PERSONNEL INFORMATION SYSTEM FOR A STATE UNIVERSITY

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Research Article

Personnel Information System for a State University

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Abstract

This study aimed to analyze, design, develop, and implement a Personnel Management System for Negros Oriental State University (NORSU) – Human Resource Department, Main Campus I, Dumaguete City, to effectively manage employee records and provide an effective solution to track and manage employee's data through data-driven system architecture. The diffusion and innovation theories (Rogers) and socio-technical theories (Emery and Krist), which investigate the factors that influence the adoption of personnel management within the framework of innovation adoption, served as the study's backbone. The study used rapid application development (RAD) to expedite software application development, using predefined prototyping techniques and tools to produce software applications. Results imply that the implementation of the NORSU Personnel Management System encourages greater employee engagement, implicating improvement in employee and university performance.

Keywords: Design, Analyze, Develop, Implement, Personnel Information System

INTRODUCTION

Technology has definitely changed every aspect of human existence. Supporting this argument, Cascio and Montealegre (2016) assert that information and communication technology revolutionizes the manner in which businesses create and capture value, how and where people work, and how they interact and communicate. Relative to this, the current pace of technological development is exerting profound changes in the way people live and work. This scenario clearly shows that it is impacting all disciplines, economies, and industries, perhaps none more than production and how, what, why, and where individuals produce and deliver products and services (Technology & Innovation, 2017).

As a powerful medium of technology, Wallace (2004) discloses that the Internet has transformed the business landscape, making it far more competitive and the workplace considerably more fast-moving. Expectedly, it also speeds up the advent of widespread twenty-four-hour connectivity, mainly through net-centric technologies such as cell phones and wireless devices that can receive and send email. Together, these factors led to a re-conceptualization of what constitutes the "workday" or the "workweek." The concept of work-life balance has gained new meaning in a highly competitive, net-centric, global economy, in which each worker is accessible at any time, any place, and employees can access their colleagues, documents, and data from just about anywhere.

Indeed, this medium of technology, like the Internet, has changed people's lives and the way they interconnect with others, how they work, how they learn, and how they spend their free time. In short, it has changed human society. Specific to this powerful medium, information technology (IT), as a set of offered schemes, has become available to people and organizations through hardware mechanisms, which play a central role in the growth of human resources. In today's world, Information technology is an important factor for the growth of human organizations as it changes the context within which Human Resource Management (HRM) operates, providing both challenges and opportunities. In actualizing IT crosswise over HRM work, HRM depicts a procedure of overseeing and using the employees of the organizations. It involves varied functions, including hiring, selecting appropriate candidates, and providing opportunities to enhance the knowledge, skills, and abilities of the human resources for monitoring and evaluation of skills as well as fixing appropriate pay packages, promotion and incentive procedures, guiding in overall professional success and in relieving the employees from the organizations.

In the Philippines, in its desire to strengthen quality service among Filipino clientele in all branches of government entities, Executive Order No 25 -- Government Information Systems Plan (GISP) has been issued to bring wide-ranging administrative reforms to enhance government efficiency and effectiveness in government operations through the adoption and wider use and application of information and communications technology in fiscal and financial management, procurement, education, and workforce development, personnel welfare, organizational effectiveness, and service delivery.

Looking at the local scene, the Negros Oriental State University – Human Resource Department has observed that some of its daily operations have been done manually by the respective personnel, like taking care of its files, retrieving them, and storing their records. This is the very reason why the manual process employed by the HR department for handling personnel information poses many challenges. This is evident in some basic procedures, such as leave management, where an employee is required to fill out a form that may take several days or weeks to be approved. Likewise, paper records placed in a flat file are a commonplace practice in institutions and organizations. Once they have been physically filed, they begin to take up valuable office space. This management typically consisted of transferring the records offsite to a record center facility or warehouse dumping ground, where they are eventually forgotten. As a result, this process makes it difficult to retrieve information when it is needed; valuable information that may need to be revisited may be lost due to the poor practice of dumping the files. This personnel information then can only be seen from the manual records; it cannot be viewed when the employee is not in the office. Also, other organizations that need information about the employees to verify their identity cannot do the job in the absence of an online system.

It is in this view that this research study is conducted with the objective of designing, developing, and implementing an online personnel management information system at NORSU in order to manage employee records effectively and to provide an effective solution to track and manage employee data through data-driven system architecture. Lastly, the implementation of the automated personnel management system would encourage greater employee engagement, entailing better improvement in employee and university performance.

Statement of the Problem

This study aimed to analyze, design, develop, and implement a Personnel Management System for Negros Oriental State University (NORSU) – Human Resource Department, Main Campus I, Dumaguete City, with the aim to manage employee records effectively and to provide an effective solution to track and manage employee's data through data-driven system architecture. Furthermore, this sought answers to the following questions:

1. What problems do the HR Head and staff encounter in filing, storing, and retrieving employees' personal information?
2. What are the functional and non-functional requirements needed for the design and development of an efficient personnel management system?
3. How can a personnel management system be implemented to keep track of and manage employee data through data-driven system architecture?
4. How effective is the personnel management system as rated by IT Experts in terms of:
    1. Usability
    2. Maintainability, and
    3. Reliability?
5. How efficient is the personnel management system as rated by the HRMO

personnel, faculty, and staff in terms of:

5.1. Ease-of-Use, and

5.2. Usefulness?

Frameworks of the Study

The personnel management system has a significant impact on individual and organizational effectiveness. A sound personnel system brings consistency in human resource management practices and improves human relations in organizations. An adequate system is focused on a strategic objective and works by improving employee knowledge, skills, motivation, and contribution opportunities. Based on their overarching goal, human resource management systems contribute to organizational effectiveness in multiple ways.

Moreover, the Personnel Management System has been subjected to many studies examining different aspects of it, including innovation adoption. The adoption of online systems to facilitate the operations of organizations brings out increased productivity, better information management, and faster processing of data. Organizations are taking advantage of Information and Communication Technology (ICT) to enhance present work steps to meet the required standard. Databases of records of different departments can now be captured. As with records in other formats, electronic records must be managed through their entire life cycle from creation, when the records are created or received, through their active life, when the records are accessed frequently (at least once a month), through their inactive life, when the records are no longer active but have to be retained for some time for legal, fiscal, administrative, or historical reasons; until their final disposition which could be

destruction or preservation as a permanent record. So, the management of human resources in an organization can only work smoothly if the system is adopted correctly.

This present study is anchored on both Diffusion and Innovation Theory (Rogers) and Socio-Technical Theory (Emery and Krist), investigating the factors that influence the adoption of personnel management within the framework of innovation adoption. Besides organizational, technological, and environmental factors, the importance of espousing a personnel management system and innovation adoption theory is accentuated in this paper.

Diffusion and Innovation Theory. The diffusion of innovation is the process by which new products are adopted (or not) by their intended audiences. It allows designers and marketers to examine why some inferior products are successful when some superior products are not. Rogers (1995) defines Diffusion as the "process by which an innovation is communicated through certain channels over some time among the members of a social system." An innovation is "an idea, practice, or object that is perceived to be new by an individual or other unit of adoption." "Communication is a process in which participants create and share information to reach a mutual understanding."

Diffusion of innovation theory predicts that media, as well as interpersonal contacts, provide information and influence opinion and judgment. It consists of four stages: invention, diffusion (or communication) through the social system, time, and consequences. The information flows through networks. The nature of networks and the roles opinion leaders play in them determine the likelihood that the innovation will be adopted. Innovation diffusion research has attempted to explain the variables that influence how and why users adopt a new information medium, such as the Internet (Rogers, 1995). The NORSU-Personnel Management System becomes an innovation that could be beneficial to organizations in managing their human resources. Like any other innovations, the diffusion of the Personnel Management System in the university can be explained based on the Diffusion of Innovation (DOI) theory. In other words, the Personnel Management System is diffused in the university at different levels according to the characteristics of innovation and organization. Based on DOI, the process of innovation adoption is expressed in a five-stage process: 1) knowledge, 2) persuasion, 3) decision, 4) implementation, and 5) confirmation (Rogers, 1983). Knowledge is the first stage, and the importance of knowledge in today's complex global environment cannot be ignored (Jamshidi, 2015; Avazzadeh, 2015).

Based on knowledge, persuasion takes place, and then decisions are made. Previous studies in the area of IS (Zhu et al., 2003; Oliveira & Martins, 2008; Pan & Jang, 2008; Ghobakhloo et al., 2011) studied many kinds of IS adoptions like website, e-business, e-commerce, ERP, marketing, etc., but studies that focus on personnel management are still lacking particularly one that measures personnel management adoption. Researchers have identified many factors that affect the decision of adoption.

Furthermore, most of these studies measure adoption only at the decision stage. Whereas the need of the time is to study the adoption process beyond the decision stage, i.e., the implementation stage, the benefits of a personnel management system could only be reaped after the organizations implement the Personnel Management System, not only by deciding to use it. Hence, understanding the adoption of a Personnel Management System is of high importance.

Concerning adoption, the current study focuses on the organizational level. In organizations, the adoption process comprises several stages. Rogers and Singhal (2003) suggested that initiation and implementation can be seen as significant stages of adoption. Zhu and Kraemer (2005) highlighted that instead of focusing on implementation, many previous researchers focused on the adoption decision, while some studies focused on the extent of use of the Personnel Management System and measured it by the number of times and hours the Personnel Management System used per week (Kassim et al., 2012). It should be noted that the Personnel Management System is a fledge integrated system of multiple applications (such as payroll administration, attendance, recruitment and selection, employee data, training and development, compensation and benefits management, performance appraisal, and HR planning) by only measuring the number of hours and the number of times Personnel Management System is used; it cannot depict the level of implementation of Personnel Management System. This scale of measuring hours and times also does not portray which applications (such as payroll administration, attendance, HR planning, performance appraisal, benefits and compensation management, recruitment and selection, and employee data) of PERSONNEL MANAGEMENT SYSTEM is under use and which they are not. Additionally, there is a difference between cumulative adoption and cumulative deployment after initial acquisition.

Some researchers (like Eveland & Tornatzky, 1990) also have pointed out occasions of either under-utilization or de-installation of recently installed technologies after initial acquisition. Regardless, there needs to be more existing literature to measure the adoption of a Personnel Management System at the fourth (implementation) stage of the adoption process. Relative to the present study, the adoption of Personnel Management System is conceptualized as "implementing a computerized and integrated information system (comprised of applications, such as payroll administration, attendance, HR planning, performance appraisal, benefits and compensation management, recruitment and selection and employee data) which is used to acquire, store, manipulate, retrieve, and distribute relevant information about an organization's human resources at the organizational level to perform HR activities." Below is the second theory that the study anchors on.

Socio-Technical Systems Theory. A socio-technical system (STS) in organizational development is an approach to complex organizational work design that recognizes the interaction between people and technology in workplaces. The term also refers to the interaction between society's complex infrastructures and human behavior. In this sense, society itself and most of its substructures are complex socio-technical systems. Eric Trist, Ken Bamforth, and Fred Emery coined the term socio-technical system.

The implementation of a Personnel Management System is a critical step since it is one of the leading causes of system failure (Doherty & King, 2002; Fisher & Howell, 2004). Kansal (2006) stated that enterprise resource planning software implementations are socio-technical challenges, and they require using a different approach from other technology-driven innovations. The same is true for the Personnel Management System, as it represents a subset of enterprise resources planning software.

In addition, technology does not automatically provide benefits. Organizational transformation is more typically met with complex, usually adverse reactions (Greenwood, 2002; Van der Linden & Parker, 1998). Therefore, regardless of the initial purpose, technology can bite back (Jaffee, 2001). Within the scope of this study, the socio-technical perspective is seen as a solution or path to achieve the goals in Personnel Management System implementations. The technical side of an organization is the application of instrumentally logical methods for the completion of tasks; that is namely, machinery processes, procedures, and a physical arrangement. The social side of an organization consists of the needs and relationships of humans, that is, people and their habits, attitudes, values, behavioral styles, and formal and informal relationships (Jaffee, 2001; Mumford, 2003). The socio-technical paradigm is a holistic view that studies the relationships between the social and technical parts of any system (Trist & Bamforth, 1951; Coakes, 2002). The socio-technical design emphasizes the need for the best fit between the technical and the social aspects relating to the relationship between jobs and the needs and expectations of individuals (Biazzo, 2002).

The socio-technical approach states that in order to benefit from technical initiatives (such as a new system or software) as much as possible, the fundamental approach of socio-technical thinking is the optimization of the relationship between technical imperatives and the social and psychological needs of employees (Jaffee, 2001). Mumford (2003) suggested that, in order to achieve this objective, a socio-technical approach takes into account the fact that different employees in an organization have their own needs, interests, and values influencing their enthusiasm about accepting change. The socio-technical perspective is a joint optimization of technical and social sub-systems so that the results of both sub-systems are positive, indicating effective accomplishment of tasks and continuous social relationships and commitments. In other words, results would be sub-optimal if a technical system exists at the expense of a social system. Likewise, implementation teams, which consist of people from technical backgrounds, like to attach all benefits to the technical side of the organization (machine, system, or software) and all implementation problems to the social system (Willmott,1994). However, the costs, benefits, and risks of the technology belong to the whole socio-technical system, not just the machine (or software in Personnel Management System) in isolation. One thing to note at this point is that people with technical backgrounds or information technology professionals, according to Doherty and King (2002), often need to gain the training, skills, and motivation to recognize and address social issues in information systems implementations. Thus, the mentioned theories reflect the same general idea; each theory employs a unique vocabulary to articulate the specific factors considered to be important. Although these theories vary in the extent to which they have been conceptually developed and empirically tested, they are better understood as models in the area under study.

The study is based on the concept of practical analysis, designing, prototyping, and development that would lead to the successful implementation of the automated personnel management system, encouraging greater employee engagement and entailing improvement in employee and university performance. It indicates the systematic series of events for the analysis, design, development, and implementation of a Personnel Management System for NORSU – Human Resource Management Office. Rapid application development (RAD) has been used as the software development methodology technique to expedite software application development. The key benefit of a RAD approach is fast project turnaround, making it an attractive choice for minimizing the planning stage and maximizing prototype development. It allows the researcher to accurately measure progress and communicate in real-time on evolving issues or changes that result in greater efficiency, faster development, and effective communication.

The RAD follows four phases of software development: 1) Requirements planning -during this stage, the researcher determines the goals and expectations for the project as well as current and potential issues that would need to be addressed during the build; 2) User design –this part of the phases gives the researcher opportunity to tweak the model until it reaches a satisfactory design; 3) Rapid construction - phase 3 takes the prototypes and beta systems from the design phase and converts it into the working mode; and 4) Cutover - the implementation phase where the finished product goes to launch. It includes data conversion, testing, and changeover to the new system, as well as user training. Finally, the output of the study encourages greater employee engagement, entailing improvement in employee and university performance.

Literature Review

Studies on Personnel Management at different levels have been an area of interest for researchers for several decades because of the expansion of the industries and innovative practices that enable an organization to retain and utilize human resources effectively. Today, human resources is treated as a variety of functions. It is a collection of highly specialized capabilities — each with distinct objectives, tasks, and needs. There is ever-increasing pressure on the Human Resources (HR) function to support strategic goals and to focus on value-adding activities. Organizations have realized the growing importance of using Information Technology (IT) in leveraging their Human Resource (HR) functions.

However, how do you compare personnel management versus human resource management? Personnel management is a predominantly administrative record-keeping function that aims to establish and maintain equitable terms and conditions. In contrast, Human resource management integrates the traditional personnel management functions into corporate goals and strategies and performs additional people-centered organizational developmental activities (Armstrong, 2006).

However, Human Resource Management is broader in scope than Personnel Management. The scope of personnel management includes functional activities such as workforce planning, recruitment, job analysis, job evaluation, payroll administration, performance appraisals, labor law compliance, training administration, and related tasks. Human resources management includes all these activities plus organizational developmental activities such as leadership, motivation, developing organizational culture, communication of shared values, and so forth (Armstrong, 2006). The human resource management approach remains integrated into the company's core strategy and vision. It seeks to optimize the use of human resources for the fulfillment of organizational goals. This strategic and philosophical context of human resource management makes it more purposeful, relevant, and effective compared to the personnel management approach. Legge (2004) states that the personnel management approach tends to attach much importance to norms, customs, and established practices, whereas the human resource approach gives importance to values and mission. It is also concerned with establishing rules, policies, procedures, and contracts and strives to monitor and enforce compliance with such regulations, with careful delineation of written contracts. The human resource management approach needs to be more patient with rules and regulations. HR managers tend to relax rules based on business needs and exigencies and aim to go by the spirit of the contract rather than the letter of the contract (Triphati, 2002).

Finally, in any discussion of personnel management versus human resource management, on the one hand, one must include that personnel management lays down rigid job descriptions with many grades and a fixed promotion policy–usually based on seniority and performance appraisal ratings. Human resource management, on the other hand, has relatively fewer grades and ranks, with broadly defined job responsibilities providing much scope for applying creativity and initiative and plenty of career paths, with skills, talent, and commitment as the key drivers

of career advancement.

Personnel Management System. The personnel management system is one of the cornerstones of a human resource department. It comprises all administrative and routine tasks in a human resources department. It provides a solution to track and manage employee data through a centralized workforce personal details and performing across data-driven system architecture. Weatherbee (1968) defines a personnel management information system as a method by which an organization collects, sorts, processes, stores, retrieves, analyzes, and reports information on people and jobs; the "system refers simply to the process of integrating a variety of disparate activities into a logical whole to accomplish a given objective. It is an administrative function of a business that exists to provide the personnel needed for organizational activities and to manage the general employee-employer relationship.

On one hand, personnel management is obtaining, using, and maintaining satisfied employees. It is an important part of management that is concerned with employees at work and their relationships within the organization, as well as an administrative record-keeping function at the operational level. Also, it makes efforts to maintain fair terms and conditions of employment while efficiently managing personnel activities for individual departments. So, it is expected that the outcomes of providing justice and achieving efficiency in the management of personnel activities will eventually result in organizational success (Ahammad, 2017).

On the other hand, personnel management performs the following tasks: 1) providing current information for individual employees, specific groups, or the entire staff at short notice; 2) handling processes: Employees are hired, transferred, promoted, or leave the company; 3) employee registration; 4) Control: Fluctuations, absence times, overtime, vacation entitlement, and working hours; and 5) personnel protection: Personnel administration ensures that the occupational health and safety of employees is being observed and that personal data is treated in accordance with current data protection laws (Startup Guide, 2019).

Personnel Management System Design, Development, and Implementation. Advances in computer-based information technology in recent years have led to a wide variety of systems that human resource (HR) managers are now using to make and implement decisions. By and large, these systems have been developed from scratch for specific purposes and differ significantly from standard electronic data processing systems. Too often, unfortunately, HR managers have little say in the development of these decision support systems; at the same time, non-managers who do develop them have a limited view of how they can be used.

Human resources information systems provide access to employee data with speed and convenience, saving time and money. Instead of researching multiple sources of information, companies can gather information in one area for quick access. Depending on the desired use and what is in place presently, an internal team will be formed to conduct various analyses of critical functions to design database modules and features. In addition to information technology personnel, the team may consist of employees in human resources, training, compensation, benefits, and operations.

Moore (2019) outlined four significant steps in the analysis and design of a (Human Resource Information System: 1) Analyzing Organizational Needs -- Conduct a needs analysis; each participating function is considered for data collection. For example, if the combined function of recruiting and staffing is included, what types of information will need to be gathered? The company may plan to expand; therefore, the database must accommodate higher numbers. If compensation data is incorporated, what information will be captured and how? Before the design process begins, all required areas are confirmed with anticipated database space and software integration needs. 2) Designing a Customized Database -- once all of the information has been gathered and decisions have been made on formats, the company is ready to research the appropriate software. Some companies send out requests for proposals to their top software vendors. Providing the software sellers with specific information regarding the scope of the system and approved budget numbers is a time saver. Inviting on-site demonstrations and meetings with the sellers allows for comparisons and contrasts, resulting in a more informed selection. 3) Drilling Down to the Essentials -- this is a critical step in the process, as software developers are involved in sharing the reality of what the software can and cannot do. It is helpful to have a checklist and questions prepared for the meetings. For example, a checklist may contain such things as the level of security, backup systems if the database crashes, employees who have external access to the system, guarantee offered, and updates. 4) Conducting a Pilot Test -- a pilot test occurs prior to implementing a new system throughout the company. The new software is tested on a smaller scale to ensure

that all modules function correctly and that any adverse results are corrected. At this time, questions and concerns are addressed with the software vendor before final installation.

Advantages of Personnel Management System. A human resource information system (HRIS) is computer software employers use to manage the human resources functions of their organization. It can maintain employment records of all staff members, and employers can use it to collect metrics surrounding the firm's staffing, performance management, compensation, and benefits activities. HRIS provides a number of benefits for any organization. They can be split into two groups: those that benefit the HR department and those that benefit the employees.1) Speedy Onboarding – it can make the onboarding process efficient and consistent. By providing easy access to training materials and handbooks for new employees and storing all new employee information in one convenient place, an HRIS can turn a disjointed process into one that runs smoothly. 2) Easy Access to Information -- HRIS system can eliminate paper and turn all employee records into easy-to-access online data. These can be retrieved simply by anyone with authorization and are backed up remotely to ensure safety. 3) Automation of Recurring Tasks -- automate tasks such as immediate approval or denial of time off requests based on set rules, shift change alerts, and other time-consuming jobs. 4) Enhanced Communication -- it provides a straightforward mode of communication that is easy to use and organize. This not only allows employees to talk with colleagues about ongoing projects but also request shift changes, explain absences, and put in for annual leave or vacation (Human Resources Workforce Management, 2017).

HRIS, as a whole, mainly improves information sharing and communication between the organization and the employees. HRIS made it easy for the human resources department to operate all components smoothly. With the accurate and objective tracking of compensation and benefits, employees' morale and motivation increase. The Human Resource Information System reduces the cost and time spent on manual data consolidation. It allows the HR management managers to focus more on making decisions and projects rather than paperwork. The system hopes to give the HR management division a more strategic role in the company, as the information taken from HRIS can be the basis for employee training schemes and work efficiency projects.

Related Studies

Navazi et al. (2013) concluded in their study that Human Resource Management Systems has achieved its purpose, taking a considerable task lifting the company's operations. To them, whatever was done manually has been completely shifted to the computerized process, and this has enabled the company to carry out its operation more quickly. They added that this has also given users a broader spectrum of communication. Since whatever has been done manually so far has been changed to a computerized one, This has resulted in more efficient data processing.

The new system they enunciated further has resulted in giving numeric advantages to the company in many ways. Some of them are given below the state of negligible paperwork that has almost been reduced. Accessing and getting data can be done with a single click. Data manipulation has become more straightforward, and the cost factor has been reduced. It is a faster and more efficient way of processing data. It is less time-consuming, where the operations are more transparent, and communications between the users are more efficient.

Simaanya (2014) found out in his study that the software product produced was pretty good, achieved most of the user requirements, and had a good user interface. It is very easy to navigate, and even novice users can find their way around the web application quickly. The client-side validation is excellent.

Manipal's (2012) study showed that the system is sometimes complicated and challenging to work with. However, it has helped to align the HR practices with the organizational strategy, identify improvement areas, and keep abreast with the current practices. It allows an organization to assess and evaluate any gaps or potential risks and increases the commitment of HR professionals to continuous improvement. On the whole, HRIS increases the efficiency of the HR function, helps to contribute to the potential of the HR Department towards the organization, develops the structure, payroll, time, and attendance, appraisal performance, recruiting, learning management, training system, performance record, employee self-service, scheduling, absence management, systems, styles, reduced HR cost, increased motivation of the HR personnel, analyzed the problems and solved them smoothly, provided and developed sound performance appraisal systems, systematic job analysis, and smooth adoption of the changing mindset. A follow-up study can be done to see if more organizations have adopted HRIS, if the extent of HRIS adoption is greater, or if the HRIS is used for more strategic purposes. By

making the HRIS a part of the organization, the HR Department can transform itself into a strategic business partner.

Obeidat (2012) posited that human resources information systems are considered to be one of the most important elements that affect the activation of the human resource department. This was supported by the central hypothesis of his study, which was that there is a relationship between human resource information systems and human resources functionalities. However, it was found that some of the dimensions that represent HRIS have a relationship with HRM functionalities, and some do not. It was found that strategic integration, forecasting and planning, human resources analysis, and communication and integration have no relationship with human resource functionalities.

Gupta (n.d.) affirmed that human resources information systems (HRIS) can play an important part in a company's HR function. After all, people live, work, and play in the information age. Implementing an effective HRIS can be surefire for HR to stay on the cutting edge in its bid to deliver more effective and streamlined service. The main conclusion of his study is the realization that the use of computerized HRIS is more effective than the manual process because it helps to maintain data with more accuracy in less time. It is also true that HRIS functions improve HRM in terms of administrative purposes and analytical purposes. HRIS works as a key component of the organization, and a good HRIS will provide important information about human resources needs and capabilities; this information will assist the management team in establishing the organizational mission and setting goals and objectives in motion. HRIS is not limited to the computer hardware and software applications that comprise the technical part of the system; it also includes the people, policies, procedures, and data required to manage the HR function.

Sagum (2015) articulated that the main objective of his study is to review related literature about the adoption of electronic human resource management (e-HRM) in an organization. There is different literature about the benefits of e-HRM, the adoption of e-HRM in an organization, and the investigation of the best practices of HRM. It is not new how technology changes a traditional HRM into an automated one, but what interests the author the most is the use of e-HRM on how information in an organization can be fully utilized in performance management, which can easily be used in promotion/reports needed and how it can be used in decision making capability of the school administrators the time they need it to make the decision timely and efficiently. It has yet to be proven how e-HRM can be used to change an organization's decision-making capability to achieve its goals. However, before adopting a technology like this, the administrators need to assess the capability or technological condition of the subject organization. The challenges must also be considered. Although, external factors like government policies/laws can still not be changed, there can be ways to integrate e-HRM into a system that can perform well under this limitation. For him, there is also a need to understand how implementation can be done by understanding the levels of implementation of e-HRM, which, according to Ruel et al. (in Sagum, 2015), plays a crucial factor in the successful implementation of e-HRM.

These mentioned literature and studies describe the relevance of human resource management systems and personnel management systems as an effective tool for modern organizations to accurately and efficiently manage human resource management and organizational processes.

Methodology

Research Design

This study used rapid application development (RAD) to expedite software application development. It has used predefined prototyping techniques and tools to produce software applications. It encompasses a graphical user interface (GUI) development environment that allows end users to quickly drag and drop required software application components that contain built-in and customizable data, processes, and organizational models. Thus, it employs a model-driven and object-oriented approach to developing complete solutions. Moreover, a descriptive survey method was utilized to evaluate the Personnel Management System practices based on the Software Evaluation Criteria derived from ISO/IEC 9126-1 Software engineering — Product quality that includes usability, sustainability, and maintainability as well as the perceived ease-of-use and usefulness.

Research Environment

The study was conducted at the Negros Oriental State University (NORSU) – Human Resource Management Office, Main Campus, Dumaguete City, and its other satellite campuses: NORSU- Guihulngan Campus, NORSU- Mabinay Campus - Siaton Campus, NORSU-Bais City Campuses, and NORSU- Bayawan-

Santa Catalina Campus, and Siaton Campus.

Respondents

The respondents of the study were the selected faculty and staff of the university, NORSU-Human Resource Management head and personnel, and the IT Experts. A random sampling design was used to identify the 199 respondents of the study, with informed consent from each of them.

Instrument

The study used a survey questionnaire to gather relevant information on the problems encountered by the respondents. The Likert Scale was used to assess the said problems.

1.00 – 1.80	Never a Problem
1.81 – 2.60	Rarely a Problem
2.61 – 3.40	Moderate/Neutral
3.41 – 4.20	Frequent Problem
4.21 – 5.00	Always a Problem

Moreover**,** the study adopted the Software Criteria Evaluation tool developed by Mike Jackson, Steve Crouch, and Rob Baxter of Software Sustainability Institute to assess the quality of the software in the following areas of Software engineering — Product quality and usability, sustainability, and maintainability. It also involves checking whether the system qualified on the specific criteria. The software quality model identifies quality characteristics, namely: Usefulness, Maintainability, Sustainability, Accessibility, and Timeliness.

The assessment involves checking whether the software and the project that develops it conform to various characteristics or exhibit various qualities that are expected of sustainable software. The evaluation considers how different user classes affect the importance of the criteria – the more characteristics that are satisfied, the more sustainable the software is. For example, for Usability-Understandability, a small set of well-defined, accurate, task-oriented user documentation may be comprehensive for Users but inadequate for Developers. Assessments specific to user classes allow the requirements of these specific user classes to be factored in. For example, a project shows rates highly for Users but poorly for Developers, or vice versa.

Scoring can also be affected by the nature of the software itself. For example, for Learnability, one could envisage an application that has been well-designed, offers context-sensitive help, etc., and is consequently so easy to use that tutorials are not needed. Portability can apply to both the software and its development infrastructure, e.g., the open-source software can be built, compiled, and tested on Unix, Windows, or Linux (and so is highly portable for Users and User-Developers).

Finally, four choices were provided for every question or statement. The choices represent the degree of agreement each respondent has on the given question. The scale below was used to interpret the total responses of all the respondents for every survey question by computing the weighted mean:

Rating Scale for Usability, Sustainability, Portability, Maintainability and Functionality

Rating	**Software Model Criteria**	
	Usability	**Maintainability/Sustainability**
1.00 – 1.75	Not Usable	Not Maintainable
1.76 – 2.50	Slightly Usable	Moderately Maintainable
2.51 – 3.25	Usable	Maintainable
3.26 – 4.00	Very Usable	Highly Maintainable

The present study also adopted Davis' (1989) questionnaire on Perceived Usefulness, Perceived Ease-of-Use, and User Acceptance of Information Technology published in the MIS Quarterly Volume 13, No. 3 p.319-340 to evaluate user experience on the usefulness and ease-of-use of the digital watermarking system for real-time copyright protection. Below is the rating scale.

Rating Scale for Perceived Usefulness and Perceived Ease-of-Use

Rating	**Criteria**	
	Perceived Usefulness	**Perceived Ease-of-Use**
1.00 – 1.75	Not Useful	Not Easy to Use
1.76 – 2.50	Partially Useful	Not So Easy to Use
2.51 – 3.25	Useful	Easy to Use
3.26 – 4.00	Very Useful	Very Easy to Use

Procedure

A written permit articulating the permission to conduct the investigation was secured from the Office of the Graduate School of NORSU and also from the offices that were involved in the conduct of the said study. After the approval, the researcher took the time to conduct the investigation and the interview; a final questionnaire was administered to each of the respondents. After the retrieval of the accomplished questionnaires, the data were arranged correctly, tallied, tabulated, and subjected to statistical treatment for presentation, analysis, and interpretation.

Data Analysis

Statistical tools were used to solve for the percentage in order to give an in-depth analysis of the Software Criteria Evaluation result; the tabulated data or the

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frequencies in the table were converted to percentages. In addition, the weighted mean was used to compute the software characteristics based on the Software Evaluation Criteria.

RESULTS AND DISCUSSION

Problems Encountered by the Respondents

Table 1. Problems Encountered by the Faculty, Staff, and Human Resource Personnel

Problems Encountered	Faculty and Staff			Human Resource Personnel		
	Weighted Mean	Standard Deviation	Verbal Description	Weighted Mean	Standard Deviation	Verbal Description
Time-consuming/Tiring	4.32	0.70	Always	4.5	0.52	Always
Requires Large Spaces, Cabinets, etc	4.22	0.92	Always	4.38	0.81	Always
Data Redundancy and Inconsistency	4.17	0.81	Frequent	4.69	0.60	Always
Lacks of Data Security	4.00	0.91	Frequent	4.25	0.77	Always
Lacks of Data Sharing	4.11	0.91	Frequent	4.44	0.70	Always
File Loss and Damage	4.19	0.84	Frequent	4.31	0.70	Always

The above result indicates that the current traditional file system employed by the NORSU- Faculty and Staff and Human Resource Management Office in handling personnel information is always a problem. On the part of the faculty and staff, time-consuming/tiring and requiring large spaces, obtaining a weighted mean of 4.32 and 4.22, respectively, rank higher when it comes to problems encountered in the said current traditional file system. The rest of the variables also show traces of considerable difficulties, garnering 4.19, 4.17, 4.11, and 4.00 weighted mean.

On the part of the human resource personnel, data redundancy, inconsistency (4.69), and time-consuming/tiring (4.50) get the highest ratings relative to the problems encountered in the current traditional file system. Still, the rest of the variable statements are within the "always a problem" adjectival description. Based on the preceding, the difficulties encountered by both entities can be seen in procedures such as leave management, where an employee is required to fill out a form that may take several days or weeks to be approved. Likewise, paper records placed in a flat file are commonplace practices in the institution, and once they are physically filed, they begin to take up valuable office space. This management typically consisted of transferring the records offsite to a record center facility or warehouse dumping ground where they were forgotten. This makes it difficult to retrieve information when it is needed, and valuable information that may need hard copy evidence may be lost due to the poor practice of dumping the files. Personnel information can only be seen from the manual records; it cannot be viewed when the employee is not in the office. Also, other organizations that need information about the employees to verify their identity can only do so in the presence of an online system.

In addition, the essential problem with traditional file management and storage techniques (such as manual filing or shared network folders) is that companies have little control over –or even knowledge of — their unstructured files. It is dependent upon individual users to remember the names of files, their contents, and their storage locations. In this environment, folder structures that start out with some semblance of logic quickly sprawl into disorganization because there are no mechanisms governing the naming conventions of files or the creation of folders. So, documents get misfiled, misnamed, duplicated, and mistaken for other versions (The Challenge with Traditional Sharing Platforms, 2012).

Functional and Non-functional Requirements of the Personnel Management System

Key human resource functional areas have identified the core functional requirements discussed in the succeeding paragraphs. They are expected to be integrated with the NORSU Personnel Management System's unique requirements in a manner that best supports the NORSU-HRMO function's programs, operations, technical environment, and management philosophy. The requirements listed for each functional area are not intended to be exhaustive but are aimed at providing a high-level description of the significant information and processing capabilities needed to have a modern human resources management system.

The NORSU-HRMO operations use the retrieve/input/scan, store, and workflow functionality. The NORSU Personnel Management System supports all HR-related imaging activities for the following areas: Scan, Index, and Verify –When the HR documents (Benefits, Recruitment Selection, Employer-Employee Relations, Classification, and Compensation) arrive at the Human Resources department, they are arranged by case type, subcategory, and document type. All the documents are scanned, indexed, and verified by Human Resources. Retrieving Documents – All the documents related to Human Resources can be retrieved for viewing as per the search criteria entered. Auto and Manual Indexing – For auto-indexing, document dates and employee IDs are entered, which return the first, middle, and last name, gender, GSIS No, TIN, etc. of the employee. Manual indexing deals with rescanning, deleting, or inserting a page in the document. The appraisal Process refers to an electronic download in

the form of an Excel spreadsheet of all the employees currently in the Human Resource Information system (HRIS).

Leave Administration Processing provides for the performance of all activities associated with the determination of proper leave balances for all types of leave, leave advances, accruals, usages, forfeitures, limitations, and transfers. The system must apply current period leave accruals and leave charges to each employee's available leave balances, leave transfers, etc. The system must process leave forfeitures and carryovers for each employee.

The user interaction makes it easy for users to interact with and serve end users intuitively. The user community is a diverse group of people with many different business and computer system experience levels. The optimal user interface for the human resource system can serve the experienced user as well as the first-time user. The user interface should also help accommodate the geographical dispersion of the user community by providing appropriate business processes and system online help resources. The two main components of this requirement are: 1) User Interface: web access to human resource data with appropriate authority; minimize jumping from screen to screen and table to table; validate data input before a transaction is completed; single User Sign On for user authorized access; easy to use, even for the occasional user; ability to allow users to link to supporting/related documents and transactions including imaged documents; free text area on all transaction screens, allow use of templates for re-occurring periodic transactions; and Field entry edit. 2) Training and Documentation includes Online or integrated tutorials, Online documentation, Online help at more than one level (function, screen, field, etc.), Provision of technical and business process help, keyword search by business process or system function to guide users to the functionality/transactions that they need.

Data Archiving and Retrieval can archive data and allow for its easy retrieval. This interaction generates a requirement to be able to archive and retrieve data and to support imaged documents as well as microfiche documents. Some of the archived data have to be stored and available per local and national guidelines. The human resource system must support these diverse requirements. The main requirements for data archiving and retrieval are to easily archive and access with appropriate retention limits, make historical data available from former human resource systems, and allow for the reactivation of information from the archives to the current system.

Meanwhile, the non-functional requirements are as follows: 1) performance requirements –the number of transactions and the number of users of the personnel management system can be estimated as ten at a time. There is no restriction on the number of users to be added to the database, and 2) design constraints- those constraints that are imposed on the design solution imposed by the HRMO. The constraints may be imposed on the hardware, software, data, operational procedures, interfaces, or any other part of the system. Examples may include a constraint that the system must use predefined hardware or software, use a particular algorithm, or implement a specific interface protocol. The design is constrained to include the legacy central monitoring station hardware as well as the communications network between the central monitoring station and the site installations.

Design constraints can have a significant impact on the design and should be validated prior to imposing them on the solution. A straightforward approach to address design constraints is to categorize the type of constraints (e.g., hardware, software, procedure, algorithm), identify the specific constraints for each category, and capture them as system requirements in the requirements package along with the corresponding rationale. The design constraints are then integrated into the physical architecture.

Personnel Management System Implementation

Planning is the first step involved in system implementation. It is the fundamental function that describes effectively the fundamental questions of how, where, and when the objectives can be realized, or it serves as a guiding framework. Planning equally involves a careful assessment of the available resources and the challenges that the team might have to encounter while reaching their business objectives/goals.

On the one hand, Koontz and O'Donnell explain that “planning involves making advanced decisions regarding what is to be done, how it is to be done, and who is required to do it." Implementation, on the other hand, is the process of execution of the proposed plan. Planning establishes the framework for the successful implementation of a system or a module. Finally, university personnel management is an important part of university management. According to the theory of knowledge staff, this paper redefined the requirement of a university personnel system, designed a scalable, adaptive system architecture and data model, and developed a register interface based on the campus network to meet different demands of faculty; it has

dramatically enhanced the working efficiency of university personnel management department. This is an important practice and experiment of personnel management informatization; it also has reference value in integrating information resources for universities.

Usability and Sustainability/Maintainability of the NORSU Personnel Management System as Rated by IT Experts

Software Evaluation: Criteria-Based Assessment

Usability	Weighted Mean	Verbal Description
• Understandability	3.80	Very Usable
• Documentation	3.60	Very Usable
• Buildability	3.90	Very Usable
• Installability	3.80	Very Usable
• Learnability	3.40	Very Usable
Grand Mean for Usability	3.70	Very Usable
Sustainability and Maintainability		
• Identity	3.40	Highly Maintainable and Sustainable
• Copyright	3.70	Highly Maintainable and Sustainable
• Governance	3.60	Highly Maintainable and Sustainable
• Accessibility	3.70	Highly Maintainable and Sustainable
• Testability	3.30	Highly Maintainable and Sustainable
• Portability	3.90	Highly Maintainable and Sustainable
• Supportability	3.00	Maintainable and Sustainable
• Analysability	3.50	Highly Maintainable and Sustainable
• Evolvability	2.70	Maintainable and Sustainable
• Changeability	3.70	Highly Maintainable and Sustainable
• Interoperability	3.60	Highly Maintainable and Sustainable
Grand Mean for Sustainability and Maintainability	3.46	Highly Maintainable and Sustainable

ISO 9241-11 defines usability and maintainability as "the extent to which specified users can use the product to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use." This definition includes four elements that are necessary for a usable and maintainable system: specified users, a set of specified goals, satisfaction with the process and outcome, and system use.

The result revealed that the NORSU Personnel Management System is "very usable" with a grand mean of 3.7; it implies that it follows the usability checklists, guidelines, and standards based on the usability elements: understandability (3.8), which means that the system is easily understood; documentation (3.6) tells that there is comprehensive, appropriate, and well-structured documentation; buildability (3.9) means it is straightforward to build on a supported system; installability (3.8) informs straightforwardness to install on a supported system; and learnability (3.4) where the system provides easy to learn functions. These elements deliver ideas about usability issues that are relevant to the user and context.

Further, on Maintainability and Sustainability, with a grand mean of 3.46, it means that the system is "highly maintainable and sustainable." The result suggests that maintainable software is easy to extend and fix, which encourages its uptake and use. The result further indicates that it is usable on multiple platforms with a rating of 3.9. On the system's identity, it gets a weighted mean of 3.4 (highly maintainable and sustainable) because the project is clear and unique. Both governance and interoperability garnered 3.6 because of the strong evidence on how the project was developed and managed, as well as how it was interoperable with other related software. Accessibility, changeability, and copyright have a 3.7 weighted mean because first, there is a confirmation of the current download; second, it is easy to see the owners of the software; and lastly, they contribute changes to developers. Lastly, supportability and evolvability are rated "maintainable and sustainable," with a weighted mean of 3.0 and 2.7, respectively. This means that the system has evidence of current support or future developer support and development.

Perceived Usefulness and Perceived Ease-of-Use as Rated by the Users

Software Evaluation: Criteria-Based Assessment

Perceived Usefulness	**Weighted Mean/Verbal Description**
• Using the system in my job would enable me to accomplish tasks more quickly	3.72 (Very Useful)
• Using the system in my job would increase my productivity	3.63 (Very Useful)
• Using the system would improve my job performance	3.90 (Very Useful)
• Using the system would enhance my effectiveness on the job	3.90 (Very Useful)
• Using the system would make it easier to do my job	3.82 (Very Useful)
• I would find the system helpful in my job	3.82 (Very Useful)
Grand Weighted Mean (**Perceived Usefulness)**	3.80 (Very Useful)
Perceived Ease-of-Use	Weighted Mean/Verbal Description
• Learning to operate the system would be easy for me	3.72 (Very Easy)
• I would find it easy to get the system to do what I want it to do	3.72 (Very Easy)
• My interaction with the system would be clear and understandable	3.54 (Very Easy)
• I would find the system to be flexible to interact with	3.64 (Very Easy)
• It would be easy for me to become skillful at using the system	3.82 (Very Easy)
• I would find the system easy to use	3.72 (Very Easy)
Grand Weighted Mean (**Perceived Ease-of-Use)**	3.72 (Very Easy)

A human resource management system, or personnel management system, encompasses the highest level of human resource management activities. It is the integration of human resource management and information technology to automate and facilitate human resource activities. Viewed from the data above, the NORSU Personnel Management System is generally beneficial and has ease of use as perceived by users.

Systems Analysis and Design

System Analysis and Design is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components. System analysis is conducted to study a system or its parts and identify its objectives. It is a problem-solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purposes. Analysis specifies what the system should do, while a system design is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy specific requirements. Before planning, one needs to understand the old system thoroughly and

determine how computers can best be used in order to operate efficiently. System design focuses on how to accomplish the objective of the system.

System Analysis

Human resource management (HRM), also called personnel management, consists of all the activities undertaken by an enterprise to ensure the effective utilization of employees toward the attainment of individual, group, and organizational goals. It is a type of information system (IS) that is designed to manage an organization's computerized and automated human resource (HR) processes. It is a combination of hardware and software resources that hosts and provides most, if not all, of an HR department's business logic. An organization's HRM function focuses on the people side of management. It consists of practices that help the organization to deal effectively with its people during the various phases of the employment cycle, including pre-hire, staffing, and post-hire.

Furthermore, a personnel management system is deployed on an application server that provides in-house and remote access to all authorized personnel as part of a standalone or enterprise resource planning (ERP) system. This system 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. In most environments, the system is integrated and connected with other supporting systems, such as time tracking, attendance, finance/accounts, and administration. Taking the project development of an enterprise personnel management system as an example, the requirements, structure, function module, and system state were analyzed in detail. Hence, requirements analysis is critical to the success or failure of the systems or software project. The requirements should be documented, actionable, measurable, testable, traceable, related to identified business needs or opportunities, and defined to a level of detail sufficient for system design.

System Design

The purpose of the system design is to supplement the system architecture by providing information and data that are useful and necessary for the implementation of the system elements. Design definition is the process of developing, expressing, documenting, and communicating the realization of the architecture of the system through a complete set of design characteristics described in a form suitable for implementation.

In an organization, the HR department is responsible for having a record of each employee, giving each of them an identification number, job identification code, e-mail address, manager, and salary. They also track those employees who earn incentives or commissions in addition to their salary. However, the university HR also tracks their role in the organization. Each job is also recorded according to its characteristics. Moreover, the jobs have job titles, identification codes, and maximum and minimum salaries. Few employees have worked for a long time with the university, and they have held different departments within the organization. If any employee resigns, then the job identification number and department are recorded. The university's HR also tracks the location of its departments and campuses. Every employee must be assigned to a department where the unique identification number identifies departments, and these departments are associated with different locations. The university HR department needs to store individual information. The database supports a better employee management plan as well as their departments, locations, and associated jobs. However, the company would have a better structure to store their confidential information. This database will provide better-extracted information to develop their insufficiency. This efficient data structure allows for increases in storage and excludes redundancy in data.

Also, there are two actors in the system --the administrator and the users. The admin can create and update the employee's information. It can also record the IPCR, OPCR, and DPCR ratings. Admin can also transact if the employees update their information, add, and view the Indicators and Ratings of the employee, and it can view the leave application and service records. The User can create, update, and delete information, and also transact if the admin changes his/her information. The user can also view the rating results and create indicators. The user can file a leave application and download a leave form. Lastly, the system provides the administrator a means of acquiring, storing, analyzing, and searching information for various employees. The employees are able to use the system as long as they have an account.

UML for NORSU Personnel Management System

The NORSU Personnel Management System will allow the human resource department to manage its employees better. When needed, it will take just a few seconds to find out the background of an employee and his/her contribution to the organization; it will also facilitate keeping all the records of an employee, such as his/her data of leaving. So all the information about the employee will be available in a few seconds; it will also make it very easy to generate statistical data or custom data, line finding a particular set of employees; overall, it will make human resource management an easier job than the human resource department.

Database Design

Database design refers to the process of producing a detailed data model of a database. The data model contains all the detailed attributes for each entity. An entity-relationship diagram (ERD) is a data modeling technique that creates a graphical representation of the entities and the relationships between entities within an information system. This diagram is often used as a way to visualize a relational database; each entity represents a database table, and the relationship lines represent the keys in one table that point to specific records in related tables. The diagrams are shown in the annexes.

CONCLUSION

4.1 Conclusion

Personnel management is definitely a purposeful activity of the governing structure of the organization that includes the development of concepts and strategies of personnel policies and management practices. It consists of the formation of the personnel management system involving planning, personnel management, human resources determination, and the organization's needs for personnel. Added to it is the technology personnel management that covers a wide range of human resource management functions.

The NORSU Personnel Management System as a whole mainly improves information sharing and communication between the organization and the employees. It is easy for the human resources department to operate all components smoothly. With the accurate and objective tracking of compensation and benefits, employees' morale and motivation increase. The implementation of the NORSU Personnel Management System reduces cost and time spent on manual data consolidation, allowing HR management managers to focus more on making decisions and projects than on paperwork.

Thus, the NORSU Personnel Management System addresses the HR management division, strengthening its strategic role in the university.

4.2 Recommendations

As shown from the findings and conclusion, the following recommendations are proposed at this moment.

1. Implementing the use of a personnel management System for NORSU can

carry out its operation more quickly because it is more effective than the manual process, helping to maintain data with more accuracy in less time.

1. Additional functional requirements can be included in the current NORSU Personnel Management System.
2. Since effective personnel management creates strong bonds between the organization and the employee and encourages employees to develop a sense of teamwork, it is highly suggested that the NORSU Personnel Management System could be implemented to provide an integrated system supplying information to be used by HR and management in decision-making.
3. The implementation of the NORSU Personnel Management System can help to make sharing information easier and ensure that every department has the information they need to get their jobs done.
4. The implementation of the NORSU Personnel Management System allows Negros Oriental State University to build a corporate community, track employee activity, and increase engagement and productivity now and in the future.

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