

Intelligent Employee Profiling System for Human Resource Decision Support

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Abstract: . Paper-based and manual processes in managing the employee records often result in delays, data inconsistencies, and operational inefficiencies affecting the human resource operations. Similar case was experienced by the human resource office of the Isabela State University at Cabagan in the general management of its employee profiles. To address this concern, the intelligent employee profiling system was developed centralizing the profiling of employee records with reporting and analytics. This digital platform is accessible to both the employee and the human resource personnel for efficient human resource data management operations and effective decision making. The agile software development was utilized based on the reports needed of the human resource office. The developed system was evaluated using the ISO/IEC 25010 covering all the criterion. Moreover, Cronbach alpha was employed to determine the internal consistency of the evaluation. Findings showed high internal consistency across all evaluation criteria, with Cronbach's alpha values of 0.91 and above. Likewise, the system received favorable evaluation result and was user-friendly and effective in supporting human resource decision making and operations, improved accuracy and operational efficiency supporting digital transformation and good governance in the University in general.

Keywords: Decision Support, Digital Transformation, Data Management, Employee Profiling

1. Introduction

The Human Resource office of the Isabela State University plays a vital role in the general management of its employee information, records, profiles, and also supports day-to-day transactions for effective decision making. Laudon and Laudon [1] and Stair Reynolds [2] emphasized that effective information systems are fundamental in improving efficiency to ensure the reliability and availability of information for effective decision making. However, the said office heavily relied on manual and paper-based operations to manage the employee profiles and records. They reported problems on data retrieval as it is being filed in a filing cabinet where they manually locate the file resulting in inefficient and time-consuming data retrieval. Moreover, they have also experienced data loss because of fire that damaged the building. These problems were highlighted with the observations of Robek et al. [4] and Witman and Mattord [7] on the traditional records management practices. Thus, the importance of information systems like the employee profiling is essential in protecting the data in the institution ensuring its confidentiality, availability, and integrity.

Cognizant to the problems experienced by the human resource office at the Isabela State University Cabagan, the intelligent employee profiling system was developed to help improve the operations and services of the human resource personnel. This system consolidates the employee information in terms of their profiles, service records, training and development information providing a convenient and secured way of managing the employee profiles and records in one system centralizing access to both the employee and human resource personnel.

Centralizing access to both employees and human resource personnel help improved efficiency, and transparency thus supporting the digital transformation efforts in the University as a whole. Davenport and Harris [5] and Sharda and Turban [9] pointed out that the integrated information systems and analytics is an effective approach to enhance organizational performance and support data-driven decision making of an organization. The develop system is the core component of the Human Resource Management System developed for the Isabela State University Cabagan streamlining the human resource transactions, improving the accuracy, and accessibility of employee records

and providing real-time report updates to support planning and decision making of management. This contributes to a more responsive and efficient human resource service delivery supporting the digital transformation initiatives in government service as highlighted by Stallings and Brown [8], which is consistent in the role of technology in improving public service performance.

Bottom of FormConceptual Framework of the Study

The conceptual framework of the study illustrates the development and evaluation of an Intelligent Employee Profiling System designed to enhance human resource information management at Isabela State University. The conceptual framework provides centralize access to secure the employee profile for effective operation of the human resource office [4],[7].



Fig. 1. Conceptual Framework for the Intelligent Employee Profiling System

Objectives of the Study

The study aimed to:

1. Develop a web-based profiling system with report generators incorporating the following features:
 - a. Information Management for Accessing and editing information, Personal Information, Position Details, Family Background, Educational Details, Eligibility, Work Experience, Voluntary Work, Training Programs, Other Information
 - b. Service Records
 - c. Printing and Downloading PDS
 - d. Account Management
 - e. Uploading Signature
 - f. Dashboard with Analytics
2. Provide a comprehensive report needed for professional and organizational development initiatives in terms of Training records report for employees filtered by keyword according to the needs of the human resource as to training classification, learning and development, date of training or based on specified information needed.
3. Evaluate how the developed system performs across' key software quality domains using the standard ISO/IEC 25010 software quality model includes eight main characteristics: Functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.

2. Methodology

The study utilized both the Developmental research and Descriptive method of research. Developmental as it followed the Agile application development methodology which serves as guide in the system development process [10]. This process includes include Requirements planning, User Design, Rapid Construction, and Cutover. Descriptive research was utilized on the gathering of data on the evaluation of the developed system including the analysis and description of the results.

For the evaluation, a survey questionnaire was utilized based on the standard web criteria which was used to gather data on the perceived functional suitability, performance efficiency, compatibility, usability, reliability, security,

maintainability, and portability of the system [6]. The study employed descriptive statistics using the mean, standard deviation, median, interquartile range, and percentage distribution to summarize the respondents' ratings across domains. Moreover, the Cronbach's alpha was used to assess the internal consistency and reliability of the instrument..

3. Results And Discussion

The profiling system is a web-based system designed to collect, analyze, organize and centralize the storage and retrieval of employee profiles accessible and updated in real-time with report generators needed by the organization. The following section presents the results and discussion of findings.

A. Development of a Profiling System

The study successfully developed a web-based profiling system with the following core features:

a. Information Management

- **Profiling Page.** The Profiling page allows an employee to edit his/her information using the "Edit My Info" as shown in Fig. 2. This real time update of information provides a convenient way to access current information for efficient and data driven decision-making of the human resource office.

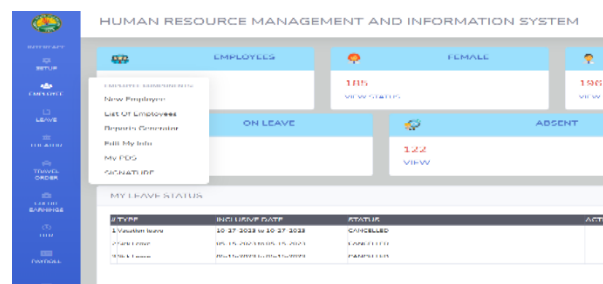


Fig. 2. Profiling page

- **Accessing and Editing Information.** In addition, the Profiling page provides access to the Personal Information, Position Details, Family Background, Educational Details, Eligibility, Work Experience, Voluntary Work, Training Programs, and Other Information can be updated as shown Fig. 3.

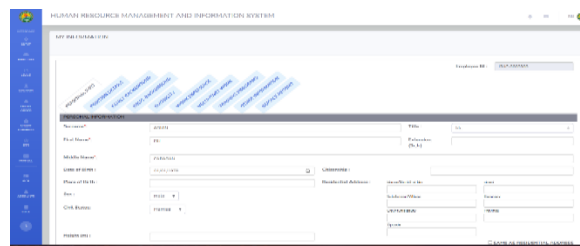


Fig. 3. Accessing and Editing Information

- **Personal Information.** The "My Information" page contains 10 tabs that includes Personnel information where the user can edit all the information in the personal data sheet by simply clicking the "Update" button to save changes automatically.

HUMAN RESOURCE MANAGEMENT AND INFORMATION SYSTEM

PERSONAL INFO

CONTACT DETAILS

EDUC. BACKGROUND

EMPLOYMENT

TECHNICAL SKILLS

MANAGEMENT SKILLS

OTHER INFORMATION

SECURITY PROFILE

EMPLOYEE ID :

0001000000

EMPLOYEE INFORMATION

Surname*	Address	Title	No.
First Name*	SSN	Estimate	(D-M)

Mobile Name*

Country

Date of Birth *

SSN/ID/CR *

Citizenship *

Place of Birth *

Residential Address *

Sex *

Male ☐ Female ☐

Marital Status *

Married ☐ Single ☐

Height (m) *

- **Position Details (Non-Editable).** This tab allows the Human resource to update the information details such as classification, category, and other information including the date of last promotion as shown in Fig. 5. All of the information is deemed important for effective and efficient information to aid in the decision support of management.

Employee ID : SAC-00003

PERSONAL INFO

PASSWORD DETAILS

EDUCATION BACKGROUND

EMPLOYMENT HISTORY

PHONE NUMBERS

TECHNICAL SKILLS

OTHER INFORMATION

SERVICE RECORD

POSITION DETAILS

CLASSIFICATION	Category :	Status :
Academic support staff	Rank And File	Contract Of Service
Position :	System developer / Programmer	
Salary Grade Step :	Department :	Program :
Please select	MST	Please select
Date Hired :	Date Of Separation :	
25-10-2022		
Payroll :	Date Of Appointment :	Date Of Last Promotion :

- **Family Background.** This tab allows the user to edit information about their family background information like his father, and mother's information and children that are applicable. The information can be updated by clicking the "Update" button to save changes as shown in Fig. 6. The information is automatically updated once the Update button is clicked.

PERSONAL INFO

POLITICAL AFFILIATION

RACE / ETHNICITY

SEX & GENDER

VOLUNTARY WORK

TRAINED IN DISASTER

OTHER INFORMATION

SIGNATURE REQUIRED

FAMILY BACKGROUND

Spouse's Surname : First name : Middle name : Extended(S/J) : Occupation : Employer/Bus. Name : Business Address : Telephone No. :	Name of child (Prints fullname and last all) Date of Birth
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Father's

Surname :

Firstname :

Middlename :

- **Educational Background.** This tab allows the user to edit information about the educational background that includes elementary, secondary, vocational, college, and graduate studies. The information

can be updated by clicking the "Update" to save changes as shown in Fig. 7. The information is automatically updated once the Update button is clicked.

Figure 7. Educational Background

- **Eligibility.** This tab allows the user to edit Eligibility information such as licenses . It has the plus button at the bottom to add more eligibility details and "Update" button to save changes as shown in Fig. 8. The information is automatically updated once the Update button is clicked.

Fig. 8. Eligibility

- **Work Experience.** The work experience tab allows the user to edit previous work experiences. It has the plus button at the bottom to add additional entries, and "Update" button to save changes as shown in Fig. 9. The information is automatically updated once the Update button is clicked.

MY INFORMATION

Employee ID :

PERSONAL INFO

POSITION DETAILS

EDUCATION BACKGROUND

TECHNICAL SKILLS

WORK EXPERIENCE

TRAINING PROGRAMS

OTHER INFORMATION

SERVICE RECORD

INCLUSIVE DATES		POSITION TITLE	DURATION/PERCENTAGE OF THE CONTRACT	MONTHLY SALARY	SALARY GRADE (if applicable)	STATUS	EMP'T SERVICE (YR)
From	To						
mm/dd/yyyy 📅	mm/dd/yyyy 📅	system developer		0			
mm/dd/yyyy 📅	mm/dd/yyyy 📅	graphic artist		0			
mm/dd/yyyy 📅	mm/dd/yyyy 📅	programmer		0			

Fig. 9. Work Experience

- **Voluntary Work.** The Voluntary work tab allows the user to edit voluntary work experiences. It has the plus button at the bottom to add more entries and the "Update" button to save changes as shown in Fig. 10. The information is automatically updated once the Update button is clicked.

MY INFORMATION

PERSONAL INFO

PERSONAL DETAILS

ADDITIONAL INFORMATION

CONTACT INFORMATION

WORK EXPERIENCE

EDUCATION

OTHER INFORMATION

ADDITIONAL ACTIONS

Employee ID: ELS-000002

Voluntary Work

Name and Address of Organisation

Address

City

Postcode

Country

Phone Number

Website

Inclusive Dates

From

To

Number of Hours

Hours per Week

Days per Week

Signature of Work

Signature

Date

Save

Cancel

Fig. 10. Voluntary Work

- **Training Programs.** The Training programs tab allows the user to edit training programs or interventions. It has the plus button at the bottom to add additional training records and the "Update" button to save changes as shown in Fig. 11. The information is automatically updated once the Update button is clicked.

STUDY

WORKSHOP

UNIT

LECTURE

TRAINING

JOINT VISIT

FIELD

MANUAL

POP

ACCUSYS

VIDEO

3D

MY INFORMATION

PERSONAL INFO

POSITION ON TEAM

POINT OF CONTACT

ELIGIBILITY

HYPERLINKS

INDEPENDENT REVIEW

TRAINING PROGRAMS

OTHER INFORMATION

SUBMIT RECORD

Employee ID:

SUC000000

TRAINING PROGRAMS

TITLE OF LEARNING AND DEVELOPMENT INTERVENTIONS/TRAINING PROGRAMS OR TEDSA TRAININGS	INCLUSIVE DATES OF ATTENDANCE		NUMBER OF HOURS	TYPE OF LD managerial, supervisory, technical/sk	Conducted/Sponsored By
	From	To			
Training 1	mm/WW/yyyy	mm/WW/yyyy		Managerial	s

+

-

STATUS

UPDATE

Fig.11. Training Programs

- **Other Information.** The other information tab allows the user to edit details regarding other information like special skills. It has the plus button at the bottom to add more entries and the "Update" button to save changes as shown in Fig.12. The information is automatically updated once the Update button is clicked.

Fig. 12. Other Information

- **Service Record.** The Service record tab is non-editable where you can only view the service record. This part can only be edited by HR as shown in Fig. 13. This is to provide an accurate report of the service record rendered by the faculty which was validated by the human resource office.

Fig. 13. Service Record

b. **Printing or Downloading the PDS.** The PDS can also be printed under the side menu under "Employee" tab – PDS, wherein a copy of your PDS will automatically appear and can be printed and downloaded as shown in the Fig. 14.

Fig. 14. Printing and Downloading PDS

d. *Account Management.* The account management tab allows you to change your password, under the profile picture in the upper right corner of the screen, Change Password as shown in Fig. 15.

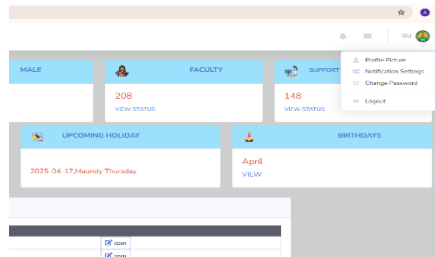


Fig. 15. Account Management

• *Uploading a Signature.* The signature can be uploaded in the side menu under the "Employee" tab – Signature as shown in Fig. 16. There are two available methods: Create Signature which is recommended for users with a pen tool and drawing pad and the "Clear" button is use to redo the signature, if necessary, as shown in Fig. 16. This is to provide convenience and security of the information provided in the PDS.

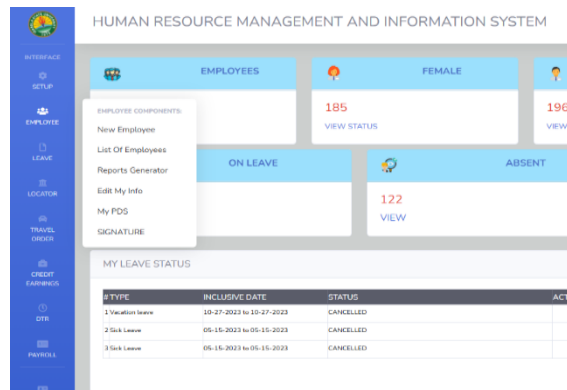


Fig. 16. Signature Tab

On the other hand, the Upload Signature is used for users without a pen tool with a PNG format then click the "Upload Image" shown in Fig. 17 to upload the signature selected. Click "Save" to use it for leave applications, locator, and travel orders.

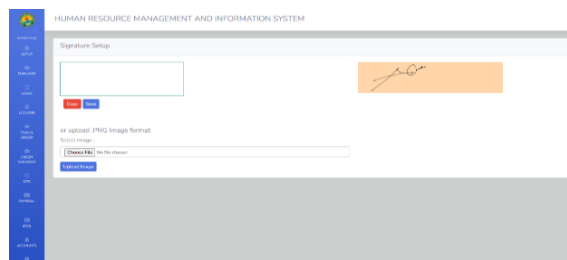


Fig. 17. Upload Signature

e. *Dashboard and Analytics.* The dashboard and analytics facilitate the needed information that are crucial for the employee profiling report needed in the human resource office. It provides all the needed information such as such as the number of employees that were absent, on leave, on travel, etc. as shown in Fig. 18 for effective decision support making.

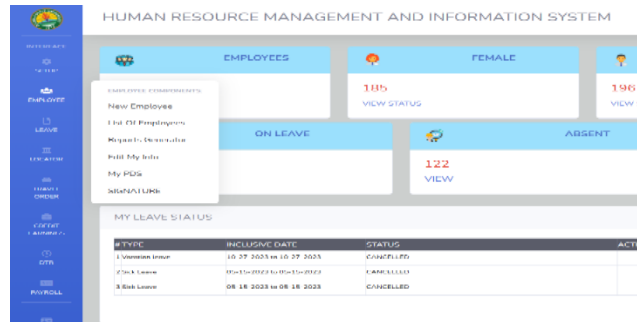


Fig. 18. Dashboard and Sample Analytics for the Training Report for Employees

B. Training Records Report for Employees

Fig. 19 shows the training report for employees for a comprehensive and structured information about the training activities of the employees. It provides a centralized access of all the training activities duly attended by the employees with all the needed information necessary to support decision making of the human resource office.

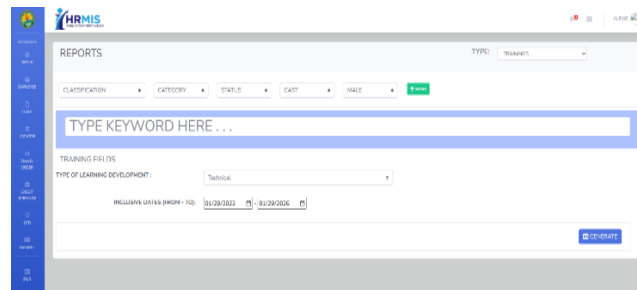


Fig. 19. Training Records Report for Employees

a. Classification of Training. Fig. 20 shows the report that is used to monitor the development of an employee that will further support strategic planning for future trainings needed for professional development. The system provides an IntelliSense feature to filter and refine the needed reports according to classification, category, employment status, office or college affiliation, gender, employee date added to the system, and age parameters (below or above a specified age threshold). This provides an intelligent way of providing the classification of training needed for a better decision by the human resource.

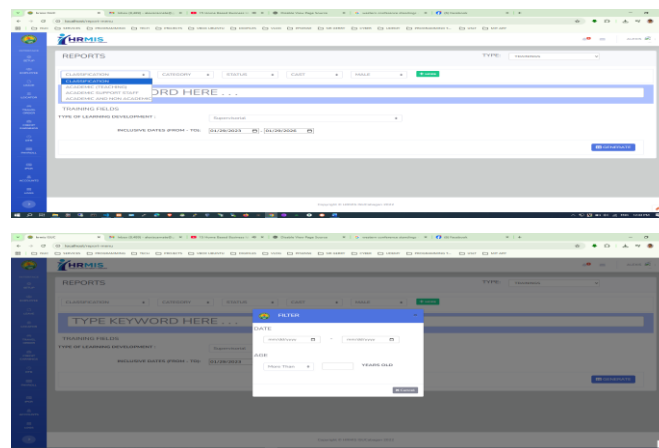


Fig. 20. Classification of Training

Fig. 21 allows users to specify exact keywords to further refine search results, enabling more precise and efficient filtering of the desired records. Additionally, keywords are provided for searching for efficient access to information.

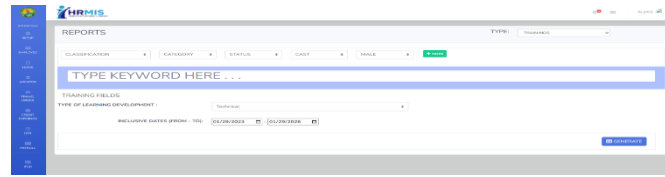


Fig. 21. Filter training with Keyword

Fig. 22 uses a filtering feature by date that enables users to accurately and systematically refine records to ensure that only relevant data are displayed.

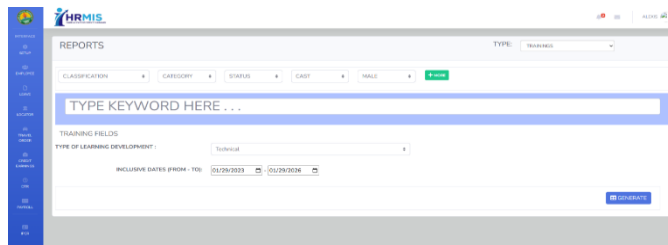


Fig. 22. Filtering Feature by Date

Under the training fields, the system also incorporates filtering options for the type of learning and development as well as inclusive dates as shown in Fig. 23. These functionalities improve the efficiency of proving the needed the reports that support analysis of the training activities attended by the employee for a certain period.

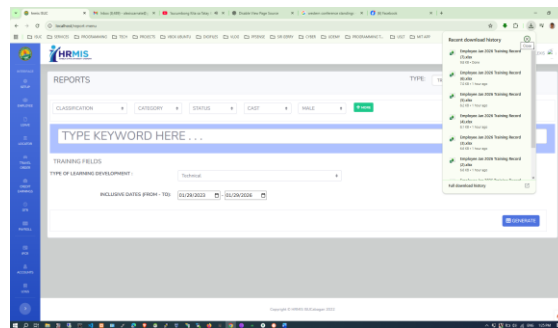


Fig. 23. Filtering by Learning and Development

Fig. 24 shows the output once the Generate button is clicked. The system intelligently processes the entered criteria based on criteria and generates an Excel file containing the requested data. The file can be automatically downloaded to allow a convenient way of review and analysis of information.

[illegible]

Fig. 24. Sample Training Report Based on Specified Condition

C. Evaluation of Effectiveness of the Profiling System

The evaluation of the system was based on the software quality standards [6] with all the seven (7) domains reflected in Table 1. All of the criteria were based on the overall performance of employee profiling system based on the user experienced for the software quality.

As shown in Table 1, it demonstrated an excellent internal consistency with Cronbach's alpha values equal to or greater than 0.91 which means that the grouped items within each construct were highly reliable in measuring the performance of the employee profiling system. From the domains reflected, Effectiveness and Usability obtained the highest mean ratings. This suggests that most users perceived the Employee Profiling System is an effective tool that enhances the work performance of employees. Moreover, the system in general is easy to navigate and operate thus providing an effective HR management services and operations [3].

Table 1. EFFECTIVENESS OF PROFILING SYSTEM

Domain	Mean	SD	Median	IQR	% respondents $\geq$ Agree (≥ 4)	Cronbach's α
Functionality	3.901	0.892	4.0	1.0	55.2%	0.928
Performance Efficiency	3.800	0.886	3.8	0.9	43.3%	0.935
Compatibility	3.755	0.874	3.8	0.8	40.3%	0.950
Usability	4.036	0.843	4.0	0.8	70.1%	0.953
Reliability	3.603	0.885	3.6	1.0	40.3%	0.949
Security	3.797	0.842	3.8	0.6	43.3%	0.917
Maintainability	3.585	0.914	3.6	1.0	35.8%	0.965

4. CONCLUSION

Based on the findings of the study, the following conclusions were drawn:

1. The intelligent employee profiling system developed met its intended purpose that significantly improved the efficiency, accessibility, and accuracy in the general management of employee record and information.
2. The developed system provided the comprehensive reports that facilitated informed decision making that supported the professional and organizational initiatives.
3. The result of evaluation confirmed that the developed systems satisfied the ISO/IEC 25010 software quality with a high ratings demonstrating that the system is effective, reliable and efficient solution for the human resource management.

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