

Development of a Centralized Human Resource Information System of Cavite State University

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Abstract - This study focused in the automation and improvement of the Human Resource services. This includes managing of employees' records, facilitating requests and processing of leave credits in accordance to the Civil Service Commission (CSC) rules and regulation, tracking the employees' performance and skills, generating reports needed, and analyzing of employee information that will help in the decision making. This also includes attendance monitoring using biometrics, calculation of tardiness and absences of employees, and processing and printing of payroll. The system is developed using Visual Basic.Net, as the main programming language, SQL Server 2008 for back end database, MS Word and MS Excel for all needed reports. Two (2) units of computers that served as server and client, network devices and finger print biometric scanner completed the set-up of the developed system. The developed system consists of three (3) major application software or modules such as the Human Resource Information System, the Fingerprint Attendance System and the Payroll Alert System. The Human Resource Information System is used in the processing of employee records of the HR office. The Fingerprint Attendance System is used for getting the employee's time-in and time-out for their attendance. The Payroll Alert System is used in notifying the accounting staff to generate the payroll on time. Test results based on efficiency in terms of CPU and memory usage, processing speed and accuracy of data, and consistency of outputs turned out favorable to the system. Forty respondents composed of faculty and administrative personnel of Cavite State University rated the system as "Excellent" with an overall mean of 4.73. It signifies that the developed system is acceptable and functions according to its preferred specifications.

Keywords: *human resource, payroll, attendance monitoring, information system, biometrics*

INTRODUCTION

Human Resource Information System (HRIS) is one of the most important Management Information Systems which contribute to human resource administration functions of an organization. Heathfield [1] discussed that HRIS is a software or solution for the data entry, data tracking, and data information needs of the Human Resources, payroll, management, and accounting functions within a business [2]. HRIS merges human resource management with information technology to simplify the decision making process, it also aid in complex negotiations that fall under the human resource umbrella. The basic advantage of HRIS is to computerize employee records and databases but also to maintain an up to date account of the decisions that

have been made or that need to be made as part of a human resource management plan. Since HRIS deals with employees' personal data, which are sensitive, it should ensure data security while transferring information from one place to another. HRIS enhances communication between employers and employees and build strong relationship with unions and management committees [3].

Corpuz [4] elaborated that many companies have begun expanding their HRIS by using Internet-related features such as the intranet and the Extranet. Intranets (intra-organizational networks that support Web Applications) help HR managers post position vacancy announcements for employees to pursue and consider from their own PCs [5].

Developing human resource software in a state university can help in automating the HR processes, enabling to track, manage, and analyze all the employee data from application to retirement, absence tracking and payroll system tools with paperless workflows designed to walk managers and employees through common set up and administration operations for improved efficiency. Implementing HRIS, management can produce needed reports that will aid in decision making. HRIS can enable faculty and staff to transact queries faster in the database server and automatically they will be able to obtain information that they need, and make necessary update[6].

The Cavite State University is composed of eleven (11) campuses and more than one thousand employees. Due to the growing population of the employees in the university, the HR office is having a hard time in managing their records. The employee data is stored in the excel sheet and various other important factors like attendance records, pay roll, insurance, holiday listings and others are stored under different fields in excel. But as the number of employees increase and the data doubles, it becomes highly inefficient to store and process data and uses the derived information to make decisions. Collecting needed data from other colleges and campuses is very time consuming. The great amount of time and energy involved in responding to every request causes more delays as the work accumulates overtime.

The University has already an existing software program that is used in attendance monitoring, but the HR staff is having a hard time in calculating the tardiness and absences of the employees. This causes delays in preparing the payroll and updating of the leave credits of the employees.

This motivated the researcher to develop a human resource information system with centralized database that would help the HR staff and other employees to retrieve and process employees' information in a fast way. It will also reduce time needed to verify attendance data and also to calculate and process payroll.

A Systems Development Life Cycle (SDLC) adheres to important phases that are essential for developers, such as planning, analysis, design, and implementation, and are explained in the section below.

An instrument is used to evaluate the developed HRIS. FURPS quality factors was used for the criteria

and a total of 40 respondents from the different units was selected to evaluate the developed HRIS.

The study aimed to develop a centralized human resource information system that automate and improve the delivery of HR services of the Cavite State University.

OBJECTIVES OF THE STUDY

The general objective of the study is to develop a centralized and comprehensive human resource information system that automate and improve the delivery of HR services of the Cavite State University.

Specifically, the study aims to; (1)Design a system that automates and improves the delivery of the HR services such as attendance monitoring, record management, and payroll preparation; (2) Create a system using the technologies and software such as finger print biometric scanner for attendance monitoring, Visual Basic.Net programming language, MS SQL Server Express 2008 for the system's database and MS Office for generating of reports; and(3) Evaluate the performance of the system using FURPS software quality factors.

MATERIALS AND METHODS

Project Design

A project design methodology plan must be properly established to satisfy all the data requirements in developing a Centralized Human Resource Information System. [7] A Systems Development Life Cycle (SDLC) adheres to important phases that are essential for development of the HRIS, such as planning, analysis, design, and implementation. The SDLC aims to produce a high quality system that meets the objective of this study.

The design structure system enables the proponent to identify all the necessary inputs, processes, outputs and interfaces for the development of the system (Fig. 1). It also helps to see the relationships and interaction between the user and the system.

There are two types of databases in the system. First is the local database package with the software application and was be used to store the daily logs of the employee. Second is the centralized database that is located in the server where all the employees record are kept. The local database is designed for attendance monitoring, when there is no network connection to the server, the system can still monitor the daily time-in and out of the employee through local database. On the other hand, when there is a network connection to

the server, the daily logs stored in the local database are transferred to the centralized database for processing.

To provide emphasis on the design of the system, the HIPO (Hierarchy Input-Process-Output) was used. The HIPO technique is a tool for planning and/or documenting a computer program [8].

Designing the HIPO for Module 0, the User Login of the Human Resource Information System (Fig. 2), the researcher can evaluate and refine a program's design, and correct flaws prior to implementation. It also shows that there are 5 users in the system.

Project Development

The designed system were constructed, application program were written, coded and documented. Procedures and customized functions were defined to support the system built-in functions. The outcome of this phase were a completely function Centralized Human Resource Information System.

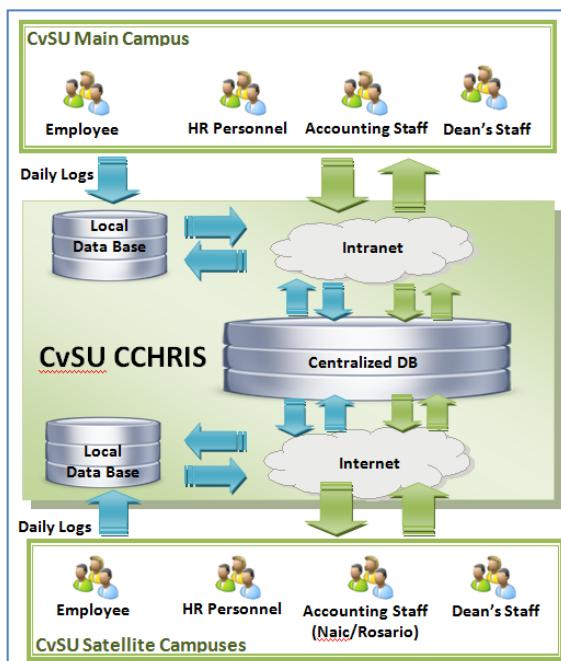


Figure 1. System Design of CvSU CHRIS.

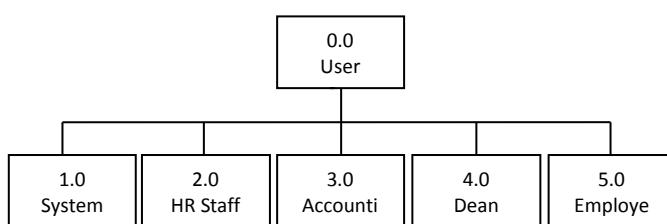


Figure 2. HIPO Chart for Module 0.0 User Login

The following materials are used in developing the system: Visual Basic.Net was used as the main programming language, SQL Server 2008 for back end database, MS Word and MS Excel for all needed reports. Two (2) units of computer that served as server and client, network devices and finger print biometric scanner were also used to complete the developed system.

Operation and Testing Procedure

The study was tested to check the accuracy and to evaluate the completeness of the system. The following procedures was conducted to check the performance and to ensure that the expected system characteristics were obtained.

System Testing Procedure

1. Connecting the system to the database server.
2. Entering username and password to access the system.
3. Testing if the buttons work according to its correct functions.
4. Filtering the data according to the needs.
5. Generate needed reports.
6. Transferring data from centralized database to the remote database.
7. Saving and testing employee's fingerprint.
8. Sending request and messages to the HR staff.
9. Testing the computation of absences and tardiness.
10. Processing of leave credits.
11. Processing of payroll.

Evaluation Procedure

To evaluate system's performance, an evaluation instrument was prepared. FURPS software quality factors were used. [9] The FURPS quality factor has the following criteria; functionality, usability, reliability, performance, and supportability. With the following criteria, the system's performance and effectiveness was monitored.

The following steps were carried out during the evaluation.

1. Evaluation forms were distributed to six (6) HR personnel, four (4) Accounting staff, five (5) Dean's staff, five (5) IT Expert and twenty (20) Employees from CvSU with a total of forty (40) respondents;
2. Before answering the evaluation forms, the researcher demonstrate how to operate the system to

the group of the abovementioned evaluator-respondents;

3. After the demonstration, the researcher allowed the evaluator-respondents to use and navigate all components of the system; and

4. The performance of the system was rated by the evaluator-respondents based on the Likert Scales (Table 1). The response was chosen from the scale of one (1) to five (5), five (5) being the highest that means Excellent, and one (1) being the lowest which means Poor.

5. Criterion type was used to validate the instrument. A panel of experts approved the instrument used to evaluate the HRIS.

6. Evaluation results were tabulated to compute for the mean of each criterion and the overall mean of the given criteria for each evaluation forms, respectively.

7. The study used the Rating Scale for Interpreting the Evaluation Result (Table 1) to interpret the results of the evaluation conducted.

Table 1 Likert Scale and Descriptive Interpretation of the Mean

Likert Scale	Range	Interpretation
5	4.51 – 5.00	Excellent
4	3.51 – 4.50	Very Good
3	2.51 – 3.50	Good
2	1.51 – 2.50	Fair
1	1.00 – 1.50	Poor

RESULTS AND DISCUSSION

Project Structure

The developed system consists of three (3) major application software or modules such as the Human Resource Information System, the Fingerprint Attendance System and the Payroll Alert System. The Human Resource Information System is used in the processing of employee records of the HR office. The Fingerprint Attendance System is used for getting the employee's time-in and time-out for their attendance. The Payroll Alert System is used in prompting the accounting staff for generating the payroll on time. These three applications systems work together to meet the objective of the study.

The Human Resource Information System (HRIS) has five (5) main users, namely: the HR Staff, Accounting Staff, Dean's Staff, Employees and the System Administrator. Each user has a specific level of access. Each user has their unique username and password for them to login in the system (Fig. 3).



Figure 3. Login Form of the System

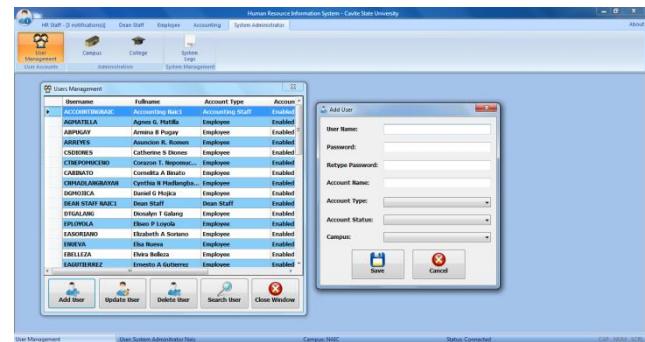


Figure 4. System Administrator Account, User Management Form

The System Administrator is responsible in creating a new user and setting the type of account as employee, HR staff, accounting staff, Dean's staff or another System Administrator. The system administrator can also update and delete a user account. The system administrator also manages the list of campus and colleges used in the system. Furthermore, the system administrator can check and supervise the system logs where they can view the list of activities or changes done by the users (Fig 4).

When the system administrator is done in creating a new employees account, the HR staff can now manage the employee records. The HR staff can add, update and search employee's information such as employment information, personal information, family background, educational background, civil service eligibility, work experience, trainings and other information (Fig. 5). The HR staff can also save the employee's picture in the database. The HR staff can generate reports such as Personal Data Sheet (PDS) and Service Record based from the employee's information entered in the system.

The system also allows the HR staff to add and update the positions and salary grade used in the system. When changes in salary occur, the employee's

salary is automatically adjusted. The HR staff can also accept request from the employee, the employee's request can be view in the notification form where the HR staff can approve and disapprove the requested documents of the employees. HR staff can generate Certificate of Employment (COE) requested by the employee.

The HR staff can post their announcement that can be viewed by the employees in the Attendance Monitoring System. The HR staff can also generate the number of employees depend on the selected category like per campus, per college, gender, academic rank, educational qualification and employment status. Furthermore, the HR staff can also generate the different information of the employees by category. The reports generated by the system are exported in MS Excel and the user can copy the needed information and format according to the needs.

One of the major functions of the HR is to monitor the attendance of the employees. The developed system helped the HR staff to monitor the employee's attendance with ease. The HR staff should create a time table for every schedule. This schedule is used for the computing of the employee's absences and tardiness. The HR staff can also change the attendance rules and holidays. This also affects the computation of the employee's absences and tardiness.

The employee can Time-In and Time-Out using the Finger Scanning Attendance Monitoring System. The employee logs are transferred from the Attendance Monitoring System database to the HRIS centralized database. The employee logs are used in processing the employee's absences and tardiness. The HR staff can also update and print the employee's Daily Time Record (DTR).

Figure 5. GUI of Manage Employee in HR Staff Account

The developed system also helps the HR staff in managing the leave records of the employees. The system automatically deducts the employee's absences and tardiness in their leave credits before deducting in the salary. The employee can apply for leave and when approved, the system automatically updating their leave records. When an employee does not have a leave credits, the system automatically deduct their absences in the payroll on the following month. The HR staff can also set if the employee is on official business or teachers leave or have a special privilege in exempting on the fingerprint attendance monitoring for a period of time.

The developed system allows the employee to view their information but not allowing them to modify. The employee should send request to the HR staff for the editing of their information. Employee should also submit the necessary documents supporting the requested changes in their record. Employees are allowed to generate their own PDS.

The employee has the following privileges in the system; view and print DTR, view and print leave credits, request documents to the HR office such as service record and certificate of employment, request leave, view request status, and send a private message to the HR staff.

The developed system is also capable of generating employee's payroll. The accounting staff can add or update employee's deduction before generating employee's payroll. The employee has a mandatory deduction like GSIS, Pag-Ibig, Philhealth and Withholding Tax. The employee's deduction can be added if they have loans and other required deduction.

Accounting staff can select which payroll will be generated as well as the period covered. The developed system is also capable of updating the Tax and Philhealth Table as well as the mandatory deduction.

The last user of the system is the Dean's staff. The user is allowed to generate reports and view the employee's absences and tardiness.

The Fingerprint Attendance System is an application developed to let the employee save their time-in and time-out (Fig. 6). A biometric fingerprint scanner is attached to the computer where the application is installed. The application system gets the employee's information in the centralized database server and stores it in the remote database. The

employee's fingerprint and all the employee logs will be stored in the remote database.

All the employee logs in the remote database are transferred to the centralized database server for the processing of their absences and tardiness, leave credits and payroll. Only the system administrator has the access for this application. It is protected by a username and password to avoid the altering of data.

Furthermore, Payroll Alert system is also developed to prompt the accounting staff in preparing the employee's payroll on time (Fig. 7).

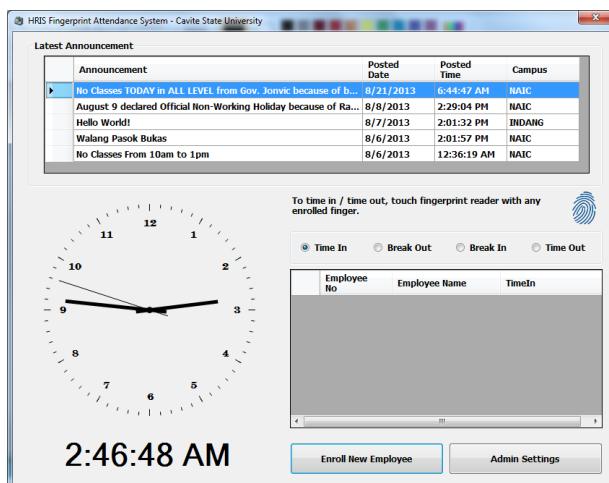


Figure 6. The User Interface of the Attendance System

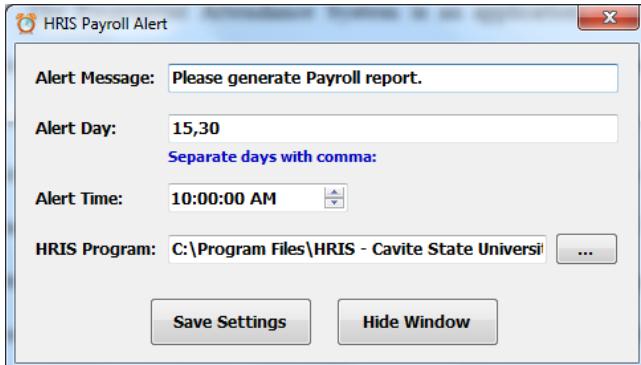


Figure 7. GUI of Payroll Alert Settings

Project Evaluation

To further prove the performance of developed system, it was subjected to a performance evaluation using the FURPS quality factors. The FURPS quality factor has the following criteria; functionality, usability, reliability, performance, and supportability. Evaluation forms will be distributed to six (6) HR personnel, four (4) Accounting staffs, five (5) Dean's

staffs, five (5) IT Expert and twenty (20) Employees in CvSU with a total of forty (40) respondents.

Table 2: Summary of Evaluation Result showing the criteria of FURPS quality factor

Criteria	Mean	Interpretation
Functionality	4.79	Excellent
Usability	4.72	Excellent
Reliability	4.72	Excellent
Performance	4.65	Excellent
Supportability	4.76	Excellent
Overall Mean	4.73	Excellent

Table 2 presents the summary of the developed system's performance evaluation. Functionality gained the highest mean while Performance got the lowest mean; nonetheless, it is still "Excellent" as construed. The overall mean for the criteria contained in the Evaluation Instrument using FURPS quality factors gained an average rating of 4.73 which indicates that the developed system is "Excellent". This means that the developed "Centralized Human Resource Information System of the Cavite State University" helped the HR office in automating and improving their services. In terms of functionality, the system gained an overall mean of 4.79, which means "Excellent". This proved that the system has the capabilities and correct functions of a HRIS, it also indicate that the system is secured; With respect to usability, the system gained an overall means of 4.73 that is equivalent to "Excellent" rating. This means that the system has an attractive design and the user interface is easy to access; Reliability of the system gained an overall mean of 4.72, which means "Excellent". It implies that the results produce by the system is accurate and it also indicates the system shows less error; In terms of performance, the system gained an overall mean of 4.65, which means "Excellent". It only shows that the users are very much satisfied in the response time and processing speed; Supportability gained an overall mean of 4.73 that means "Excellent" rating. It implies that the system is easy to maintain, easy to install and easy to extend and innovate.

CONCLUSION

Based on the results of the study as well as the outcome of the testing and evaluation made, the developed system was successfully designed, as it automates and improves the delivery of the following HR services: (1) Attendance Monitoring System monitors the employee's absences and tardiness with

ease; (2) Record Management was improved, it is now easy to search and print employee's information; and (3) The system processed and generates employee's payroll. Finally, the evaluation results has an overall mean of 4.73 corresponding to excellent, this means that the developed HRIS meets its objectives and successfully automated and improved the delivery of HR services of the Cavite State University.

RECOMMENDATIONS

The following are some recommendations for future enhancement and improvement of the system: (1) to use a standalone fingerprint scanner device that can connect to the system; (2) to include other HR services like Qualification Standard, Performance Evaluation System, Merit System and Grievance Machinery; and (3) refinements and enhancements on the system's design are recommended.

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