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Development of Online Jobs Publication System

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Abstract: *This study aimed to develop an online jobs publication system that caters both employers and job seekers to post jobs related information and qualification respectively through the internet. Employers may post job vacancies online in their respective industries so that job seekers may be able to view and apply certain position electronically. Job seekers may also attach their educational qualification and job experiences. It also aimed to assess the software's quality assurance in terms of job seeker's security, usability, functionality, and reliability. It utilized the project method through the software development life cycle model. The main assessment tool was the evaluation sheet prepared by the researchers. There were 30 respondents included during testing and evaluation. The study revealed that the online jobs publication system is the best tool for communication between employers/recruitment agencies and job seekers through communication and information technology. Electronic mails, private message, video communication, forums and blogs are used to communicate between them. The system caters not only for the benefit of employers but it is also beneficial to the job seekers in searching for a right job and right employer conveniently according to their needs. The implementing establishment of the software may earn financial benefits if the website is visited multiple times by the viewing public, so then, business owners are attracted to use the website for the advertisement of the their products. It also revealed that the software has a high level of security for the protection of job seekers to avoid scammers since the system validates and filters all registered employers/recruitment agencies based on the POEA, DOLE and SEC registered agencies database. The software quality assurance in terms of functionality and reliability were also very high considering that the software performed fast and accurate delivery of results.*

Keywords: *Online Jobs, Jobs Publication, Job Hiring, Online Jobs Publication, Online Jobs Hiring*

I.

INTRODUCTION

Internet is one piece of technology that influences our perceptions of ourselves and our surroundings. It has been a major breakthrough in bringing people more closely at any hour of the day. It cannot be imagined a day without modern inventions though technology which has made living easier and better. But with all these high technology inventions, people are still seeking new things to make their living easier, faster and comfortable. In a world where people are looking for more and more online job activities, which means that job seekers must be able to identify their skills and qualifications in order to find certain company of interest to work for.

The role of the Internet in job search is multi-faceted and Internet use has permeated much of the job-search process over recent years. The use of internet can be able to facilitate the exchange of information among employers and job seekers at the same time lessen the cost of uncovering information on job opportunities. There is increasing policy emphasis on increasing the use of digital media in the job-search process and related activities. The Information and Communication Technology (ICT) can be utilized in searching jobs together with the other job search methods [1]. As the Internet has become more persistent tool in job-search and in recruitment, so disengaging the use of internet in job search has become more difficult; the borders between different job-search methods have become more unclear. With the increasing use of the internet and ICT, concerns have arisen about the 'digital divide' – i.e. the gap between those who have access to the internet looking for job opportunities and to those with little time or no access anymore. The digital divide is itself is dynamic and complex. It encompasses digital divides shaped by 'exclusion' (i.e. on the basis of socio-economic and educational inequalities) and those shaped by 'choice' (i.e. those individuals that have access to the internet but choose not to use it), with policy concerns resting primarily [2].

One strategy to enhance employment mobility is the provision of online job search services across Europe. Online job search can assist with increasing the transparency of job opportunities and collating all information about available positions into one place. Such services have the potential to increase the efficiency of the job market by increasing the number and quality of matches between employers and job seekers [3]. For job seekers online job search can provide a convenient way to search for opportunities related to their skills and interests; for employers job search websites can be a cost effective and efficient way of recruiting staff. Online job search services have been created by the EC at the Pan-European level and each member state (or its regions) is responsible for providing a similar service to its citizens. The European Commission facilitated two Pan-European online job search facilities namely: the "European Researchers Mobility Portal257" and the "European Job Mobility Portal (EURES) 256". In 24 of

the 27 member states, job search is primarily the responsibility of central government; and online job search is available in all member state. In Belgium, Italy and Spain the responsibility for online job search services is held either jointly between the national and regional level (Spain), is in the process of being decentralized to the regional level (Italy) or is based purely at the regional level (Belgium) [4].

This study aimed to develop an online jobs publication system that caters both employers and job seekers to post their information electronically through the web. Employers may post job vacancies in their corresponding companies so that job seekers may browse posted job information and may be able to apply certain position using the system. Job seekers may also post electronically their resumes, scanned certificates and any other related job experiences as evidence for their qualifications. It also aimed to determine the processes involved of the developed software; determine unique the features from the existing online jobs publications; and to assess the software's quality assurance in terms of Job Seeker's Security, functionality, and reliability.

The online jobs publication system is a guide for job applicants to find jobs easily according to the required skills and experiences suitable for their field of expertise. It also offers wide variety of job specifications in different fields namely: accounting, information technology, graphics designing, 3D animation, business industries, carpentry, wilding, metal fabrications, plumbing, electronics, electrical works, computer programming, web development, medical works, engineering, building design and many others. By means of the system, employers can register; post jobs and specific qualifications; the number of required years of experience; job monthly salary; and the hiring period. This is a non-profit website with free registration system for employers and job seekers who want to post job vacancies and job applications respectively. Its main purpose is to increasing traffic on the website and increase the number of viewers visiting the page.

II.

METHODS

The researcher utilized the developmental research method which is a systematic study of designing, developing, and evaluating computer programs, processes, and products that meet the criteria of internal consistency and effectiveness. Developmental research is mainly vital in the field of specialization for information technology [5]. The research engaged situation wherein the project-development-process is examined and described and the ultimate product is evaluated.

The instrument used by the researchers is a modified evaluation sheet. The software project is evaluated by the PESO representatives to examine the job seekers' security, member of IT faculty, staff, programmers and IT specialist also examine its usability, functionality and reliability. IT Students were also part of evaluating some aspects of the program. The researcher's evaluation sheet is validated by a PESO representative and IT specialists in determining its usability, functionality and reliability based on the modified ISO 9126 guide in determining the software quality assurance.

A. Project Development Process

Software Development Life Cycle (SDLC) is a process utilized by some software development companies in designing, developing and testing high quality software [6]. It also aims to provide from top to toe quality software that come across or exceeds customer expectations, reaches completion within period of times and cost estimation [7]. It is commonly called as software development process. Thus, the said process is an outline defining tasks executed at each step in the software development procedure [8].

"ISO/IEC-12207" is an international principle determining the quality of software life-cycle processes [9]. It aims to be the standard benchmarks that define all the undertakings required to develop and maintain computer programs [6]. It included the six stages namely Planning, Defining, Designing, Building/Coding, Testing and Evaluation, Deployment and Maintenance.

Requirement analysis is the most essential and ultimate phase in SDLC [10]. It is performed by developer with inputs from the user. In this study there were four identified users who interact with each other namely: the direct employer who is responsible for posting related job vacancies in their firms; any participating agency also post job vacancies and looking for qualified applicants to a certain position depending on the demand of their clients or companies who relying them on the selection of workers; the job seekers who are responsible in posting their qualifications and experiences in the websites; and the administrator user that acts as a moderator between the job applicants and employers/agency. Planning for the quality assurance of requirements and identification of the risks for failures associated with the project is also done in the planning stage.

As soon as the requirement analysis is made the succeeding step is to evidently define the project obligations and get them accepted from the consumer or the market analysts [6]. This is done through hardware and software requirement specification document which consists of all requirements in designing and developing the online publication system. The following hardware/software requirements are put into place for the implementation of the system for employers/job applicants/recruitment agencies namely: 1 unit computer system; 1 unit printer for printing related documents; 1 unit web cam and 1 headset for online interview; all types of

operating system. The following additional requirements are the specifications for the server wherein the entire programs and database are located namely: XAMPP framework; Navicat database management software; MySQL connection software and internet connection.

The hardware and software requirement specification is the reference for project architects to come-up with the best architecture for the project to be developed. Based on the stated requirements, variety of design approaches are proposed for the project architecture and get documented in the Design Document Specification (DDS). DDS is then reviewed by project team, stakeholders/recruitment agencies/employers and based on various constraints like risk assessment, project strength, modular design, budgetary requirements, time frame, the best design approach is then selected intended for the project. A design technique clearly expresses all the structural design of different modules of the project along with its data communication and data flow illustration together with the external and third-party modules [11]. The internal design of all the modules of the proposed architecture are clearly defined with the minutes of the details in DDS as prepared by the researcher.

Along this phase of SDLC the development proper started and the project is built immediately [6]. The source code of the program is generated according to the design document specification throughout this phase. In certain condition that the design is performed in an itemized and detailed manner, the code generation is achieved without much trouble. The programmers followed the coding standards using programming tool for the generation of code through hypertext preprocessor (PHP) mixed with java scripting and or AJAX. The choice of programming language is made according to the needs of the consumer and the type of software being developed.

Testing activities are frequently involved in all the stages of SDLC wherein this phase is typically a subsection of all the stages in the modern SDLC models. However this stage refers to the testing of the system's quality assurance as to usability, functionality and reliability of the project wherein the defects are documented, reported, tracked, fixed and retested, until the project reached the defined quality standards. Thus, the final evaluation of the system took place.

III.

RESULTS AND DISCUSSIONS

Figure 1 shows the steps in posting job vacancies for employer / recruitment agencies. For the first step, recruitment representative in any agencies or a direct employer creates an account using the website that requires related data such as username, password, company profile that includes the registered name of the company or recruitment agency, registration and expiry date as prescribed in the Philippine Overseas and Employment Agency (POEA), Department of Labor and Employment (DOLE) and the Security Exchange Commission (SEC).

The validation of registration is based on updated list of legitimate recruit agencies, in case of any company or business establishment not found in the list from POEA, DOLE and SEC were automatically invalidated.

For the user or a company representative who already created an account, the user goes directly to the login page to enter login information (username/password).

The second step is a process wherein recruitment agency representative or a direct employer may post job vacancies using the web-based software for certain position and also capable to browse posted educational qualifications / applicant's profile and any other highlights of the job applicants. Right after reading the selected profile of job applicants, the third step follows:

The user may select the perfect and ideal applicant through the job seekers information posted; then, after as soon as the employer has selected the its prospect, the employer may contact the job seeker through email or phone number for an interview or verification; then afterwards, negotiation follows. The fourth step is to hire selected applicant for specific position.

A. Steps in Posting a Job (for employers only)



Fig. 1 Steps in Posting Jobs for Employers/Recruitment Agencies

The next figure illustrates the processes in applying jobs for applicants. The first step points out that the job seekers need to create an account using the website to enter related personal information including the username, password, email address and any other related documentary evidences that attract job hunters namely: job seekers' educational qualification; field of expertise; trainings and seminars attended; and work related experiences. For the job seekers who already created an account using the same website, the user may fill-in the username and password directly to visit the user account page that contains different features customizing, managing accounts and updating profile. Right after login, the job seekers may post complete and detailed resume or curriculum vitae as reference for the job hunters presented in step 2. The third step is a process wherein job seekers may select/search posted job vacancies according to its area of concentration or search for a prospect company/employer to apply corresponding position using the system. Right after reading the job search result, the fourth step will then follows wherein the hiring process took place. Applicants may consider appointments or job interview through email or phone calls from the employer. In the event that employer satisfied with the result of the interview process, job seekers may be given a contract or a working schedule or any direct instructions from the job hunters.

B. Steps in Applying a Job (for job applicants only)



Fig. 2: Steps in Applying a Job for applicants

Shown in figure 3 is the main page of the online jobs publication system that caters job applicants and employers/companies/government and non-government recruitment agencies. The login window is located at the left pane of the main page, which intended only for registered users to enter the user ID and password in order to manage their account. The user account page contains notifications and messages in their inbox from employers or any recruitment agencies sending communication to the job applicant. Below the login window is the search window wherein users may search possible job postings according to its category and job specialization as posted by different registered employers. Adjacent to the login window as illustrated in the figure are the frames/boxes containing photos of job seekers with a short job description, job title, salary rate, available hours per week and the number of years experience. Right below the frame is the list of jobs posted by employers/recruitment agencies containing job titles, desired employment status (i.e. full time/part time/free launch) and the date of expiration of the job alert. Qualifications of the desired candidate for employment are also included as part of the interface. There are buttons at the top portion namely: Home; Register; How it works; Legit Agencies; About us; Post a Job; and Apply a Job. The “Home” button is triggered when the user wants to go to the home page, while the “Register” button is used to register all users. Subsequently the “How it Works” button displays the description of the entire system for the new users. On the other hand, the “Legit Agencies” button is used to generate the list of legitimate recruitment agencies and to validate the legalities and existence of specific agency or employers registered in POEA, DOLE and SEC for the security of job applicants. All agencies are subject for automatic validation through searching the database of all valid, delisted, cease operations, suspended, canceled, denied for renewal, forever banned and inactive agencies. The system is capable to manage job posting and assist job seekers finding the right employer/recruitment agencies for their job security.

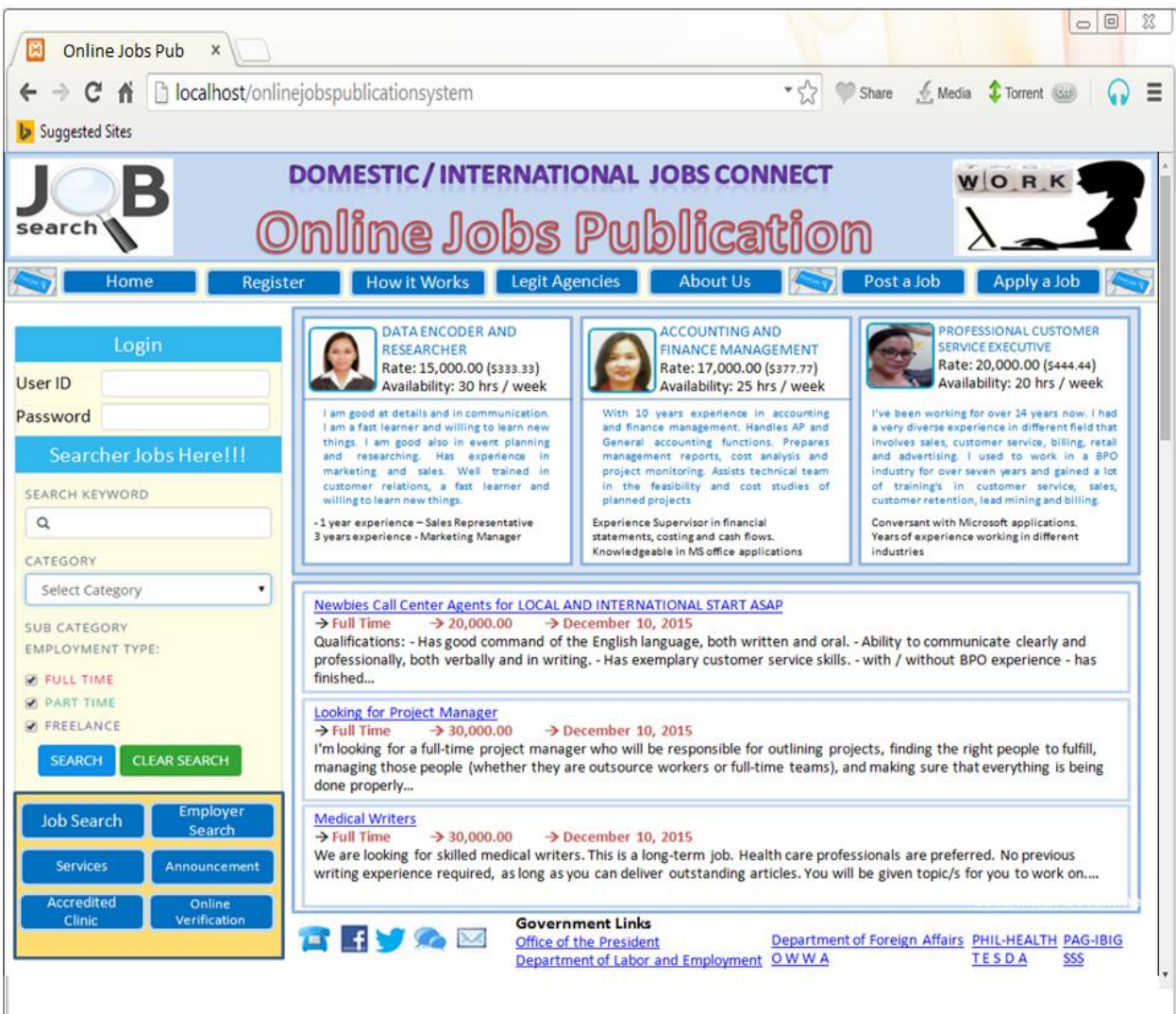


Fig. 3: Main Page of Online Jobs Publication

C. System Features

- 1) Private communication between job seekers and employers through email, video communication, forums and blog spots.
- 2) Bench marking on salaries
- 3) Direct Link to social media networking site (Facebook, Twitter, etc.)
- 4) Direct interview between employer and job applicant
- 5) Pre-screening against competency based questions and running pre-interview tests
- 6) Compilations of job descriptions and person specifications
- 7) Headhunting
- 8) Opportunity for full vacancy brief - in person (location dependent!)
- 9) Preparation of an advertisement for posting in relevant trade medi
- 10) Optimum exposure on the website and Social Medi
- 11) Set timeframe for recruitment process in line with your requirement
- 12) Selection and comprehensive screening process of candidates
- 13) Online registration with candidates and Employment agencies and direct employer
- 14) Online Submission of selected number of CVs for job vacancy
- 15) Proactive organization of interviews and implementation of any relevant tests
- 16) Candidate referencing service
- 17) Invoice on start date, no financial risk organization!
- 18) Updated database for the list of legitimate agencies, delisted, cease operations, suspended, canceled, denied for renewal, forever banned and inactive agencies

TABLE I RESULT OF SOFTWARE TESTING AS TO JOB SEEKERS' SECURITY

Criteria	MEAN	Description
Job seekers are provided with an updated list of all land-based / manning recruitment agencies with valid and updated licenses	4.67	Very Much Secured
The software provides an updated list of companies/recruitment agencies' contact numbers, website, email address and mailing address to the job seekers	4.60	Very Much Secured
The system checks the official name of the companies/recruitment agencies and official representative with POEA license number	4.70	Very Much Secured
The system displays the official license validity dates	4.43	Very Much Secured
The software prompts/blocks all companies/recruitment agencies who are delisted, ceased operations, suspended, cancelled, denied for renewal, forever banned, inactive, expired licenses, Cash Bond Withdrawn, preventive suspension status and revoked licenses.	4.47	Very Much Secured
Total Mean	4.57	Very Much Secured

Table 1 shows the result of evaluation on the software quality assurance in terms of job seekers' security. It illustrates that the software provided an updated list of all land-based / manning recruitment agencies with valid and updated licenses, which lead to a secured browsing for the job seekers in picking the right company and employer to choose from. The job seekers have a high level of security to any companies and recruitment agencies since during the registration process, employers and recruitment agencies are asked to fill up contact numbers, website, email / mailing address and any other related information for the purpose of background validation and for security reasons. Job seekers are also very much secured in view of the fact that the software always check the official name of the companies/recruitment agencies and official representative with POEA license number and its validity dates of official registration from an authorized body to secure the job seekers. Thus, the system is very much secured in terms of blocking all companies/recruitment agencies who are delisted, ceased operations, suspended, cancelled, denied for renewal, forever banned, inactive, expired licenses, cash bond withdrawn, preventive suspension status and revoked licenses. This result implied that all blocked companies were not able to register and post job vacancies to the website.

The overall result has a rating of 4.57 or very much secured, which indicates that the assurance of the job seekers in trusting posted jobs in website is very high. Thus, the system provided a high quality security assurance to both job seekers and employers.

TABLE II RESULT OF SOFTWARE TESTING AS TO USABILITY

Criteria	MEAN	Description
The system is a user friendly program	4.43	Very Much Usable
The system is quick driven program	4.40	Very Much Usable
The system features are simple to manipulate	4.57	Very Much Usable
The system enables self-learning attributes to users	4.60	Very Much Usable
The system is attractive and well designed	4.17	Very Much Usable
Total Mean	4.43	Very Much Usable

The software quality factor on usability testing determines how easy the systems functions be understood, which relates to mental models of the user in interacting with the software or a machine. It helps user to lessen its learning effort consumed for them to be trained. Thus, the ability of the software to be easily manipulated and controlled by the user in any given environment is manifested [12].

Table 2 above shows the result of evaluation on the software quality in terms of usability. It showed that the online job publication system is a user friendly internet-based software that provides the user a graphical user interface environment and with menu driven functionalities. It has a descriptive rating of “Very Much Usable”, which indicates that the system provided a user friendly environment showing a high degree of performance. It also provides quick-driven attribute, which implies that the software is very fast that satisfies the end user needs with its button driven interface. It has a modest design interface that leads to its simplicity in manipulating the entire environment and easy to operate. The design of the website enables the user to learn different functions of its interface quickly without any practical guide. Its simplicity leads to attractiveness since all web pages are using lighter color.

The total mean has a qualitative description of “Very Much Usable”, indicating that the total usability of software is highly considered since all of the system functionalities are apparently easy to figure out to almost all of the users. Thus, the system has a high level of usability to its design, attractiveness, the concept and the website’s ideal content are really beneficial to the employers/recruitment agencies and to the viewing public more specifically to the job seekers.

D. Software Quality Factor as to Functionality

Functionality testing is performed to verify that the designed software application performs and functions correctly according to design specifications. It is the efficiency of the software project in providing tasks that meet the specified and suggested needs as soon as the software is used under specific conditions [12].

TABLE III RESULTS OF SOFTWARE TESTING AS TO FUNCTIONALITY

Criteria	MEAN	Description
Users are able to register and apply jobs online through the website	4.40	Very Much Functional
Users are able to post vacant jobs online	4.23	Very Much Functional
The system validates the legal existence of all users before the approval of its registration	4.37	Very Much Functional
the software meets the desired design specification	4.37	Very Much Functional
Total Mean	4.38	Very Much Functional

The result of software testing in terms of functionality showed that the online job publication system is very much functional in which users are able to register and apply jobs online using the website interface, which means that the system facilitates registration to all users who want to post certain job for employer-side and posting of curriculum vitae for job seekers. The system is also capable to allow users in posting and publish vacant job position using the website. It provides efficient browsing for both employers and job seekers getting connected with each other. The website also helps validating the legal existence and viability of users through its updated list of registered companies, establishment and or any recruitment agencies leading to high satisfaction of

the end users. The online job publication system highly complied the end-users' demand due to its performance that meets the required specification for both users.

The overall descriptive rating is "Very Much Functional", which means that the overall functionality of the system highly satisfies the needs of the end users and it functions correctly according to design specifications specifically on the core application functions namely: the online registration and jobs application directly to the employer's inbox, online job posting and users' validation.

E. Software Quality Factor as to Reliability

Reliability is the ability of the developed software to perform the required functions under stated conditions for a specified period of time, or for a specified number of operations [12].

TABLE IV
RESULTS OF SOFTWARE TESTING AS TO RELIABILITY

Criteria	MEAN	Description
The system is resilient to human error	4.47	Very Much Reliable
The system output is understandable	4.17	Very Much Reliable
The system has complete	4.43	Very Much Reliable
the software meets the desired design specification	4.40	Very Much Reliable
Total Mean	4.37	Very Much Reliable

Table 4 shows the result software testing and evaluation based on reliability of the proposed system. Resiliency of the system to human error has a rating of 4.47 or much reliable, which means that the system is able to handle errors that arose internally or externally during runtime. Bugs, errors or inevitable situations that arose causing unexpected events and situations are handled by the system through its error handling routines. The understandability of the software project has a numerical rating of 4.17 described as much reliable. This means that the users were able to understand the program interface, input procedures and reports generated by the software. However, the completeness of the system earned a rating of 4.43 or very much reliable, which indicates that almost all of the features and functions of the found are mostly complete. It is also capable to display the desired output needed by the client users. Lastly, the appropriateness of information provided by the system that gained a weighted mean of 4.40 or very much reliable, which revealed that the proposed design is able to provide suitable and significant information needed and understood to the users. The total is rated 4.37 or very much reliable. It specifies that the overall assessment of the users with regards to the reliability of the software is very highly, dependable and consistent specifically on understandability of the desired running output of the program, which got the highest rating. The information provided by the system is also appropriate especially to beginners. Furthermore, the software project is almost complete and bears error trapping routines for the correctness of the desired result.

IV.

CONCLUSIONS

Based on the findings of the study, the researchers concluded that the online jobs publication system is a better alternative in addressing the present needs of job seekers to post their educational qualifications and personal profile to the internet, which can be viewed by the recruitment agencies and or employers seeking for the right and qualified job applicants. Employers / Job Recruitment agencies are able to post job vacancy electronically using the online jobs publication system's website. The website provides built-in procedures for job seekers on the processes of applying appropriate job position according to the needs of the recruitment agencies/employers. It also includes certain procedures for employers and recruitment agencies on how to post certain job vacancies in specific company. The overall level of acceptability is very high based on evaluators' rating as to the job seeker's security, usability, functionality and reliability. The developed online jobs publication web-based software is also very much precise in processing data to provide the desired result as expected by the users. It is also dependable since the system has an error trapping routines to minimize faults during operation. Thus, the system has a high level of acceptability that provides functional features for its implementation.

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