship, having extensively used the CodeIgniter MVC framework, it was relatively easy to learn to develop using the Laravel framework.

3.1.2 VERSION CONTROL SYSTEMS

Version control is a system that records changes to a file or set of files over time so that you can recall specific versions later. It has become part of the software development cycle for many developers. It allows developers to share code easily between themselves. It also allows users to revert to older versions of a particular file if an error occurs.

As work is done on a tracked folder, each change is tracked automatically. This can include modifying a file, deleting a directory, adding a file, moving files or any other action that may alter the files. Changes can be submitted collectively as commits.

When a commit is made, the changes are recorded as a changeset and given a unique revision. This revision could be in the form of an incremented number or a unique hash depending on the system. A changeset will include a reference to the person who made the commit, when the change was made, the files or directories affected, a comment and even the changes that happened within the files (lines of code).

3.1.3 RELATIONAL DATABASE SYSTEMS

Relational Database Management Systems (RDBMS) are data storage structures where data is stored in tables. A table represents an entity and its columns contain the properties of the entity. They are the most commonly used database systems in web applications. The most common is the free MySQL database system. This was the system I used the most during the course of my internship.

MySQL is an open-source relational database management system (RDBMS) it is the world's second most widely used relational database management system, and the most widely used open-source client–server model RDBMS. Data in a MySQL database is manipulated using SQL queries. SQL stands for Structured Query Language. Data with the same properties are stored in

tables with columns for storing the properties. This was the primary database system used during the course of my training.

3.2 NEW TOOLS/SOFTWARE APPLIED

Below is a list of the new tools/software I used during the course of my internship

i.   Jetbrains PHPStorm: A full-fledged IDE used for PHP development. It provides user interfaces for version control integration, unit testing, debugging using Xdebug (A PHP debugging extension that allows variable tracking after execution of each line of code) and so much more.

ii.   MySQL workbench: In building advanced applications, standard database planning has to be done. This involves sketching the flow tables, together with the links between them, for clear representation. MySQL workbench allows for database tables, their relationships and constraints to be modelled graphically before they are engineered into the actual database engine.

iii.   FileZilla: This is an FTP (File Transfer Protocol) program for file uploading and downloading to and from an FTP server. The program lets you transfer files and navigate among folders, Websites, and one's computer. This software enables one to perform multiple file transfers simultaneously.

iv.   PuTTY: An application used to gain remote access to the terminal of a Linux-based computer via the SSH protocol. It allows the use of SSH keys (if the remote computer supports them as security measures) instead of passwords to gain authorization on the remote computer.

v.   IntelliJ IDEA: An IDE by Jetbrains used for Java application development.

3.3 SUCCESSFUL PROJECTS ACHIEVED WITH ACQUIRED SKILLS

3.3.1 EMERGING PLATFORMS GROUP CAREER WEBSITE

The Human Resources team at Emerging Platforms needed a better way to post job vacancies and receive applications. A career section of the hitherto website was proposed and I was assigned the job. I was given a week to complete the assignment.

Considering the deadline, I opted to use the Laravel 4 PHP framework. I used MySQL as the data storage system. It helped me understand how CRUD (Create, Read, Update and Delete) operations work. I also had to do data validation to ensure that the Curriculum Vitae (CV) uploaded by applicants are either .doc, .docx or .pdf formats.

I hit a major setback when I tried to deploy on the server used to host the hitherto static website. The Laravel framework has PHP 5.4 as one of its minimum requirements. It also needs the php_mcrypt extension in order to run without hitches. The server at the time only had PHP 5.2 installed without the php_mcrypt extension. I had to reinstall the application server stack. I upgraded the Apache web server to version 2.4 and updated the PHP installation to version 5.6. The application was deployed successfully and can be found at https://emergingplatformsgroup.com/.

This project taught me to use Linux commands as the server ran a version of Linux called RedHat.

3.3.2 THE COBUILDIT PLATFORM

CoBuildIt is a platform for real estate stakeholders to meet and collaborate on projects under secure conditions. Each project started on the platform needs a forum for participants to have conversations. The platform was being handled by a senior developer but it was necessary that I build the forums module to meet client deadlines. The project allowed me to work with a developer that is performance-centric. I was taught how to write less-expensive database queries by selecting only the data needed at runtime. I also learned to use a caching system called Memcached to avoid making queries for the same data repeatedly. I used a tool called clockwork to view running time of queries while making optimizations to their structure. I also learned how to manipulate images with PHPs php_gd2 extension.

3.3.3 COMPUTER-BASED TESTING (CBT) PORTAL

The computer based testing portal was developed for the Kano University of Science and Technology. It is a web-application that runs on the institution's intranet. The tests run on two linux servers configured to run in parallel for an extra layer of redundancy. The entire platform runs as web application with client ends for staff and candidates. The examination questions can uploaded by the staff using an excel sheet downloaded from the application. Parsing the excel sheet proved to be difficult when a lot of questions were uploaded. The algorithm had to be rewritten multiple times in order to get better performance. I also had to set PHPs global MAX_EXEC_TIME variable to higher value to avoid script timeouts during upload of questions due to the number of iterations it takes to upload the questions. The size of the project allowed me to learn how to normalize database tables for better query efficiencies. I was given the job of designing the database structure for the project.

Security was top priority, thus the counter for the examinations page had to be backed up with a server check when submitting the test to make sure that a candidate did not tamper with the JavaScript counter from the browser.

3.3.4 ALUMNI MANAGEMENT SYSTEM

The Alumni Management System is a Software-as-a-service (SAAS) platform that allows University Alumni Associations to manage Alumni duties and processes. It allows for

- Payment of dues

- Donations

- Elections

- A forum for communication

- Requests for transcripts

The e-payments are routed through GTBank's GTPay platform. GTPay's documentation has been shown to be very vague and unreliable. It is however, the most cost effective payment solution in Nigeria. The lack of reliable documentation caused development to be hectic as I had to communicate constantly with their support team via email to verify parameters for API access.

CHAPTER FOUR

4.1 CHALLENGES FACED DURING ATTACHMENT

i. Transportation Challenges: It was expensive to transport myself to and from my place of work owing to the fuel scarcity problems that plagued many Nigerian cities at the time.

ii. Finding a place of attachment: It was difficult to find an organisation that specialized in the ICT niche I am interested in. The ones I was able to find, had one reason or the other for not accepting student interns. This made me to begin my internship about a month late.

CHAPTER FIVE

5.1 CONCLUSION

This industrial training has afforded me the basic practical and theoretical knowledge that I may not have gotten from the lecture room. It also gave me the opportunity to experience how the Nigerian ICT sector works. It has given me the opportunity to have a look into the future and access my readiness for employment or entrepreneurship. The training has bridged the gap between academic theory and practical. It has also built by confidence in my skills.

5.2 RECOMMENDATIONS

i.   I would like to recommend that the management of the school use the relationship that SIWES students have made with their various places of attachment to create a better learning experience for students who will participate in the program in the future.

ii. I would also like to recommend that more practical sessions should be provided for students studying courses like computer science which require constant practice. With such, students can encounter real-life problems to enhance their problem solving skills.