

Improving Employability Skills Through a Web-Based Work Integrated Learning Database for Construction Students

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Abstract. Employability and Unemployment continues to be dire issues that Nigerian youth are faced with daily in a saturated employment market. Whereas, the use of work-integrated learning can help bridge the gap by increasing employability skills among students. The study examined the benefits of having a work-integrated learning (WIL) program for students in the construction field. Therefore, the study developed a framework for improving employability skills through a web-based work integrated learning database for construction students. Using a system block diagram, use case diagram and activity diagram, the study illustrated the functional requirement needed for the development of the WIL platform. The WIL platform is a web-based system pooling submission of available WIL positions from employers in construction businesses and former WIL students in order for prospective WIL students to access possible openings where they can learn in a workplace environment. The methodology of this research includes using the combination of HTML, CSS and the C-Sharp programming language for the interface design and server side scripting while MySQL was the database platform used for storing and retrieving the data used for the application. In conclusion, the study designed a WIL platform for construction students. The use of the WIL platform is intended to encourage employability of construction students by ensuring that they are adequately engaged in a work place training.

Keywords: Construction students · Employability · Work-integrated learning

1 Introduction

Employability and unemployment continues to be dire issues that Nigerian youth are faced with daily in a saturated employment market. Despite the high number of higher institution in the country, there are concerns about the quality of graduates that are churned out yearly. The youth unemployment and underemployment rate (15–35 years) for the fourth quarter (Q4) of 2017 were put at 52.65% which is 22.64 million people [1]. There is need to take concerted efforts at reducing these unemployment numbers.

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In response to this, institutions of higher learning are trying to emphasize practical experience in academic course [2]. Experts have pointed out that graduates of Nigerian Universities should be creators of new jobs or require little or no training to fit into new employment roles. This means that their employability skills must be adequately sharpened within and outside the four walls of the university.

Some researchers have also argued that employability skills cannot be adequate taught within higher institutions. This notion is emphasized in the study by [3], in that, there is no correlation between the skills acquired in the universities and those required in the place of work. This is the area where industry and higher institutions of learning partnership is very crucial. The Federal Government understanding the importance of employability skills in a formal setting set up the Industrial Training Fund (ITF) in order to achieve the Students' Industrial Work Experience Scheme (SIWES). This skill training usually occurs in a formal setting but most times it is hard for students to get the right placement within the allotted period of 6 months. Using a work-integrated learning, [4] argued that this innovative approach shows the difference between an employable graduate and one that lacks the employability skills.

The case for enhancing construction graduates' employability in a developing economy is built around their relevance in oiling the necessary housing and urban infrastructure needed in developing nations [5]. Nigeria for instance struggles with housing deficit for its over 180 million population and over-pressured infrastructure [6]. Also, a major challenge the construction industry deals with is building collapse. The construction sector is looking for raw talents that are able to assume the required positions within organizations with little or no need of retraining [7]. These employable recruits will be able to fill the skill gap that exists in the construction sector. SME construction businesses are looking for individuals that would enhance the productivity and profit of the firms rather than becoming liabilities and increasing the employment turnover, ones they do not fit.

For employers of labour, [2] noted that a skill deficient graduate will lead to a loss and poor output for the firm. The construction industry is so critical in using graduates that have the required skills because of the nature of the products in terms of housing and other civil infrastructure [7]. It is paramount that the graduates produced in this sector are of utmost quality as mandated by the industry. This is the role work-integrated learning intends to fulfil, by creating a well-rounded graduate for job creation and the world of work. This study posit that with the high level of unemployment, it is difficult for some undergraduate students to find placement in order to experience a work-integrated learning system. It is possible to use information and communication technologies such as web-based systems to track down WIL openings. Therefore the study aims to develop a framework for improving employability skills through a web-based work integrated learning database for construction students.

2 Review of Related Literature

[8] defined work-integrated learning as a learning strategy in a well-designed curriculum that integrates theory with work practice. On the other hand, [9] stated clearly that WIL is the process of creating a linkage between a students' present academic roles

with his/her future professional duties. This means that WIL helps to prepare students that are involved for the future career in their chose career. In the study by [10], WIL is regarded as an inclusive learning framework that integrates practical experiences with their academic courses. These practical experiences can be in form of simulations, problem-based learning in class room settings and investigating real life cases. The study [11] proposed a virtual WIL, whereby students can use virtual reality to experience work place scenarios of their programs. The VWIL comes with the drawback of huge financial investment and inability to portray the reality of physical work place experience for students. Additionally, [11] opined that WIL is a two-way learning process for students. It was recorded in [12] that the major objectives of WIL is that students are able to learn from their employers in a WIL system applied knowledge and transferable skills. WIL empower graduates to be more productive at their workplaces.

WIL can exist as learnship, apprenticeship, internship and traineeships in a work setting [3, 11]. WIL most times expose students to their first work experience. In the study by [4], they measured the overall experience of students in WIL and the graduate attributes that are formed in the process. Further studies in [13] evaluated the impact of WIL on Masters' students in Business Administration in Pakistan. The study [14] measured the impact of WIL on the academic and workplace competencies of 3rd year students in South Africa. In order to design a working framework [15] helped develop a WIL curriculum that takes contribution from the industry in order to build a robust curriculum for the future. The study [4] stated that work-integrated learning (WIL) gives the students in institutions of higher learning the opportunity to mix theory and practice which would help them develop their own personal and professional attributes. By this [16] noted that through WIL, the cognitive skills of students are enhanced through knowledge that helps prepare students for the workplace. Succinctly, [17] reported that WIL helps produced graduates that have enhanced skills for the workplace through competence, experience and employability attributes that are entrenched during the program. An analysis of [15] concluded that the overall benefits of WIL helps students to easily transition from study to work place environment.

3 System Design

There are other systems that have been designed for students' use in previous studies [18, 19]. The study in [18] proposed a web-based system to help secondary school students get the required guidance counselling in the Building profession. The problem identified in this study is the lack of database for students to find placement or positions for the work-integrated learning platform or Students' Industrial Work Experience Scheme (SIWES) in the Building profession. In order to develop the WIL database system, the system block diagram, use case diagram and activity diagram were designed as shown in Figs. 1, 2 and 3 respectively. In Fig. 1, students, employers and former WIL students are able to interact with the WIL database from their devices. The users are able to log into the HTML designed interface and complete the online interaction.

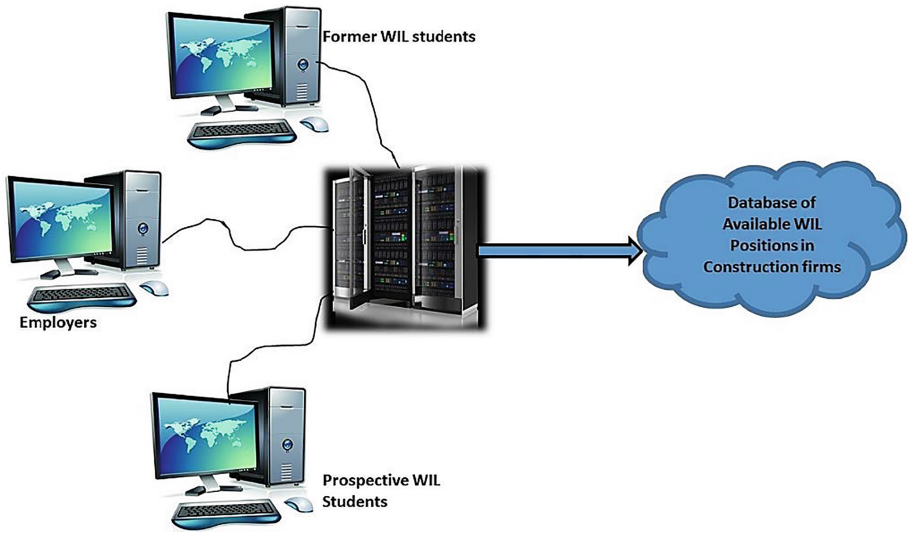

Fig. 1. System block diagram for the WIL system

Figure 2, showed there are majorly two sections of users in the WIL system. The first major component of users involve the employers of labour in construction businesses and former WIL students that had opportunity to work in construction businesses in the WIL program. The second user is the prospective WIL students seeking for placement or positions in a construction business for the WIL program.

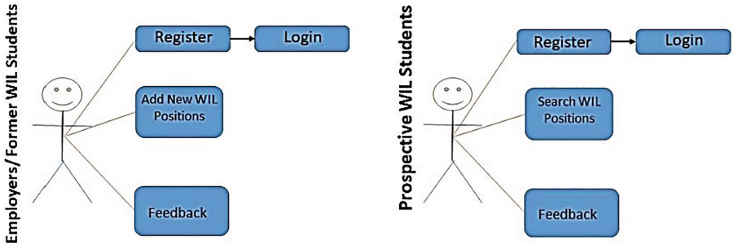

Fig. 2. Use case diagram for the WIL system

Figure 3 showed the activity diagram of the WIL system. The WIL system is designed to have a URL that can be accessed on a web-based platform linked to the university's website. Users of the platform will need to register on the platform and obtain a username and password in order to access the web-based platform. The employers in construction businesses and former WIL students can add new WIL positions available for prospective WIL students to access in the WIL database. Information about the name of the company, location of the company, duration for the WIL, possible start date required, role description for the position and contact details in

terms of email and phone number can be supplied on the WIL platform. In addition, Employers can give feedback on WIL students within their organization. Prospective WIL students can pool from the database based on the location they prefer to carry out their WIL program or search all the database for possible openings for WIL. Students can also give feedback of their experience working in the WIL program. The system would help make search faster and create a two-way system between students and employers.

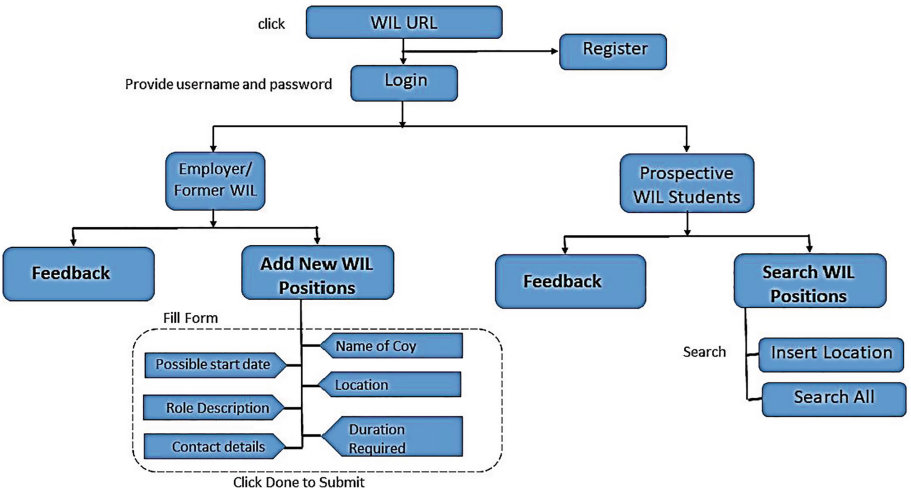

Fig. 3. Activity diagram of the WIL system

4 System Implementation

This section gives a brief overview of the tools used in the coding of the application software. The various tools used in the development of the system are as follows:

4.1 Hyper Text Mark-up Language (HTML)

HTML is a markup language used in the development of web pages. Markup languages are usually written with angled brackets and tags such as <p> which means paragraph, <br> which means break, <body> which means the main contents that will be viewed on the browser and so on. HTML codes can be written with any text editor and are saved using the file extensions ".htm or .html". Once they have been saved any web browser can be used to view it. HTML for this application was written using sublime text as the text editor.

4.2 Cascading Style Sheet (CSS)

CSS is used to add some styling to HTML tags. The particular framework used was Bootstrap. The extension for css file is .css and external style sheets can be added using

the html <link> tags. It helped to enforce the behavior of several of the entities of the application.

4.3 MySQL

In order to design the database management system (DBMS) for the work-integrated learning platform, MySQL (Structured Query Language) was used. Using MySQL helped to store the data in separate tables rather than putting each of them in a large warehouse. This is organized for speed, scalability, reliability and easy-to use. A database is a collection of related data. This is a free and open source software and runs on all platforms. MySQL also performs several functions. This was used in this application to store the data.

4.4 C-Sharp(#) Programming Language

The programming language used for controlling the system was C-Sharp (#). A C# program can contain managed or unmanaged parts. The managed code is fussed over by the system which runs it. C# programming language is able to maximize possible performance, and enable direct access to parts of the underlying computer system. C# programming belongs to the family of languages in the visual studio. It can be used for various types of application programming some of which include web programming, windows programing, animation and graphics and so on.

The methodology of this research includes using the combination of HTML, CSS and the C-Sharp programming language for the interface design and server side scripting while MySQL was the database platform used for storing and retrieving the data used for the application.

In the implementation of the work-integrated learning system, Figs. 4, 5, 6, 7, 8, 9 and 10 showed the screenshots of the developed work-integrated learning system. The users of the platforms follows the activity diagram described in Fig. 3. This WIL system is for employers, past SIWES or WIL students to be able to post available SIWES or WIL positions in the construction industry. The requirement include;

a. If you log in as a user, you should be able to do three things (Add New Job, Search for Job, Feedback).
b. If you select Add new Job, you should see a form that contains the following (Name of Company, Location, Duration, Role, Contact email, phone number, Start date, submit).
c. If you select Search for Job, you should see a form that contains the following (Location and search), if you select search, you should be able to see various list of available work learning jobs.
d. If you select feedback you should see a form that contains Name, Email comment and submit.

Figure 4 showed the Login page for the work-integrated learning (WIL) system. Users (students and employers) can access the platform via a link. New users can register on the platform in order to use the WIL system as in Fig. 5.

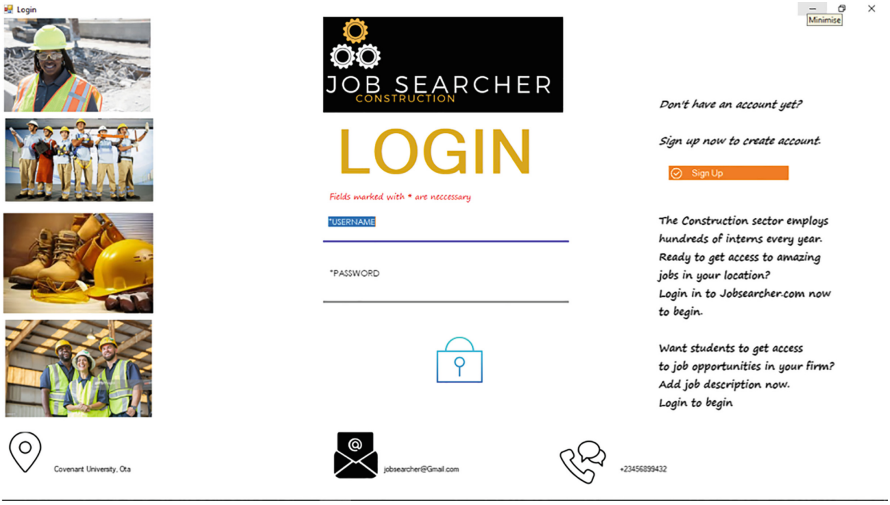

Fig. 4. Login page for the work-integrated learning system

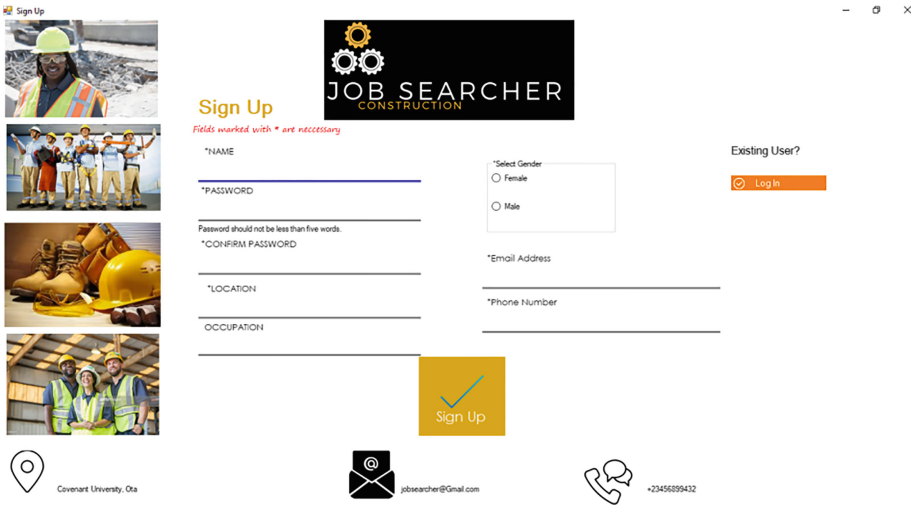

Fig. 5. Registration page for new users of the work-integrated learning system

Figure 6 showed the Home page of the WIL system. The Home page showed services that can be obtained from the WIL system such as Add Job, Search for Job and Feedback. Figure 7 showed the Add Job interface and the required data for the past SIWES students and employers to provide. By adding the information for the Add Job it helps students to easily search for prospective WIL positions.

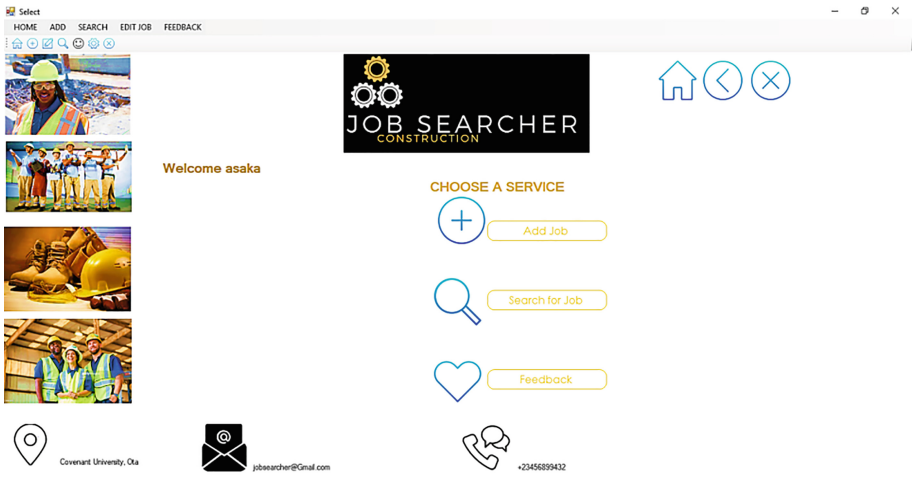

Fig. 6. Home page for the work-integrated learning system

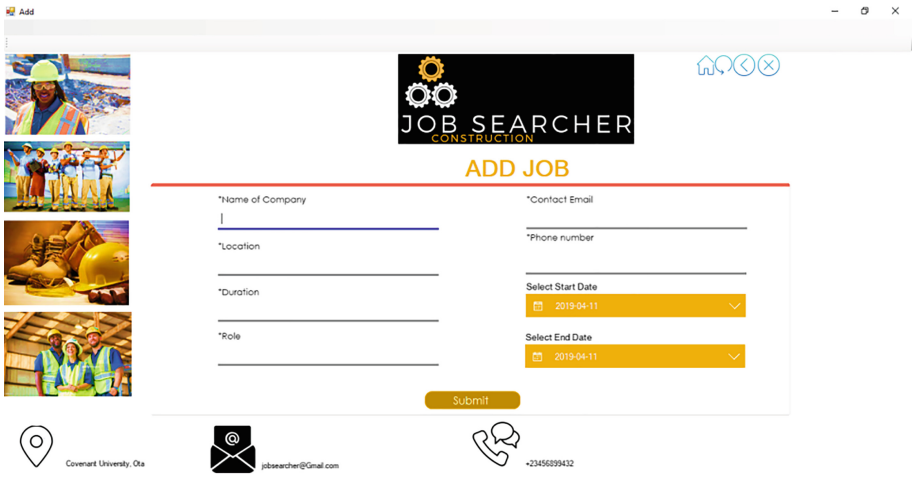

Fig. 7. Add WIL job interface in the work-integrated learning system

Figure 8 showed the Search interface based on location input in the WIL job search. Figure 9 presented the Result interface for a prospective WIL student, while the student can select and contact the employer. Figure 10 highlighted the need to provide feedback for the system. The feedback can be provided by the students and the employers.

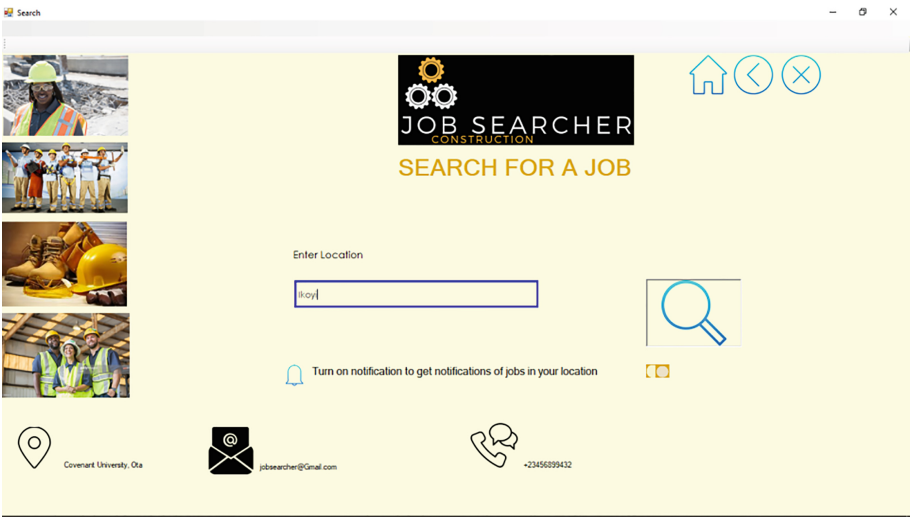

Fig. 8. Search WIL job interface in the work-integrated learning system

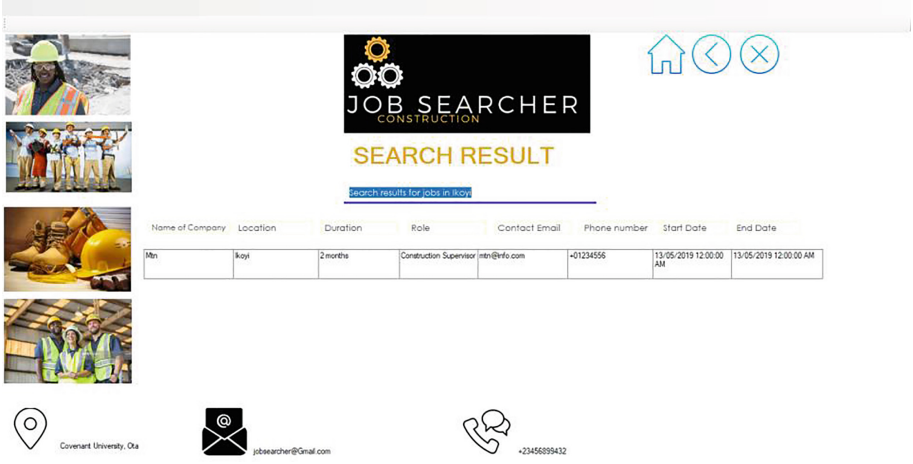

Fig. 9. Result page from WIL job search in the work-integrated learning system

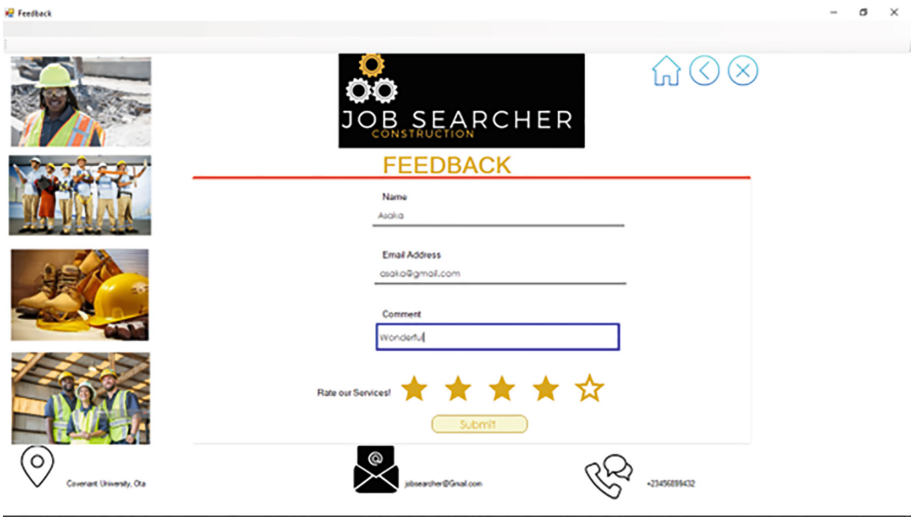

Fig. 10. Feedback page for the work-integrated learning system

5 Conclusion

The study examined the benefits of having a work-integrated learning (WIL) program for students in the construction field. Therefore, the study developed a framework for improving employability skills through a web-based work integrated learning database for construction students. Using a system block diagram, use case diagram and activity diagram, the study illustrated the functional requirement needed for the development of the WIL platform. The WIL platform is a web-based system pooling submission of available WIL positions from employers in construction businesses and former WIL students in order for prospective WIL students to access possible openings. In conclusion using HTML, CSS, MySQL and C-Sharp programming language, the study developed a work-integrated learning platform to add and search for WIL job positions for construction students. The use of the WIL platform is intended to encourage employability of construction students by ensuring that they are adequately engaged in a work place training.

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