Development of Efficient E-Recruitment System for University Staff in Nigeria

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ABSTRACT

The development of e-recruitment system is web-based tool used in order to reduce communication gap between job seekers and employers. E-recruitment, also known as online recruitment, is the practice of using technology and in particular Web-based resources for tasks involved with finding, attracting, assessing, interviewing and hiring new personnel. Most of the existing mode of recruitment (manual recruitment) takes much time in processing the application form, existing system will not automatically send feedback to all applicant whose meet up with the job requirement but with the help of the developed system there is reduction in time to process the application form and there is automatic feedback from the employer to the job seeker that meet up with requirement. The objective of this work is to developed an efficient e-recruitment system capable of managing all stages of the e- recruitment process, including multi-job posting, agency channel management and candidate filtering to identify the most relevant candidates.

The development e-recruitment system employs 3-tier web architecture. The system consisted of design activities that produce system specifications satisfying the functional requirements that were developed in the system analysis process. A Unified Modeling Language (UML) was used to build a formal model of the university recruitment system. The Web-based University Recruitment System (WBURS) was designed to be user friendly and it is easy to navigate. A Macromedia dream wave was used in coding and developing website; SWISHmax was also used for creating graphics and animation in developing the website. Structured Query Language (SQL) was employed in creation of the database for the website and adoption of PHP (Hypertext Processor) was adopted to connect the website to a database.

The performance of the developed system was evaluated by consulting three university staff and relevant information was collated through personal interviews and questionnaires was administered to the staff of those university, Human Resource Departments and other relevant professionals of these university.

Keywords
E-recruitment, Web-based tool, Unified Modeling Language (UML), University Recruitment System.

1. INTRODUCTION
Recruitment is important for organizations since it performs the essential function of drawing an important resource into the organization. It has a strategic aim as it focuses on the need to attract high quality people in order to gain a competitive advantage [1]. A new development in this domain is the use of the internet to attract potential employees to an organization, and is referred to as e-recruitment [2]. E-recruitment, also known as online recruitment, is the practice of using technology and in particular Web-based resources for tasks involved with finding, attracting, assessing, interviewing and hiring new personnel. E-recruitment is a new technological mean for selecting one of the companies' most crucial resources, i.e. human resource. This technological innovation improves the process of recruiting knowledge sources by using the Internet

Organizations cannot exist without staff to complete the production cycle. Therefore the organizations do not take their staff for granted. Choosing the right candidate at the right place has implications for an organization's goals. The recruitment strategy needs to be dynamic to let the organization grow. An online profile management system has been built to match and put in touch job seekers with their respective employers; in addition to that, a search technique has been developed to enable users to get results based on their search criteria in the most efficient possible order [3].

When considering the available online recruitment systems, it is observe that the advanced features they provide, however, the search approaches are still traditional, and that is what motivated us and implore us to think of an automatic search function, with relevancy ranking technique. The developed system was based on portal composite pattern, i.e. combine business patterns and integration patterns to create complex one. In this research work, introduction of two different features will be implored. Mainly, the instant search which allows the job seeker to get a list of available vacancies listed according to certain criteria, and allows the employers to get a list of potential job seekers instantly; the second thing is the ranking technique itself that orders those vacancies [3]. E-Recruitment System (ERS) is web-based tool to reduce communication gap between Job providers and job seekers. This process will make recruitment process very easy and fast. The developed system is designed by considering parties like employers and employee. The system will allow job seekers to register their details like name, qualification and experience with the system, and then on the other hand it allows job providers to post their requirements with the system. ERS will reduce the amount of time required to complete the recruitment process of any organization and also provides an advanced search facilities [2].

ERS is an effective way of providing communication between Job providers and job seekers. The developed system is reliable and consistent way of searching jobs, help in conducting secured and restricted online exam for screened employees another advantage of e-recruitment over manual

recruitment is that it help in sending e-mail notification to all job seekers [9].

2. RELATED WORK

Many research works have been carrying out in the field of e-recruitment system. Stevenson [4] explores how the frequency and characteristics of job search activity have changed since the emergence of the Internet. The study finds that the Internet has induced significant expansion of job search methods used by the unemployed. In addition, the Internet has caused reallocation of search efforts among various job search activities. The author finds that the unemployed are now more likely to have looked at ads and to have contacted an employer directly. He also finds evidence that the unemployed are becoming more discriminating about the jobs to which they submit an application, as the Internet enables them to better target specific positions. This work proved that the overwhelming majority of job-seekers who use the Internet to collect information about specific positions and employers of interest are those who are already employed; compared with the unemployed, currently employed workers are better able to assess opportunities in the marketplace, and the Internet has a role in this process [4]. Another work focused on how the Internet, as a convenient, cost-efficient, and effective employee recruitment tool, could be used to the best advantage in tapping talent for an organization [5]. Djabatey [6] investigate recruitment and selection practice of organization using a HFC Bank as a case study. The author purpose of the study was to assess the effectiveness of the recruitment and selection practices and procedures. From investigation through different mode such as respondents from staff of HFC Bank and also administers of questionnaires the results indicated that, advertising of job vacancies and employee referrals are mostly the mode for recruiting potential employees, it was also realized that the method used in the recruiting and selection process was very effective and moreover helped improve employee performance, the study revealed that the selecting and recruitment process are also characterized with lots of challenges.

Yacoub S [7] present online recruitment system with advanced search capability. The author demonstrate a prototype solution by building a dedicated website for job seekers, students, or graduates on one hand, and potential employers on the other, the aim is to enable them reach and match each other's requirements using an advanced instant custom and automatic search feature. Both can have access to the website which is introduced in the form of online portal holding their details in a database and allowing searches to match seekers with providers and vice versa. Another work exhibit the reasons behind an organization's decision to use online recruitment, through in-depth interviews and a survey of human resource managers, with recruitment responsibility, thus providing a basis for further research into how organizations may adopt online recruitment successfully [8]. There are many portals available online for the purpose of recruitment, job porter such as Monster.com, Salary.com, Recruit soft, hotjob.com, Adecco, getthejob.com, and others that are not mentioned[10]. In this research work we will investigate this existing job porter and locate there limitation.

Monster.com is one of the Internet's earliest dotcom domain registrants and the first commercial online job placement destination [11], it is one of the World's leading career networks, the idea is based on posting CV by the user then the system makes it available for employers in the same industry, or business.

Hotjob is another kind of job porter. The approach of HotJobs is similar to that of monster.com, which depends on CV being posted by the user, after HotJobs became part of Yahoo, Network, very large users profiles was integrated somehow in HotJobs database [7] which gives more advantages for Yahoo. This business model is mainly based on advertising, as it is a heavy traffic online community place, it is also supported by some other products and services which are provided for a fee especially posting a job in the case of Monster.com.

GetTheJob.com also act lke a job porter but the literature make us understand that not all employment sites are portals, GetTheJob.com is a vertical search engine or aggregator that gathers job postings directly from thousands of company websites and organizes them into a searchable database [7]. Some of the limitation of this existing job porter is based on the implementation; most of the system build make use of MS access which is more scalable and slow in real life application when there is heavy traffic on the server. Another limitation is on the issues of response time, job seeker need a feedback from the system may be is considered for the job or not.

3. RESEARCH METHODOLOGY

The developed e-recruitment system aims to reduce communication gap between Job Providers and Job Seekers, reduction in time spent on provider and reduction in recruitment processing times. There are six key stages involve in e-recruitment process.
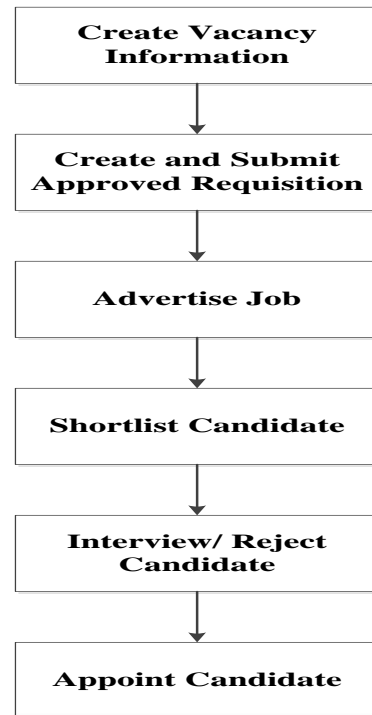

Figure 1: Stages involve in e-recruitment process

3.1 Creating Vacancy Information

When a university need to recruit to a vacancy one need to draft a job description and person Specification and have it graded. Pre-existing Job descriptions may be used or the generic Job description library to create it

3.2 Create and Submit Approved Recruitment Requisition

The university creates an online requisition by logging onto the e-recruitment system and adding a new requisition. One needs to log on by entering the given URL address into your web browser. The given link will enable the applicant to complete all mandatory fields and any optional fields which may apply. If there is any challenges on how to complete any part then there is need to consult the directorate for help or contact the central HR Service Centre.

3.3 Advertise Job

The central HR Service Centre will post all job adverts from the information provided on the requisition. They will automatically be informed of an approved requisition online, confirm with HR Managers the job evaluation, and post the advert out to the relevant sites according to the closing dates specified on the requisition.

3.4 Shortlist Candidates

This stage involve where job can be advertise .Once the job is advertised you are able to review candidate applications online. Candidates will have been requested to submit a CV and a Supporting Statement. one can view candidate applications individually as they are received or in one batch following the respective closing date. Redeployee candidates can submit applications through their own application gateway. Recruiters will be able to view redeployee profiles online on this gateway and shortlist. To shortlist you can send applications to other shortlisters to review. You can also send a spreadsheet to shortlisters and ask them to complete this with their results for ease of recording decisions.

Unsuccessful applicants at this stage will receive an automatically-generated email from the system, two days after their status has been changed to unsuccessful pre-interview. You can, of course, also send more personalized rejection letters. Successful candidates will be indicated as such on the system on candidate status and these will be then taken forward for interview.

3.5 Interview / Reject Candidates

Once you have selected your shortlisted candidates, interviews can now be set up for the lucky applicant.

3.6 Appoint Candidate

Once you have selected a preferred candidate to appoint you should change that candidate's status online to Recommendation to Offer. This will open up the Appointment Form, which will be auto-populated from the requisition where possible. Once you determined the draft offer details you should contact the candidate and make a verbal offer. Once those discussions have been completed and you believe the offer can now be formally made you can proceed to appoint. At this point you should complete and submit the Appointment Form and any reference requests, for non-academic jobs.

The performance of the developed system was evaluated by consulting three university staff and relevant information was collated through personal interviews and questionnaires was administered to the staff of those university, Human Resource Departments and other relevant professionals of these university.

4. ARCHITECTURAL DESIGN OF THE SYSTEM

The computing model for the course of this work is the client/server computing. This is a solution in which the presentation, presentation logic, application logic, data manipulation and data layers are distributed between client PCs and one or more servers. In this client/server model there are two types of model known as the distributed data(two tier architectural design) and the multi-tier distributed data and application(three tier architectural design or n-tier architectural design). For the purpose of this research work the use of three tier architectural design will be employed as described below and shown in Figure 2.
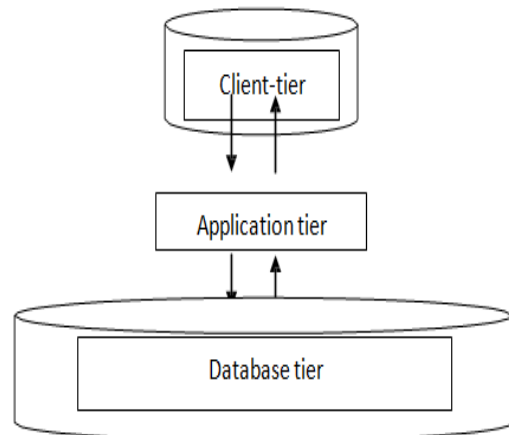

Figure 2: The three-tier architecture

4.1 The client tier

This consists of the user interface and data access levels for the user of the system. Access methods and Graphical design is determined at this stage. All access to the system by the user is via the web browser.

4.2 The application tier

This is where the application logic is stored; application security and access methods are defined here. It usually consists of a web server (Apache, IIS, and Tomcat) and the Application logic Container (J2EE Container, PHP engine, ASP.net).

4.3 The database tier

Database tier is the most critical aspect of the web application. It is where the user data, operational data and Meta data are stored for easy access and retrieval. All database logic and entity relationships will be defined here (SQL).

4.4 System design and modeling

System design of the staff recruitment system consisted of design activities that produce system specifications satisfying the functional requirement that were developed in the system analysis process. It is also the structural implementation, which specifies how the system will accomplish the objectives. A formal model of the e-recruitment system will be built using Unified Modeling Language (UML). The UML, as a modeling system, which will provide a set of conventions that will be used to describe the software system in terms of objects, offers diagrams that provide different perspective views of the system parts.

The following are the UML diagram.

1. Use case diagram
2. Sequence diagram
3. Collaboration diagram
4. Class diagram
5. Stata diagram
6. Activity diagram
7. Component diagram
8. Deployment diagram

5. IMPLEMENTATION

The purpose of this research work is to develop a software platform for university e-recruitment system. This platform can be used as frame work web-based implementation. The implementation of e- recruitment system follows a particular process. At the point of execution, the Graphical User Interface (GUI) window appeared as the file name and executed. The Web-based University Recruitment System (WBURS) was designed to be user friendly and it is easy to navigate. If the viewer needs to communicate with the website, all he has to do is to click the contact hyperlink and he can communicate with it. The various modules were integrated together through a single web interface. The modules were packaged and install on the testing server, each module having some specific requirements but generally, certain minimum specifications must be met. After these requirements have been met, the project can now be configured and implemented. The WBURS was configured and implemented in modules.

The tools employed in the methodology included, macromedia dream weaver (a professional HTML editor for designing, coding, and developing websites, web pages, and web applications), SWISHmax (for Creating graphics and animations), Structured Query Language (SQL) (for database creation for the website, creation of different tables, and the storage of data sent from the website). Web development was achieved by using PHP (Hypertext processor), which was used to connect the website to a database, and validate the forms to be used in the project. Implementation of the procedure of designs; identifying various programming tools and languages such as PHP, MySQL, Apache, HTML etc; designing of database tables; attributing the constraints to the database table fields; designing of front-end interface of the solution; scripting and linking the front-end to the back-end; testing solution; and finishing and compiling for distribution. Figure 3 shows the architecture for the system and figure 4 shows the flowchart.
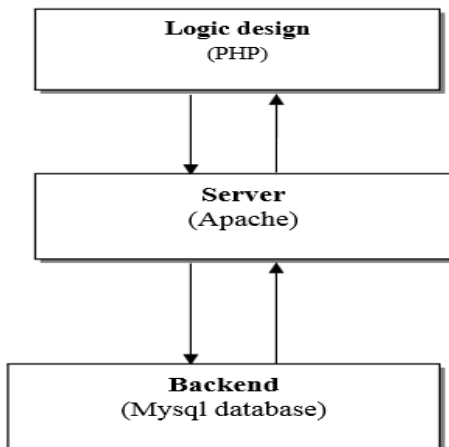

Figure 3: Architecture of e-recruitment System for university staff in Nigeria

The software was installed on Windows Operating System, create a local host server, and then you configure the apache server to work with PHP. Internet explorer, Mozilla Firefox and any supportive browser may be used on client-side machine and on the application side the On-line recruitment package was transferred into the root folder of the web server. After the application software have been copied to the server then the application software could be accessed through any supportive web browser.
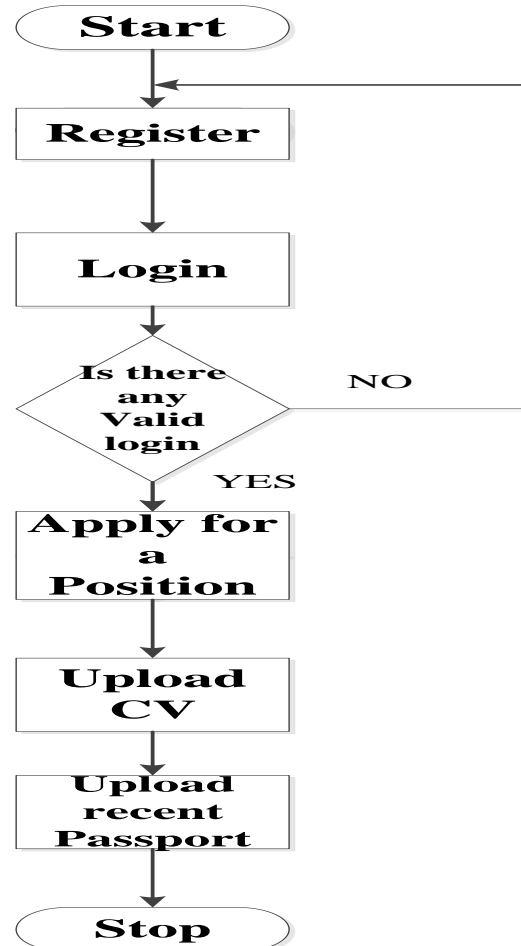

Figure 4: E-Recruitment Flow Chart

6. RESULTS AND DISCUSSION

Experiments have been performed to test the developed system and to measure the accuracy of the system. The first stage of the evaluation was the self-evaluation and technical testing which has been carried out without the help of external users, and this part included validating the XHTML code, testing the system with different kinds of inputs, debugging, and other design issues. After that, the system was tested working from different locations, platforms, and browsers. At this stage the system was said to be valid. At the second stage of evaluation, a survey was conducted using questionnaire with random users (sixty) in three universities, as mentioned in methodology, table 1, shows the responses for the two multiple choice questions, along with each question, the percentage of satisfied users, i.e. who gave the system 70% positive feedback or more for that question according to our success criteria.

Table 1: Results from questionnaire that shows evaluation of the result accuracy given by the search vacancies functions

Responses	Number of staff	Count	Accuracy (%)
Accurate	60	49	81.667
Neutral	60	7	11.667
Not accurate	60	4	6.667

Table 2: Results from questionnaire that shows evaluation of the easiness of the developed system

Responses	Number of staff	Count	Accuracy (%)
Very easy	60	46	76.667
Easy	60	12	20.000
Satisfactory	60	2	3.333

It is shown from Table 1 above that accuracy for the accurate usage of the system is 81.667%, 11.667% for easy usage of the system and 6.667% is the percentage of accuracy of the satisfactory usage. Table 2 shows the accuracy for very easy usage of the system as 76.667%, 20.000% for easy usage of the system and 3.333% is the percentage of accuracy of the satisfactory usage.

From this result it is deducted that the developed system attain satisfactory level when compare with the existing system as reflected from the literature.

7. CONCLUSIONS

This research work introduced an efficient method for recruitment process. In this work, introduction of some online job portals was done, and analyzed them critically, by demonstrating how each of them operate and pointing to some limitations they have, such as the human initiative to do the search. Then we introduced our solution to these limitations by developing this e-recruitment system. After that, we have presented the actual functional requirements, technical implementation, and a number of interesting elements in our developed system. The technique is tested using three different universities with 60 people samples which give satisfactory performance. The use of an online job recruitment platform has greatly enhanced the organization(s) effectiveness, accuracy, speed, efficiency and convenience of its applicant and administrator. This software has attempted to solve the problem of manual traditional new paper systems and replace it with web-based applications. The system also reduce recruitment processing times, Online recruitment allows seekers to take advantage of the latest Internet and helping them in managing all stages of the online recruitment process, reduce communication gap between Job Providers and Job Seekers.

8. REFERENCES

[1] Parry, E. & Tyson, S. (2008), 'An analysis of the use and success of online recruitment methods in the UK'. Human resource management journal. 18, 3, 257 – 174

[2] Oluwagbemi O and Akinsanya A (2010), 'Development of a medical staff recruitment system for teaching hospital', International journal of natural and applied science.6(1) Pp. 116- 124.

[3] Block, Jay A.; Betrus, Michael (2003), *'2500 Keywords to Get You Hired'*, New York McGraw-Hill Professional.

[4] Stevenson, B. (2008) "The Internet and Job Search" NBER Working Paper 13886.

[5] Wayne, M. and Shane, R. P. (2001). 'Targeting your online employee recruitment efforts'. CUPA-HR Journal Editor, 52(1) pp: 1-7.

[6] Djabatey, Edward Nartey (2012) "Recruitment and selection practices of organizations, a case study of hfc bank (gh) ltd" Institute of Distance Learning, Kwame Nkrumah University of Science and Technology, PP:1-82

[7] Yacoub S (2007)" online recruitment system with advanced search capability" University of Manchester for the degree of MSc e-Business Technology in The School of Informatics. Pp: 1-81

[8] Parry, E. and Wilson, H. (2009). 'Factors influencing the adoption of online recruitment'. Personnel Review Journal, 38(6): 655-673.

[9] Kuyoro Shade O., Okolie Samuel O., and Abel Samuel B.(2012). 'Design and Implementation of an Automated Personnel Recruitment System' International Journal of Research in Management & Technology (IJRMT), ISSN: 2249-9563 Vol. 2, No. 3

[10] Burkholder, Nicholas C.; Edwards, Preston J.; Sartain, Libby (2004), 'On Staffing: Advice and Perspectives From HR Leaders', Hoboken, N.J. John Wiley & Sons, Inc. (US).

[11] Tatnall, Arthur (2005), 'Web Portals: The New Gateways to Internet Information and Services', Hershey, PA : Idea Group Publishing.

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