# A Web-Based Decision Support System for Project Manager's Proficiency

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*Abstract - The problem of incompetence of project managers has led to abandonment of several projectswhich can be attributed to the lack of experience on the job, exposure as well as possession of the requisite certification. This study seeks to salvage these problems by developing a web-based decision support system (DSS) that can serve as a solution to the problem of incompetence attributed to a project manager.*

*A web-based DSS was designed which we call the Curve Proficiency systemto determine proficiency of project managers and this system keep track of their experience, exposure and certification. Curve proficiency system was developed using Apache server, MySQL for the database with a combination of PHP, HTML, CSS, and JavaScript as the development tools.*

*The DSS enhances the classification and prediction of project managers as either proficient or not for specific project. This will influence organizations in the determination of suitable project manager for an available position. In further studies, researchers can improve on the proposed system by making it an adaptable system that can be used in other field of study.*

*Keywords: Decision Support System (DSS), Project Manager, Proficiency, Project, and Web-based*

## I. INTRODUCTION

A project manager is saddled with the heavy responsibility of achieving all of a projects goals and objectives, and for him to be able to meet up with, his proficiency is of major concern.This position of a project manager may refer to a temporary endeavor containing an end coinciding with the end of the assigned project, but can also be a semi- permanent or permanent position [1]. Several researchers have looked at the problem of incompetency of project managers and have tried to proffer solutions for example [2] investigated the awareness of Nigerian and the knowledge level of project managers about project management methodologies and discovered that most of the project managers lack adequate experience as only 50% of them showed a complete competency using they three criteria of experience, exposure and certification to access them. Also, [3] showed that the leadership competency profiles of project managers are the dominating factors for project success, using the ten dimensional project success criteria developed by [4], in turn based on the Project Excellence Model of [5].

Furthermore, in addition to the necessity of processes related to information systems, reports published by several companies indicate a high percentage of failure for information systems projects. For example, CHAOS research performed by the Standish Group covering several industries, including banking, securities, manufacturing, retail, wholesale, health care, insurance, services, local, state, and federal organizations, found that: 32% of all software projects are completed on time and within budget, with all functions and features as initially specified, 44%of the projects are completed over-budget and over the time estimate, offering fewer features and functions than originally specified, 24% of the software projects are cancelled at some point during the development life cycle [6].

## II. WHAT IS A DECISION SUPPORT SYSTEM?

A Decision Support System can be seen as an interactive computer-based system intended to help decision makers utilize data and models in order to identify and solve problems and make decisions [7].

DSS can be categorized as follows: communication-driven DSS, data-driven DSS, document-driven DSS, knowledge-driven DSS, Web-based DSS and model-driven DSS [8]

- A communication-driven DSS supports more than one person working on a shared task; examples include integrated tools like Google Docs or Groove [9].
- A data-driven DSS or data-oriented DSS emphasizes access to and manipulation of a time series of internal company data and, sometimes, external data.
- A document-driven DSS manages, retrieves, and manipulates unstructured information in a variety of electronic formats.
- A knowledge-driven DSS provides specialized problem-solving expertise stored as facts, rules, procedures, or in similar structures.
- Web-based DSS: Web-Based DSS is a DSS that delivers decision support information or decision support tools to a manager or business analyst using a "thin-client" Web browser like Netscape Navigator or Internet

Explorer, Mozilla Firefox etc. that is accessing the Global Internet or a corporate intranet. The computer server that is hosting the DSS application is linked to the user's computer by a network with the TCP/IP protocol. Web-Based DSS can be communications-driven, data-driven, document-driven, knowledge-driven, model-driven or a hybrid. [10]

- A model-driven DSS emphasizes access to and manipulation of a statistical, financial, optimization, or simulation model. Model-driven DSS use data and parameters provided by users to assist decision makers in analyzing a situation; they are not necessarily data-intensive. Dicodess is an example of an open source model-driven DSS generator [11]

Three fundamental components of a DSS architecture are:[8][12][13][14]
- The database (or knowledge base),
- The model (i.e., the decision context and user criteria), and
- The user interface.

The users of this systems are also important components of the architecture [14]
The support given by D SS can be separated into three distinct, interrelated categories: [15] personal Support, Group Support, and Organizational Support.
The components of a DSS can be classified as follows:
- Inputs: Factors, numbers, and characteristics to analyze
- User Knowledge and Expertise: Inputs requiring manual analysis by the user
- Outputs: Transformed data from which DSS "decisions" are generated
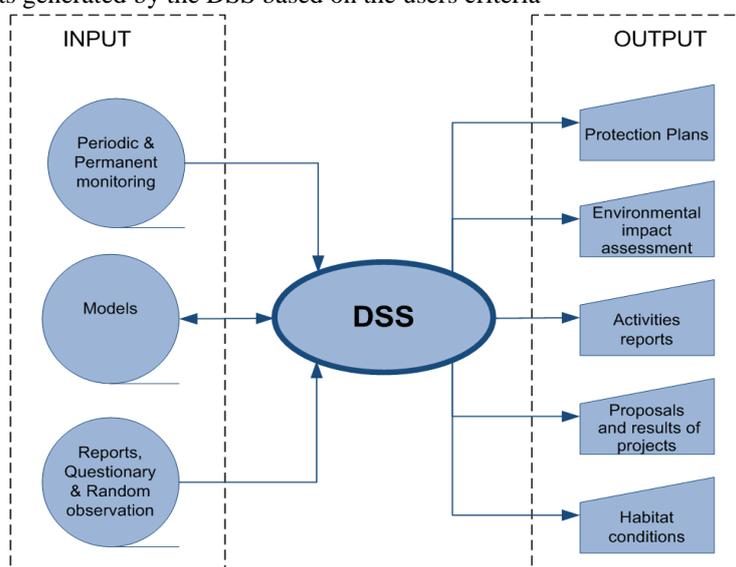- Decisions: Results generated by the DSS based on the users criteria



Figure 1: Diagram of a DSS showing inputs & outputs [8]

Hence in this paper a web-based DSS was developed that will be used to access project managers to determine if they are competent for a particular project or not. The remaining sections of this paper will discuss some related works, also present the method used to design the system and how it was implemented.

### III.   RELATED WORKS

[16]In their work built a Decision support systems (DSS) that helps job seekers to upload their credentials online with the following details location, salary and grade of degree. The system allows recognized employers to log on to the database and search the profiles of jobseekers under a number of different criteria which includes skills, location, salary and degree grade as stated above. The system then returns the similarity matching for each jobseeker in the database and displays them on a results page. This matching offers employers a list of potential candidates; the final choice is left to the decision maker who may consider factors not easily incorporated in the DSS. This system was a DSS built around a web interface, relational database technology and a similarity model to associate applicants with potential employers. Although many DSS has been used for human resource problems such as personnel scheduling, there are very fewer DSS applications in the area of personnel placement which is what this research describes by developing a DSS to assist in the matching of the skills of the prospective employees with the needs of the employer. The gap identified in this work is that the DSS built does not give feedback to the jobseekers.

[17]In theirwork describes a knowledge-based system designed for the purpose of enhancing decision making in a construction firm. This research used a knowledge acquisition exercise to determine the tasks of project managers and the information necessary for and used by these tasks. This information was organized into a knowledge base for use by an expert system and this knowledge helps the construction Project manager to know the task that are needed to be complemented at a time in other for the project to be completed. The knowledge-based system was developed to identify

the interrelationship between tasks, to analyze the interdependency, to generate the tasks and to recommend corrective actions. This was then used as the basis for an intelligent decision support system for project managers.

The work undertaken shows that it is feasible to benefit from the field of artificial intelligence to develop a project manager assistant computer program that utilizes the benefit of information and its links. The gap identified in this research is the fact that we cannot solely depend on the knowledge the system is given if the project manager himself is not proficient in the field of construction project.

[18]In their study designed an enhanced DSS for portfolio management using financial indicators however, financial indicators are used for market analysis and to forecast the future of stock prices. Due to the high complexity of the stock market, determining which indicators should be used and the reliability of their outcomes have always been a challenge. This research provide a hybrid approach in the form of a decision support system that offers the best suggestions in buying and selling stocks. This system will help an investor to identify the best portfolio of stocks using a series of financial indicators. These indices act as a model that forecast the future price of a stock by examining its activities and status in the past. Therefore, using a combination of the indices enables us to make decisions with more certainty. To determine the proficiency of this system, data from the stock market in Iran from 2001 through 2011 was used. The results show that the use of indices and their combination have led to the decision support system to produce suggestions with very high precisions. However the flaw in this system is that it was not made to be adaptive to the situation of stock market in other countries.

[19]In their work gave a comprehensive study on DSS and how it work with web technologies. They realized that World-Wide web technologies has rapidly transformed the design, development, and implementation process for all Decision Support Systems. In particular web technologies have provided a new media for sharing information about decision support and new means for delivering decisions capabilities. For DSS developers, the big leap forward is to use the "web as a computer and hence they are recommending the use of DSS on the web which is known as Web-Based DSS. But the challenges that must be overcome are technological challenges, economic, social and behavioral challenges must be dealt with for this system to see the light of day.

## IV.  METHODOLOGY

The software development model that was used is the spiral model. The Spiral Model is a type of iterative software development model that is generally implemented in projects with high risk factor. It was first proposed by Boehm. In this system development method, they combine the features of both, waterfall and prototype model [20]. Spiral model was used due to the robustness of this work.

WAMP was used for the development of the web-based DSS which has the following:

   i)    Windows  operating system was used
   ii)   Apache web server was used
   iii)  MySQL to create the database for the application using PhPMyAdmin
   iv)  HTML, CSS, PHP and JavaScript was used to design the web pages

Below is the entity relationship diagram for the web-based DSS showing all the components of the system which includes the Admin, the HR, the users which are the project managers and the three main attribute (Experience, exposure and certification) which are the basic criteria used for assessing them.
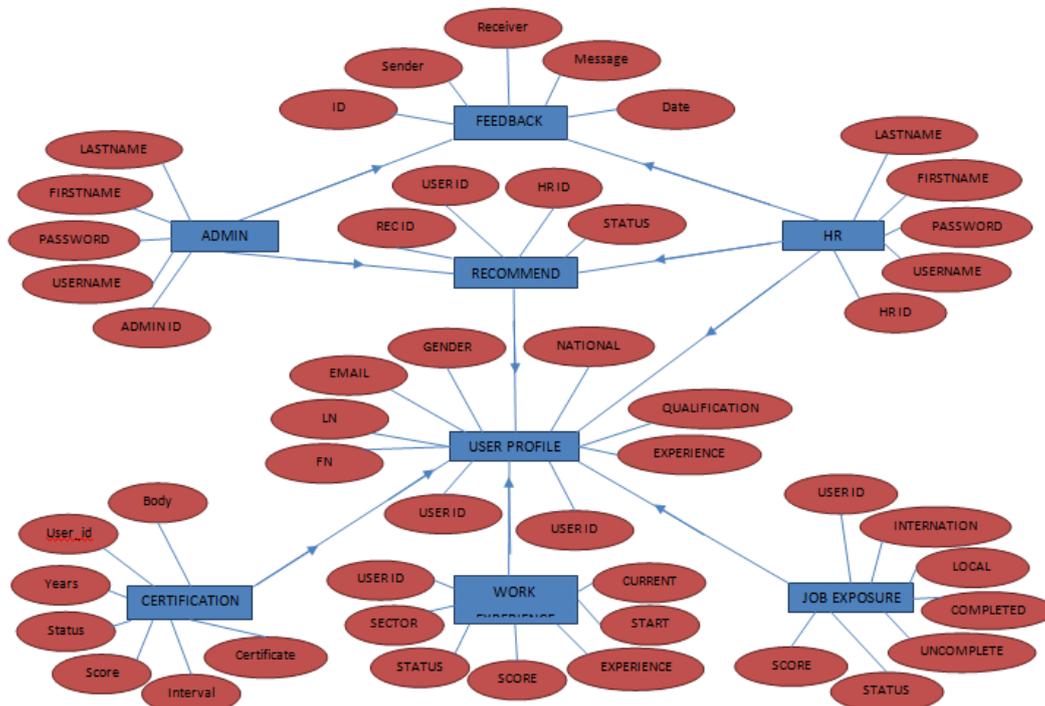


Figure 2: ER Diagram for our Web-Based Proficiency System.

   

Below is a diagram showing the system architecture of our web-based application which comprise of a web browser, web server and the database.
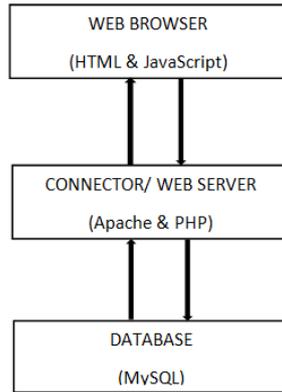


Figure 3: Architecture of the Web-based DSS

Furthermore bellow is a figure of the use case diagram for our proficiency system showing the key actors in the system who are the Admin, HR and the Users which are the project manages.
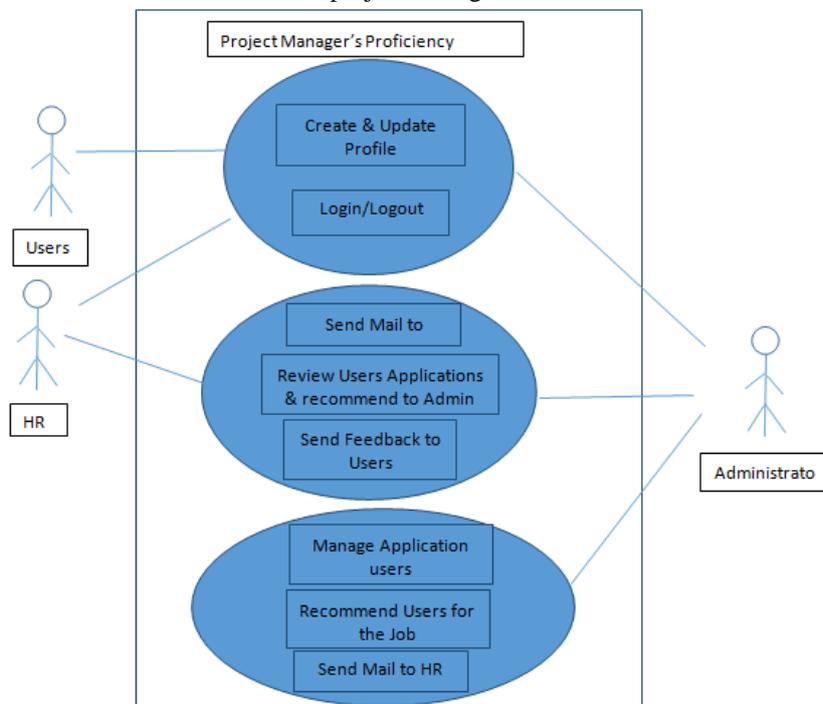


Figure 4: Use Case Diagram of Project Manager's Proficiency System

## V.   IMPLEMENTATION OF THE WEB-BASED DSS

Curve proficiency system for project managers is a web-based system that was designed for granting access to users so the user has to be connected to the internet, however this system is recommended for use by employers of labor seeking the hands of proficient Project managers for a particular job or project in their organizations. Once a user is authenticated, he has access to the home page by entering the URL into the web browser where he will either login as an administrator, the Human Resource personnel, an existing applicant or a new applicants will need to fill in their user name and password to login. Fig 5a and 5b depicts the home page
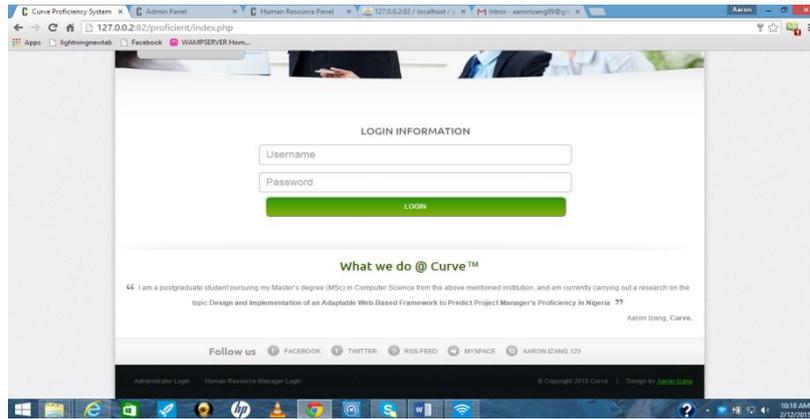


Figure 5a: Home Page

Figure 5b: Existing Applicant

the home page give a brief description of what the application do thereby given the project managers an idea of what is expected from them by using this system as a platform to seek for employment. Figure 5b shows the page where existing users can login.
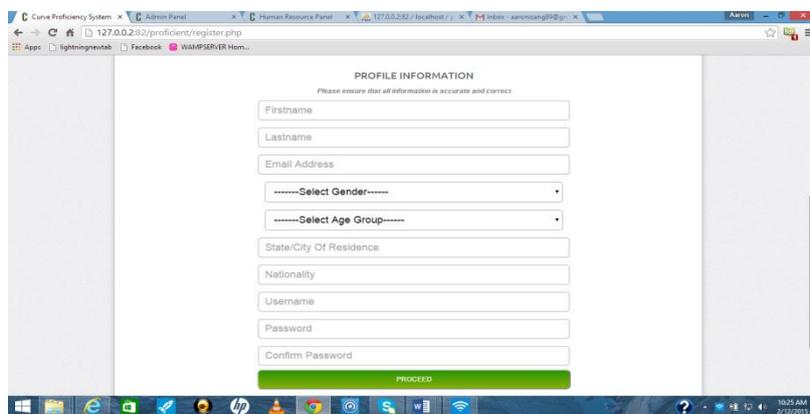


Figure 6: New Applicant profile creation page

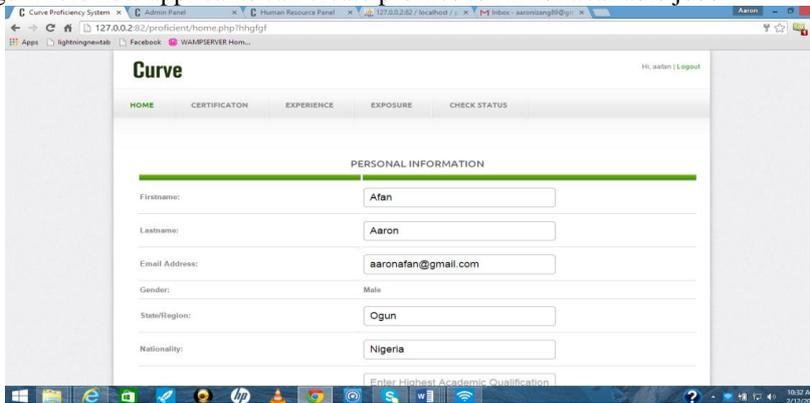Figure 6 shows the page where new applicants can create profiles to fill for available jobs.
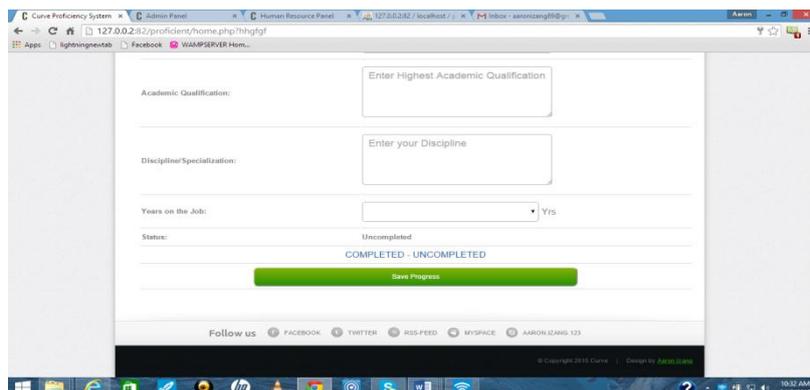


Figure 7a: Project manager's window



Figure 7b: Project manager's information page

Figure 7a & b shows the window where a new project manager seeking a particular job will fill in their details which include (Experience, Certification & Exposure) and also has a window where they can check the status of their application to know if they are proficient for the job or not and will be given reasons why they are not proficient and how to improve.
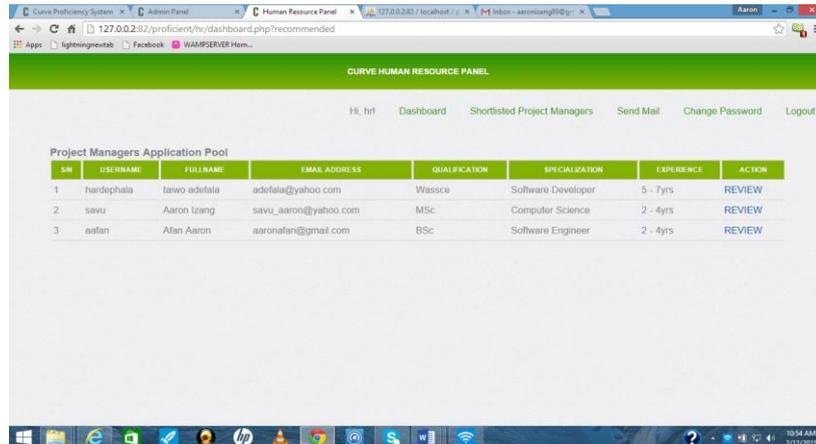

Figure 8: Human Resource Panel

The human resource personnel has access to all project managers that applied for the job, and will review their applications, recommend any project manager that meets all the criteria for employment to the admin, the HR can also send mail to the admin seeking for advice should the need arises.


Figure 9 Admin Panel

The admin, on his dashboard have access to the list of all project managers recommended for the job by the HR Personnel. He will now make the final decision on who to pick based on their qualification as soon as he chooses any Project manager for the job, the person will be notify and if otherwise a notification will also be sent to the person. The admin can also communicate with the HR officer view an internal mail platform.

## VI.    CONCLUSION AND RECOMMENDATION FOR FURTHER STUDIES

In conclusion, this research proffers a web-based DSS that provides a solution to the problem of incompetence of project managers by determining their proficiency in other words, accessing their experience, exposure and the certification they possess to determine how they will perform if given a particular project to handle and this will help organizations that wish to select a proficient project manager in their selection process, thereby helping organizations bridge the gap in their recruitment process of project managers. It is therefore recommended that organizations should make use of this software as it will give them an idea of the type of project manager they are recruiting. For further studies, this system can be modified by other researchers in other fields of study to be adapted in their area for different purposes.

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