

# IMPLEMENTATION OF DECISION SUPPORT PERSONNEL RECRUITMENT SYSTEM FOR LAGUNA STATE POLYTECHNIC UNIVERSITY-SAN PABLO CITY CAMPUS

Joanna A. Erlano-De Torres

College of Computer Studies,  
Laguna State Polytechnic University-San Pablo City Campus, Philippines

## **ABSTRACT**

*The Laguna State Polytechnic University-San Pablo City Campus viewed the hiring of possible employees as a major problem in the university because it takes time for the human resource department to facilitate the process of recruitment. The main objective of the study is to implement a web-based decision support personnel recruitment system that can screen qualified applicants, assist the human resource personnel in ranking the applicants and generate reports. The system was developed using PHP, CSS, Java Script and XHTML as programming platform and MySQL as database engine. The system design, testing and evaluation procedures were presented. Test results show that the project is secured and can be best viewed in Google Chrome, IE7+, Mozilla Firefox and Opera Mini using personal computer, laptop, tablet and mobile phone. Two questionnaires were distributed - ISO 9126 Software Quality Matrix and acceptability survey to determine whether the implementation was successful. Based from the results of evaluation conducted, the project was rated as excellent with an overall mean of 4.52. The users also agreed that the system was acceptable in terms of interface, operability, security and portability. It was recommended that the system should allow multiple applications for different job vacancies and the ranking of applicants with the same points should be tie regardless of who submitted the application first.*

## **KEYWORDS**

*Decision-Support System, Human Resource System, Online Recruitment, Automated Screening.*

## **1. INTRODUCTION**

In our modern-day society, technology plays a vital role in business, education, transportation, communication and even agriculture. It has changed the personal lives of most people. In addition, modern technology has changed civilization in many different ways. Humans have almost always been on a path of progression, and because of technology, the twentieth and twenty-first centuries have seen a number of advancements that revolutionized the way people work, live and play. Imagining what life would be like without some of these advancements has become a difficult task due to their importance and the people's reliance on them [1].

Since the population of Laguna State Polytechnic University-San Pablo City Campus is growing, the need for additional work force including new professors/instructors, administrative staff and utility workers arises. Recruitment success is generally measured by the number of positions the HR department fill and the time it takes to fill those positions. The LSPU-SPCC administration viewed the hiring of possible employees as one of the major problems in the university today because of its "old school" approach or the lack of technological touches. It could take a month

or two for the human resource department to do manual advertisement of job posting, sourcing candidates, screening applicants, conducting preliminary interviews and coordinating hiring efforts with directors, deans and administration heads for making the final selection of candidates.

Hiring process could become a lot faster with the help of different technological advancements. This can be a valued tool, however, it is user driven. Because of the problem stated, the implementation of an online recruitment system like Decision Support Personnel Recruitment System is necessary.

### **1.1. System Capabilities and Functions**

The system entitled “Decision Support Personnel Recruitment System” is a web-based recruiting system aimed to provide assistance to the recruiting process of the human resource department of Laguna State Polytechnic University-San Pablo City Campus. The system provides the following functions: (1) online posting for job vacancy; (2) screening of data input of the applicants; (3) automated text or email to the qualified applicants (4) generate ranking of the applicants; (5) generate reports and ranking list for qualified applicants.

### **1.2. Objectives**

The main objective of the research project is to implement Decision Support Personnel Recruitment System, a web-based recruitment system that will provide assistance to the human resource department of Laguna State Polytechnic University –San Pablo City Campus.

Specifically, it aims to:

1. Provide a system that has the capability to receive job application for other LSPU campuses;
2. Design a web-based system that can:
  - a) Screen qualified applicants;
  - b) Assist the human resource personnel in ranking the applicants; and
  - c) Generate reports.
3. Create the system as designed using the following software applications and technologies: Programming languages such as PHP (personal home page), CSS, Java Script and XHTML; and MySQL for database;
4. Test the conformity to W3C standards, portability and security of the system;
5. Evaluate the performance of the system using ISO 9126 Software Quality Matrix; and
6. Evaluate the acceptability of the system during implementation.

## **2. RELATED LITERATURE**

### **2.1. Laguna State Polytechnic University**

Laguna State Polytechnic College-San Pablo City Campus, now a state university is located at CALABARZON. It is situated at Brgy. Del Remedio, San Pablo City, Laguna. The institution covers about four (4) hectares of land dedicated primarily to academic, administrative, medical and student facilities. As of December 2014, LSPU-SPCC has a population of 7,913 students and 308 employees.

Other CHED-supervised-institutions (CSIs) were amalgamated with the system during the year 1999 to 2000 due to the operation of Higher Education Modernization Act of 1998. These are the Laguna College of Arts and Trades (LCAT) in Sta. Cruz, the Los Banos College of Fisheries (LBCF), and the San Pablo City National School of Arts and Trades (SPCNSAT). By the enactment of Republic Act 9402, the college was converted into a state university on February 8, 2007. It duly sponsored by the four congressional district representatives of Laguna: Hon. Congressman Benjamin C. Agarao of fourth district, Hon. Congressman Danton Q. Bueser of third district, Hon. Congressman Justin Marc SB. Chipeco of second district and Hon. Congressman Uliran T. Joaquin of first district. This was further signed into law by Her Excellency Gloria-Macapagal-Arroyo, former President of the Philippines, on March 22, 2007, thus born the Laguna State Polytechnic University, with Dr. Ricardo A. Wagan as the first University President. The University Charter Day falls on April 10, 2010, 15 days after publication in two newspapers on March 24, 2007 of general circulation, Malaya and the Daily Mirror [2].

## **2.2. Human Resource Management System**

A Human Resource Management System (HRMS) is a type of information system which is designed to handle an organization's computerized and automated human resource (HR) processes [3]. The combination of hardware and software resources hosts and provides most, if not all, of a HR department's business logic. It is also known as Human Resource Information System (HRIS).

The study entitled "Human Resource Management Information System for the Provincial Capitol of Laguna" cited that the main function of HRMIS is to store data about the employees of an organization. Among these data are personal histories, family information, skills, capabilities, and experiences [4]. This is further divided into payroll processing, report generations, searching and querying, and data manipulations. The researchers explained that by applying information system, not only it can handle and manage employees but yield a fast and time saving system for human resource department.

As part of an isolated or enterprise resource planning (ERP) system, an HRMS depends on HR management software, which is integrated with HR-specific business processes and features that give HR staff members the ability to perform routine operations, such as employee records management, payroll, attendance management, and performance evaluations. Each feature may be available as part of the primary HRMS or added as software modules/components. An HRMS is positioned on an application server that delivers in-house and/or remote access to all authorized personnel.

In addition, the job of HRMS is to keep track of employee performance, employee data such as sick and vacation days accumulated and taken and the entire aspects of personnel management. An HRMS stores data that can help to improve in managing people and track performance evaluations. When there are issues with performance, the system can track the initial problem against any improvement or declines.

Human Resource Management (HRM) is defined as the function within an organization that focuses on recruitment of, management of, and providing direction for the people who work in the organization. HRM can also be performed by line managers [5]. It is the organizational function that deals with issues related to people such as compensation, hiring, performance management, organization development, safety, wellness, benefits, employee motivation, communication, administration, and training. It is also a strategic and comprehensive approach to managing people and the workplace culture and environment. Effective HRM enables employees

to contribute effectively and productively to the overall company direction and the accomplishment of the organization's goals and objectives.

HRM is moving away from traditional personnel, administration, and transactional roles, which are increasingly outsourced. HRM is now expected to add value to the strategic utilization of employees and that employee programs impact the business in measurable ways. The new role of HRM involves strategic direction and HRM metrics and measurements to demonstrate value.

To achieve the highest possible performance in order to meet strategic goals, the guiding principle of human resource management can be expressed by positioning the right people [6].

The study entitled “The Human Resource Management Function in Ethiopia: Focus on Civil Service in Southern Regional Government” acknowledged that effective HRM and HRD is a corner stone for building an institution in the public sector, which in turn has an impact on the development performance of the country in general, and the region in particular [7]. The finding on the study shows that there is a positive relationship between HRM and decentralization in the regional government.

Furthermore, human resource management has already proven its importance in every organization. It has moved away from the transactional, paper pushing, hiring/firing support function it has been and is becoming a bottom-line decision maker. The terminology as well as function has transformed from personnel department to human resource department (HRD), which reflects the expanding role of HRD and an increasing awareness that human resources are the key to a successful organization [8].

In most business organizations, the human resource department is the one responsible for recruitment. It begins with the manager's employee requisition. Employee requisition is a document that specifies job title, department, the date the employee is needed for work and other details. Next step is determining if there is a possible qualified employee available within the firm (internal source) or must the organization recruit from external source [9].

Organization must be able to utilize recruitment sources and methods that will be most beneficial for a particular company for recruiting to be effective. The inclination in both public and private sectors in the Philippines following the Western organizations is the use of the term human resources management either to supersede or to incorporate personnel management. Considering that there are different types of human resources, the term human resources management is deemed more appropriate than human resource management.

An examination of the various definitions of human resources management by foreign and Filipino authors, academicians and management practitioner, shows more common elements than disparate concepts. Synthesizing these, the following definition is arrived at:

Human resources management is the art and science of acquiring, motivating, maintaining and developing people in their jobs in light of their personal, professional and technical knowledge, skills, potentialities, needs and values and in synchronization with the achievement of individual, organization and societies are planning, organizing, staffing, directing and controlling. Human resources management deals only with people so that they can manage the other resources within their domain of responsibility efficiently and effectively.

### **2.3. Online Recruitment**

To match people to jobs, the power of the internet is now being used. Primarily, it is about marketing or advertising job opportunities on either job sites or corporate websites. At this very basic level, it is particularly effective at getting a high level of response. While it may generate more applications than traditional print advertising, simply attracting more candidates is only part of the job.

The real strength and power of online recruitment lies in connecting internet technology to not just attract candidates but to deal with them too, when done properly. In this sense, it is also about streamlining the recruitment process so that busy HR departments can give a better recruitment service to their colleagues in finance, marketing, sales and manufacturing. Added to that, it frees up more of their time for more value-added responsibilities.

HR Portal is a specialist software provider which can develop a modified application program for recruiters that will save time, effort and money. This can automate the pre-selection process by setting 'killer questions' (that only the top candidates will answer correctly), profiling and scoring, psychometric tests and automatic CV scans to look for key words such as qualifications and experience [10].

In a study conducted entitled “Recruitment Management Information System for Human Resource Department of Colegio De San Juan De Letran- Calamba”, it was emphasized that recruiting is one of the key functions of the human resource department. Organizations normally have an “employment office” within their human resource department [11]. The employment office has recruiters, interviewers, and clerical personnel who handle the recruitment activities both at the organization’s offices and elsewhere. The goal of recruitment is to attract a pool of highly qualified candidates or applicants to be hired by the organization to perform specific jobs. It is one of the most difficult time-consuming and costly processes of the staffing function.

E-recruitment, also known as online recruitment, is the practice of utilizing technology and in particular web-based means for tasks which involves with finding, attracting, assessing, interviewing and hiring new personnel. It is intended to make the process involved more efficient and effective, as well as less costly. Online recruitment can reach a larger pool of potential employees and facilitate the selection process.

Furthermore, in a study entitled “E-recruitment: The Effectiveness of the Internet as a Recruitment Source”, the author stipulated that internet as a recruitment source is an effective tool to use in reaching target markets when compared to more traditional recruitment sources. The results of the study indicated that applicants who search for job classified in the professional employment group are more likely to use the internet than those searching for positions in the academic employment group [12].

On the other hand, the study entitled “E-Recruitment in the United Nations Agencies in the Occupied Palestinian Territories”, stated that the old-fashioned or traditional methodology to recruitment has been revolutionized by the concept of online recruitment (or e-recruitment) in recent years. The concept of e-recruitment has gone through a rapid growth due to the dispersal of the internet in combination with an increasing number of users. This study explores the implementation of e-recruitment system which was applied to the United Nations Agencies working in the occupied Palestinian territories [13].

Based in the study entitled “Effectiveness on Online Job Recruitment System: Evidence from University of the East”, it claimed that online recruitment is set to transform the way in which

companies recruit their workers [14]. Online recruitment, as an essential business process, is the removal of multifaceted and superfluous paper works, and the introduction of rationalized workflow systems, reliable database applications, and efficient communication channels between job seekers and managers.

Evidently, internet insinuation rates have been on a sharp rise over the past decade. Internet has significantly changed the job application process and improved the channels of communication between employers and job-seekers. Its use in the job search process can take numerous forms. Online professional social networks such as LinkedIn serve as a marketplace, wherein job seekers can find right career opportunities and job providers can reach out to potential candidates [15, 16]. Job boards and corporate career web pages are the center of the online job process. They offer several advantages over more traditional search tools such as personal referrals, job fairs, direct employer contacts, public and private employment offices, and newspaper ads [17]. First, the internet offers access to information on many more openings and in many more locations. Second, the internet allows employers and job-seekers to update online ads and resumes more frequently and easily. Third, most job boards and career websites offer a more user-friendly experience than their traditional counterparts, for both the job-seeker and employer.

## **2.4. Decision Support System (DSS)**

A DSS is a communicating computer system that can be used by managers to make intelligent decisions. It has three fundamental components. First is the Database Management System (DBMS) which stores large quantity of data relevant to the glitches DSS has been designed to tackle. The second component is the Model-Based Management System (MBMS) which converts data from the DBMS into information that is useful in decision making and last but not the least is the Dialog Generation and Management System (DGMS) which provides a user-friendly interface between the system and the managers who do not have extensive computer training.

Correspondingly, DSS which pertains to a computer program application that analyzes business data and presents it so that users can make business decisions more easily. It is an "informational application" to extricate it from an "operational application" that collects the data in the course of normal business operation. Usual information that a decision support application might gather and present would be projected revenue figures based on new product sales assumptions, the consequences of different decision alternatives, given past experience in a context that is described and comparative sales figures between one week and the next [18].

According to an article written in [dssresources.com](http://dssresources.com), a decision support system can give information graphically and may include an expert system or artificial intelligence (AI). It may be directed at business executives or some other group of knowledge workers. The study entitled "National Competency based Teacher Standards Evaluation System with Decision Support for Calamba Elementary School", pointed out that a system with decision support capability can reduce the time spent for evaluation [19]. The system can accelerate any computations helping the evaluators to provide prompt evaluation. Consequently, decision support system must be implemented in Human Resource Management System to shorten the required amount of time needed to fulfil a task.

## **3. METHODOLOGY**

Before the actual implementation of the system, the methodologies on its development were discussed. This portion includes the detailed discussion on the procedures undertaken and how the development process of the system was conducted. Based on the designs developed from the

previous section, the researcher analyzed the technology and requirements of the users to construct programs to be integrated on this project.

Project design, use case diagram, and home page diagram were used as guides in developing all the features required by the system. These diagrams were presented to understand well the functions and how data are being processed. The database and tables were created using MySQL to store all the data and information relevant to the system's needs.

Additionally, programming languages such as Java Script, My SQL, CSS and PHP were used for the design and creation of the system. Also, a domain name played a crucial role for web hosting. The system used different hardware resources for testing and implementing the system such as quad core processor, two gigabytes of RAM, and at least one gigabyte of video card, hard disk with at least 250 gigabytes, and a server.

### 3.1. Project Design

Decision Support Personnel Recruitment System is a type of management system. It is a web-based system which can automatically assess applicants to improve the recruitment process in the human resource department of the university.

Figure 1 shows the interface diagram of the Decision Support Personnel Recruitment System. The starting point is a data storage containing submitted resumes or information of all the applicants. From the DSPRS Data Storage, the system returns an assessment in a form of report or chart. Components such as wifi/router, switch and data were connected with the computer containing system for the purpose of clients or viewers.

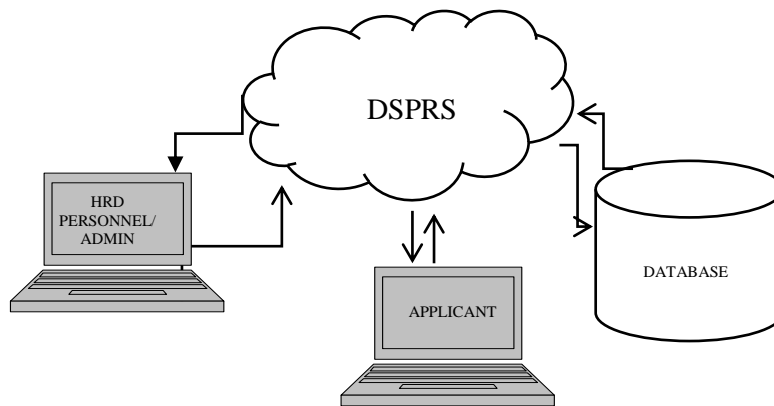


Figure 1. Project Design of DSPRS

### 3.2. Use Case Diagram

Use case diagram represents the system functionality and its requirements from the user's perspective. It also shows different types of users called as actors and their relationship and various ways that they interact with the system.

The system identifies three major actors only namely: super administrator, administrator and applicant. Each actor has given different access level and allowable transactions on the system. Actors such as the super administrator and administrator of the system are allowed to have their own account in the system. Super administrator can solely create an account for the HR staff

called administrator. The re-setting of password and deletion of admin account can only be done in this type of account. User logs can only be generated and seen by super administrator. On the other hand, administrator has the full management of the system. The user of this account, usually referred as admin, can process the application being submitted in the system. Applicant can access the system by going to the [lspuspcc.edu.ph](http://lspuspcc.edu.ph) site then he/she can submit the application by filling out the information needed.

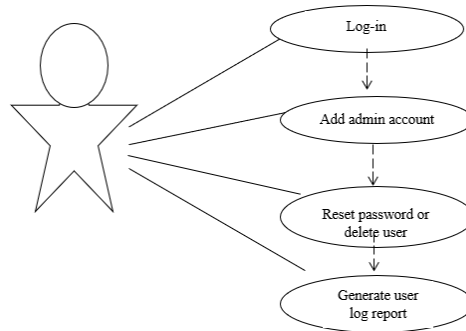


Figure 2. Use Case Diagram of Super Administrator

As illustrated in Figure 2, the super administrator actor is the person who controls the creation of the administration account. Once the admin account has been created, the super administrator can now monitor the logs of that account. Password can only be reset by super administrator. Also, if a certain administration account is no longer needed, super administration can be the only one who has the capacity to delete it. To distinguish the flow of work of each user, this account can generate user logs if needed.

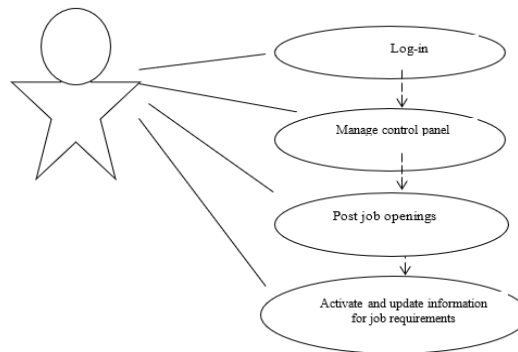


Figure 3. Use Case Diagram of Administrator

Figure 3 above illustrates the use case diagram of actor administrator. Usually, administrators are staff of the Human Resource department. They are called administrator because they are the one who requested for an account and activated by the super administrator. After a successful log-in the administrator can now manage the control panel. Once there is an available job opening, the administrator will create and post it in the system for the website to display. And as a system administrator, the HR staff is responsible for the overall management of the system and has the full control of the modification, updates, and database maintenance.

Figure 4 shows the use case diagram of the actor applicant. The applicant can only view the web page contents and fill out information needed for application submission. Afterwards, the applicant can submit the application by clicking the apply button.



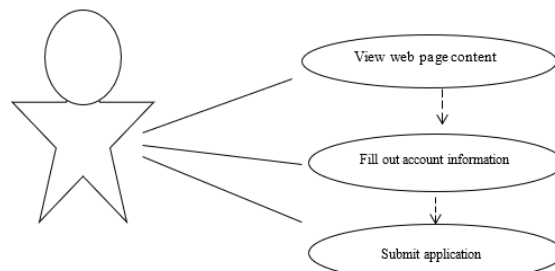


Figure 4. Use Case Diagram of Applicant

The homepage design for Decision Support Personnel Recruitment is shown in Figure 5. It describes the entire features of the system. The system designed to have two major modules, each with its function. First is the application module for new applicants with drop down menu consisting of Teaching and Admin Staff positions to choose from. The second module is for updating existing applications which will ask the previous applicant to input the contact number and the email address that were used from its previous application.

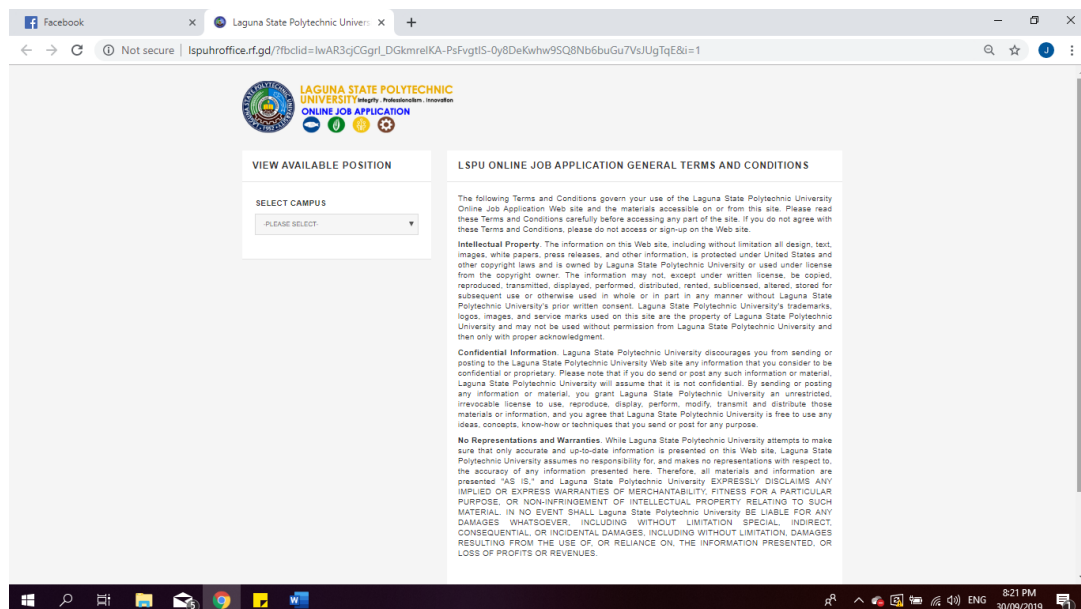


Figure 5. Homepage Design of DSPRS

Homepage design shown in Figure 5 consists of the university logo, name of the department which will use the system, mission and vision of the university, career options and update of existing application.

### 3.3. Project Development

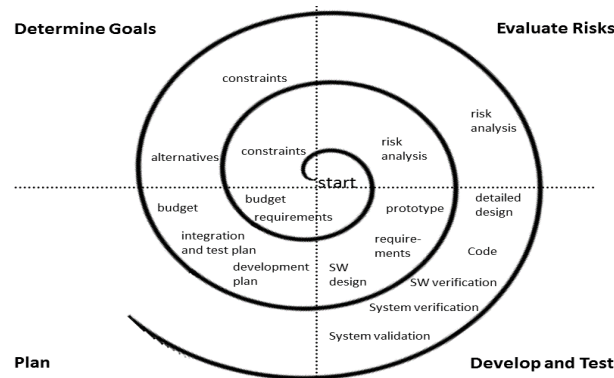


Figure 6. Spiral Model

For the development of the system, the spiral model was followed. Each cycle of the first quadrant commences with *identifying the goals*. With the case of Decision Support Personnel Recruitment System, the need for the said software was addressed by the client or end user based on series of interviews conducted. In addition, it determines other alternatives, which are possible in accomplishing the goals. The next step in the cycle which is *evaluating alternatives* was based on objectives and constraints identified from the first cycle by the Human Resource Management Office of LSPU-SPCC. This process identifies the areas of uncertainty and focuses on significant sources of the project risks. The third quadrant which is *developing the final software* for Decision Support Personnel Recruitment System while considering the risks that may occur, including the test and evaluation results. Risk management considers the time and effort to be devoted to each project activity such as planning, configuration management, quality assurance, verification, and testing.

The last quadrant which is *planning the next step* after the project was implemented at LSPU-SPCC. It also includes planning for the next prototype and thus, comprises the requirements plan, development plan, integration plan, and test plan.

One of the key features of the spiral model is that each cycle is completed by a review conducted by the individuals or users. This includes the review of all the intermediate products, which are developed during the cycles. In addition, it includes the plan for the next cycle and the resources required for that cycle. The spiral model is similar to the waterfall model as software requirements are understood at the early stages in both the models. However, the major risks involved with developing the final software are resolved in the spiral model. When these issues are resolved, a detailed design of the software is developed.

### 3.4. Project Testing

The main purpose of this stage is to determine if the system is in conformity with the W3C standards, if it performs in terms of portability and if the system is secured from unauthorized access.

W3C stands for the World Wide Web Consortium who is the recognized standards organization for the World Wide Web. These standards are then used to help guide web developers and browsers to develop code that lives up to certain standards. It is used to test if the website conforms with the W3C standards.

To test the portability of the system, it was opened using different browsers and launched using different operating systems. Also, it was opened to different portable devices such as laptop, tablet and smart phones.

To test how secured the system is, several log-in attempts were made to both super admin and admin accounts without the correct log-in info to check if the system can be accessed or penetrated without an authorized account. Also, several attempts were made to check if the administrator account cannot access the control panel which is intended for super admin user only as well as to check if the password of the registered administrator account cannot be altered by any user.

### 3.5. Project Evaluation

To determine the performance of the project, a survey was conducted. This study adopted ISO 9126 Software Quality Matrix with the following criteria: Functionality, Reliability, Usability, Efficiency and Maintainability. During the evaluation, there were 40 evaluators consisting of five (5) IT experts (programmers and web developers) who are skilled in the technology, five (5) possible users such as the head of human resource department, HR staff and other administrative staff; ten (10) LSPU-SPCC alumni, and twenty (20) graduating students. The researcher demonstrated how the system works to the respondents for them to explore and use. Then, distributed the evaluation instrument to the evaluators and asked to rate the system using active-point Likert Scale in Table 1. After the collection and tabulation of the gathered data, the researcher computed the mean of each criterion and the overall mean. Lastly, results were interpreted for the equivalent descriptive rating using Table 2.

Table 1. Likert Scale

Rating	Interpretation
5	Excellent
4	Very Good
3	Good
2	Fair
1	Poor

Table 1 above shows the Likert Scale rating, 1 interpreted as poor, 2 interpreted as Fair, 3 interpreted as Good, 4 interpreted as Very Good and 5 interpreted as Excellent. This scale was the basis of the evaluators in rating the system.

Table 2. Range of Scale Value for Interpreting the Evaluation Result

Range	Interpretation
4.51 - 5.00	Excellent
3.51 – 4.50	Very Good
2.51 – 3.50	Good
1.51 – 2.50	Fair
1.00 – 1.50	Poor

Table 2 shows the Range of Scale Value for Interpreting the Evaluation Result. The Excellent rate ranged from 4.51 to 5.00. The rating Very Good will be ranging from 3.51 to 4.50. The rating

Good ranged from 2.51 to 3.50. Fair rating ranged from 1.51 up to 2.50. Lastly, the Poor rating ranged from 1.00 to 1.50.

The researcher also employed a survey questionnaire to determine the *acceptability* of the system which was validated by various IT experts. There were four (4) categories being rated such as interface, operability, security and portability. The ratings were interpreted as agree, neutral and disagree. The result was analyzed through descriptive statistics – frequency distribution.

## 4. RESULTS AND DISCUSSIONS

There system underwent three testing procedures specifically W3C standard testing, portability testing and security testing.

### 4.1. W3C Standards Test Results

During the initial testing, the system encountered errors such as two consecutive hyphens in a comment, absence of alt attribute in image file and excess use of div tags as shown in figure 7.

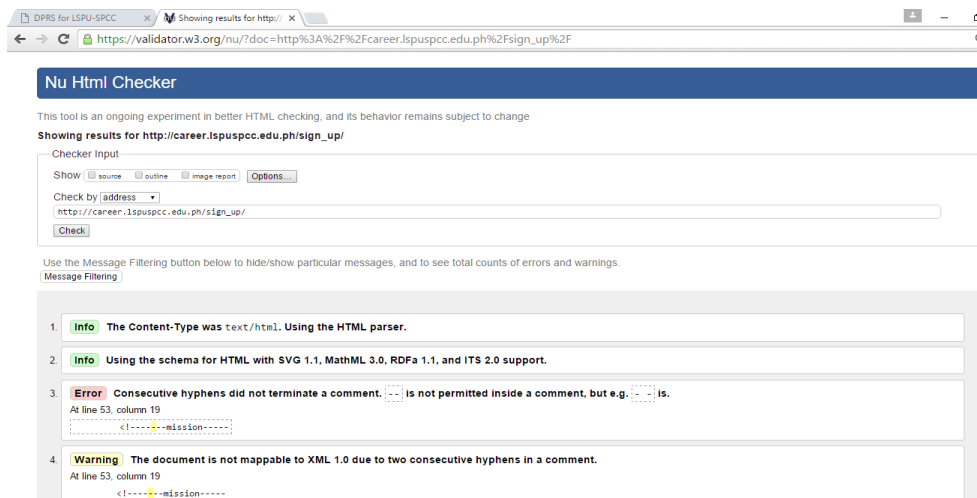


Figure 7. Initial Test Result of W3C Markup Validation as XHTML1.0 Transitional

After series of troubleshooting, the system passed and successfully checked as W3C validation as XHTML 1.0 as shown in figure 7.

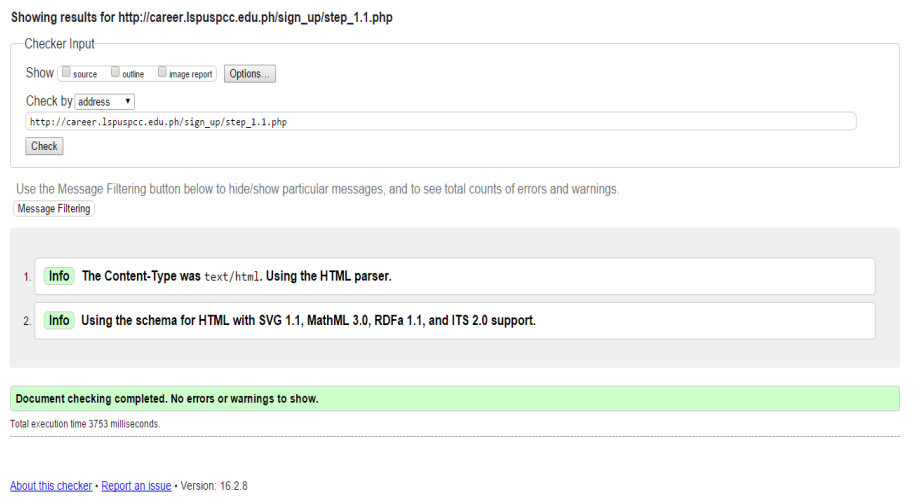


Figure 8. Final Test Result of W3C Markup Validation as XHTML1.0 Transitional

Aside from the Markup validation, all pages were validated using the CSS Validation as shown in Figure 8. This type of validation is the presentation of Web pages, including colors, layout, and fonts. It allows one to adopt the presentation on different devices, such as large screens, small screens, or printers. Figure 9 shows the test result of W3C CSS validation. All were thoroughly checked and contained no error for CSS level 3.

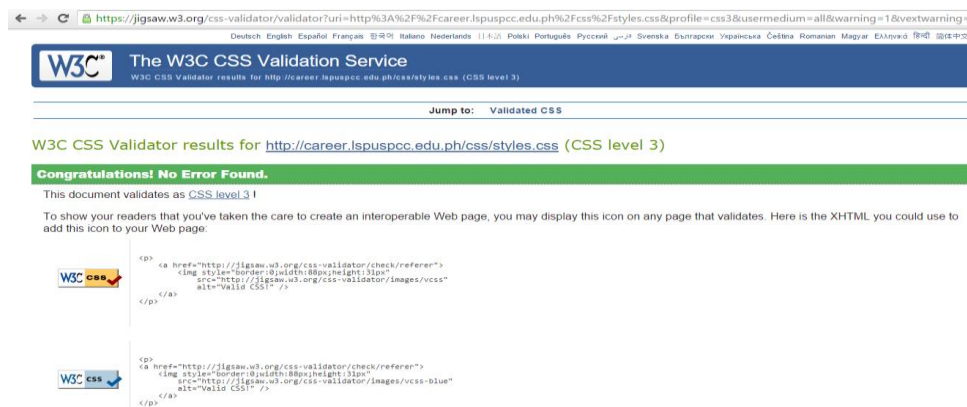


Figure 9. Sample Test Result of W3C CSS Validation

## 4.2. Browser Test Result

The system was tested using different browsers such as Google Chrome, Internet Explorer, Mozilla Firefox, Safari and Opera. As a result, table 3 shows that the system has flexible imagery, functional links and has a fast page loading experience except in Opera browser. Loading time in Opera browser is of medium speed.

The system can be best viewed in Google Chrome, Internet Explorer, Mozilla Firefox and Safari because the images are intact or uncluttered.

Table 3. Browser Testing Result

<b>BROWSER</b>	<b>EXPECTED BEHAVIOR</b>	<b>ACTUAL BEHAVIOR</b>
Google Chrome	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, fast loading page
Internet Explorer	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, fast loading page
Mozilla Firefox	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, fast loading page
Safari	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, fast loading page
Opera	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, medium speed of page loading

#### 4.3. Portability Test Result

The system was tested using different portable devices such as laptop, tablet and mobile phone. Table 4 below shows that the actual behavior of the system in laptop and tablet resulted to flexible imagery, functional links and fast page loading.

Table 4. Portable Device Testing Result

<b>Portable Device</b>	<b>Expected Behavior</b>	<b>Actual Behavior</b>
Laptop	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, fast loading page
Tablet	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, fast loading page
Mobile Phone	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, slow loading page

On the other hand, the actual behavior of the system in mobile phone device resulted to flexible imagery, functional links and slow page loading.

#### 4.4. Operating System Compatibility Testing Result

Table 5. Operating System Compatibility Testing Result

<b>Operating System</b>	<b>Expected Behavior</b>	<b>Actual Behavior</b>
Windows	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, fast loading page
Android	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, fast loading page
Ios	Flexible imagery, functional links, fast loading page	Flexible imagery, functional links, fast loading page

The system was tested using different operating system such as Windows, Android and iOS for is compatibility. Table 5 shows that the actual behavior of the system in all the operating system resulted to flexible imagery, functional links and fast page loading.

## 4.5. Security Test Result

The system was tested in terms of security by accessing the administrator account using valid and invalid passwords.

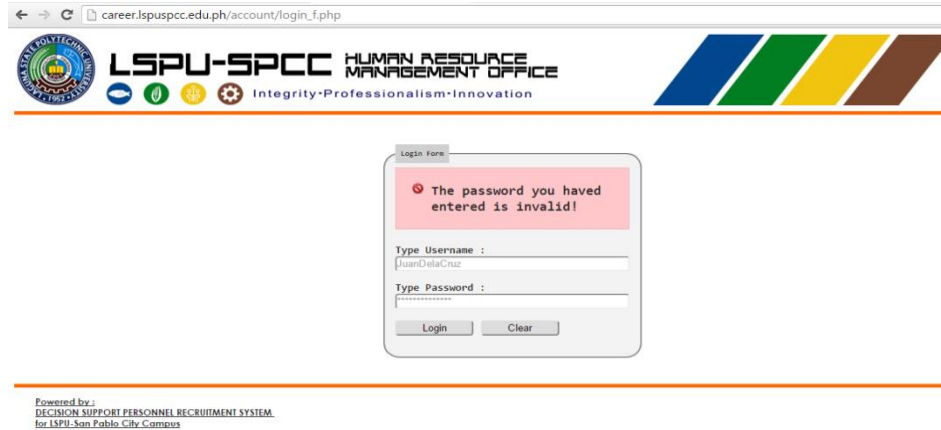


Figure 10. Sample Test for Unauthorized Access

Test result shows that the administration account cannot be accessed by unauthorized user using invalid password. In order to access the account, password must match the system as shown in figure 10. Super administrator can be access by authorized user by double entry of a unique password. In addition to that, in super administrator side of the system, password input cannot be decrypted once the account is registered. It will display encrypted password. Only this type of administrator has the liberty to reset password as shown in figure 11.

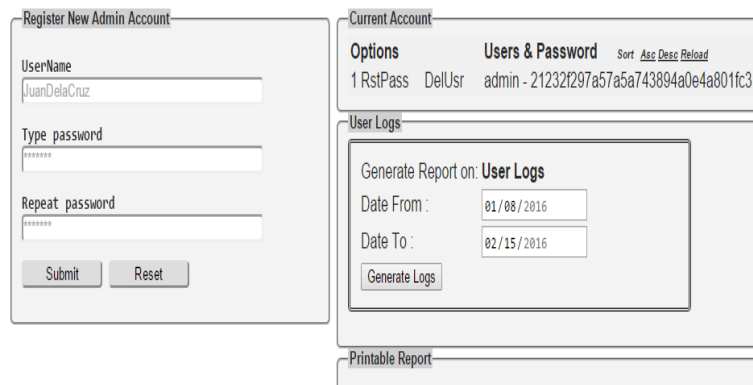


Figure 11. Password Encryption

## 4.6. Evaluation Results

### 4.6.1. ISO 9126

The performance of the project was evaluated in terms of functionality, reliability, usability, efficiency, and maintainability based on ISO 9126 Software Quality Matrix. There were 40 respondents who evaluated the project consisting of five (5) IT Experts (programmers and web developers), five (5) Admin Staff, ten (10) alumni of the university and twenty (20) graduating

students. All the respondents' rating was consolidated and computed to get its quantitative and qualitative interpretation.

Table 6. Result of Respondents' Rating of the System

<b>Criteria</b>	<b>Mean</b>	<b>Qualitative Interpretation</b>
1. Functionality	4.59	Excellent
2. Reliability	4.47	Very Good
3. Usability	4.39	Very Good
4. Efficiency	4.56	Excellent
5. Maintainability	4.57	Excellent
<b>Overall Mean</b>	<b>4.52</b>	<b>Excellent</b>

Table 6 summarizes the evaluation result showing the mean per criterion and the corresponding qualitative interpretation. The table also presents the overall mean by getting the average of all the means of the five criteria.

The respondents' rating regarding the functionality of the system obtained a mean of 4.59 equivalent to "excellent" in descriptive terms. This indicates that the system has met the required functionalities. It also proves that the system is secured, accurate, and performs according to its specifications.

The respondents' ratings regarding the reliability of the system got a mean of 4.47 and interpreted as "very good". This signifies that the system is capable of recovering the system and errors can be predicted and can be tolerated.

The respondents' ratings regarding the usability of the system obtained a mean of 4.39 equivalent to "very good" in quantitative terms. This means that the system is user- friendly, easy to operate, learn and understand.

The respondents' ratings regarding the efficiency of the system got a mean of 4.56 interpreted as "excellent". This attests that accessing the system is very fast and provides convenience and can be effectively used by the end-user.

The respondents' ratings regarding the maintainability of the system obtained a mean of 4.57 interpreted as "excellent". This means that the system is easy to test and maintain and offers performance satisfaction regardless of the time needed.

Moreover, the criterion functionality got the highest mean while usability obtained the lowest mean but still falls within the range of the scale value "very good". The overall mean generated for all the criteria contained in ISO 9126 Software Quality Matrix evaluation instrument yielded an average of 4.52 which validates that the system has attained its anticipated functions according to the organizations' requirements and indicates that the system is "excellent".

#### **4.6.2. System Acceptability**

In terms of the acceptability of the system illustrated in figure 12, results showed that the users agreed that the graphical user interface (GUI) of the system is excellent ( $f=36$ , 90%). Majority of the users agreed that the system is user-friendly ( $f=32$ , 80%). As for the consistency to the theme, all of the users agreed that it provided a quality user experience. It can also be noted that



the system works well during operation ( $f=35$ , 88%). During implementation, the users agreed that the concept of the system was easy to understand. In fact, a users' manual before the pilot testing was not needed. Moreover, users believed that the system had enough security measures ( $f=29$ , 73%) since it offered multi-factor authentication and encryption. Lastly, DSPRS received a favorable rating in terms of portability ( $f=30$ , 75%) since it can be used in different devices such as tablet, mobile phone and desktop computer. All in all, 79% (32 out of 40 users) believed that the system was acceptable according to its intended use.

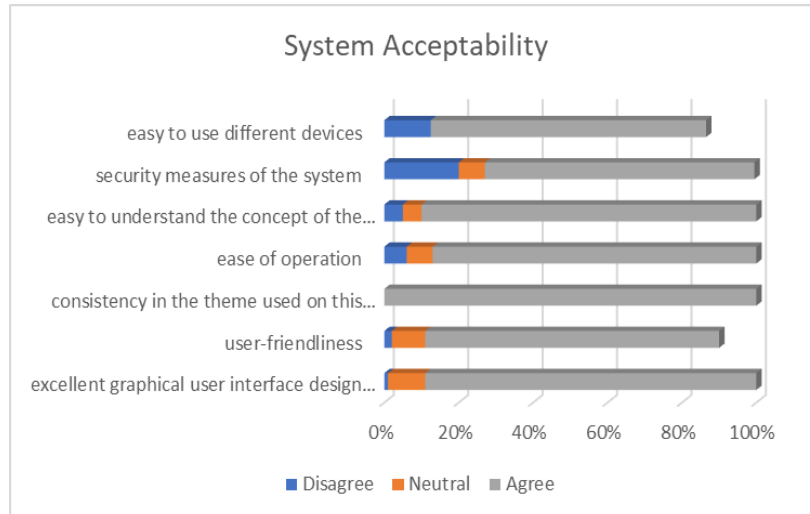


Figure 12. System Acceptability

## 5. CONCLUSIONS

In consideration of the objectives of the study and results of testing and evaluation carried out, the following conclusions were derived. The researcher provided a web-based Decision Support Personnel Recruitment System for LSPU-San Pablo City Campus that has the capability to receive job application for other LSPU campuses. The system can screen qualified applicants that supported the previous study of Rameshbabu [20] which can produce a list of suitable candidates by using information from the database. Moreover, it can assist the human resource personnel in ranking the applicants and can generate reports that supported the study of Niaz [21], which implies that the implementation of technology into the human resource workflow frees the professionals from a great amount of routine work.

In addition, the project was successfully developed using technologies and tool such as XHTML, CSS, Java Script, MySQL and PHP. Based on the findings, the system is W3C compliant, attained its portability status for it was launched to different browsers and operating systems and validated successfully. As for the performance of the system, it was rated "excellent" by the respondents which proved that the system is a beneficial tool in the academic community especially in the human resource management office, alumni and graduating students. Furthermore, 79% or 32 out of 40 users believed that the developed system is acceptable in terms of GUI design, user-friendliness, consistency to the theme, consistency to the theme, ease of operation, understandability of the concept, security measures and portability. Having an acceptable user interface an important aspect in the implementation of the system according to previous studies [22, 23].

After the development of this system, several limitations were realized such as it is limited to online users, it can only be accessed by the human resource department (super admin and system admin) and applicants (users) if there is internet connection as well as Human resource personnel must be online all the time to perform basic tasks such as data input and email confirmation otherwise processes on the system will not be initiated. For the screening and assessment of the applicants, the requirements established by the human resource department must match with the qualifications possessed by the applicant. Otherwise, the applicant with mismatch qualifications cannot continue to the recruitment process.

To further enhance the developed system, the following recommendations were derived. First, the system should allow applicants to submit applications for multiple job vacancies. Second, the ranking of applicants with the same points should be tie regardless of who submitted the application first.

## 6. ACKNOWLEDGEMENT

The author is indebted to the support of College of Computer Studies and Research and Development office of Laguna State Polytechnic University, San Pablo City, Laguna, Philippines.

## REFERENCES

- [1] J.A. Erlano-De Torres, "Performance of sophomore information technology students in assembly language subject based on different teaching methods", *Information Management and Computer Science (IMCS)*, 2(2), pp.10-13, 2019.
- [2] *History of LSPU*, Laguna State Polytechnic University (History, Campuses, Courses, Contacts. Accessed on September 27, 2020. [Online]. Available: <http://www.wowlaguna.com/features/schools/laguna-state-polytechnic-university-cabuyao/laguna-state-polytechnic-university-history-campuses-courses-contacts/>.
- [3] C. Janssen, *What does Human Resource Management System Does*. Accessed on: January 2021. [Online]. Available: [www.techopedia.com/what-is-hrms](http://www.techopedia.com/what-is-hrms).
- [4] J.J. Aladin, M.H. Medina and J.L. Santos, *Human Resource Management Information System for the Provincial Capitol of Laguna.*, Colegio De San Juan De Letran-Calamba, 2006.
- [5] S.M. Heathfield, *What is Human Resource Management?*, About Money. Accessed on: January 10, 2021. [Online]. Available: [www.humanresources.about.com/od/glossary/h/hrmanagement.htm](http://www.humanresources.about.com/od/glossary/h/hrmanagement.htm).
- [6] L. Yorks, *Strategic Human Resource Development*, 1<sup>st</sup> Ed.. New York: Argosy Publishing, 2005.
- [7] T.A. Desta, "The Human Resource Management Function in Ethiopia: Focus on Civil Service in Southern Regional Government.", *Institute of Social Studies*, Netherlands, p. 71, 2008.
- [8] E. De Jesus, M.V. Caparas, A.V. Lopez, *Human Resource Management First Edition*. Manila: Giuani Prints House, 2010.
- [9] C.R. Martinez, *Human Resources Management: Principles and Practices Third Edition*. Manila: National Book Store, 2004.
- [10] "Introduction to online recruitment," *Hrmguide.co.uk*. [Online]. Available: [http://www.hrmguide.co.uk/recruitment/introduction\\_to\\_online\\_recruitment.htm](http://www.hrmguide.co.uk/recruitment/introduction_to_online_recruitment.htm). [Accessed: 31-Aug-2021].
- [11] R.J. Bariat, L.A. Angeles, and J.G. Marifosque, "Recruitment Management Information System for Human Resource", BS Thesis, Department of Colegio De San Juan De Letran- Calamba, Colegio De San Juan De Letran-Calamba, 2011.
- [12] E.R. Marr, *E-recruitment: the effectiveness of the internet as a recruitment source*. Diss. Queensland University of Technology, 2007. Accessed on: June 10, 2021. [Online]. Available: <https://eprints.qut.edu.au/16566/>
- [13] R.A. Hamarma, *E-recruitment implementation in the United Nations Agencies in the Occupied Palestinian Territories*, Islamic University of Gaza, 2011. Accessed on: December 3, 2020. [Online]. Available: [https://iugspace.iugaza.edu.ps/bitstream/handle/20.500.12358/19414/file\\_1.pdf?sequence=1](https://iugspace.iugaza.edu.ps/bitstream/handle/20.500.12358/19414/file_1.pdf?sequence=1)

- [14] M.G.Ventura, and R.P. Bringula, “Effectiveness of Online Job Recruitment System: Evidence from the University of the East”, *International Journal of Computer Science Issues, Volume 10, Issue No. 4*, 2013.
- [15] F. Borisyuk, L. Zhang, and K. Kenthapadi. “LiJAR: A System for Job Application Redistribution towards Efficient Career Marketplace”. In *Proceedings of the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD '17)*. Association for Computing Machinery, New York, NY, USA, 1397–1406, 2017.
- [16] K. Kenthapadi, B. Le, and G. Venkataraman, “Personalized Job Recommendation System at LinkedIn: Practical Challenges and Lessons Learned”. In *Proceedings of the Eleventh ACM Conference on Recommender Systems (RecSys '17)*. Association for Computing Machinery, New York, NY, USA, 346–347, 2017.
- [17] F. Suvankulov, *Job Search on the Internet, E-Recruitment, and Labor Outcomes*, Accessed on: July 12, 2021. [Online]. Available: <https://www.proquest.com/openview/6aaddc083bcd3f4d4d733970dab12281/1?cbl=18750&pq-origsite=gscholar>
- [18] T. Segal, *Decision Support System-DSS*. Investopedia. Accessed on: August 9, 2021. [Online]. Available: [https://www.investopedia.com/terms/d/decision-support-system.asp#:~:text=A%20decision%20support%20system%20\(DSS,problems%20and%20in%20decision%20making](https://www.investopedia.com/terms/d/decision-support-system.asp#:~:text=A%20decision%20support%20system%20(DSS,problems%20and%20in%20decision%20making).
- [19] R.D. Larano, , M. Ojeda, and C.P. Saldana, “Competency Based Teacher Standards Evaluation System with Decision Support for Calamba Elementary School”, BS. Thesis, Colegio De San Juan De Letran-Calamba, 2011.
- [20] H. Rameshbabu, Ph.D., “The Computerization of Human Resource Information Systems: Its Benefits”, *International Journal of Research in Business Studies and Management Volume 5, Issue 6*, pp 8-16, 2018.
- [21] A. Niaz, “Impact of information technology on human resource management,” *Profilesasiapacific.com*, 21-Jan-2020. [Online]. Available: <https://www.profilesasiapacific.com/2020/01/21/information-technology-hrm/>. [Accessed: 31-Aug-2021].
- [22] M.A.T. Pratama and A.T. Cahyadi, “Effect of User Interface and User Experience on Application Sales”, *IOP Conf. Ser.: Mater. Sci. Eng.* **879** 012133, 2020.
- [23] S.M. Sarsam and H. Al-Samarraie, “A First Look at the Effectiveness of Personality Dimensions in Promoting Users’ Satisfaction With the System”, *SAGE Open Volume 8 Issue 2*, 2018.

## AUTHOR

**Joanna E. De Torres** received her BS in Information Technology from Laguna State Polytechnic University and MIT degree from the Technological University of the Philippines. She is currently serving as Research Implementing Unit Head and a member of the Faculty of the College of Computer Studies at Laguna State Polytechnic University, Philippines. Her research interests include Performance and Reliability Analysis of Computer Software, e-Government, IT Education, and e-Learning.

