CHAPTER I

INTRODUCTION

Background of the Study

The use of computers in almost every aspect of human's lives is already as essential as our basic needs. This product of technology are considered as tools to promote development, being used to exchange information and plays its main objective of making tasks faster and more efficient in the most convenient and beneficial process. Through different computer systems such as HRMS, human resource-related tasks are being automated and when data analysis is being integrated, an organization and or a company can use it to predict the future of their operations. Madridejos Community College (MCC) is a semi-private tertiary education institution which falls under the category of Local Universities and Colleges (LUC) and is managed and administered by Local Government Unit of the Municipality of Madridejos. This institution runs for almost a decade but there is no single automated system being used especially in the aspect of managing their employees' records. If somebody like from CHED (Commission on Higher Education) asks the profile of their faculty, they experienced delays of submission due to manual process of validating the records. In addition, there is no resident – Human Resource personnel at MCC

who caters the concern of all the employees instead, this institution is always tapping the HR who is connected to the Local Government Unit of Madridejos.

The development of this Human Resource Management System with Data Analysis will play a very crucial role in managing and safekeeping employees' records. Human Resource Management System with Data Analysis is a system that is being tailored according to the needs and requirements of MCC. One of the features of this system is its capability to analyze data (e.g. employee's performance and evaluation) which can help administrators decide whether to retain or dismiss an employee.

Objectives of the Study

General Objectives

This study aims to develop a Human Resource Management System with Data Analysis.

Specifically, it aims to:

1. Develop a system which:
    a. Collects faculty information for record organization and management.
    b. Serves as the school's repository of human resource-related forms, reports, memos and other related documents.

c. Analyzes employees’ data in terms of training needs based on specialization.
d. Displays employees’ performance evaluation rating
e. Generates report of employees’ profile

1. Determine the quality of the developed system based on **ISO/IEC 25010:2011** Systems and Software Quality Requirements and Evaluation (SQuaRE) Quality Model
2. Determine the usability of the developed system based on the following criteria: Usefulness; Satisfaction; Ease of Use and Learning.

Scopes and Limitations

Human Resource Management System with Data Analysis composed of the following sections of the system:

1. **Employee Record Management.** This part of the system allows the user input and save all records of an instructor. This is where the user edits, updates, deletes and or searches for an instructor’s profile and other related data.
2. **Recruitment Record.** This portion of the system stores the data pertaining to the points of an instructor during his/her demonstration teaching, interview and scholastic record evaluation.

3. **Human Resource-related Documents Repository/ Archives.** This part of the system stores forms such as Leave Form, Load Changing Form, Personal Data Sheets and the likes.
4. **Performance Evaluation Record.** This portion of the system stores the performance scores of each instructor after a Performance Evaluation has been conducted separately. Through this part of the system, the performance standing of an instructor is being visualized through graphs and charts.

This system is intended only for Madridejos Community College. The functionalities of this system is being tailored and customized according to the needs of the aforementioned institution.

Significance of the Study

The development of this system – Human Resource Management System with Data Analysis will be of great help to the following:

- **College Instructors**. The developed system stores the profile of the college instructors since the day they were hired enabling them to update data upon requests of the instructor. This system minimizes

the needs for the instructors to fill in Personal Data Sheet (PDS) almost twice in an academic year because of the reason that the previously submitted sheets were lost.

- **Human Resource Officer.** This system will help the officer in position in improving its productivity towards human resource management. He will also be helped in terms of promulgating new human resource policies through analyzed data being displayed through graphs and charts. The graphs also provide information about the employment status of each employee, which is essential in making reports and decisions in the part of the school's administration.
- **MCC Administrators.** Through data analysis, the administrators can foresee the future of the operation of the school and can easily address the possible issues they might encounter.
- **Madridejos Community College.** Through this system, the school will have a smoother operation in terms of human resource management if being compared to manual management of human resources.
- **Future Researchers.** This study may be of help to the future inquiries regarding Human Resource Management System with Data Analysis. This could be of a big

help especially in the query of integrating Data Analysis into managing human resources.

Definition of Terms

These are the following terms which are operationally defined for better understanding of this study:

Data Analysis

Conceptually. This term is being defined as the process of converting raw data into a useful information and is usually being presented through graphs and tables so that an individual can extract valuable insights about the data presented.

Operationally. In this study, it is being defined as the summary of the employee's record being presented through graphs and charts in terms of their ages, employee status, training needed, civil status and school activities.

ISO/IEC 25010:2011 Systems and Software Quality Requirements and Evaluation (SQuaRE) Quality Model

Conceptually. A quality in use model composed of five characteristics (some of which are further subdivided into sub characteristics) that relate to the outcome of interaction when a product is used in

a particular context of use. This system model is applicable to the complete human-computer system, including both computer systems in use and software products in use.

Operationally. In this study, this is being used as an evaluation instrument for survey results regarding how wholesome the developed system is.

Human Resource Management System

Conceptually. An HRMS, or human resources management system, is a suite of software applications used to manage human resources and related processes throughout the employee lifecycle. An HRMS enables a company to fully understand its workforce while staying compliant with changing tax laws and labor regulations.

Operationally. In this study, the term is being defined as a software system being tailored according to the required functionality of Madridejos Community College in managing their human resources such as employees’ portfolio, semestral performances, human resource-related documents, and memoranda.

Archives

Conceptually. Archives are the documentary by-product of human activity retained for their long-term value.

Operationally. In this study, archives refer to a certain part of the system – HRMS which stores human resource-related documents, reports and forms.

Leave of absence

Conceptually. Leave of absence is generally defined as a right granted to officials and employees not to report for work with or without pay as maybe provided by law and as the rules prescribed.

Operationally. In this study, leave of absence is being filed using leave of absence form in order for an employee to inform the office of his/ her absence. Filing for leave of absence only means written notice, in addition, this for the purpose of file management of the office.

Conceptual Framework

The Conceptual Framework of Human Resource Management System with Data Analysis illustrates the inputs,

processes, outputs and outcomes of the system. It illustrates the flow of the process involving the inputs until the desirable outcomes.

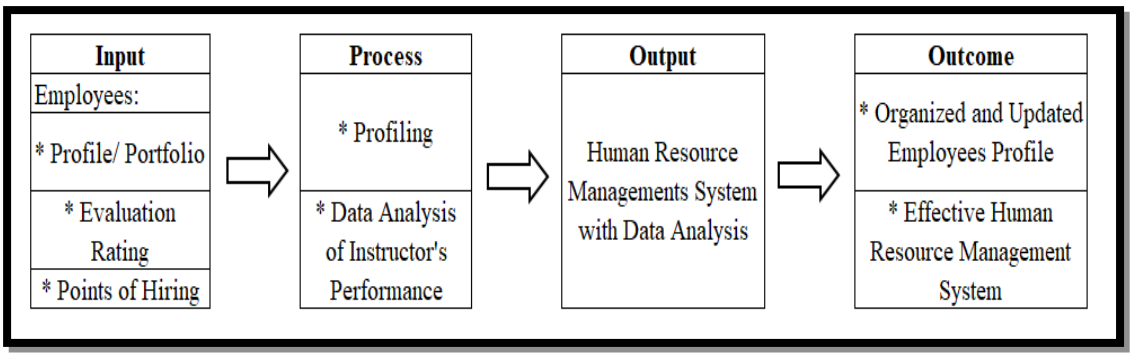


Figure 1. Conceptual Framework of Human Resource Management with Data Analysis

Figure 1 shows the necessary data to be inputted to the system for it to produce desirable and purposeful outputs. The inputs consists but are not limited to faculty profile, their hiring points and performance evaluation scores, uploading of existing school forms and reports, scheduling of leaves and typing of memoranda. The system accepts all of the aforementioned inputs and processes these into meaningful information such as analyzed data being represented through graphs and charts and printed materials. Human Resource Management System with Data Analysis provides outcomes which allows the generation of employees' profile easily as well as manage these data effectively and efficiently. The outcomes of this study will be very helpful for the said institution.

CHAPTER II

RELATED LITERATURE AND PRIOR ARTS SEARCH

Related Literature

HRMS: Its Importance in every organizations

Human Resource Management is an art of managing people at work in order to achieve organizational goals (Abdullah, 2009). These goals are usually targeted through the implementation of different HR policies and objectives performed by employees and or people within an organization. Through these people with effective human resource management, an organization can achieve a competitive advantage and even improve their performances (Lado & Wilson, 1994; Huselid, 1995; Pfeffer, 1995; Becker & Gerhert, 1996). In every organization, effective HRM is vital in order to reach the market demands with well – qualified employees at all times (Sylvester, Bamidele & Oluyemi, 2015).

Human Resource (HR) policies are predetermined course of action established to guide the performance of work towards accepted objectives. These are the types of standing plans which serve to guide subordinates in the execution of their tasks (Srinivasan, 2017).

On the same manner, Shikha Singh in her study entitled “A Study of the Effectiveness of Human Resource Information System on an Organization with Special Reference to Macleod’s Pharmaceutical Ltd.”, she found

out that there has been a significant increase in the number of organization’s gathering, storing and analysing human resources data using Human Resource Information System (HRIS). With HRIS in an organization, the administrators can maintain or even improve the efficiency of faster information processing, employee communications and greater information accuracy (Overman, 1992; Beadless, et.al., 2005).

In addition, the study of Dianna L. stone and James H. Hulebohn entitled “Emerging issues in theory and research on electronic human resource management (eHRM)” in 2013 emphasized that technology has a very dramatic impact in the field of human resource management (HR) processes in so many decades already. The researchers highlighted the work and power of World Wide Web as a perfect platform for modifying manual HR practices such as planning, recruitment, selection, performance management, workflow and compensation. These researchers believed that these new systems in the field of Human Resources enabled HR professionals to provide better service to all of their stakeholders such as applicants, employees and managers and even reduced the administrative burden in the field.

The same study appreciates the importance of the implementation of a computerized Human Resource Management in an organization entitled “Implementing E-

HRM system in Developing Countries: Challenges and Prospects” in 2015 conducted by Egwuche O. Sylvester, Adewole D. Bamidele & Olatunji S. Oluyemi. They highly stressed out that Human Resource professionals and organizations must be able to adopt technologies that allow reengineering of the HR function, be prepared to support organizational and work – design changes caused by technology.

They further discussed in their study that government institutions are increasingly growing and existing structures are weak in performing statutory HR responsibilities. Therefore, it is the integration of technology to their current HR management in the form of an electronic Human Resource Management in order to improve an organization’s investment in human capital.

In one of the local studies being conducted by Gracelyn M. Mabida in 2014 entitled “Human Resource Management System Implementation and level of Employee Engagement in the City Government of Tagum”, revealed that the extent of the implementation of HRMS was much extensive. This study enables culture of the employees to go a long way of promoting a healthy competition at the workplace likewise; this study led the City Government of Tagum to become the best practice avenue for other local government units in their region plus qualifying to Level II PRIME – HRM Accredited City Government.

Through the study conducted by (Mabida, 2014), along with the implementation of Human Resource Management System, the City of Tagum was accredited to Level II PRIME-HRM and became a HRM model for the rest of the Local Government Units in the region.

The support for the strong implementation of a Human Resource Management System in every organization is also supported by the report published by Jimmyley E. Guzman in his publication entitled “PIA (Philippine Information Agency) launches automated human resource management information system” in 2019. It was cited that the director of PIA approved the partnership with Asiagate Networks, Inc. for the provision of software that will integrate systems and processes to ensure easy management of human resources, business process and data of PIA.

Asia Project Manager stressed that the HRMS to be implemented is a fully integrated system that consists of the following modules, personnel information management, attendance and logs management, leave administration, payroll, compensation benefits, employee discipline, personnel services, dashboard and calendar notifications, and self-service employees’ portal.

The Role of Data Analysis

In an article published by Muhammad Ibrahim entitled “ The art of Data Analysis” in 2015 defined data analysis as a process of performing certain calculations and evaluations in order to extract relevant information from the collected data. He added that the word analysis refers to a closely-related operation those are performing with the purpose of summarizing the collected data and organizing in such a manner yielding answer to the questions. In simple words, it means, studying the data to determine inherent facts.

Being added, Joel Ashirwadam (2014) on descriptive data analysis stated that this type of analysis aims at summarizing raw data into useful information being represented through graphs and tables which is considered as sufficient for a particular investigation or research purpose.

Descriptive analytics applies simple statistical techniques like mean, median, variance, standard deviation etc. and describe what contained in the data set (Fred and Kinange, 2015) and answer the questions of “what happened?” or “what is happening?” (Jabir, et al., 2019).

Likewise, Kirtane (2015) defined HR analytics as an integrated process that improves the individual and organizational performance by assisting to improve the quality of people related decisions. HR analytics mostly

depends on statistical tools and analyses and requires high quality data, well-chosen targets, talented analysts, leadership, as well as broad-based agreement that analytics is a legitimate and helpful way to improve performance.

The same thought is shared by Dooren, (2012) as in Lochab et al. (2018) - A methodology for understanding and evaluating the causal relationship between HR practices and organizational performance outcomes (such as customer satisfaction, sales or profit etc.), and for providing legitimate and reliable foundations for human capital decisions for the purpose of influencing the business strategy and performance, by applying statistical techniques and experimental approaches based on metrics of efficiency, effectiveness and impact.

Jabir et al. (2019) also stated that HR analytics is about analyzing and understanding how and why things happen, produces alerts about what the next best action is, and make interpretation about what the best and the worst are that can happen based on the analyzed data.

In a study conducted by Pooja Jayani Opatha in 2020 entitled “ HR Analytics: A Literature Review and New Conceptual Model” delivered the importance of data analysis in the field of human resource management. HR analytics is more important as it improves the performance of the employees, improves ROI of human

resources, provides opportunity to assess how employees contribute to the organization, forecasts workforce requirements and determines the best ways to fill the vacant positions, links workforce utilization to strategic and financial goals to improve business performance etc.

This study further concludes that HR analytics provides a data-driven framework for solving workforce problems through analysing data with a combination of software and methodologies that applies statistical models and derives new insights for smarter decision making that allow enterprise leaders to optimize human resource management while enhancing the strategic value of HRM.

Prior Arts

Here are the nearest prior arts of this Human Resource Management System with Data Analysis:

BambooHR

This is an online Human Resource system designed for small to medium-sized business and or organization which offers payroll, tools for onboarding applicants, applicant trackers and performance management features. It is even partnered with a mobile app version for easy reporting and tracing of applicants’ application. In

addition, this software gathers and manages employees' information throughout their employment life cycle. Through BambooHR, the management will have ample time focusing on the most important factor of their business and or process – their people. **(BambooHR Software, 2020)**.

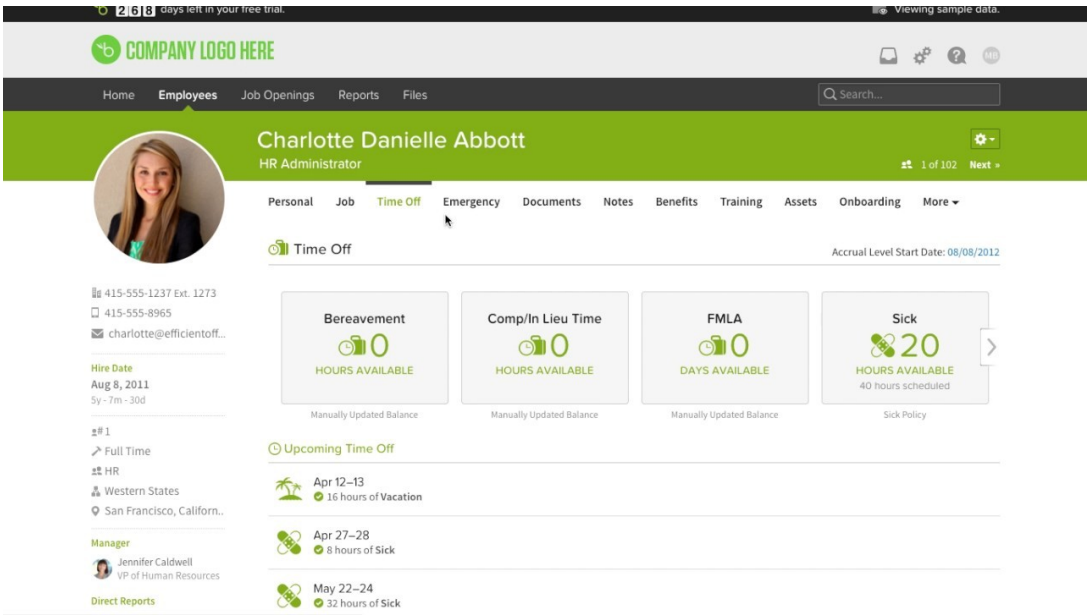


Image Source: https://www.youtube.com/watch?v=8DLylY-P9-E

The researcher of this study realizes that through the use of BambooHR, management of a certain business and or process can focus and appreciate one of the greatest assets of an organization – people.

Breezy

By using this system, the entire hiring process of a certain company will be simplified. This simply eliminates the repetitive and time-consuming hiring tasks and processes. With just a few clicks, a company can now

post job advertisements through the portal which will attract applicants and from there, this system will automatically top-list candidates, schedule interviews through automated emails and texts. **(Breezy Software, 2020)**.

Image Source: https://www.softwareadvice.com/hr/breezy-hr-profile/

This system focuses on the eliminating the time-consuming and repetitive hiring process of every companies. It addresses this issue by providing a feature to this system which automates the hiring process: from identifying candidates into offers for signatures.

WorkforceHub

This system is a cloud-based time, leave and attendance management system where employees time off balance and leave requests: vacation, sick and family leave can easily be managed real-time. Using this system, small to mid-sized businesses capture physical and web-based clocks for employees' productivity whether onsite, online or working from home. **(WorkfroceHub, 2020)**

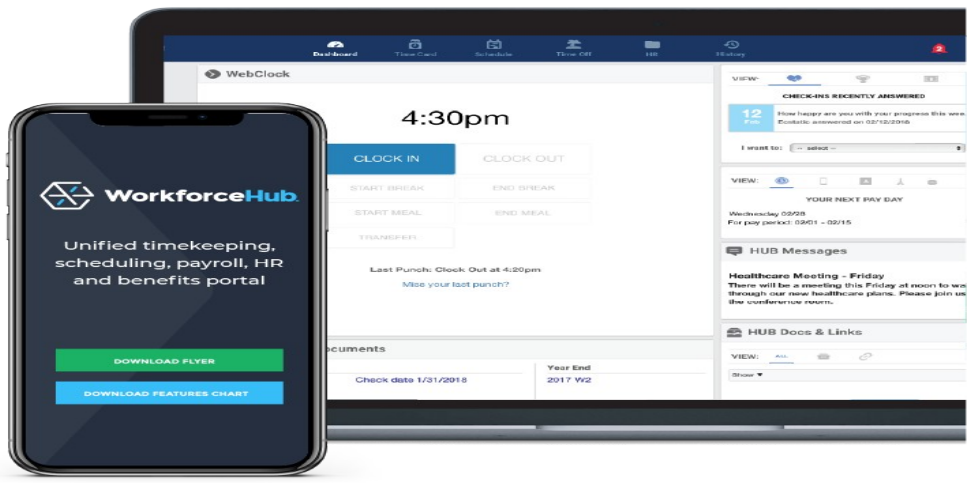
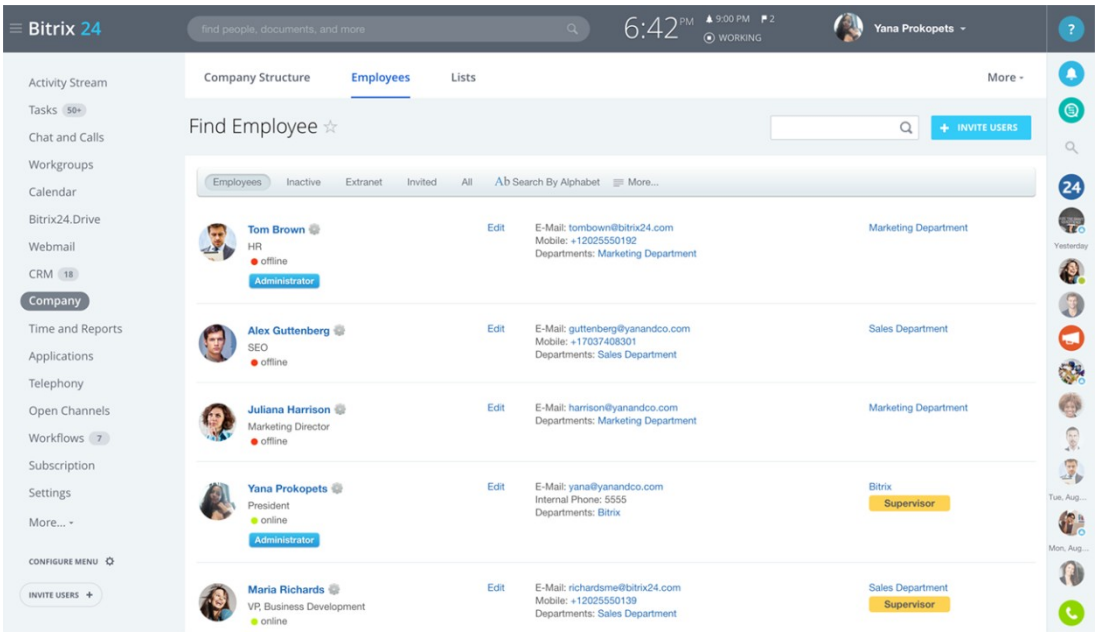


Image Source: https://www.workforcehub.com/

Bitrix24

The Bitrix24 Human Resources (HR) solution provides a platform for businesses to manage, engage, and reward employees. Key features include a staff directory, report builder, workflow automation, a self-service portal, real-time communication, employee engagement, and time management. With Bitrix24, users can store and find all HR documents and employees; contracts in one place. The solution includes a social intranet that helps with employee training and workflow management. Users can set up and manage access permissions for employees and keep a record of their organizational charts in the system. Bitrix24 is also a time tracking and reward program where users can motivate their employees with likes and badges **(Bitrix24 Software, 2020)**.



The researcher has learned that a human resource information system like Bitrix24 is a complete human resource solution that provides a platform for businesses to manage, engage, and reward employees.

TimeWorksPlus

This is a cloud-based attendance system with leave management frameworks in managing human resources in small to mid-sized businesses. In addition, this can capture time logs through web-based and or physical clocks. It enables employees of a certain company to work from home and offsite. It has a mobile version of the system which aid employees access the time management anywhere and anytime.

In real-time, managers can see employees clock in and out activities and using geo-referencing, it can flag employees in wrong location and destination. TimeWorksPlus also provides options for the employees to monitor their requests for leave such as vacation, family and sick leaves. **(TimeWorksPlus Software, 2020)**.

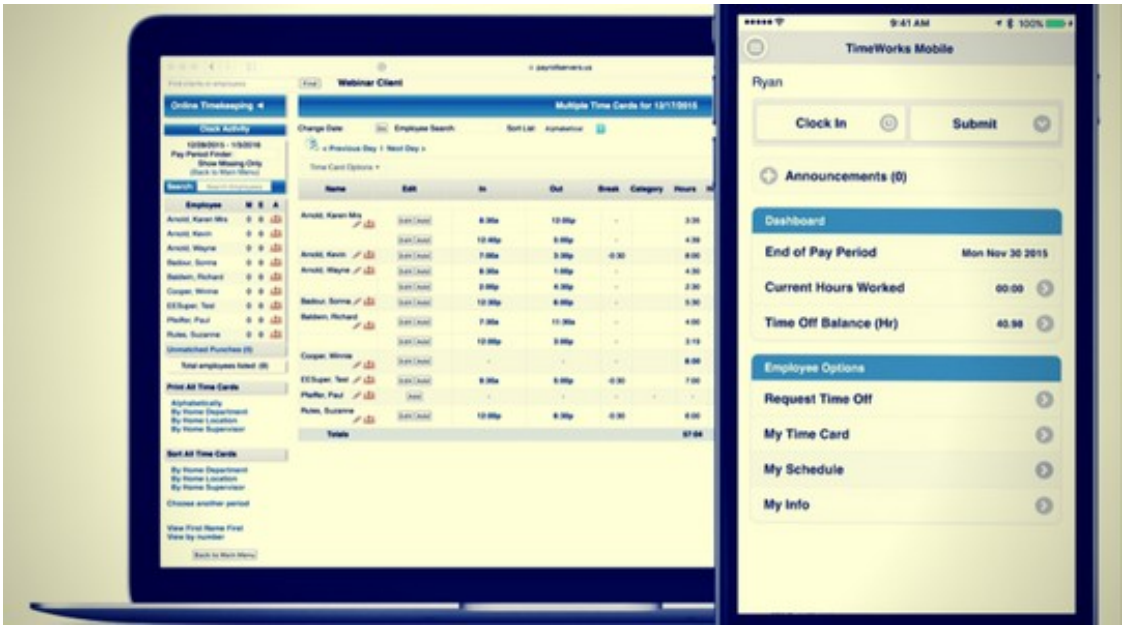


Image source:

https://info.completepayroll.com/timeworksplus

This system focuses on attendance and leave monitoring aspects of an employee. It has the capability of monitoring the number of leave an employee had spent plus the calculations of their leave payments.

Zenefits

This software encompasses a robust offer in the span of human resource management in terms of time and attendance, performance and payroll; it is tightly integrated with an application to simplify the radical works in the field of human resource administration.

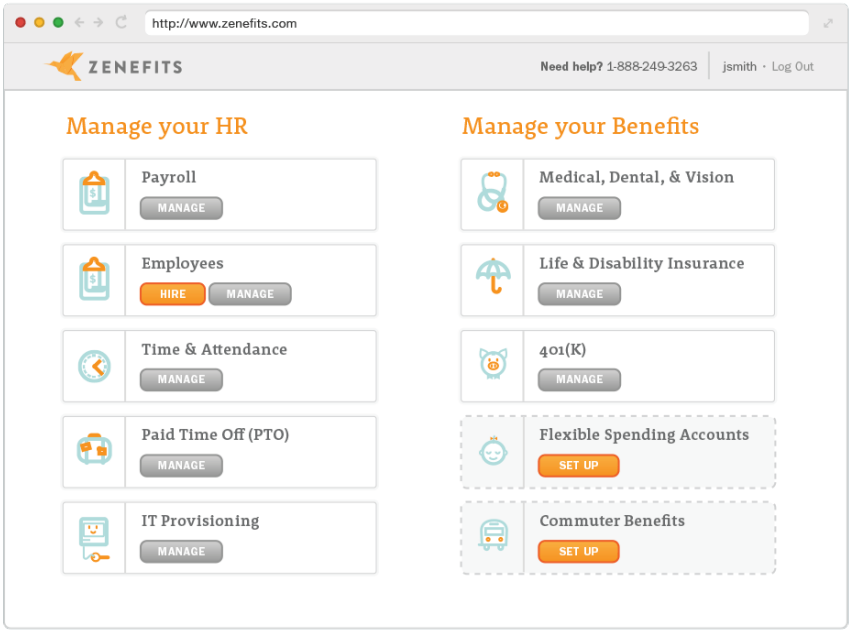


Image source:

https://www.starterstory.com/tools/zenefits

This system focuses on the essentials of an employee, their growth in the company while working, and learning the Zen's of life. **(Zenefits Software, 2020)**.

Zira

Zira has a capability to take records of employees into the cloud which highlights employee scheduling and performance management when data needs to be analysed. It also includes web-based manager which creates and publishes schedules; a mobile app used for tracking schedules. **(Zira Software, 2020)**.

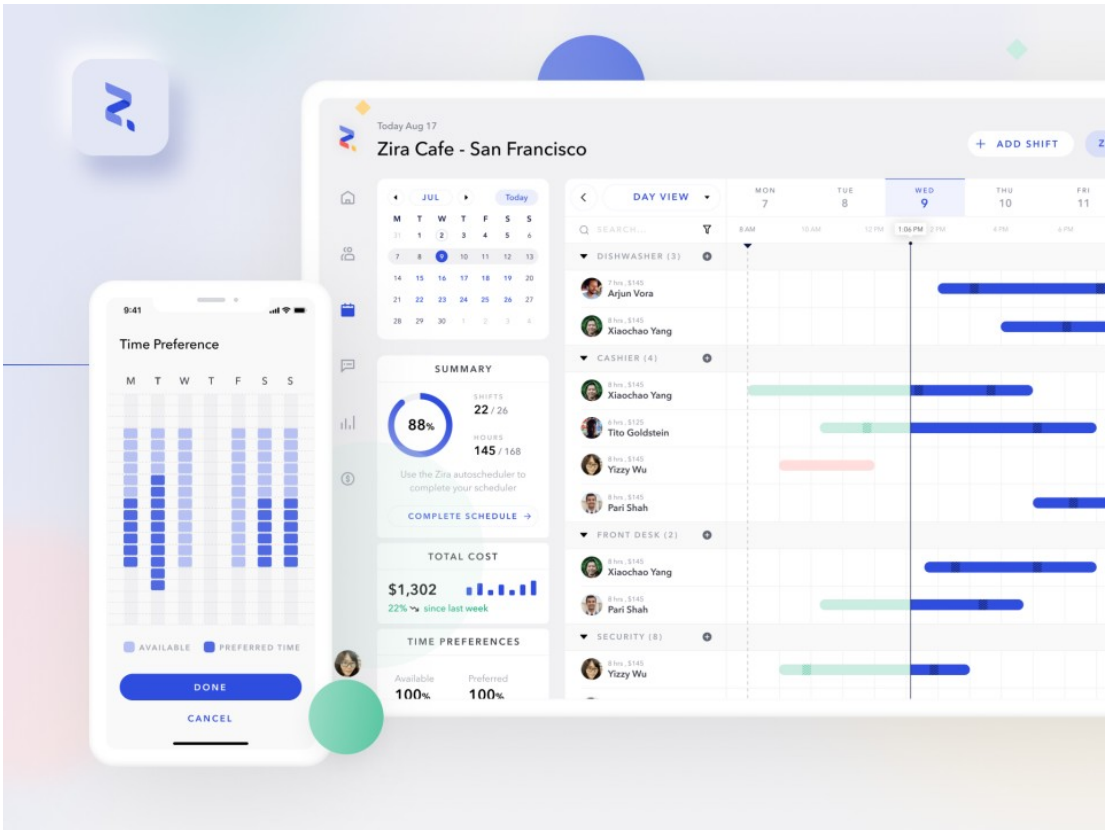


Image source: https://www.capterra.co.uk/software/201704/zira

This system is being designed in order to automate complex team processes such as scheduling and performance management. It became an elegant on-location schedule management tool through its Zira Portal.

Breeze 360

Breeze 360 is a cloud-based employee time and attendance software system that manages employee time and/or attendance workflows for companies in all industries.

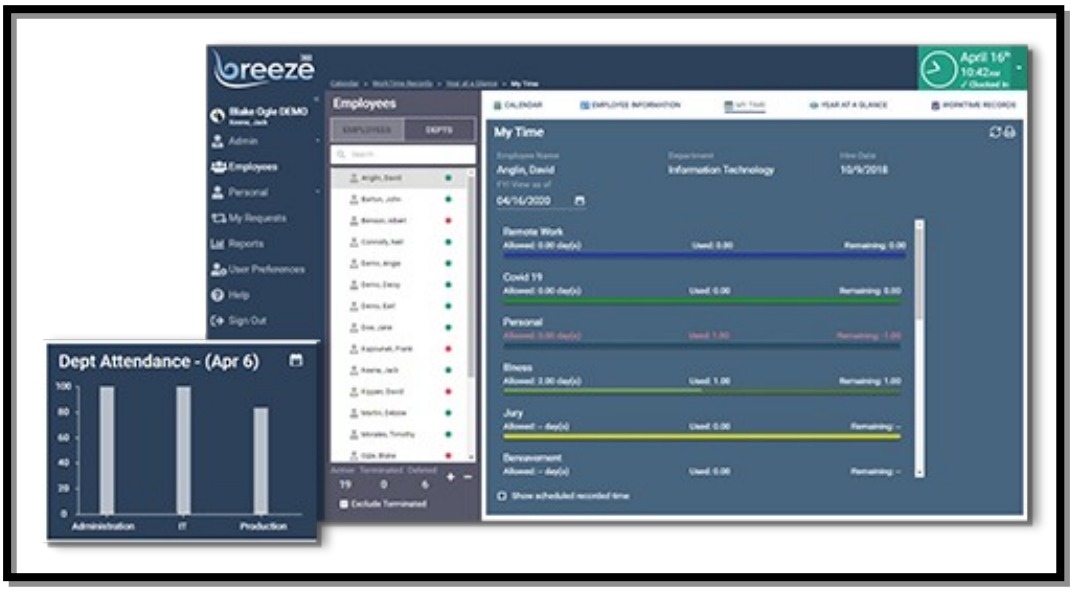


Image source: https://softwaretech.com/breeze360-time-attendance/

This system provides options for employers to take control of the attendance of their employees. Through this cloud-platform attendance management system, employers can configure rules for attendance, accruals, points, leaves and even payroll.

Performly Software

Performly is a human-resource solution which has features like employee's talent management, object and competency management, performance reviews, feedback databases, recognition and checklist of employee's daily tasks **(Performly Software, 2006)**.

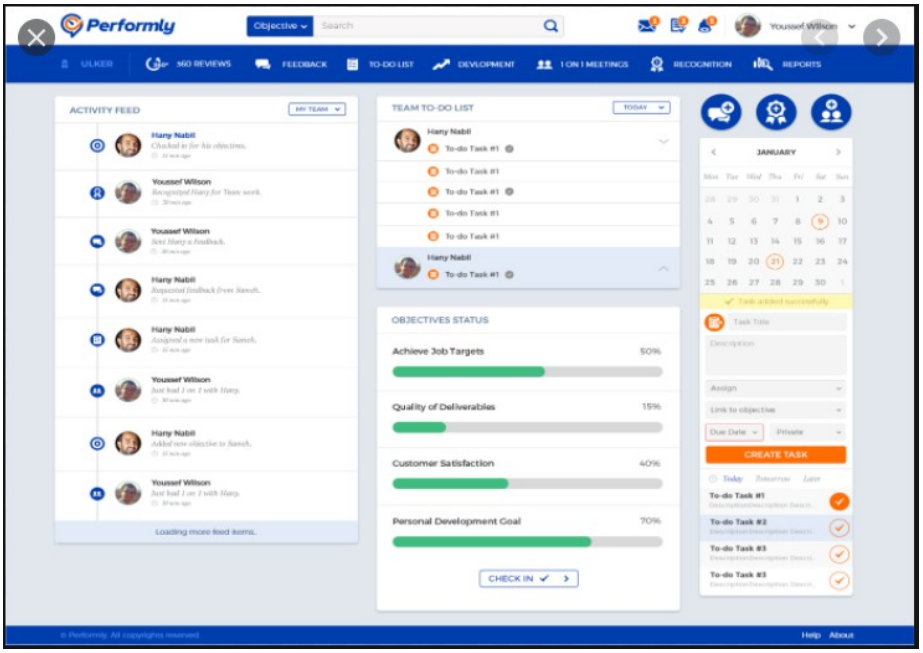


Image source:

https://www.softwareadvice.com/hr/performly-profile/

This system has specified the talent management and competency monitoring of the employers manpower. It assesses the employees' performances and provides trainings for their growth and development as individuals.

TrenData

TrenData People Analytics is software which is categorized as cloud-based business intelligence (BI) – a solution which is being designed for midsize businesses in various industries. This software offers various HR analytics and management in terms of the company's workforce which features compensation plan modelling and succession planning.

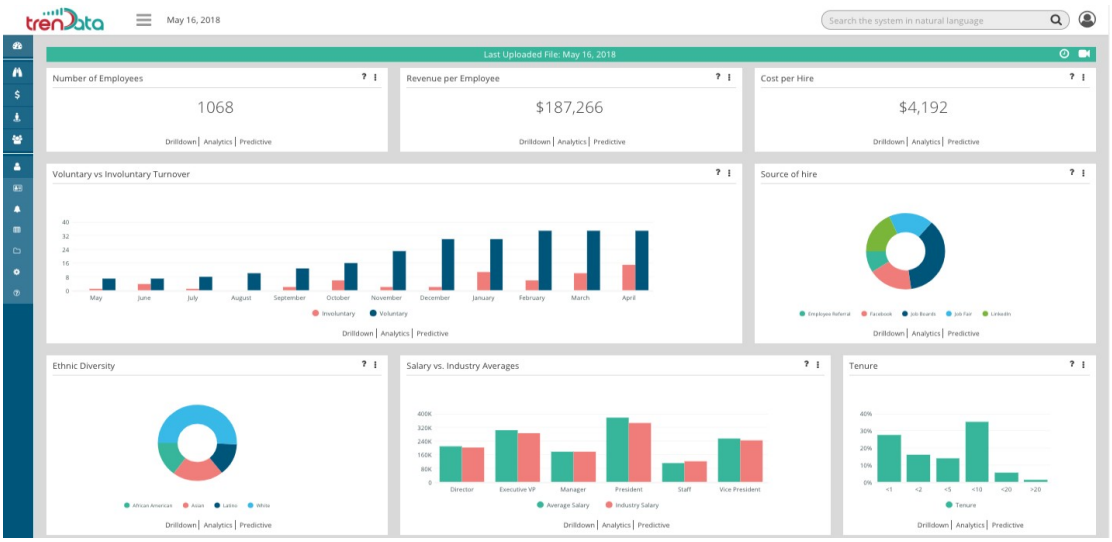
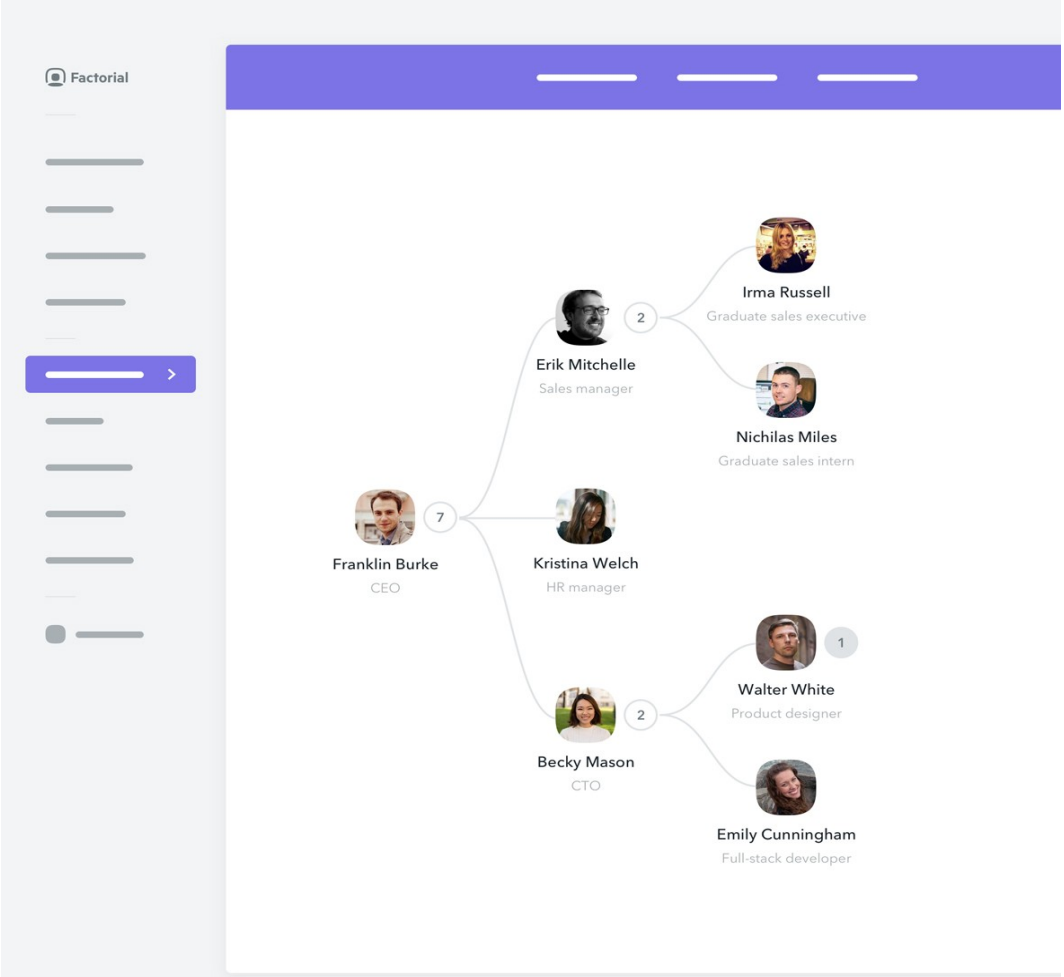


Image source: https://www.softwareadvice.com/bi/trendata-profile/

TrenData's analytics panel allows users to see and monitor trends and their workforce performance over a specific time period. This part of the software helps administrators predict and modify business-related decisions of the company.

Factorial

Factorial is a cloud-based human resources (HR) solution which addresses management problems across small business. Its key features are time-off manager, chart for their organization and a document manager.



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https://www.softwareadvice.com/bi/factorial-profile/

Factorial's employee portal allows employees to access and view their personal accounts, providing them an option to file and or requests for leaves and check their paychecks. Factorial also features a communication line between managers and employees, allowing them to exchange resources **(Factorial, 2021)**.

Paylocity

Paylocity is a cloud-based human capital management (HCM) platform which offers payroll management options and human resource features in various business sizes which highlights the importance of human management.

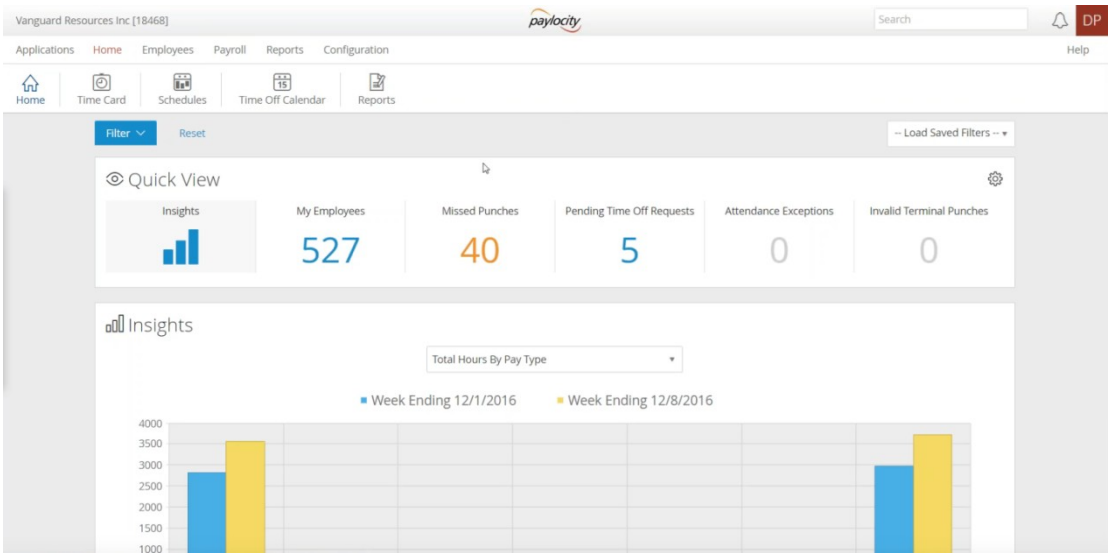

Image source: https://www.softwareadvice.com/bi/web-pay-profile/

Paylocity also offers an employee self-service portal which permits employees to access personal and company information. It also has a core HR capability which enables businesses to manage HR functions using quick-edit templates, custom checklists, action forms, position management, and dynamic reporting **(Paylocity, 2021)**.

OnBlink

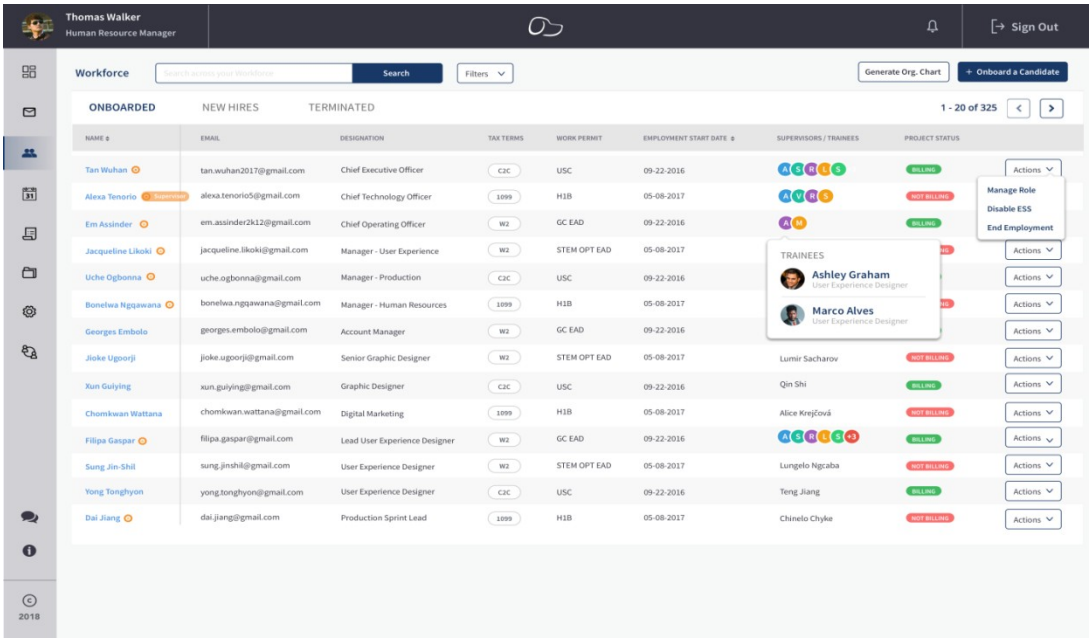

Image source: https://www.softwareadvice.com/bi/onblick-profile/

This software focuses on the management of human resources in terms of immigration offices. The setting up of this software is easy with great teams who are willing to go an extra mile in helping an organization to set it up. OnBlink's display features are clean, modern and crisp plus, it has a dashboard which is intuitive and elegant **(OnBlink, 2021)**.

If you are someone who wants all things at a glance and instant, OnBlink is one of the right software to choose. Its user-friendly in nature, has ease of access and self-explanatory design and features for HR and immigrations, makes it a delight to its users.

BizMerlinHR

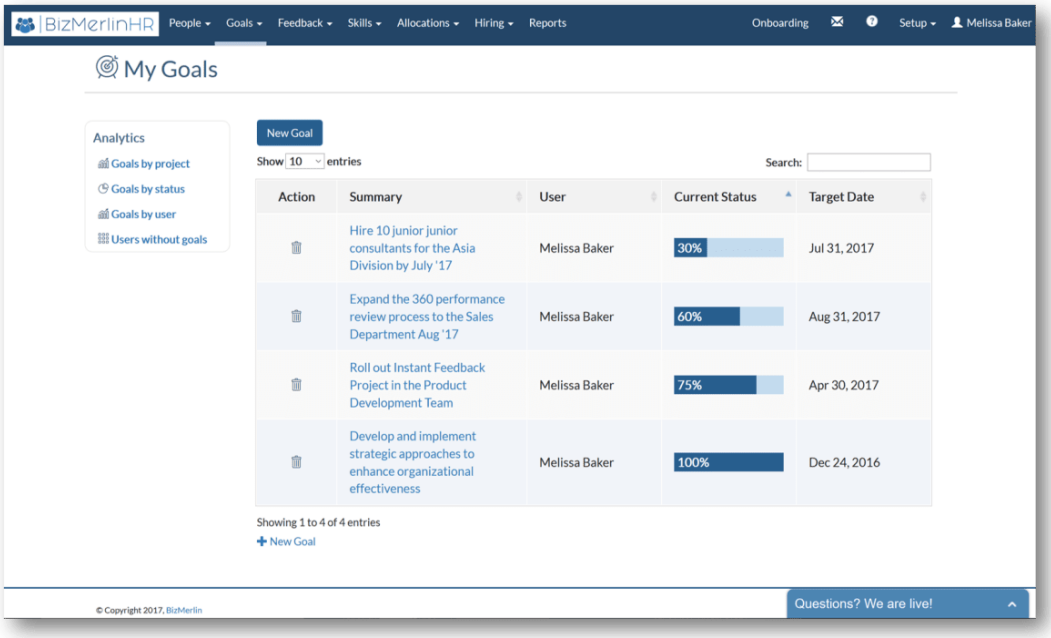

Image source: https://www.bizmerlin.com/our-solutions/

BizMerlinHR is a cloud-based human resource management solution that helps mid to large enterprises manages the entire employee lifecycle, from on-boarding to comprehensive employee records to performance management to team retention, in one integrated application.

BizMerlinHR's advanced features include configurable workflows with a wide range of step types (esignatures, training, document uploads, forms, emails, etc.) and automatic operations. You can design a comprehensive employee record with your own custom sections and filters with sophisticated visibility options. Conduct performance reviews individually or in bulk based on your

own metrics, templates and processes. Track your skill matrix and manage and conduct training for compliance and career development purposes. Native iOS and Android mobile apps enable your workforce to work on the go, from anywhere **(BizMerlinHR, 2021)**.

This system has a wide range of scope concerning the management of human resources; from onboarding of a newly – hired employee into its graceful exit from the company.

Sage HR

Sage HR provides tools that can automate repetitive tasks. Furthermore, sick leaves can be requested directly from the dashboard without initiating email chains. Each employee has a separate login and access permission level to safeguard sensitive information. Benefits, documents, and emergency tabs can be hidden for enhanced privacy. Users get a bird’s eye view of key data points like upcoming tasks, goals, leaves, and expenses. The solution allows employees to easily access all options with minimal mouse clicks **(Sage HR Software, 2020)**.

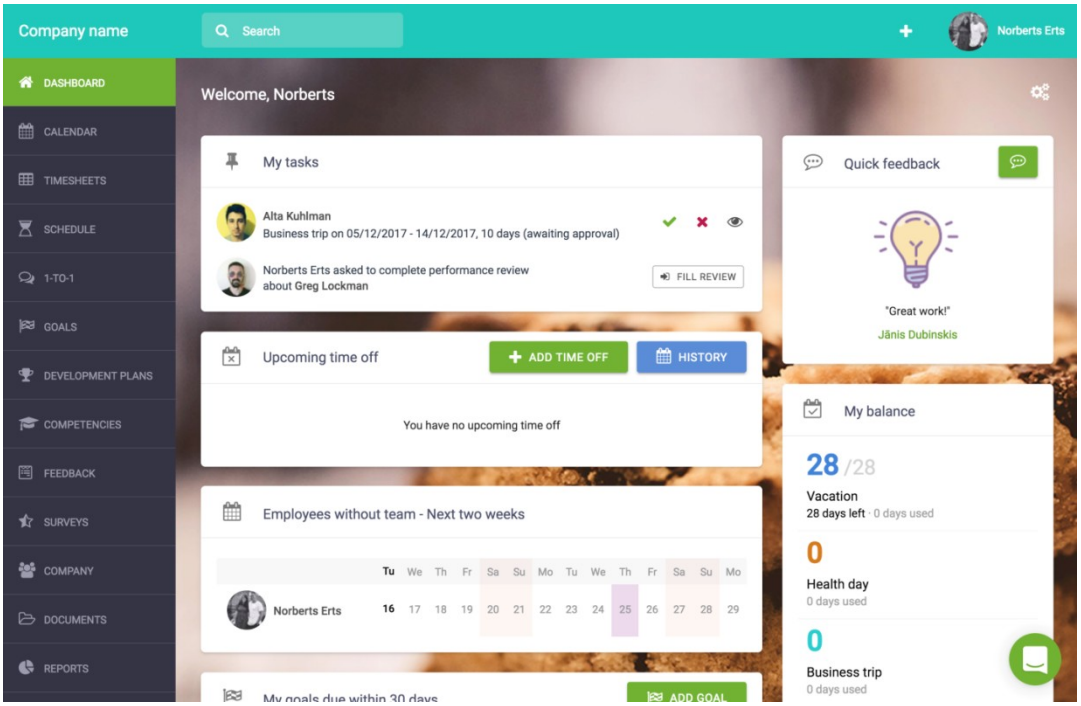

Image source: https://www.softwareadvice.com/bi/sage-hr-profile/

This system has features highlighting the importance of an employee's privacy through safeguarding their sensitive information. It also allows employees to see what are their upcoming tasks, to-do-it goals, remaining days for their leaves and even expenses.

PeopleInsight

PeopleInsight is a cloud-based workforce analysis solution designed to help companies in industries by providing useful information on their human resources operations through their data and then allowing them to apply that information to meaningful decision-making.

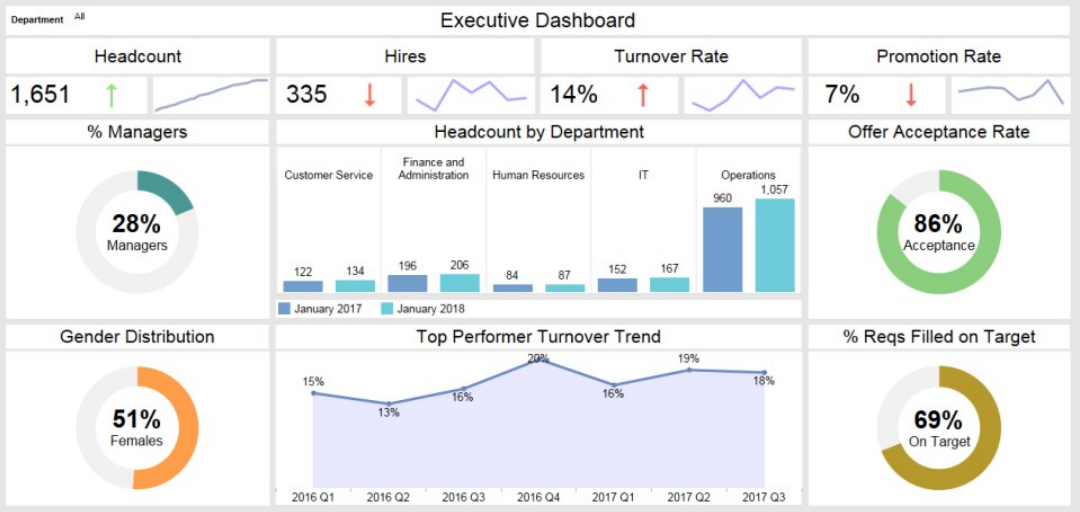

Image source: https://www.getapp.com/hr-employee-management-software/a/peopleinsight/

PeopleInsight also partners with companies that implement the solution on an ongoing basis. The expert team can assist with resolving infrastructure problems, customizing data, build tailored dashboards and analysis and provide information on updated practices **(PeopleInsight Software, 2021)**.

This system allows companies to have insights about their human resources. Through the algorithm being applied to analyse data, companies will be informed of the status of their employees in the company, be it regarding their performances, growth and or development, problems that may arise could be addressed earlier. Analysed data can help employers tailor resolving plans for possible future problems.

Dayforce HCM

Dayforce, provided by Ceridian, is a cloud-based solution for Payroll, Benefits, Workforce Management, Human Resources, Talent Management, Document Management, and Analysis. As a single application, Dayforce provides organizations with access to real-time data and results from all domains of HCM. With one employee record and one user experience, organizations can find and hire the right people, create schedules that support work-life balance, manage employee development, process pay and administer benefits, all while monitoring compliance throughout the employee life cycle **(Dayforce HCM Software, 2021)**.

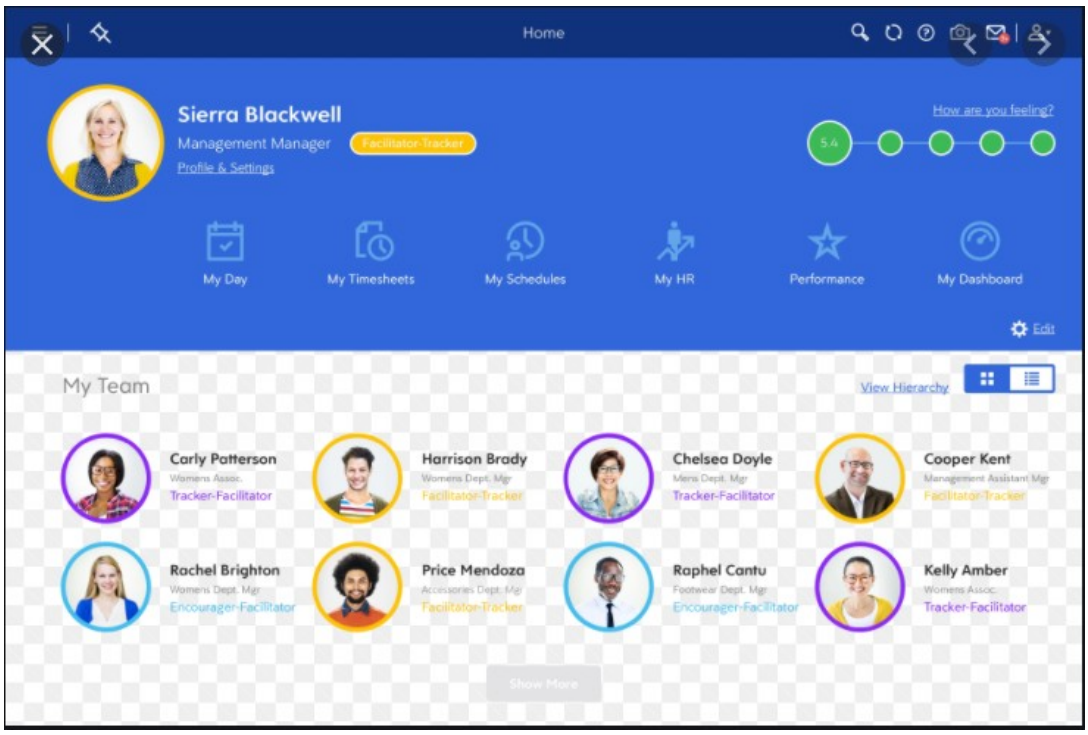

Image source: https://www.ceridian.com/products

This system has a feature of managing documents of the human resources of a certain company. It has a one-rule, single application for human capital management needs which has a goal of eliminating the pain of disconnected applications in one system. By having this rule, all related transactions will just flow seamlessly while avoiding duplications and manual workarounds.

sumHR

sumHR is a cloud-based human resource management solution for small and midsize companies. Primary features include payroll automation, attendance and leave management, performance management, reimbursement management, enterprise social networking and human resource analysis.

Other features include onboarding, employee surveys, rewards, recognition, asset management, applicant tracking and file management. It allows employees to access their profile and import data from LinkedIn. Administration features include smart search, filters and bulk import. Users can create and manage multiple salary structures **(sumHR Software, 2021)**.

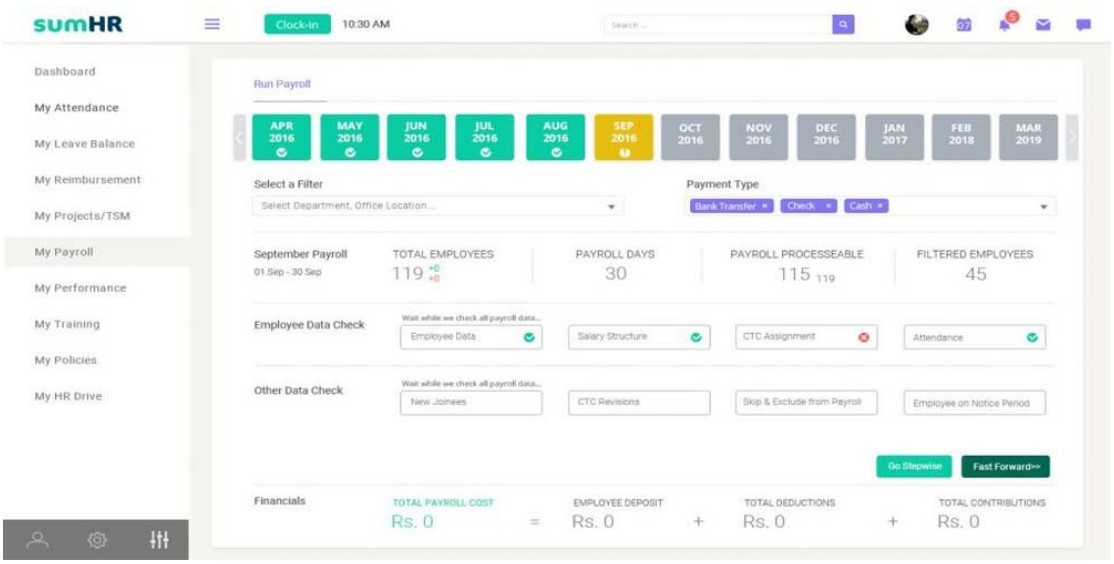

Image source: https://softwarestreets.com/sumhr/

This system is being designed to suit the needs of any companies in terms of their attendance management. This has feature of being customized in terms of attendance in order to fit the needs of an organization. Existing data from LinkedIn can also be directly imported into this system so that manual encoding of newly – hired employee will be minimized.

Qualtrix EmployeeXM

Qualtrics EmployeeXM is a human resource (HR) management solution that helps small to large enterprises collects feedback from employees using surveys. The centralized platform lets administrators grant access to specific users, create customizable dashboards, generate reports and gain insights into organizational performance using charts.

Qualtrics EmployeeXM allows businesses to create assessments, store employee data in an in-built directory and automatically add specific participants to projects. Users can deliver invitation links to participants via emails and send reminders through notifications, improving response rates on surveys. Additionally, it enables managers to collaborate on projects, record employee responses and import/export data in PDF formats **(Qualtrix EmployeeXM Software, 2020)**.

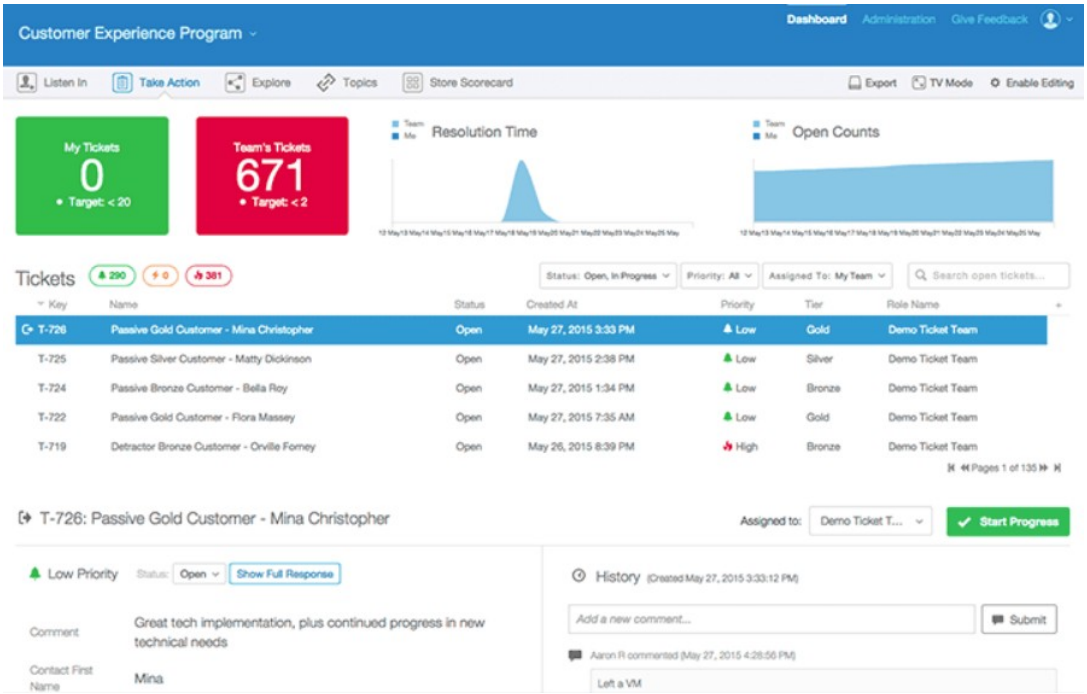

Image source:

https://sourceforge.net/software/product/Qualtrics-EmployeeXM/?source=directory

This system highlights the importance of a feedback from a performance of an employee. Through its customizable dashboard, the system can provide an

interface for performance feedback responses and transforms the results into graphs and charts through data analysis being embedded into the algorithm of the system.

Synthesis

With thorough review on cited literatures, there have been a large number of studies highlighting the importance of a computerized human resource management in every organization, be it public and or private as it enables HR policies and guidelines to be fully implemented likewise supports the fulfilment of the organization’s plans, goals and objectives. Other studies even enhanced the power of human resource management through the integration of data analysis as it not only manages records and performances thoroughly but it also helps administrator’s forecasts and identify the future of the organization as HR analytics solves workforce problems through analysing data with a combination of software and methodologies that applies statistical models and even derives new insights for smarter decision to optimize human resource management while enhancing the strategic value of Human Resource Management.

CHAPTER III

METHODOLOGY

This research study utilized the Developmental Research methodology. It is the systematic study of designing, developing, and evaluating instructional programs, processes, and products that must meet criteria of internal consistency and effectiveness. In addition, this study uses the descriptive type of analysis in presenting the data through the dashboard of the system.

Software Life Cycle Model

In this study, the researcher used the Rapid Application Development (RAD) model in developing the

software.

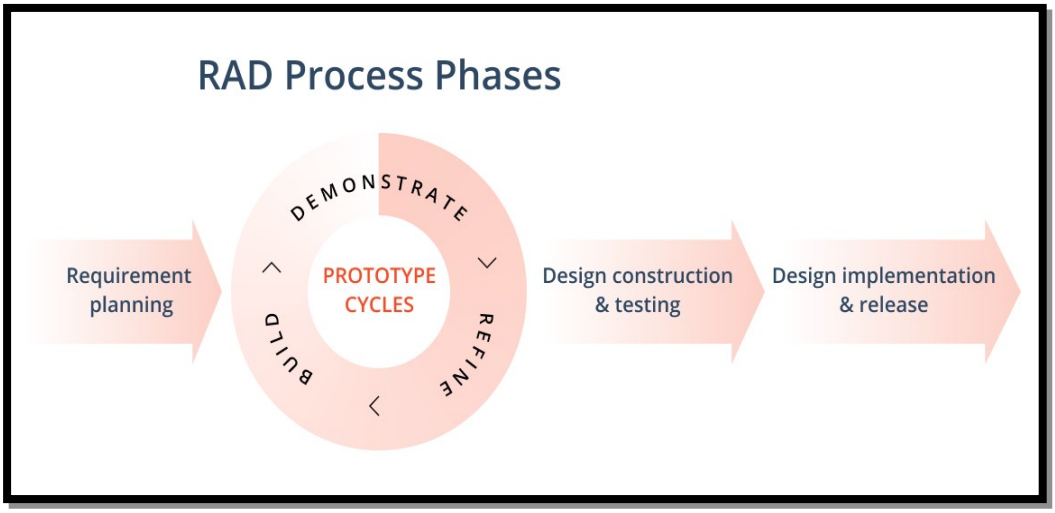

Figure 2. Rapid Application Development model

This research uses the Rapid Application Development approach in creating its system since this method is a fast project management strategy that is popular in developing software. The main benefit of the RAD approach is the fast completion of the project, making it an attractive choice for developers working in fast-paced environments such as software development. This fast step is made possible by RAD's focus on minimizing the planning stage and maximizing prototype development. Reducing planning time and emphasizing prototype

iteration, RAD allows programmers to accurately measure progress and communicate in real time toward problems or changes that are developing. This yields in greater efficiency, faster development, and effective communication **(Hamzah,et.al., 2019)**.

RAD Software Phases

Here are the following phases involved in developing a system using Rapid Application Development:

Stage 1. Requirement Planning

In this stage, existing problems which need automation of records and data processing in the Human Resource aspects of the institution were properly discussed with the administrators. Goals and expectations were determined which highlights the resolution to the current and potential problems of manual human resource management. Together with the human resource staff, office administrators and the researcher, planning of the development of the system was carefully performed, needed requirements were carefully discussed and objectives of the study were clearly set for targets.

Step 2. Prototype Cycles (Demonstration, Refine, Build)

After thorough planning with the administrators, the system is being scoped out through feedbacks and the

development of the system architecture is being started in this phase.

What is in this phase is that, the researcher will develop the model of the system (prototyping) then present the developed module to the client for testing purposes. All figured flaws and errors of the module will be presented back to the developer for tweaking the project. It is in this phase that both the client and the developer work hand in hand and maintain close communication with each other. This type of process iterates until the whole system has scopes being required and the expectations of the design are met.

Step 3. Design Construction and Testing

This phase of the development of the Human Resource Management System with Data Analysis is being set to test the functionality of the system while ensuring that almost majority of the expected functionalities are working as expected. It is in this phase that changes, updates and or additional functionalities and or modules may be added to the system per client’s requests and demands. Client’s feedback enables this phase for the system’s code to be rewritten and retested.

Software testing is the process of verifying a system with the purpose of identifying any errors, gaps

or missing requirement versus the actual requirement. Software testing is broadly categorized into two types - functional testing and non-functional testing (**Bennett, 2021)**.

In order for the Human Resource Management System with Data Analysis be tested, the researcher allowed the Human Resource Staff to use the system by exploring its functionalities and modules. An evaluation form is being distributed in order to gather feedback/s regarding the functionality of the system for the purpose of possible changes to be made and or applied.

The standard questionnaires were used, such as the USE Questionnaire: Usefulness, Satisfaction, and Ease of use questionnaires and the ISO/IEC 25010 software characteristics. The IT expert group used the ISO/IEC 25010 Software Quality Model questionnaires. In contrast, the sample population evaluated the system using the USE Questionnaire: Usefulness, Satisfaction, and Ease of use.

The user and the experts tested the Human Resource Management System with Data Analysis. The overall output of the system is 100% running and out of errors based on the objectives required for the system. The result shows that the developer meets the requirements and standards of the user.

Step 4. Design Implementation and Release

This phase is the final step before the finished product goes to launch. It involves data conversion and training of the users on how to use the system. This phase is where the system is now performing its purpose but it still needs to be closely monitored and maintained.

Schedule Feasibility

Gantt Chart

Figure 3 shows the time table of the project – from scratch up until it is being fully developed into a useful system. It also displays the length of time a certain task needs for a deliverable to be finished.

Activity Name	Start	Finish	January		February				March				April		
			W-4	W-5	W-1	W-2	W-3	W-4	W-1	W-2	W-3	W-4	W-1	W-2	W-3
Analysis and Quick Design															
Conducted a meeting with the Stakeholders	1/20/2021	1/24/2021													
Identified and Discussed the existing problems	1/20/2021	1/24/2021													
Finalize Project Requirements	1/27/2021	1/31/2021													
Gave a Project Proposal Letter to the School	1/27/2021	1/31/2021													
Demonstrate, Refine and Build															
Created a Design and Features of the system	2/3/2021	3/4/2021													
Demonstrated the system to the Stakeholders	3/4/2021	3/5/2021													
Asked for Suggestions and Approval	3/4/2021	3/5/2021													
Refine the system for improvement	3/7/2021	3/31/2021													
Testing															
System users tested the system	4/2/2021	4/9/2021													
Codes are tested and retested for its smooth functioning	4/15/2021	4/20/2021													
Implementation															
Launching of the system to the school	4/22/2021	4/22/2021													
Data Conversion and Trainings of the users	4/22/2021	4/22/2021													

Figure 3. Gantt Chart

A Gantt chart is a popular tool in project management. It basically drills down activities which need to be done by a fixed time period. It is commonly used for tracking project schedules **(Bennett, 2021)**. On the chart, the vertical axis represents the different tasks to be done while the horizontal axis represents the scheduled time. Each task is represented by a bar that shows the time required for the project.

Economic Feasibility

Cost and Benefit of the System

Development and Implementation Cost			
Hardwares	**Quantity**	**Unit Price**	**Cost**
Desktop Computer	1	15000/set	15,000.00
Printer	1	5000/unit	5,000.00
Softwares	**Quantity**	**Unit Price**	**Cost**
Operating System License	1	7,500.00	7,500.00
Total Development and Implementation Cost	**27,500.00**		
Operation and Maintenance Cost			
Operational Cost			15,000.00
Maintenance Cost			10,000.00
Total Operation and Maintenance Cost	**25,000.00**		

Table 1. Cost of the System

Benefits of the system	
Human Resource Management System with Data Analysis	25,000.00
Reduce Bond Paper use	5,000.00
Ink	5,000.00
Total Operation and Maintenance Cost	**35,000.00**

Table 2. Benefit of the System

Table 1 and 2 shows the Cost and Benefit breakdown of the system, which includes the Development and Implementation Cost, Operation and Maintenance Cost, and Benefits of the system to the school.

Cost-Benefit Analysis

Details	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cost						
Development and Implementation Cost	22,500.00					
Operation and Maintenance Cost		5,000.00	5,250.00	5,775.00	6,641.25	7,969.50
			5%	10%	15%	20%
Total Cost	**22,500.00**	**5,000.00**	**5,250.00**	**5,775.00**	**6,641.25**	**7,969.50**
Discount Factor (12%)	1.00	0.89	0.80	0.71	0.64	0.57
Present Value of Costs	22,500.00	4,465.00	4,184.25	4,111.80	4,223.84	4,518.71
Cumulative Present Value Costs	22,500.00	26,965.00	31,149.25	35,261.05	39,484.89	44,003.59
Benefits						
Benefits from new system	0.00	32,000.00	33,600.00	36,960.00	42,504.00	51,004.80
			5%	10%	15%	20%
Discount Factor (12%)	1.00	0.89	0.80	0.71	0.64	0.57
Present Value of Costs	0.00	28,576.00	26,779.20	26,315.52	27,032.54	28,919.72
Cumulative Present Value Costs	0.00	28,576.00	55,355.20	81,670.72	108,703.26	137,622.99
Cumulative Present Value Benefits + Costs	-22,500.00	1,611.00	24,205.95	46,409.67	69,218.38	93,619.39

Table 3. Cost-Benefit Analysis

Table 3 illustrates the total estimation of the cost of the system when implemented. It shows the costs upon implementation of the system, the costs of its operation

and maintenance as well as the benefits the institution will get from having a Human Resource Management System with Data Analysis being installed and utilized.

One of the most important tools that help to facilitate this task is the cost-benefit analysis as it connect directly with the needs and requirements of a wide group of users whether inside or outside business **(Al-Obaidi, 2019)**.

Requirements Modeling

Context Flow Diagram

In a Data Flow Diagram (DFD), Context Flow Diagram is the highest form and it is also known as Level 0 DFD. It points out the flow of information between the system and external components **(Edrawsoft, 2021)**.

A system context diagram embodies all external entities that may relate with a system. The all-inclusive software system is shown as a single process. Such a diagram pictures the system at the center, with no details of its interior structure, surrounded by all its External entities, interacting systems, and environments **(Visual Paradigm, 2021)**.

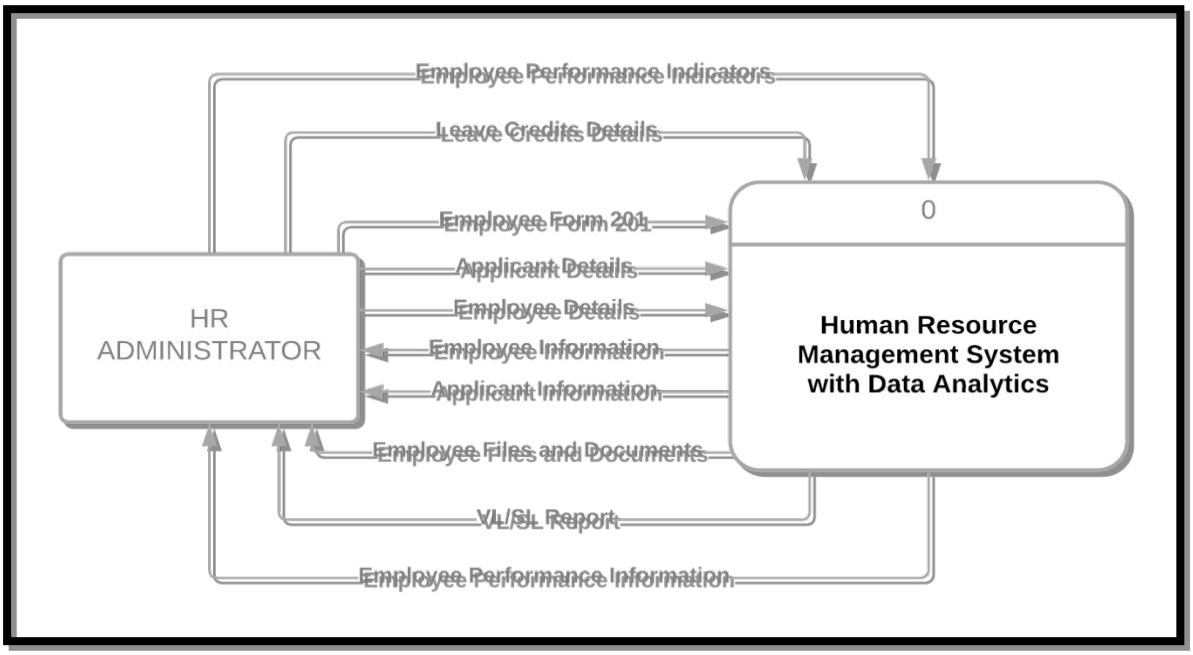

Figure 4. Context Flow Diagram

Data Flow Diagram

Data Flow Diagram (DFD) is being used graphically to represent the flow of data mostly in business information systems. It also describes the processes which are involved in a system for transferring data from input phases to the storage phase and reports generation.

The figure below shows and illustrates the process of the Human Resource Management System with Data Analysis. Through this illustration, users will have knowledge about the functionalities, sequences and processes of the aforementioned system.

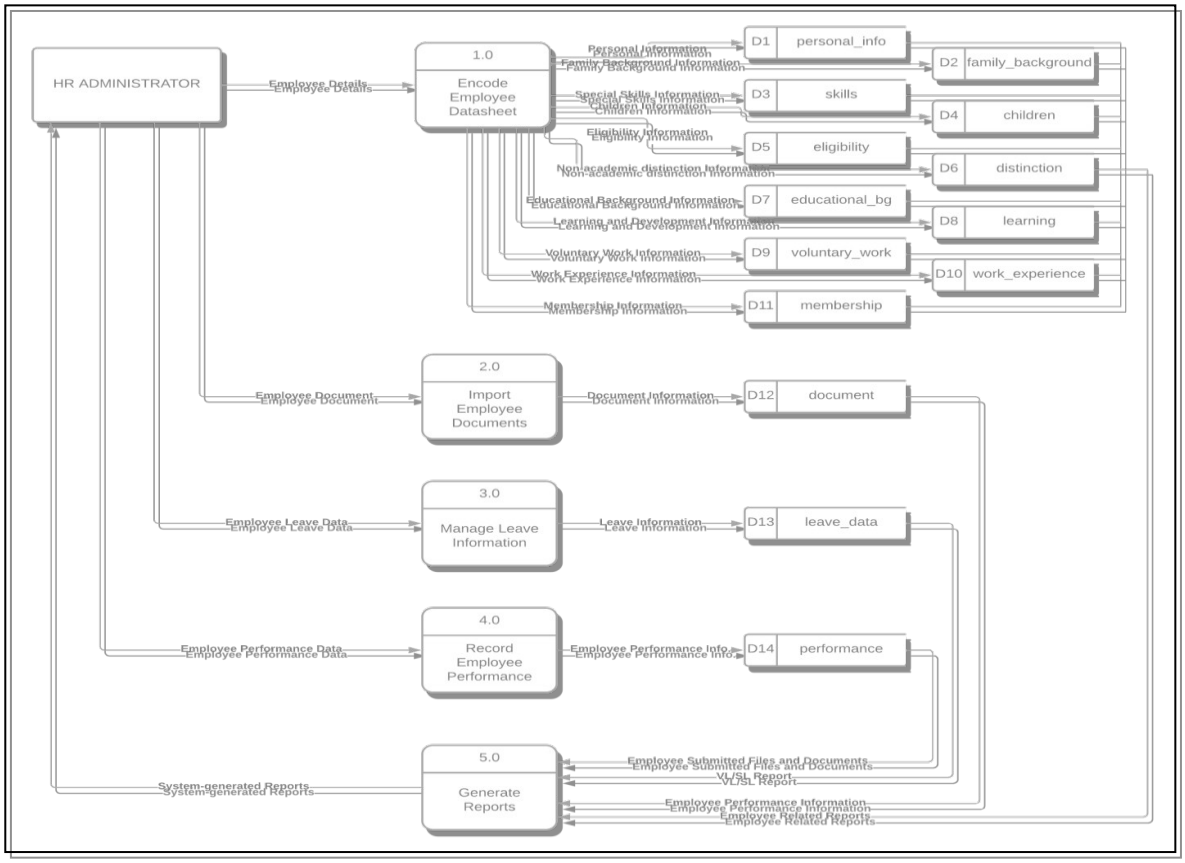

Figure 5. Data Flow Diagram

Data flow diagrams can be divided into logical and physical. The logical data flow diagram describes flow of data through a system to perform certain functionality of a business. The physical data flow diagram describes the implementation of the logical data flow **(Visual Paradigm, 2021)**.

Entity – Relationship Diagram

An entity-relationship diagram or also referred to as ERD illustrates the logical structure of databases when entities, their corresponding attributes and

relationships between them are being observed and defined. An entity referred to an object which is a component of a data. An entity set refers to a set of collection of almost similar entities which have attributes that define similar properties **(Smartdraw, 2021)**.

Entity relationship diagram (ERD) is one of the main diagrammatic representations of a conceptual data model that reflects users' data requirements in a database system. In today's business environment, the business model is in a constant change which creates highly dynamic data requirements which also requires additional processes like modifications of ERD **(Nergiz, 2013)**.

Figure 6 illustrates the Entity-Relationship Diagram of Human Resource Management System with Data Analysis. It will somehow give you snapshots of how the entities are being related to each other in one system.

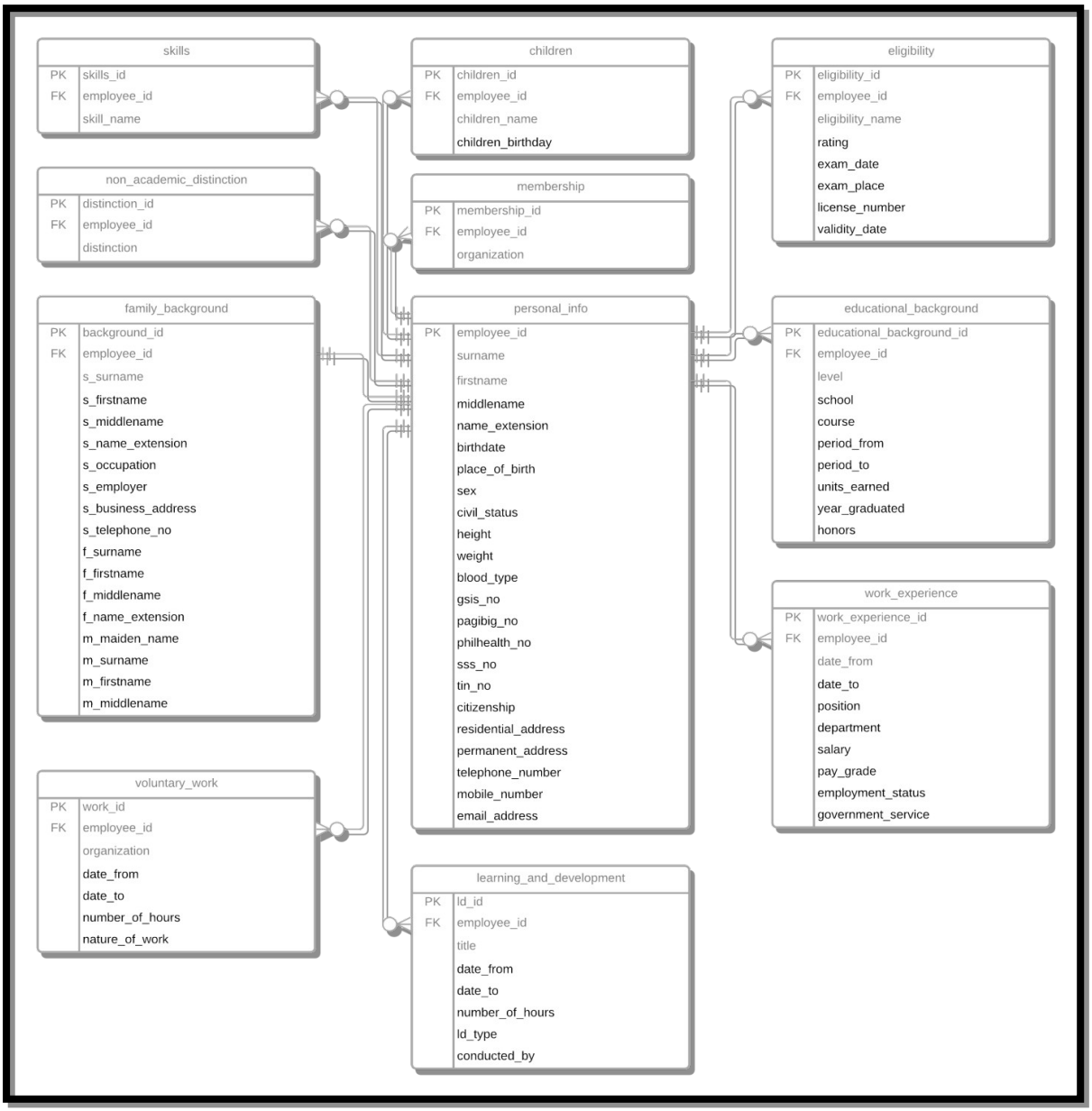

Figure 6. Entity-Relationship Diagram

Application Architecture

Application Architecture for the Human Resource Management System with Data Analysis illustrates the overall architecture of the system as to what devices and

technologies are used in the implementation of the system.

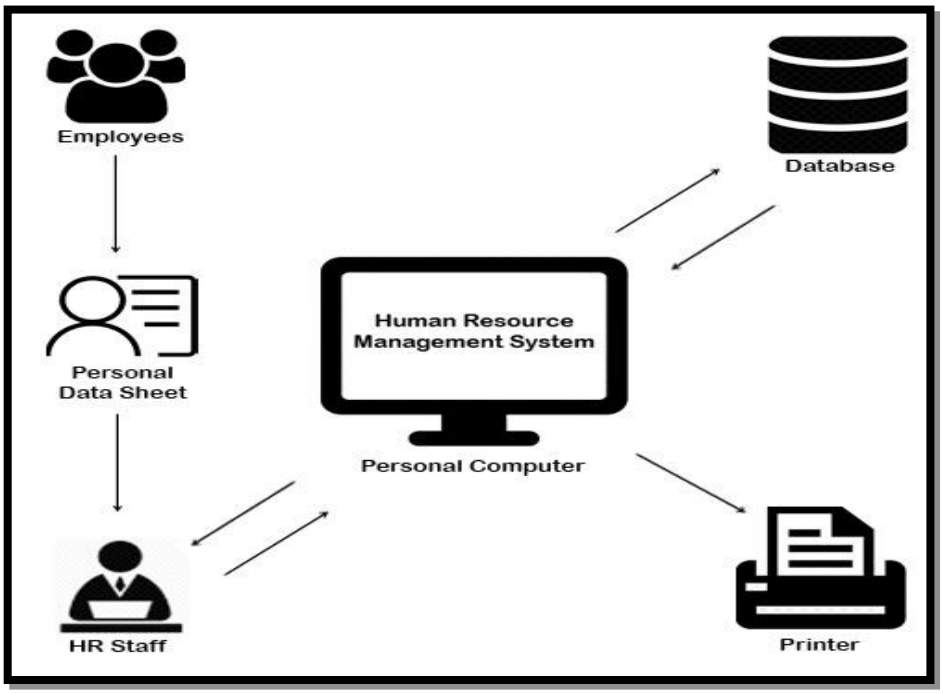

Figure 7. Application Architecture

Application architecture illustrates the backbone of an actual system which comprises the hardware and software components of it. It further defines how applications interact with middleware, databases and other applications. Application architectures usually follow software design principles that are generally accepted among its adherents but may lack formal industry standards **(Ferguson, 2019)**. It may also include the conceptual model of the system which describes its structure and behavior. Likewise, system architecture may include the technical framework, end-user requirements and the list of system components **(Whitsett, 2018).**

Use-Case Diagram

Use case diagrams are widely used for gathering requirements of a system which includes its external and internal influences. In order to analyze the system's functionalities, actors are being used to represent the users of the system **(Waykar, 2015)**.

For high level requirement analysis of a system, Use Case Diagrams play such role in capturing and presenting a dynamic view of its functionalities. Actors, also known as agents are being identified as internal and external entities which will interact or use the system **(Dascalescu, 2018).**

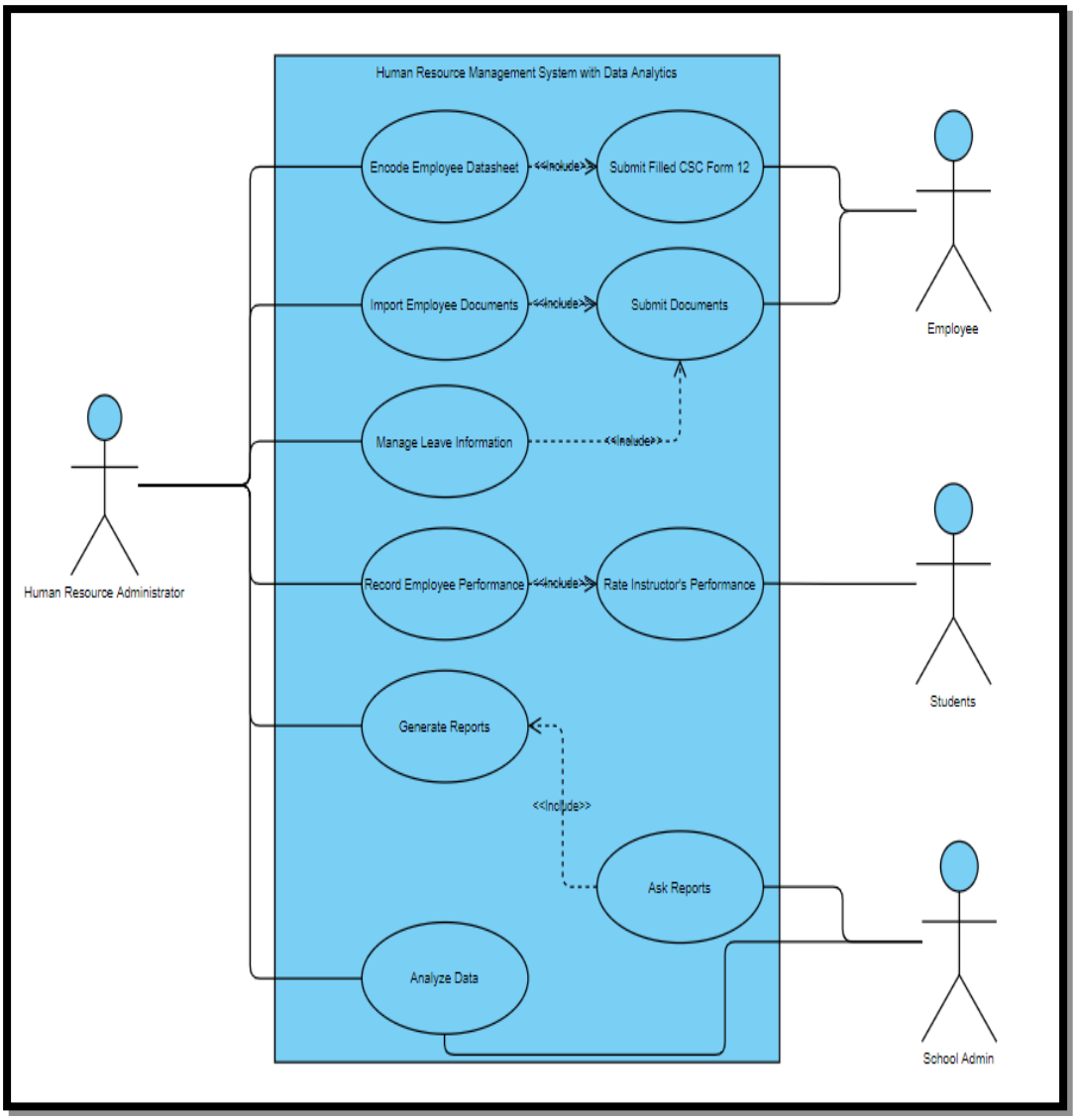

Figure 8. Use-Case Diagram

Figure 8 illustrates the Use Case Diagram of the Human Resource Management System with Data Analysis which identifies four (4) actors: Human Resource Administrator, Students, Employees and the School Admin. These agents are considered as essential part of the system hence they are thought to be either direct or indirect users of the system.

Software Requirements

The following are the software requirements for the development and implementation of Human Resource Management System with Data Analysis:

- Windows 10 operating system
- XAMPP
- Google Chrome as browser for better compatibility
- Bootstrap
- JQuery

Hardware and Other Required Devices

The following are the minimum hardware requirements of the system for it to be functional:

- **Processor:** Intel ® Core ™ i3-4030U CPU @ 1.9GHz
- **RAM:** 1.00 GB
- **Graphics:** Intel ® HD Graphics Control Panel
- **Peripheral:** Mouse, Keyboard/ Touchpad and printer

Programming Environment

The interface of the system which is visible to the user is being developed using scripting languages such as HTML, CSS, Javascript, Bootstrap Framework, and JQuery. While for back-end, the programming language that was

used is the PHP: Hypertext Pre-processor (PHP) which is much known for its lightweight capability and as an open-source scripting language. Most developers prefer using this scripting language in order for them to develop dynamic web pages which is usually being accompanied by Open-Source flexible database management software – MySQL.

Test Plan

To test the system, the researcher asked three IT Experts to validate the functionality of the system and to ensure that the system met its objectives and specifications by evaluating the following: the program design for its objectivity, validity, effectiveness, and completeness of the system. The measuring tool used in Expert Testing is the ISO/IEC 25010 Software Quality Model.

CHAPTER IV

PRESENTATION, ANALYSIS, AND INTERPRETATION OF RESULTS

After the thorough evaluation of experts and respondents, the following are generated:

	Mean	Verbal Interpretation
I can generate reports and other human resource-related forms and documents.	**4.92**	Very High
I can manage employee records.	**4.68**	Very High
I can view instructor's semestral performance rating, school activities through notifications and received memorandum/a.	**4.75**	Very High
Total	**4.78**	**Very High**

Table 4. In terms of managing records and employee data analysis

Table 4 shows the result of the user’s feedback in using the Human Resource Management system with Data Analysis in terms of generating easily-accessed reports and forms from archive, managing the employee record with efficiency and correctness as well as viewing the instructor’s semestral performance rating through data analysis. The table above shows a mean value of 4.78 which is interpreted as Very High.

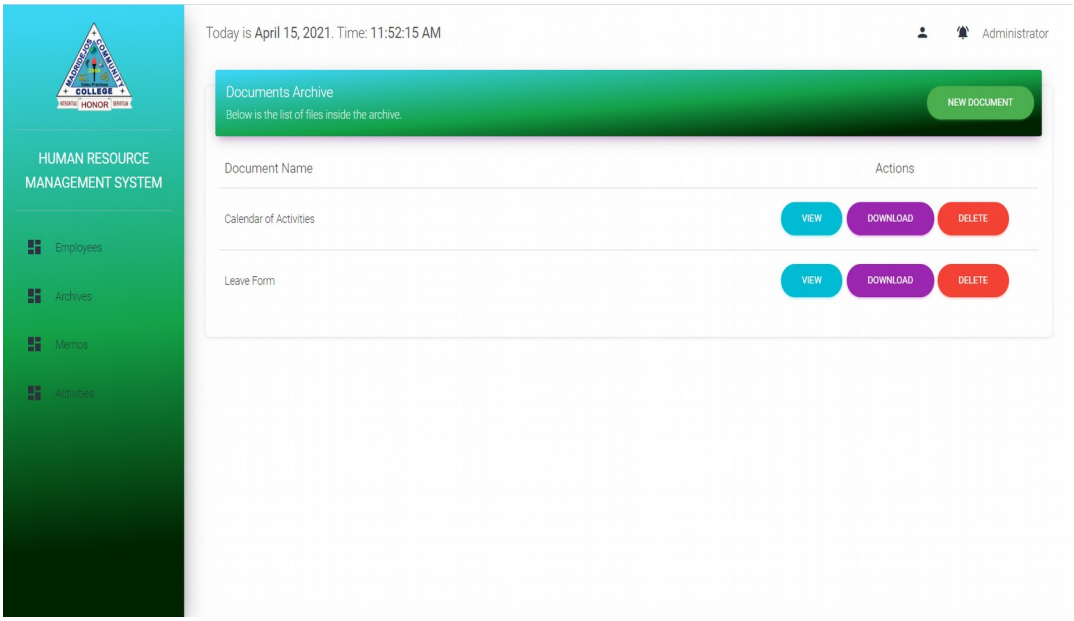

Figure 9. Human Resource-related documents, forms and reports available and ready for reproduction

Figure 9 shows a part of the Human Resource Management System with Data Analysis where a HR Staff can store any human resource-related documents for its future availability. Through this functionality of the system, forms are being organized and can be requested and reproduced anytime a certain document is needed.

Figure 10. Management of Employees' Profile and Records

Figure 10 above shows the part of the Human Resource Management System with Data Analytics where employees' records are available for modification and or updates. The HR staff can easily modify and or update records of a certain employee, generate related reports such as their Personal Data Sheet and even the list of the all employees of the organization.

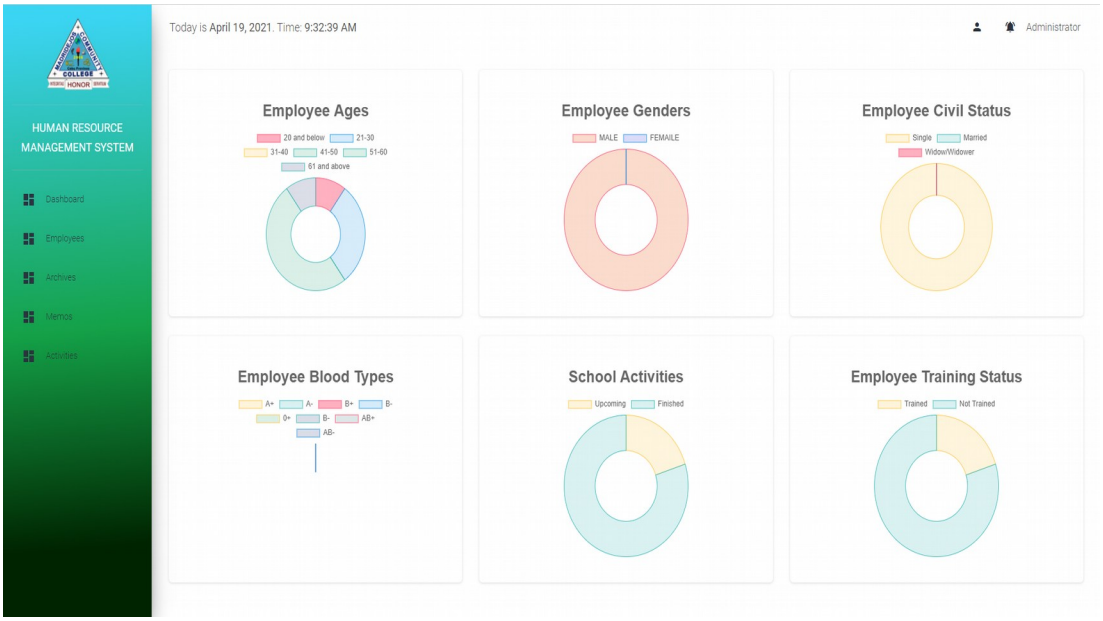

Figure 11. Data Analysis of Employees

Figure 11 shows the dashboard of the Human Resource Management System with Data Analytics where graphs and charts pertaining to the analyzed data of the employees e.g. semestral performance rating, number of teaching and non-teaching staffs and trainings needed.

	Mean	Verbal Interpretation
I can upload, view and print any human-resource related documents.	**4.68**	Very High
I can analyze employees' data in terms of training needs based on specialization.	**4.83**	Very High
I can generate report of an employee's profile	**4.83**	Very High
Total	**4.78**	**Very High**

Table 5. In terms of uploading, viewing and printing of human resource-related documents, training analysis and generation of employee's profile.

Table 5 shows the expert's feedback regarding the usefulness of the system based on uploading, viewing and printing of human resource-related documents. Training analysis based on specializations is also being rated as Very High including the generation of employee's profile which garnered an average total of **4.78** which has a verbal interpretation of **Very High**.

Figure 12. The system showing an option to upload, view, download and print human resource-related documents

Figure 12 shows the portion of the HRMS with Data Analysis which allows the user to upload, view, download and print human resource-related documents. The expert during the system evaluation rated this functionality with an average of **4.68** which has a verbal interpretation of **Very High.**

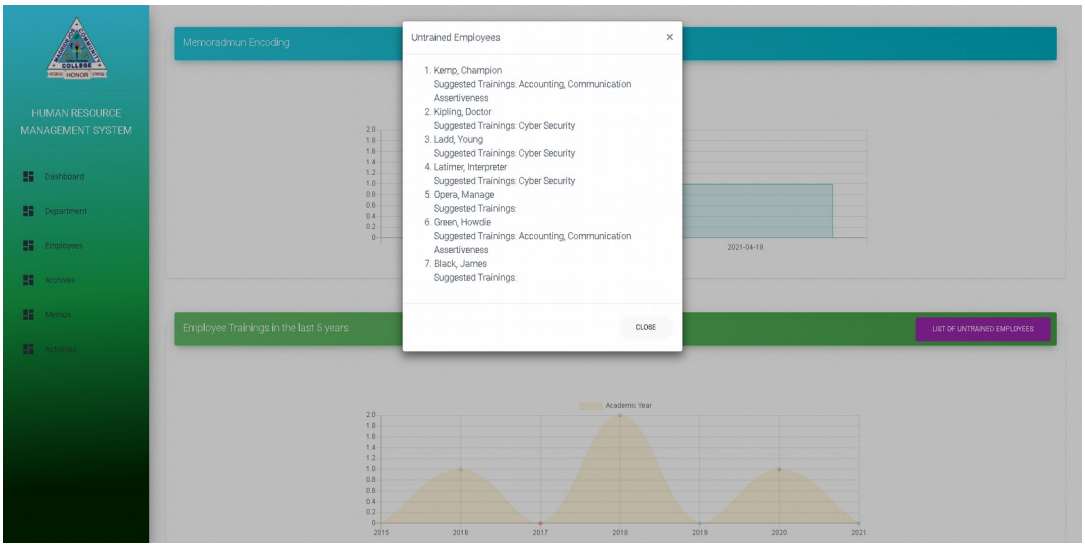

Figure 13. A part of the system which displays the training analysis of the employees

Figure 13 above shows the part of the system which informs the user the training needs of the employees based on their specializations. It is also in this part of the system where the names of the employees appear as being recommended for certain training. After this functionality was evaluated by the panel of experts, it turns out a mean of **4.83** which has a verbal interpretation of **Very High.**

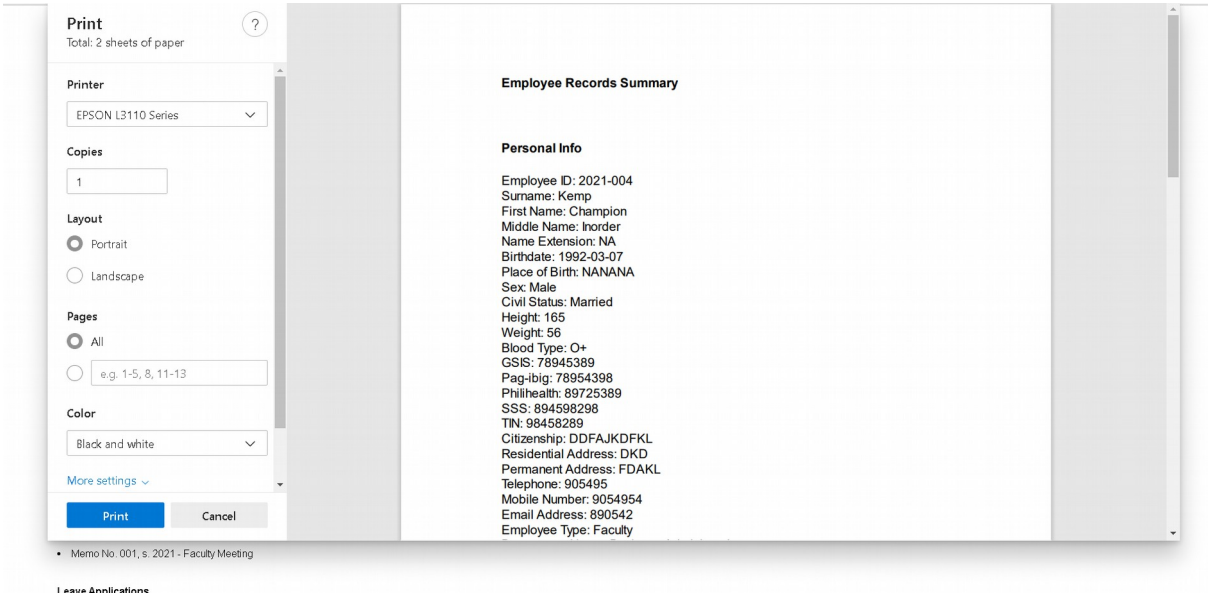

Figure 14. In terms of generating a report through an employee's profile

Figure 14 shows the part of the system where a user can generate an employee's profile through a report. It was rated an average of **4.83** during the expert's evaluation of the system and has a verbal interpretation of **Very High.**

Criteria	Mean	Verbal Interpretation
Functional Suitability	**4.67**	Very High
Performance Efficiency	**4.56**	Very High
Compatibility	**4.67**	Very High
Usability	**4.73**	Very High
Reliability	**4.67**	Very High
Security	**4.67**	Very High
Maintainability	**4.67**	Very High
Portability	**4.67**	Very High
Total	**4.6638**	**Very High**

Table 6. In terms of the characteristics set in ISO 25010 Software Quality Model

Table 6 shows the result of the IT Experts' feedback in determining the quality of the Human Resource Management System with Data Analysis based on the characteristics set in the ISO 25010 Software Quality Model.

In terms of Functional Suitability, Performance Efficiency, Compatibility, and Usability, it was rated with a mean value of 4.66, which is interpreted as Very High. With regards to Reliability and Portability, it was rated with a mean value of 4.67, which is interpreted as Very High.

Concerning Security, it was rated with a mean value of 4.67, which is interpreted as Very High. As to Maintainability, it was rated with a mean value of 4.67, which is interpreted as Very High.

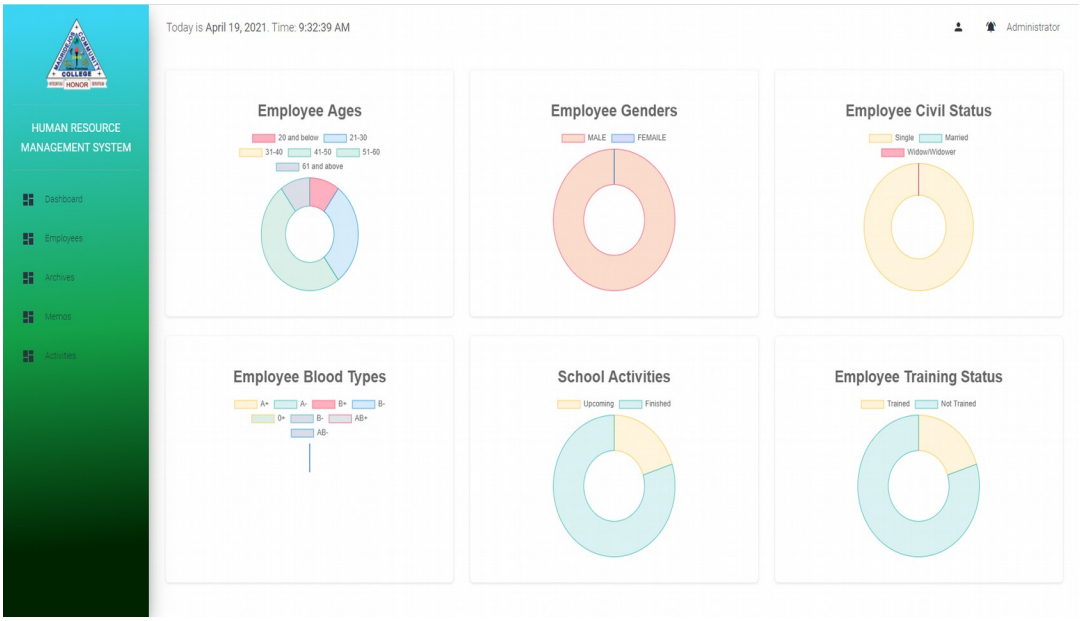

Figure 15. Human Resource Management System with Data Analysis Main Page

Figure 15 shows the main page of the Human Resource Management System with Data Analysis which allows the human resource staff to navigate through various navigations menus like Dashboard, Employees, Archives, Memos, and Activities. The main page also displays the graphs like the pie graph to show the age brackets of the employees, gender, civil status, blood types, school activities and their training status of Madridejos Community College. In terms of Functional Usability, the system is very versatile primary because it runs on a web browser and very easy also to navigate through the use of the mouse.

Performance efficiency - the system runs faster and processes the data much faster because it runs on its web

server of the local machine it is only used by a single user and uses MySQL database which can store and big amount of data in the system. The use of open-source software like PHP, Apache, and MySQL make the system compatible with other operating systems like Mac OS and Linux operating system which can run with little or no modification on its code.

In terms of security, the system is very secure because it uses various validation checks to make sure the user will give only valid input information to the system. The system also has a login page which only allows authorized users to gain access to the system and restrict unauthorized users.

Regarding the maintenance of the system, it is easier because the researcher is also an employee of Madridejos Community College likewise, the one who will be providing a technical support of the said system.

Furthermore, the Human Resource Management System with Data Analysis is very portable and can run on any operating systems which support the PHP, Apache, and MySQL. The system also supports various web browsers which most users have already been familiar using. The other benefit is that technologies being used by the system are open-source which is free to use, free of charge and has lot coverage of developers and or

community which can helps the school save some money during the maintenance and usage of the system.

Criteria	Mean	Verbal Interpretation
Usefulness	**4.81**	Very High
Satisfaction	**4.84**	Very High
Ease of Use	**4.65**	Very High
Ease of Learning	**4.73**	Very High
Total	**4.76**	**Very High**

Table 7. In terms of usefulness, satisfaction, and ease of use and learning

Table 7 shows the result of the users' feedback in determining the usability of the Human Resource Management System with Data Analysis based on usefulness, satisfaction, and ease of use and learning.

In terms of Usefulness, it was rated with a mean value of 4.81, which is interpreted as Very High. With regards to Satisfaction, it was rated with a mean value of 4.84, which is interpreted as Very High. As to Ease of Use and Learning, it was rated with a mean value of 4.69, which is interpreted as Very High.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary of Findings

Based on a detailed presentation, discussions, interpretation, and analysis of research findings, the following summary is now presented:

1. In terms of generating reports and other human resource-related forms and documents, it was rated with a mean value of 4.92 which has a verbal interpretation of Very High.
2. In terms of managing the employees' record, it was rated with a mean value of 4.68, which is interpreted as Very High.
3. In terms of viewing the instructor's semestral performance rating, leave of absences and received memorandum/a, it was rated with a mean value of 4.75, which has a verbal interpretation of Very High.
4. In terms of determining the quality of the Human Resource Information System with Machine Learning Integration based on the characteristics set in ISO 25010 Software Quality Model, it was rated with a

mean value of 4.66, which is interpreted as Very High.

5. In terms of determining the usability of the Human Resource Management System with Data Analysis based on usefulness, satisfaction, and ease of use and learning, it was rated with a mean value of 4.76, which is interpreted as Very High.

Conclusion

Using Descriptive Analysis, the researcher was able to present the analysis of the employees’ record and or profiles through a dashboard. In addition, the researcher concludes that, based on the thorough evaluation of the experts and respondents that the Human Resource Management System with Data Analysis is highly usable, secured, efficient, and provides a fast and easy way to manage employees' records, creation of various employees reports such as personal data sheet, list of employees, birthdays, memoranda, human resource-related documents and forms in addition to the presentation of employee-related data through analysis.

In terms of onboarding new employees, the Human Resource Management System with Data Analysis is a fast and reliable tool for the human resource office. The use of this system can also help in storing employees' records with security, accuracy and efficiency and the

availability of the records is at hand that whenever a report like list of employees is needed, it can be printed and or produced in a manner of seconds. The faster and timely access of employee's information can be used by the administrator for monitoring the employee's training, work experiences, educational attainments, years of service and most importantly the analysis of data which can be used as a tool to improve the retention of employees in the school by providing more employees driven policies and programs which is very beneficial to the school and its employee's in general. Data Analysis is a very helpful and useful tool being integrated to Human Resource Management as it helps the administrator of the school predict the trends and curves of its employee in terms of their achievements, professional developments, trainings needed and all other aspects of human resource management.

Recommendation

Based on the findings and conclusion drawn, the following recommendations are put forward:

1. The Human Resource Staff of the Madridejos Community College may consider implementing this system to:

a. Manage the employees' records. This system can be effectively used as a personnel administration tool. It can help the human resource staff to work faster in the retrieval and processing of employee records. The reduction in duplication of efforts on the part of human resource staff leading to a reduction in cost;

b. utilize the use of various report generating tools available in the Human Resource Management System with Data Analysis like printing Personal Data Sheets to be required during regularization, list of employees, length of service, human resource-related documents and forms being archived in the system;

c. Use the graphical representations of analyzed data through pies and graphs containing the educational qualifications of the teaching staffs, trainings needed, length of service and semestral performance of the instructors. This data analysis serves as a tool in improving the decision-making of the administrator in improving the quality of their human resources.

2. Further, it is also recommended that a similar study may be conducted to improve the Human Resource Management System with Data Analysis in terms of monitoring the attendance with direct relation to payroll system of Madridejos Community College.

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APPENDICES

APPENDIX A

EXPERT EVALUATION USING ISO/IEC 25010

SOFTWARE QUALITY MODEL

Name: _____ **Company:** _____
Position: _____ **Specialization:** _____

Direction: Listed below are the characteristics of a Software or Product as based on **ISO/IEC 25010 Software Quality Model**.

Each of the items is provided with five options. Please read each item carefully and **check (/)** the box that closely represents your choice.

Rating Scale:

[5] Very Good [4] Good [3] Average [2] Fair [1] Poor

How would you rate the developed system, **"HUMAN RESOURCE MANAGEMENT SYSTEM WITH DATA ANALYSIS"** in terms of the following software criteria:

Functional Suitability the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions	
• **Functional completeness.** Degree to which the set of functions covers all the specified tasks and user objectives.	[1] [2] [3] [4] [5]
• **Functional correctness.** Degree to which a product or system	[1] [2] [3] [4] [5]

provides the correct results with the needed degree of precision.	
• **Functional appropriateness.** Degree to which the functions facilitate the accomplishment of specified tasks and objectives.	[1] [2] [3] [4] [5]
Performance efficiency the performance relative to the amount of resources used under stated conditions	
• **Time behaviour.** Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.	[1] [2] [3] [4] [5]
• **Resource utilization.** Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements.	[1] [2] [3] [4] [5]
• **Capacity.** Degree to which the maximum limits of a product or system parameter meet requirements.	[1] [2] [3] [4] [5]
Compatibility Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment.	
• **Co-existence.** Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.	[1] [2] [3] [4] [5]
• **Interoperability.** Degree to which two or more systems, products or components can exchange information and use the information that has been	[1] [2] [3] [4] [5]

exchanged.	
• **Appropriateness recognisability.** Degree to which users can recognize whether a product or system is appropriate for their needs.	[1] [2] [3] [4] [5]
• **Learnability.** degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.	[1] [2] [3] [4] [5]
• **Operability.** Degree to which a product or system has attributes that make it easy to operate and control.	[1] [2] [3] [4] [5]
• **User error protection.** Degree to which a system protects users against making errors.	[1] [2] [3] [4] [5]
• **User interface aesthetics.** Degree to which a user interface enables pleasing and satisfying interaction for the user.	[1] [2] [3] [4] [5]
• **Accessibility.** Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.	[1] [2] [3] [4] [5]
Reliability Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time	
• **Maturity.** Degree to which a system, product or component meets needs for reliability under normal operation.	[1] [2] [3] [4] [5]
• **Availability**. Degree to which a system, product or component is operational and accessible	[1] [2] [3] [4] [5]

when required for use.	
• **Fault tolerance.** Degree to which a system, product or component operates as intended despite the presence of hardware or software faults.	[1] [2] [3] [4] [5]
• **Recoverability.** Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system.	[1] [2] [3] [4] [5]
Security Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.	
• **Confidentiality.** Degree to which a product or system ensures that data are accessible only to those authorized to have access.	[1] [2] [3] [4] [5]
• **Integrity.** Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data.	[1] [2] [3] [4] [5]
• **Non-repudiation.** Degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later.	[1] [2] [3] [4] [5]

APPENDIX B

RESULTS OF EXPERT EVALUATION USING ISO/IEC 25010 SOFTWARE QUALITY MODEL

Criteria	Mean	Verbal Interpretation
Functional Suitability	4.67	Very High
Performance Efficiency	4.56	Very High
Compatibility	4.67	Very High
Usability	4.73	Very High
Reliability	4.67	Very High
Security	4.67	Very High
Maintainability	4.67	Very High
Portability	4.67	Very High
Total	**4.6638**	**Very High**

APPENDIX C

EVALUATION INSTRUMENT
USE Questionnaire: Usefulness, Satisfaction, and Ease of use

Based on: Lund, A.M. (2001) Measuring Usability with the USE Questionnaire. STC Usability SIG Newsletter, 8:2.

Name of System: HUMAN RESOURCE MANAGEMENT SYSTEM WITH DATA ANALYSIS

Instruction: Please rate the system on how strongly you agree or disagree with each of the following statements by placing a check mark in the appropriate box.

Legend:

1 – Strongly Disagree
2 – Disagree
3 - Neither agree nor disagree
4 – Agree
5 – Strongly Agree

Usefulness	**1**	**2**	**3**	**4**	**5**
It helps me be more effective.					
It helps me be more productive.					
It is useful.					
It gives me more control over the activities in my life.					
It makes the things I want to accomplish easier to get done.					
It saves me time when I use it.					
It meets my needs.					
It does everything I would expect it to do.					

Ease of Use	**1**	**2**	**3**	**4**	**5**
It is easy to use.					
It is simple to use.					
It is user friendly.					
It requires the fewest steps possible to accomplish what I want to do with it.					
It is flexible.					
Using it is effortless.					
I can use it without written instructions.					
I don't notice any inconsistencies as I use it.					

Both occasional and regular users would like it.					
I can recover from mistakes quickly and easily.					
I can use it successfully every time.					

Ease of Learning	**1**	**2**	**3**	**4**	**5**
I learned to use it quickly.					
I easily remember how to use it.					
It is easy to learn to use it.					
I quickly became skilful with it.					

Satisfaction	**1**	**2**	**3**	**4**	**5**
I am satisfied with it.					
I would recommend it to a friend.					
It is fun to use.					
It works the way I want it to work.					
It is wonderful.					
I feel I need to have it.					
It is pleasant to use.					

List the most **negative** aspect(s):

_____
_____
_____
_____
_____

List the most **positive** aspect(s):

_____
_____
_____
_____
_____

APPENDIX D

EVALUATION INSTRUMENT

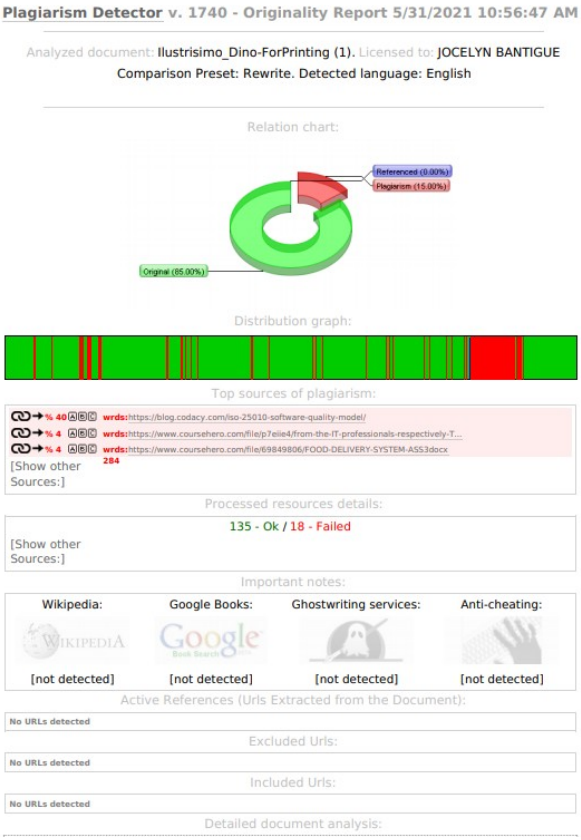
Result of USE Questionnaire: Usefulness, Satisfaction, and Ease of use of Human Resource Management System with Data Analysis

Based on: Lund, A.M. (2001) Measuring Usability with the USE Questionnaire. STC Usability SIG Newsletter, 8:2.

Criteria	Mean	Verbal Interpretation
Usefulness	**4.81**	Very High
Satisfaction	**4.84**	Very High
Ease of Use	**4.65**	Very High
Ease of Learning	**4.73**	Very High
Total	**4.76**	**Very High**

APPENDIX E

PLAGIARISM CHECK RESULT



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APPENDIX F

CERTIFCATE OF UTILIZATION

Republic of the Philippines
Province of Cebu
Municipality of Madridejos
MADRIDEJOS COMMUNITY COLLEGE
Bunakan, Madridejos, Cebu

CERTIFICATE OF UTILIZATION

This certifies the utilization and implementation of the system hereby created by **Dino L. Ilustrisimo** entitled "Human Resource Management System with Data Analysis". This system was accepted and successfully implemented in our school with gratitude to the creator.

Given this 15th day of May 2021 at Madridejos Community College, Bunakan, Madridejos, Cebu, Philippines.

RENO R. SEVILLEJO
Officer-In-Charge

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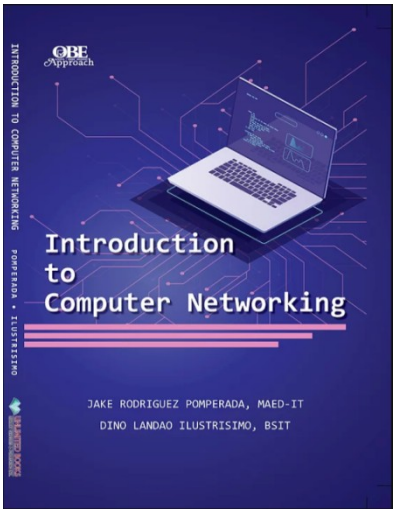
HONOR GRADUATE (Presidential Decree No. 907)

With certificate number 100107140639 issued in October 14, 2014 by CSC Regional Office

BOOK PUBLISHED:



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