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Human Resource Information Management System

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Abstract: ***This study focused on the system development and assessment of a "Human Resource Information Management System." It aimed to describe its developments using the Agile Software Development Method in terms of analysis, design, development, testing and evaluation. It also aimed in assessing its system qualities in terms of technicality, functionality and usability both by IT experts and HR practitioners as end-users based on the ISO/IEC 25010:2011 standards. The system was developed either for public or private organization. This study was conceptualized to further enhance a system that will consolidate the employees' records. Its functionalities included the maintenance of employees' records, attendance and leave monitoring, class schedules, related to work email messages notification for employees, ranking and evaluation, reduce paper management of employee's records, generate service records, generate a pre-formatted PDS records compliant to recent Civil Service Commission format and other HR reports. The users of the developed system can either be employees as end users and administrators.***

Keywords: Human Resource, Leave monitoring, Agile, Employees, Records, and Benefits

1. Introduction

Today's technology plays a vital role that serves to every sector of human life, be it personal or in the workplace. This application of computers and other related technologies such as the internet has significantly improved the way we do tasks and the way we store, retrieve, transmit, and manipulate data or information. In the workplace, the most challenging area where essential data and information are concerned is in the human resource department (HRD). Thus, the HR department is a fundamental, if not critical, component of any business regardless of the organization's size. It is in charge of finding, screening, recruiting and training job applicants, as well as administering employee-benefit programs and evaluating the employees' performance. For these critical roles, there is a dire need to make human resource management as efficient as possible.

Employee's records are one of the most important information resources in an organization. With the growing number of its personnel, record management has never been that easy. Problems such as those related to organizing their records, tracking their educational and professional details, as well as disseminating personal information to its department have been a common concern of the management. The traditional processing and filing of data are tedious, and it may consume much time and effort in doing those for the personnel in charge. Managing these individual records is already laborious not to mention the summarizing and preparing employees' record summary based on specific criteria. Performance management is another task related to employee's record management that demands more time and effort that is necessary on the part of the staff.

This study was conceptualized to further enhance a system that will consolidate the employees' records, thus, resolving the issues mentioned above. It will help to engage the employees' manager in managing their profile information, assess their performance, and generate readily available information that will help management in decision making. Comprehensive reports of information through this system could readily benefit the administration because relevant information related to employees are stored in one database, reports like a comprehensive listing of employees and their specific details, professional growth, compensation as well as performance reports can easily be generated mainly the preparation of PDS record. Lastly, it can streamline the administration of employee's benefits, strengthening the tracking and updating of employee's records.

2. Objectives

The main point of this study is to develop a Human Resource Information Management System both for public and private organization that will manage and maintain their employees' records.

This study aims to achieve the following:

1) To develop the system for the HR Department that will manage and maintain employees' records;
2) To develop the system that will evaluate and rank employee's performance;
3) To file the leave of absence online and monitor employee leave benefits;
4) To notify employees through emails messages related to work;
5) To generate pre-formatted PDS records compliant to the recent Civil Service Commission format;
6) To generate HR reports;
7) To reduce paper management of employee's records.

3. Methodology

This part discussed the study's research design, procedures and phases in the development of the software. The results present the process workflow of the developed HRIMS, and lastly the discussion, the statistical assessment based of the functionality and usability of the system tests by IT experts and end-users.

3.1 Research Design

This study used the developmental method of research. A

developmental study is a process of synthesizing different elements which have been broken down to its specifics and putting together those which are related to be re-arranged in creating or developing a new model, concept, material or instrument (Adanza, Et.al, 2009). To develop the system, it had two phases - the development and assessment.

The development of HRIMS followed the agile methodology. Agile is a software development methodology that divides system development tasks by regular cadences of work, knows as sprints or iterations. Each sprint coves the phases of development, including planning, analysis, design, development, testing, and evaluation.

Figure 1 shows the Agile Software development method. It initialized the planning and analysis at a very high level, to outline the scope of project development.

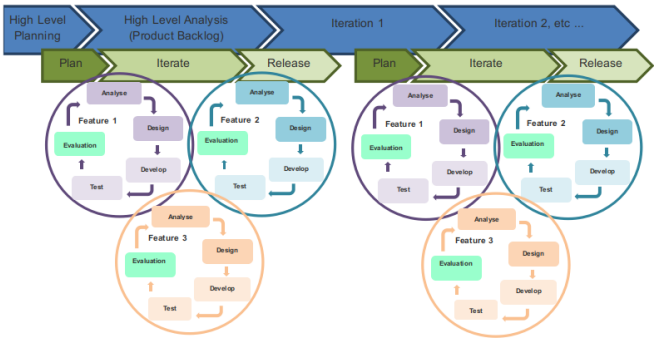

Figure 1: Agile software development

During the design phase process, diagrams, data flow diagrams and Gantt chart were prepared to illustrate the movement of information and relationships of entities, and schedule of development.

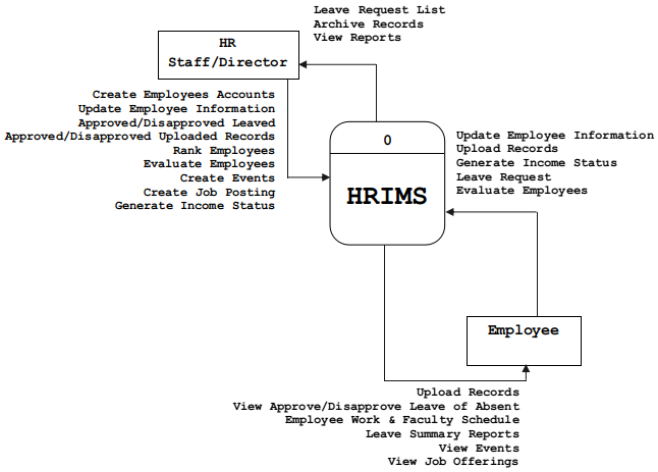

Figure 2: Process Diagram

Process diagram details the inputs, processes, and outputs that can be done by the users to the HRIMS system. It allows the users to inputs, updates employees records, and the HRIMS will process, manage furthermore provide results that fit the needs of the users.

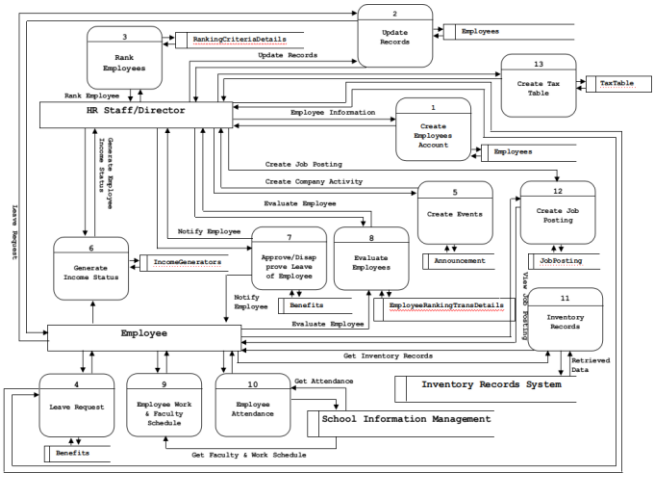

Figure 3: Data Flow Diagram

The data flow diagram shows the technicality of system process flow inside the HRIMS. This manner represents the movement of records and how the system manages each one of it.

Agile Iteration	1st Month				2nd Month				3rd Month				4th Month			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Planning																
Analysing																
Designing																
Developing																
Testing																
Evaluation																

Figure 4: Gantt Chart

The prepared Gantt chart presents the phases of development that in tracking the progress of tasks per area of iteration.

During the development phase, the modules were divided into sprints attainable in iteration every two weeks of completion. Using Laravel 5.1 framework with AngularJS, the back end was developed, and Angular JS was used for the front end. These two were integrated with the use of an Application Program Interface (API). PHP programming language was used in coding process with MySQL for defining the database structure. MySQL Workbench was used for data modeling, SQL development, and comprehensive administration tools for server configuration, user administration and backup. Sublime Text3 was used as a text editor for coding, and JSON file in transmitting data objects that consisted of attribute-value pairs to easily manage the administration of the system data entry maintenance.

To test the technical functionalities of the developed Human Resource Information Management System, the proponent determined if the design met its intended purpose. For every sprint or module delivered, a series of tests were conducted and examined the possible loopholes thoroughly.

The system evaluators, composed of IT experts and Human Resource practitioners, validated the system technical qualities based on ISO/IEC 25010:2011.

3.2 Results

The results of this study are the development of the Human Resource Management Information System that consolidates the employees' data and other pertinent records. Encoding of employee's data such as, personal, educational, employment information, and learning development interventions and training programs were done, managed and validated, and maintained of the developed system.

The developed system was able to evaluate and rank the employee's performance. Employees were able to file a leave of absence and monitor their leave benefits online.

The HRIMS system was able to generate HR reports such as personal data sheets, employee's 201 file, service records, leave benefit list, contact details, employee's list of credential, a matrix of employee's educational attainment and other reports provided by the HR department. With the information stored in one database, the records of employees are tracked and monitored online. The HRIMS system can provide user access for each employee, where they can check and update their records regularly. With the above-mentioned system capabilities, employees needs relevant to record retrieval and update can easily done by the employees themselves relieving the HR department of such tasks. This will give them more time to focus on other HR-related tasks. Also, printing of reports will be lessened.

The HRIMS was developed to fit either for public or private organization/agency through its system feature of record builder where the HR can build their design system.

The figure below shows the process workflow of the HRIMS system where the users will log first its account, then they can record or update their details, updates are then stored in the system's database that can be retrieved anytime for report generation.

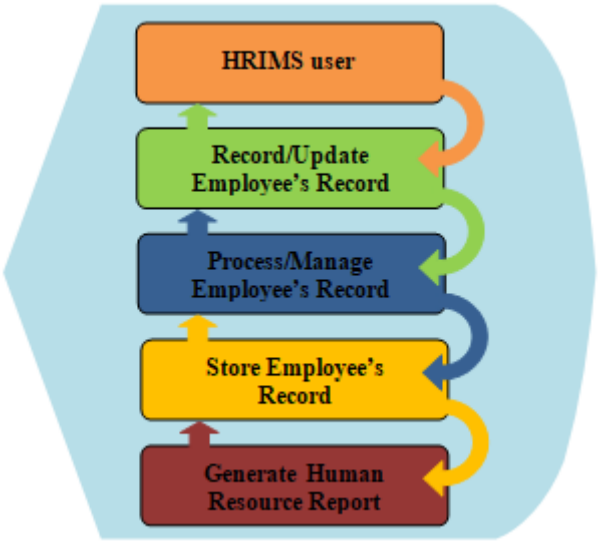

Figure 5: Developed HRIMS Process Workflow

3.3 Discussion

The Human Resource Information Management System was assessed based on its functionality, efficiency, validity, reliability, maintainability, and portability through a series of tests based on ISO/IEC 25010:2011 and conducted with IT experts and Human Resource practitioners. The employees of the different organization who were considered as the end-users were also tapped to evaluate the system functionality. The results of the evaluation and feedbacks of the evaluators were collected and incorporated into the development of HRIMS.

Table 1: Summary of Responses by IT experts assessment of the technical qualities of the developed system.

Criteria	*Weighted Mean*	*Verbal Description*
1. Functionality	4.93	Excellent
2. Reliability	4.85	Excellent
3. Usability	4.95	Excellent
4. Efficiency	4.87	Excellent
5. Maintainability	5.00	Excellent
6. Portability	4.87	Excellent
	4.91	**Excellent**

The developed HRIMS system was evaluated by the IT experts in different field of specialization and had passed the criteria tool of assessment of technical qualities in functionality, reliability, usability, efficiency, maintainability and portability based on ISO/IEC 20015:2010 standards. All had been marked as excellent with overall weighted mean of 4.91 with a verbal interpretation of excellent.

The HRIMS system was also assessed by employee's of the different organization as system end-users. Summary of responses on the Assessment of the HRIMS by IT Experts and End-users based on the following criteria:

Table 2: Summary of Responses as to Functionality.

Criteria	*Frequency*	*Weighted Mean*	*Verbal Description*
1. IT Experts	10	4.93	Excellent
2. End-users	20	4.81	Excellent
	30	**4.87**	**Excellent**

Table 2 shows the combined assessment of all the respondents rating the system as excellent with a weighted mean of 4.87 for the functionality criteria. The IT experts' assessment has a weighted mean of 4.93, verbally interpreted as Excellent while the End users tabulated assessment is 4.81, also verbally interpreted as Excellent.

Table 3: Summary of Responses as to Functionality.

Criteria	*Weighted Mean*	*Verbal Description*
3. IT Experts	4.95	Excellent
4. End-users	4.88	Excellent
	4.92	**Excellent**

Table 3 shows that all the respondents agreed that the system had very strong compliance based on usability with a weighted mean of 4.92 verbally interpreted as excellent. The assessment of the IT Experts and End-users had a weighted mean of 4.95 and 4.88 respectively. Both were verbally interpreted as Excellent.

4. Findings

The study was able to develop the Human Resource Information Management System that manages employees records of the organization/agency and to transform traditional operation into digital operation to help particularly the Human Resource Department to consolidates voluminous records personnel and also the primarily beneficiaries of the HRIMS.

A server for HRIMS can set up locally or online. The employees will be given the user access to update their employee's records, monitor their leave credits and benefits, file application for leave of absence online, and keep in touch with the announcement and activities. Orientation and user trainings will be conducted with members of the organization to familiarize the personnel to the utilization of the HRIMS.

The system functionalities were assessed by the IT and HR professionals all of them given the HR system functionality excellent remark.

For the process of implementation, the developed system was intended to be used based on the needs of the organization's Human Resource function. The system - inputs and processes for public or private organization/agency can be incorporated into the HRIMS system.

4.1 Recommendations

The developed Human Resource Information Management System is recommended to be used by the public or private organization/agency that has no computerize system. This system eradicates hand-process transaction and implements digital management of employee's records that consolidates HR reports, interconnects offices and employees, speed up the process and accumulate less paper production.

Further system updates to accommodate the growing need of the HR department for improvement is also encouraged by close collaboration with the system developer.

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Emmanuel Carlos Navarro graduated Bachelor's Degree of Computer Science at the College of the Immaculate Conception and finished Master's Degree in Information Technology at the Nueva Ecija University of Science and Technology. He worked for Midway Maritime Foundation now (Midway Colleges) as assistant registrar, part-time computer instructor and head of Information Technology department for almost sixteen (16) years. He is currently connected with NEUST as Instructor for two (2) years, has been active in research and development ever since and at the same time work as a freelance web system developer.