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Human Resource Portfolio Management System with
Decision Support System

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ABSTRACT

Human Resource is considered the best asset in an organization, especially in an educational institution. Education service provided by an organization is dependent on the quality performance and skills of its faculty members. The data in the human resources department are vital for human resource development, hence they must be organized, processed, analyzed, managed, and disseminated effectively to improve training development and productivity. This study aimed to deploy the Portfolio Management System with the Decision Support System support human resource management. The descriptive method was used to assess the present conditions and problems of the human resource processes. The Agile software development model was adapted to the development of the system. The findings revealed that the developed system is highly compliant with ISO 25010:2015 system standards.

Keywords - Human Resource Portfolio Management, Human Resource Support System, Human Capital, Human Resource Information System, Personnel Management

Introduction

Employees are a company's best asset and the most important resource in any organization. This is more evident in an educational institution of higher learning. The quality of education provided by the institution is directly dependent on the quality of instruction provided by the faculty members. The quality of services that the school can provide is highly based on the profile and skills of their teaching personnel.

To increase and elevate the productivity of every educational institution, effective human resource management is highly necessary. As the term implies, human resource management means managing the organization's manpower or human resources to utilize its full potential towards organizational goals. The activities in the human resource department include recruitment and selection, training, and development, mentoring and career management, compensation, and benefits, & performance appraisal and evaluation of employees. This department plays a vital role in strategically managing people and the workplace's culture and environment. Its primary goal is to support the employees in their growth and development as individuals and team players in improving organizational performance. [1].

Along with the upsurge of Information Technology in the industrialized and developing countries, Human Resource Information Systems (HRIS) also evolved. Information technology in the past decade drastically changed the human resources function. In the beginning, providing support for mainly administrative activities such as payroll and

attendance management was the focus of Information During the 1990s, along with the adoption of more complex HR practices, the HR system focused on a company's overall performance goal. HRIS correspondingly developed into more sophisticated information systems featuring analytical tools to support decision-making in managing human capital [2]. Information technology today enhances many of the recruitment function's sub-processes such as the generation, pre-screening, and processing of applications or the contracting long and short-term candidate career path, and onboarding of new hires. Online job advertisements on corporate websites and internet job boards, curriculum vitae databases, different forms of electronic applications, applicant management systems, corporate skill databases, and IS supported workflows for the contracting phase are only a few examples of the various ways by which information systems today support recruitment processes. [3].

The increasing use of technology to deliver HR management leaves HR specialists more time for strategic decision making and that outsourcing of people-management activities will liberate HR specialists to perform more strategic activities [4]. HR professionals can also act as a competency manager by arranging the right people to the right positions in the right time with their new strategic roles [5]. HRIS is thought to contribute to overall business performance by fulfilling or at least supporting the tasks of data storage and retrieval, of serving as primary administrative support tools, of reporting and statistics as well as of program monitoring. HRIS plays an important role in any organization to effectively manage its human assets [2]. Many organizations have adopted HRIS to assist their daily human resources operations. HRIS aligns and satisfies the needs of the organization and its personnel in order to be successful in their career [6]. In order to meet the competition in the global market, firms need to balance their available resources to achieve the desired profitability and sustainability. It is believed that the management of human resources is the most important function for every organization that wants to have a competitive edge over its competitors [7].

Even in a computerized environment, the Human Resource department encounters various limitations and difficulties not only in record management but in acquiring reports as bases for human resource development. The increasing number of employees, their data, issues, and opportunities to be analyzed are essentials for better human resource development and career upward mobility. Some of the critical problems in human resource information management are employee records retention, performance evaluation, and its analysis, and how can these results be aligned with the training development program. Most oftentimes employees' training and programs are only based on the perceptions and observation of the HR officer or administrative personnel but not based on the individual and collective needs of the employees and the organization.

The developed system was designed to solve the identified problems and support the functions of the human resource department in an educational institution. The software is a support system to improve the productivity and human resource development of faculty members in the educational institution. The developed system could assist in the recruitment and selection activities by simplifying the process of collecting of resumes, reviewing applicants' information, and consolidating reports on the existing skills and test results for hiring processes. In the developed system, the employees can manage their individual's database and training roadmap that is based on the results of performance evaluation and completed training and seminars. The road map can be designed aligned with the educational institution's vision-mission and core values. With the accurate tracking of employees' career management, resources and a limited budget for human resource development can be optimized thereby also optimizing the ranking and promotion benefits of the employees, thereby improving employees' morale and motivation to stay in the institution.

The data-driven decision support feature of the developed system could aid in human resource management of the educational institution as analyses of employees' turnover trends, performance evaluation, training and needs, training roadmap and employees' counseling reports could be done. The human resource analytics features of the developed system play a vital role in optimizing resources in developing human resources. The system hopes to give the HR department a more strategic role in the company, as the information taken from the system can be the basis for employees' training program to build a career and meet the educational institution's goal.

Statement of the Problem

This study is designed to determine the functionality of the human resource management support system.
Specifically, it aims to present the following:

1. What are the practices, problems, and issues in human resource management as to the following:
    1.1. Recruitment & Selection
    1.2. Career Management, Training, and Development
    1.3. Performance Appraisal and Mentoring
    1.4. Ranking and Promotion
    1.5. Compensation and Benefits
2. What HR Portfolio Management System with DSS can be developed to address the identified problems and issues?
3. What is the extent of compliance of the developed system to ISO 25010 Software Quality Standards in terms of?

    3.1. Functional sustainability;
    3.2. Performance efficiency;
    3.3. Compatibility;
    3.4. Usability;
    3.5. Reliability;
    3.6. Security;
    3.7. Maintainability; and
    3.8. Portability
4. What enhancements can be made to improve the developed system?

Methods

Research Design

This study employed descriptive and developmental methods. The descriptive method was used to understand and assess the present conditions and problems in the human resource processes in the educational institution. Agile methodology was used in the design and development of the developed system.
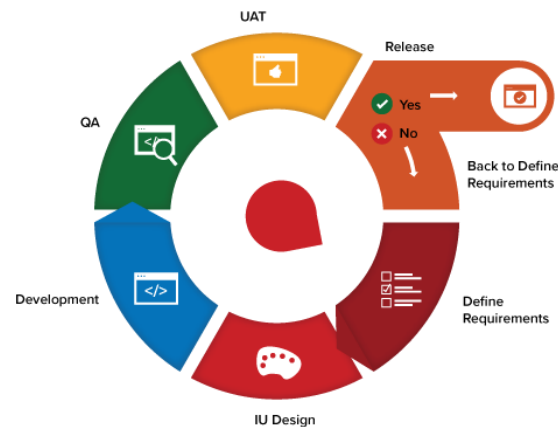

Figure 1. Agile Model

Figure 1 shows the agile software development model. This was adapted in the development of the system. The agile model is a mixture of the iterative and incremental development process. The software was broken into different modules and developed using an incremental and iteration approach. Every iteration in the system development involved the following processes:

Define Requirements. The researchers gathered data from different respondents such as HR Officer, Program Chairpersons, Teaching, and Non-Teaching Personnel. Accumulated data were filtered and analyzed to design system user's requirements.

Development. In this phase, the researchers developed the software based on defined requirements. The activities were database designing, user interfaces, system's transactional features, common and DSS reports, and system security development.

Testing. Unit, component, and integration testings were done in this phase to ensure system functionality and efficiency. Incremental output has undergone to quality assurance & user acceptance testing.

Release and Delivery. The software was delivered to the client for implementation and users' training was conducted. The researcher implemented the system at Cagayan Valley Computer and Information Technology College(CVCITC) at Santiago City, Isabela, Philippines.

Feedback. The developer accepted the customer and stakeholders' responses and work them into the requirements of the next iteration.
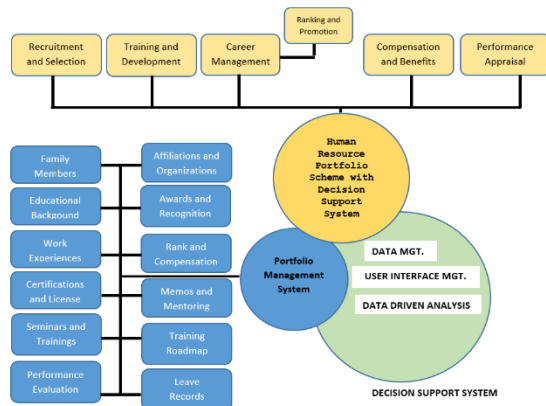
Conceptual Model

Figure 2. Conceptual Model: Portfolio Management System with Decision Support System

The conceptual model, as shown in Figure 2, of the developed system was created by the researcher based on the fifteen interrelationships among the six HRM practices model formulated by Akiko Ueno [8] and in consideration with the features of a decision support system.
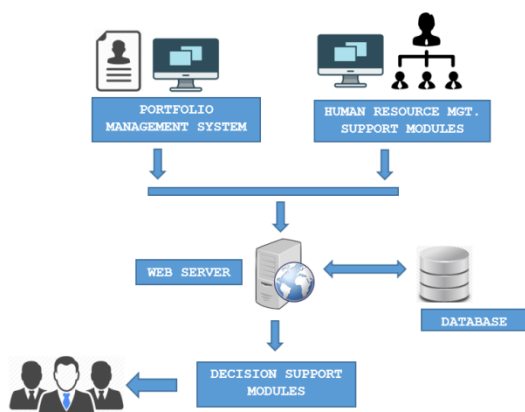
System Architecture

Figure 3. System Architecture of Portfolio Management System with Decision Support System

Figure 3 shows the system deployment diagram. It was implemented using a centralized web-based system. Data and inputs from different system component modules are processed on the webserver

incorporated with a central database system. Consolidated data and information from these different modules were analyzed for decision support and strategic planning functionalities.

Results

Employees deserve feedback for their outstanding performance as well as to identify areas for improvement. An appraisal is often a vital basis in promotion, salary upgrade, and employee's continuous development. Performance appraisals are done through student-teacher and supervisory evaluation. These are conducted through a traditional paper-pen evaluation. Regular mentoring helped to protect the interest of the school and the employees. It is designed to commend the outstanding faculty performance and educate employees along with the fundamental standards of behavior and performance.

In tallying of both student-teacher and supervisors' evaluation results, computation, and encoding student's comments were time-consuming. The paper cost for the evaluation process was also high as it was required to print the evaluation forms. This also resulted in bulk records to be kept by the HR Office. Class interruptions were also encountered since the deans, program coordinators or other facilitators have to go to different classrooms for the evaluation tool distribution and processes. There were also problems with the limited manpower of the HR Office to evaluate instructors and the less total number of student evaluators.

When it comes to counseling, a memorandum of violations is kept in a folder, but the record shows that an employee has undergone mentoring is not kept. The analyses of violations and mentoring results were not kept. The bases for ranking and promotion include further studies; training, seminars, and workshops attended within and outside the school; and conducted researches and presented in conferences as well as published articles in peer-reviewed journals. The only problem identified in this phase is the tracking and documentation of the employees' designation and promotions history. Notice of designation and promotions are kept in a portfolio folder which sometimes is lost or forgotten to be included in the compilation. The individual folder containing the portfolio of candidates for promotion were manually stored. During the preliminary assessment before deliberation, the folder would be forwarded to every

office of the evaluator and brought back to the human resource officer once the process is done. This results in misplacement or loss of attachments and the difficulty of identifying who is responsible or what office is liable when the record is misplaced or lost.

The HR department would want to integrate the currently used Payroll System to the developed system for easy accessibility. In the developed system, it shall allow employees to view their compensation and benefits since the personnel tends to forget the compensation and benefits discussed to them at the start of each school year. Because of this, the human resource officer usually would be flooded with so many requests to provide a printed copy of the personnel's salary computation, thus produces more paper that adds up paper cost.

Developed Human Resources Portfolio Management System with DSS to address the identified problems and issues.

The design of the system is a web-based and internet-ready platform. The system was developed using the different web development tools: HTML 5, Bootstrap, PHP, Jquery, and Javascript; MYSQL for its database. The system consisted of two components. The first one is the portfolio management system which contains twelve modules. Seven of the twelve modules (Family Information, Academic Achievement, Work Employment, Certifications and Licenses, Seminars and Trainings, Affiliations and Awards and Recognition) are managed by individual employees wherein they can upload and manage their records and monitored by the human resource department. The remaining five modules (Performance Evaluation, Compensation and Benefits, Designation Records, Memos, and Counseling and Leave Records) is managed by the human resource officer and available for viewing of employees.

The second component is the Human Resource Information Support System. This consists of five modules (Recruitment and Selection, Training and Development, Career Management, Compensation and Benefits, and Performance Appraisal). The Recruitment and Selection module manages the applicant's resume, test results, and hiring records. Training and Development module manages the Training Needs Analysis Survey, setting-up employees' training roadmap, and monitoring individual training roadmap progress. Career Management consists of features for Ranking and Promotions, Work Designation History, subordinates' management. Compensation and Benefits modules

allow employees to monitor their salary computation and benefits. The Performance Appraisal module manages Student-Teachers Evaluation, Supervisory Evaluation, and Employees' Counseling and Mentoring.

The system two major components are shared with a central database where data is collected and presented using a data-driven approach in the form of charts for decision-making support. The applicant manages his/her application records online such as application letter, resume, educational achievement, previous work experiences, and certifications or licensure examination, take the essay, and other behavioral examination required during a job application. This makes school recruitment and selection more effective. Hiring the best talent is the biggest and most important drivers of the school's success. With this, the system provides the necessary analytics in the form of applicant ranking reports and visualization which can be used by the administration in selecting or hiring the right applicant that is best qualified for the needs of the school. With this solution in place, it is easier than ever for the school to find the right applicant painlessly.

The system is capable of conducting an online training needs survey among employees and produces a training needs analysis report and visualization for school administrators to select employees who will attend training or seminars. These analytics serves as a basis for a career and professional development of employee base on their needs in the performance of their duties and responsibilities. Likewise, the system also provides an item analysis on the student-teacher evaluation where employees' weaknesses were identified that serve as a basis for management to select teachers who will undergo training/seminars to improve their teaching performance for the benefits of the students. These analytics provided by the system will provide a balanced selection of employees who need to improve through seminars and training and continuous professional growth for the good of the school and especially the students. The school administrators, using the system, can facilitate the annual performance review process and build skill inventories of teachers.

The developed system provides a Mentoring Factor Analysis report that helps school administrators implement the mentoring program of the school. This mentoring program provides mentors and protégé positive outcomes, including a higher degree of engagement in the organization, commitment, job satisfaction, and greater feelings of self-worth.

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The employees are assessed on several criteria, the quality of their work being the most common. Employees are assessed on several criteria, the quality of their work being the most common. With this, the system provides a historical report on the performance evaluation of the employees which includes the student-teacher evaluation and supervisor evaluation. These analytics help school administrators decide on the approval of promoting deserving employees based on their performances.

Table 1: Extent of compliance of the developed application to ISO 25010 Software Quality Standards

ISO 25010 Software Quality Standards.	Weighted Mean	Descriptive Rating
1) Functional Suitability	4.53	Compliant to the very great extent
2) Performance Efficiency	4.63	Compliant to the very great extent
3) Compatibility	4.70	Compliant to the very great extent
4) Usability	4.48	Compliant to the very great extent
5) Reliability	4.48	Compliant to the very great extent
6) Security	4.46	Compliant to the very great extent
7) Maintainability	4.54	Compliant to the very great extent
8) Portability	4.40	Compliant to the very great extent
GRAND MEAN	4.53	**Compliant to the very great extent**

Table 1 shows the summary assessment of IT experts on the compliance of the developed system using ISO 25010 Software Quality Standards in terms of Functionality Sustainability, Performance Efficiency, Compatibility, Usability, Reliability, System Security, System Maintainability and System Portability. The system got a grand mean of 4.53, descriptively interpreted as compliant to a very great extent. The result implies that the system is highly compliant with all of the indicators of ISO 25010 Software Quality Standards thus accepted by the users with high satisfaction.

Conclusion and Future Works

The developed Portfolio Management System with Decision Support System is a valuable system in an educational institution that can support human resource management and decision-making functions. Its features and functionality have met acceptable quality standards. It can be effectively used to document and process recruitment and selection, career management, training and development, ranking and promotion, compensation and benefits reporting, and performance appraisal and mentorship of employees.

The system provides employee analytics that helps school administrators retain best-fit employees because retention strategies such as training/seminars, mentoring and incentive policies should be considered as a long-term investment in the future growth and competitiveness of the school.

The researcher recommends the following:

1. The institution must seriously adapt the developed system in its operation.
2. When the system will be adapted, the institution can consider purchasing greater cloud storage for easier and flexible accessibility, and assign a system administrator who will provide preventive maintenance and technical assistance.
3. Since the system was created through open source technology, it is adaptable to system integration. The system can undergo continuous improvement through the proposed enhancement activities identified in this study.

Ethical Considerations

The researcher considered ethical standards in this to prevent the fabrication or falsification of data. The participants of the study were not subjected to any harm in any way whatsoever. Full consent was obtained from the participants prior to the study. The protection of the privacy of research participants and the data provided was secured, ensuring an adequate level of confidentiality. Furthermore, this study underwent rigorous review by the Ethics Review Committee of St. Paul University Philippines to ensure it passed thru ethical standards. A language editor also validated, checked, and critiqued the entire manuscript

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Authors Bio note

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