SOUTHEAST ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

Trackternship: A Web-Based Internship Management and Student Employability Prediction System Using Random Forest Algorithm

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Article Info:
Received: ***05 June 2025;*** *Revised:* ***19 Aug 2025;*** *Accepted:* ***21 Sept 2025;*** *Available Online:* ***17 Dec 2025***

Abstract - *Internship or On-the-Job Training (OJT) programs play an important role in preparing students for professional practice and workforce readiness. However, many higher education institutions continue to utilize manual and spreadsheet-based internship management processes, resulting in inefficient document handling, delayed report generation, fragmented monitoring procedures, and limited employability assessment capabilities. To address these challenges, this study developed TRACKTERNSHIP, a web-based internship management and employability prediction system for the Internship Program Office of Urdaneta City University. The study utilized a descriptive-developmental research design supported by Design Science Research (DSR) principles, and the Rapid Application Development (RAD) methodology in developing the system. TRACKTERNSHIP integrated functionalities for OJT tracking, file and document management, student progress monitoring, employability prediction, and automated report generation. The Random Forest Algorithm was integrated to analyze internship-related performance indicators and generate employability predictions for student interns. The developed system was evaluated using ISO/IEC 25010 Software Quality Standards, System Usability Scale (SUS), and User Acceptance Testing (UAT) involving student interns, OJT coordinators, and the Director of the Internship Program Office. Results revealed that the system achieved high software quality and usability evaluation results with an overall weighted mean of 4.39 interpreted as Strongly Agree, while the Random Forest Algorithm achieved an overall prediction accuracy of 91.4%. The findings indicate that TRACKTERNSHIP improved internship monitoring efficiency, centralized document management, employability analytics, and institutional reporting procedures. The study demonstrates the potential of integrating machine learning and web-based technologies in improving internship management and supporting data-driven employability assessment in higher education institutions.*

Keywords – *educational data mining, employability prediction, internship management system, machine learning, Random Forest Algorithm, web-based information system.*

INTRODUCTION

Internship or On-the-Job Training (OJT) programs remain essential components of higher education institutions because they provide students with opportunities to apply theoretical knowledge within actual workplace environments. Through internship immersion, students develop technical competencies, communication abilities, professional discipline, adaptability, and workplace readiness that significantly contribute to employability outcomes and career preparation. In recent years, higher education institutions have increasingly adopted digital transformation initiatives to improve academic operations, administrative efficiency, and institutional decision-making processes through technology-driven systems and data analytics.

Recent studies emphasized the growing importance of web-based internship management systems in improving operational efficiency, centralized monitoring, and institutional coordination within

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

educational institutions. Mydyti (2025) highlighted that web-based internship information systems significantly reduce administrative workload, improve transparency, and enhance monitoring procedures through centralized digital platforms. Similarly, (Nugraha et al., 2023) emphasized that digital internship management systems improve document organization, supervision, and internship monitoring while reducing dependency on physical records and manual processing procedures. In addition, (Web-Based Student Internship Attendance Application System, 2023) explained that technology-driven attendance and monitoring systems improve operational efficiency, reduce administrative burdens, and provide real-time data visibility for educational institutions. Wicaksana et al. (2023) further emphasized that high-usability web-based internship platforms improve workflow efficiency and contribute significantly to user satisfaction and system acceptability.

The integration of educational analytics and predictive technologies has also become increasingly relevant in higher education systems. According to Rane et al. (2023), educational data mining and predictive analytics support evidence-based decision-making by identifying student performance patterns and institutional trends through intelligent data analysis. Byagar et. al (2025) demonstrated that machine learning algorithms can effectively predict student employability using indicators such as internship experience, communication skills, technical competency, and workplace evaluations. Similarly, Musa et al. (2025) emphasized that internship participation significantly contributes to the development of soft skills and employability competencies necessary for workforce readiness. These studies demonstrate the growing relevance of predictive analytics and machine learning technologies in improving educational support systems and employability assessment within higher education institutions.

Despite these technological advancements, many higher education institutions in the Philippines continue to utilize manual internship management procedures involving spreadsheet-based monitoring systems and paper-based document handling. At the Internship Program Office of Urdaneta City University, internship coordinators manually encode student information using Microsoft Excel while maintaining physical folders containing student requirements, Daily Time Records (DTRs), weekly reports, evaluation forms, and deployment documents. Such procedures consume considerable administrative time and expose the institution to operational inefficiencies, inconsistent monitoring practices, delayed report generation, data redundancy, and document management issues.

Document management remains one of the major challenges in manual internship operations. Student requirements including medical certificates, barangay clearances, résumés, Memoranda of Agreement (MOAs), endorsement letters, and weekly reports are physically stored and manually validated, increasing the risk of document loss, incomplete submissions, delayed verification, and retrieval difficulties. Oliveros (2022) identified similar operational challenges in internship monitoring systems, particularly the inefficiencies caused by manual report submission and administrative backlogs. Likewise, (An Architectural Approach of a Web-Based Monitoring System for Efficient Internship Time Tracking, 2025) emphasized that digital internship monitoring systems with centralized data management significantly improve accountability, monitoring efficiency, and accessibility of internship records through automated and real-time tracking mechanisms. Barrocan et al. (2025) further noted that web-based internship monitoring systems with automated reporting functionalities reduce human error and administrative workload while improving efficiency in internship time tracking and records management.

Another significant limitation of existing internship management systems is the absence of predictive analytics and intelligent employability assessment functionalities. Most existing systems primarily focus on administrative monitoring rather than analyzing internship-related performance

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

indicators that may contribute to employability outcomes. Recent developments in machine learning and educational analytics demonstrated that predictive models can effectively evaluate employability using indicators such as attendance consistency, communication skills, technical competency, supervisor evaluations, workplace behavior, and task completion performance (Mendoza, 2025). Chaurasia (2023) demonstrated that internship-related datasets and student performance indicators can be utilized to predict employability and workforce readiness using machine learning techniques, while (Lacap et al., 2025) emphasized that technical skills, portfolios, and internship-related competencies significantly contribute to employability prediction accuracy.

Among machine learning algorithms, the Random Forest Algorithm has become widely utilized in educational prediction systems because of its high classification accuracy, robustness against overfitting, and capability to process multidimensional datasets. According to Yadav and Vishwakarma (2023), Random Forest utilizes ensemble learning through multiple decision trees and majority voting mechanisms to improve prediction reliability and classification performance. The algorithm has demonstrated strong effectiveness in educational data classification and predictive analytics involving employability assessment and student performance evaluation.

In response to these challenges, this study developed TRACKTERNSHIP, a web-based internship management and employability prediction system intended for the Internship Program Office of Urdaneta City University. The system was designed to centralize internship operations, automate report generation, improve document management, monitor student progress, and integrate employability prediction using the Random Forest Algorithm. Specifically, the system integrated functionalities for OJT tracking, file and document management, student progress monitoring, employability analytics, and automated institutional report generation.

The study utilized Developmental Research Design combined with Design Science Research (DSR) principles and the Rapid Application Development (RAD) methodology to guide the design, development, implementation, and evaluation of the proposed system. Through the integration of educational data mining, machine learning, and web-based information systems, TRACKTERNSHIP seeks to improve internship management efficiency, reduce administrative workload, strengthen institutional monitoring capabilities, and support data-driven employability assessment within higher education institutions.

Furthermore, the study supports Sustainable Development Goal (SDG) 4: Quality Education by promoting technology-driven educational support systems that improve internship monitoring, student development, and workforce preparedness. The study also contributes to Sustainable Development Goal (SDG) 8: Decent Work and Economic Growth through the implementation of employability analytics and intelligent internship management mechanisms that support career readiness, skills development, and data-driven workforce preparation among higher education students.

OBJECTIVES OF THE STUDY

This study aimed to develop TRACKTERNSHIP: A Web Application for Managing Internship Programs and Predicting Student Employability using Random Forest Algorithm.

Specifically, the study aimed to:

1. Analyze the existing procedures, operational challenges, and process gaps encountered in internship management;
2. Design and develop TRACKTERNSHIP with modules for:
    a. OJT tracking;
    b. file and document management;
    c. student progress monitoring;
    d. employability prediction; and
    e. automated report generation;
3. Determine the functional and non-functional requirements of the proposed system; and

SOUTHEAST ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

4. Evaluate the system using: a. ISO/IEC 25010 Software Quality Standards; b. System Usability Scale (SUS); and c. User Acceptance Testing (UAT).

Research Framework

Figure 1 presents the Research Framework of the Study utilized in the development of TRACKTERNSHIP: A Web-Based Internship Management and Employability Prediction System using Random Forest Algorithm. The framework illustrates the relationship between the identified internship management problems, the development processes implemented using the Rapid Application Development (RAD) methodology, and the resulting web-based internship management system developed for the Internship Program Office of Urdaneta City University.

The input phase of the framework consisted of the identified procedures, operational challenges, and process gaps encountered in internship management. These included issues related to OJT tracking, file and document management, student progress monitoring, employability prediction, and automated report generation. The input phase also included the determination of the functional and non-functional requirements of TRACKTERNSHIP as well as the evaluation criteria based on ISO/IEC 25010 Software Quality Standards, System Usability Scale (SUS), and User Acceptance Testing (UAT).

The process phase followed the Rapid Application Development (RAD) framework, which emphasizes iterative development, rapid prototyping, continuous refinement, and active user participation throughout the software development lifecycle (Peek, 2024). The RAD methodology included the phases of Planning, User Design, Construction, and Cutover. During these phases, the system interfaces, database structures, internship monitoring modules, employability prediction functionalities, and automated reporting components were designed, developed, refined, tested, and evaluated.

The output phase resulted in the development of TRACKTERNSHIP: A Web-Based Internship Management and Employability Prediction System using Random Forest Algorithm. The developed system integrated functionalities for OJT tracking, file management, student progress monitoring, employability prediction, and automated report generation intended to improve internship monitoring efficiency, centralized document management, and institutional reporting procedures within the Internship Program Office of Urdaneta City University.

The research framework demonstrates the systematic flow of the study from problem identification and requirement analysis toward the development and evaluation of an intelligent web-based internship management system capable of supporting data-driven employability assessment and operational efficiency within higher education institutions.

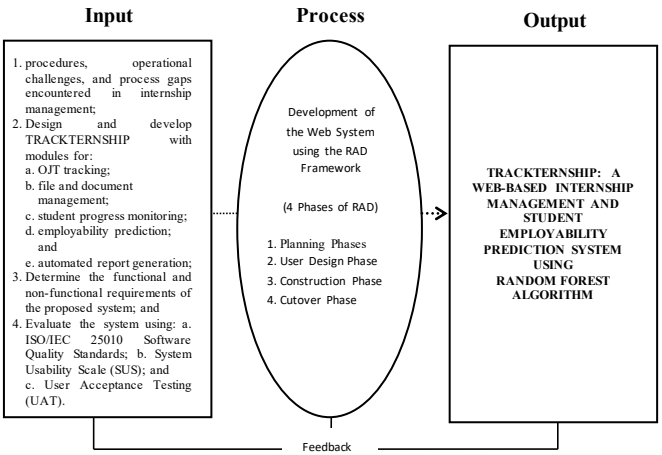

Figure. 1. Research Framework

MATERIALS AND METHODS

This section presents the research design, software development methodology, system implementation procedures, respondents of the study, data gathering procedures, research instruments, machine learning implementation, and data analysis techniques utilized in the development and evaluation of TRACKTERNSHIP: A Web-Based Internship Management and Employability Prediction System

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

using Random Forest Algorithm for the Internship Program Office of Urdaneta City University.

Research Design

The study utilized a descriptive-developmental research design. The descriptive aspect focused on identifying and analyzing the existing procedures, operational challenges, and limitations encountered in internship management processes at the Internship Program Office of Urdaneta City University. The study examined current practices related to OJT tracking, document management, student monitoring, report generation, and internship evaluation procedures.

The developmental aspect involved the design, development, implementation, and evaluation of TRACKTERNSHIP: A Web-Based Internship Management and Employability Prediction System using Random Forest Algorithm. The developmental process focused on creating a technological solution intended to improve internship monitoring efficiency, centralized document management, employability assessment, and institutional reporting procedures.

The study also incorporated Design Science Research (DSR) principles in developing the proposed system. Design Science Research emphasizes the creation of innovative technological artifacts intended to solve identified organizational and operational problems through systematic design, iterative development, and continuous evaluation procedures. According to Peffers et al. (2022), DSR is highly appropriate in information systems development because it integrates practical problem-solving with scientific knowledge generation through the development and evaluation of functional technological solutions.

In addition, the study utilized the Rapid Application Development (RAD) methodology during system development. The RAD methodology emphasizes iterative prototyping, rapid system construction, continuous refinement, and active user participation throughout the software development lifecycle. The methodology included the phases of Requirements Planning, User Design, Construction, and Cutover. The RAD methodology was selected because it supports flexible and user-centered system development while enabling continuous feedback from student interns, OJT coordinators, and the Director of the Internship Program Office during the design and evaluation of the proposed system.

Scope and Limitations of the Study

This study focused on the design, development, implementation, and evaluation of TRACKTERNSHIP: A Web-Based Internship Management and Employability Prediction System for the Internship Program Office of Urdaneta City University. The system was developed to streamline internship management processes and address operational challenges associated with manual internship monitoring, fragmented document management, delayed report generation, and limited employability assessment procedures.

The developed system covered major internship management processes including OJT tracking, monitoring of student deployment, submission and validation of internship requirements, weekly report management, attendance and rendered hours tracking, management of Midterm and Final Evaluations, handling of Host Training Establishments (HTEs), and monitoring of student-company assignments. The system also integrated functionalities for importing student data from Excel, automated generation of student accounts, centralized file and document management, online submission of internship requirements, automated institutional report generation, and employability prediction using the Random Forest Algorithm.

The employability prediction component utilized internship-related performance indicators including attendance consistency, communication skills, technical competency, weekly report compliance, supervisor evaluations, and OJT performance ratings to generate employability classifications categorized as

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

High Employability, Moderate Employability, and Low Employability.

The study utilized the Rapid Application Development (RAD) methodology to support iterative development, rapid prototyping, continuous refinement, and active user participation throughout the system development process. The developed system was evaluated in terms of functionality, usability, performance efficiency, reliability, security, maintainability, and portability using ISO/IEC 25010 Software Quality Standards, System Usability Scale (SUS), and User Acceptance Testing (UAT).

The respondents of the study included the Director of the Internship Program Office, OJT coordinators assigned across different academic programs, and student interns of Urdaneta City University. Interviews, process observations, document analysis, and requirement gathering procedures were conducted to identify existing internship workflows, operational challenges, and institutional system requirements.

The study was limited to the operational processes, internship procedures, and institutional requirements implemented within the Internship Program Office of Urdaneta City University. The employability prediction component was limited to the historical internship evaluation datasets collected during the conduct of the study and did not include external labor market trends, employer hiring preferences outside partner institutions, or post-graduation employment tracking. Furthermore, the study primarily focused on system development and usability evaluation and did not include large-scale deployment testing, long-term employability analysis, or comparative evaluation with other internship management systems and machine learning algorithms.

In addition, the developed system was specifically designed for the operational environment of Urdaneta City University and may require further customization and scalability adjustments for implementation in other higher education institutions with different internship management procedures and organizational structures. Future enhancements of the system may include advanced predictive analytics, long-term employability tracking, integration with external recruitment platforms, and mobile application support.

System Development Methodology

The study adopted the Rapid Application Development (RAD) Agile Methodology in developing TRACKTERNSHIP. According to Martin and Osmani (2022), RAD is highly appropriate for web-based information systems because it accelerates software delivery while maintaining flexibility in handling changing system requirements. Similarly, Alshamrani and Bahattab (2023) emphasized that RAD supports rapid prototyping and iterative enhancement, enabling developers to continuously refine system functionalities based on evaluation feedback and operational requirements. The RAD process implemented in the study consisted of the following phases:

- Requirements Planning Phase - During this phase, existing internship management procedures were analyzed through observational assessment, workflow analysis, document analysis, and survey-based requirements gathering. Existing problems related to manual internship tracking, spreadsheet dependency, delayed report generation, fragmented document storage, and inefficient monitoring procedures were identified.
- User Design Phase - During the User Design Phase, the researcher designed the system architecture, database structure, API communication workflow, and interface prototypes. User-centered dashboards and interface mockups were created to visualize internship workflows, student monitoring, and employability prediction outputs.
- Construction Phase - During the Construction Phase, the actual development and coding of TRACKTERNSHIP were implemented. The researcher developed internship tracking

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

modules, student monitoring modules, attendance and Daily Time Record (DTR) monitoring modules, weekly report submission modules, file and document management modules, automated report generation modules, employability prediction modules, and administrative dashboards. Backend development was implemented using Laravel Framework while frontend interfaces were developed using React.js. REST APIs were utilized for communication between frontend and backend services. The Random Forest Machine Learning Algorithm was implemented using Python and the scikit-learn library to generate employability predictions based on internship-related performance indicators including communication skills, attendance consistency, technical competency, and OJT performance evaluations.

- Cutover Phase - The Cutover Phase involved system deployment, testing, refinement, and evaluation procedures. The developed system underwent unit testing, integration testing, functionality testing, usability testing, and debugging procedures prior to deployment and evaluation.

System Implementation

The developed system was implemented as a web-based internship management and employability prediction platform intended for the Internship Program Office of Urdaneta City University. The system was designed to provide centralized internship monitoring, document management, employability analytics, and automated institutional reporting through a responsive and accessible web-based environment compatible with desktop and mobile devices.

TRACKTERNSHIP was developed using a modern web technology stack consisting of the Laravel Framework for backend development and React.js for frontend user interface development. REST API Architecture was utilized to support communication between the backend services and frontend components, enabling efficient data processing and dynamic user interaction. Tailwind CSS was utilized to develop responsive and user-friendly interfaces, while MySQL served as the relational database management system for centralized data storage, retrieval, and management of internship-related records.

The system integrated functionalities for OJT tracking, student deployment monitoring, attendance and rendered hours tracking, file and document management, weekly report submission, internship evaluation management, employability prediction, and automated report generation.

The employability prediction model was implemented using Python and the scikit-learn machine learning library integrated within the Laravel-based system architecture. Historical internship datasets consisting of 350 internship records collected from Academic Years 2022–2025 were utilized for model training and evaluation. The dataset included internship-related performance indicators such as attendance consistency, communication skills, technical competency, weekly report compliance, supervisor evaluations, and OJT performance ratings used for employability classification and prediction. The implementation of the system followed a modular and user-centered development approach to ensure scalability, maintainability, accessibility, and operational efficiency within the Internship Program Office. The centralized web-based architecture enabled internship coordinators, administrators, and student interns to access internship-related services, monitoring tools, and institutional reports in real time through an integrated digital platform.

Machine Learning Implementation

The employability prediction component of TRACKTERNSHIP utilized the Random Forest implemented using Python and the scikit-learn machine learning library integrated within the Laravel-based backend architecture. The model analyzed internship-related performance indicators to generate employability classifications for student interns.

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

Historical internship datasets consisting of 350 internship records collected from Academic Years 2022–2025 were utilized for model training and evaluation. The dataset included attendance consistency, communication skills, technical competency, weekly report compliance, supervisor evaluations, employer feedback, and OJT performance ratings. Dataset preprocessing procedures included duplicate removal, handling missing values, normalization, feature selection, and categorical data transformation using Label Encoding techniques. The processed dataset was divided into seventy percent (70%) training data, fifteen percent (15%) validation data, and fifteen percent (15%) testing data.

Students with satisfactory internship performance evaluations and employer assessment results were classified under High Employability, while lower performance indicators were categorized under Moderate Employability and Low Employability classifications for prediction analysis.

According to Leo Breiman (2001), Random Forest improves classification performance through ensemble learning, bootstrap aggregation, random feature selection, and majority voting mechanisms while minimizing overfitting and prediction bias. The algorithm was selected because it effectively handles mixed numerical and categorical datasets, provides high classification accuracy, and supports feature importance analysis for identifying significant employability indicators.

Respondents of the Study

The respondents of the study consisted of student interns, OJT coordinators, and the Director of the Internship Program Office of Urdaneta City University (UCU). These respondents participated during requirement gathering, system testing, usability evaluation, and assessment of the developed TRACKTERNSHIP system. The respondents were selected through purposive sampling because of their direct involvement in internship monitoring, deployment management, document validation, internship evaluation, and system utilization within the university.

Student respondents included currently enrolled interns from different academic colleges and academic programs of Urdaneta City University. These students served as the primary end-users of the system's internship tracking, attendance monitoring, weekly report submission, and document management functionalities.

The study also involved OJT coordinators assigned across different academic programs of the university. Urdaneta City University currently operates twelve (12) academic colleges and centers offering more than forty (40) academic programs, wherein each academic program is supervised by a designated OJT coordinator responsible for student deployment, internship monitoring, validation of internship requirements, coordination with Host Training Establishments (HTEs), and preparation of institutional internship reports.

In addition, the Director of the Internship Program Office served as the primary administrative respondent and overall system administrator responsible for centralized internship supervision, institutional monitoring, report consolidation, and operational management of internship programs across the university.

Table 1. Distribution of Respondents

Respondent Group	Frequency
Director	1
OJT Coordinators	40
Student Interns	60
Total	101

As presented in Table 1, the study involved a total of one hundred one (101) respondents composed of one (1) IPO Director, forty (40) OJT coordinators, and sixty (60) student interns.

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

Data Collection

Data collection procedures were conducted using interviews, observations, document analysis, requirement gathering activities, and survey questionnaires. According to Creswell and Creswell (2022), interviews and observations are effective qualitative data collection methods utilized to identify operational workflows, institutional procedures, user experiences, and existing organizational challenges within information systems research. In this study, interviews and observations were performed to identify the existing internship management workflows, operational challenges, monitoring procedures, and institutional requirements of the Internship Program Office of Urdaneta City University.

Document analysis was utilized to examine existing internship-related forms, deployment records, Daily Time Records (DTRs), weekly reports, evaluation forms, Memoranda of Agreement (MOAs), and institutional internship reports including Annex C and Annex D. (McBeath et al., 2021) emphasized that document analysis provides systematic evaluation of organizational records and operational documents necessary for identifying workflow processes, administrative procedures, and institutional requirements relevant to system development studies. The gathered information served as the basis for identifying operational inefficiencies and determining the required functionalities of the proposed system.

Requirement gathering procedures were conducted with student interns, OJT coordinators, and the Director of the Internship Program Office to determine user requirements, system functionalities, interface preferences, and operational expectations necessary for the development of TRACKTERNSHIP. According to Staff (2024), requirement gathering is a critical software engineering process that enables developers to identify user needs, operational expectations, and system functionalities necessary for effective system design and implementation.

Research Instruments

The study utilized ISO/IEC 25010 Software Quality Evaluation questionnaires, System Usability Scale (SUS), User Acceptance Testing (UAT) questionnaires, observational analysis forms, and document analysis forms as the primary research instruments in evaluating the developed system. The ISO/IEC 25010 evaluation questionnaire was utilized to assess the software quality characteristics of TRACKTERNSHIP in terms of Functional Suitability, Performance Efficiency, Reliability, Usability, Security, Maintainability, and Portability based on ISO/IEC 25010:2011 software quality standards.

User Acceptance Testing (UAT) questionnaires were administered to evaluate the functionality, operational effectiveness, and overall user acceptability of the developed system. Observational analysis forms were utilized to document the existing procedures, workflow processes, and challenges encountered in internship management operations. Document analysis forms were also utilized to examine internship-related records, reports, and evaluation forms necessary for the development of the proposed system.

Statistical Treatment of Data

Weighted Mean was utilized to evaluate the responses gathered from the ISO/IEC 25010 Software Quality Evaluation questionnaires and User Acceptance Testing (UAT) questionnaires. The System Usability Scale (SUS) scoring method was utilized to determine the overall usability rating of the developed system. For machine learning evaluation, classification performance metrics such as Accuracy, Precision, Recall, F1-Score, and Confusion Matrix analysis were utilized to assess the predictive performance of the Random Forest model.

Likert Scale Interpretation

The study utilized a five-point Likert Scale to evaluate the usability, acceptability, and software quality of TRACKTERNSHIP. According to Taherdoost (2022), the Likert Scale is commonly utilized in information systems and usability evaluation research because it systematically measures user

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

perceptions and evaluation responses. The following scale and interpretation were utilized:

Scale	Interpretation
5	Strongly Agree
4	Agree
3	Neutral
2	Disagree
1	Strongly Disagree

The weighted mean interpretation used in the study was as follows:

Range	Interpretation
4.21-5.00	Strongly Agree
3.41-4.20	Agree
2.61-3.40	Neutral
1.81-2.60	Disagree
1.00-1.80	Strongly Disagree

RESULTS AND DISCUSSION

This section presents the findings gathered during the development and evaluation of TRACKTERNSHIP: A Web-Based Internship Management System with Employability Prediction for the Internship Program Office of Urdaneta City University. The discussion focuses on the identified problems in the current internship management procedures, the developed system features, centralized internship monitoring functionalities, employability prediction capabilities utilizing the Random Forest algorithm, and the evaluation results based on ISO/IEC 25010 Software Quality Standards and System Usability Scale (SUS).

Current Internship Management Processes

Based on interviews conducted with the Director of the Internship Program Office and internship coordinators from different colleges of Urdaneta City University, the current internship management procedures rely heavily on manual and semi-digital processes. Existing procedures involve physical submission of internship requirements, manual monitoring of attendance and reports, fragmented company records, and time-consuming report preparation processes. These practices resulted in delays in document validation, inefficient monitoring of student interns, and difficulties in retrieving internship records efficiently.

Record Management Process

Prior to deployment, student interns are required to submit internship requirements including résumés, evaluation forms, medical certificates, barangay clearances, police clearances, parent waivers, and Memoranda of Agreement (MOA). These documents are manually reviewed, organized, validated, and stored in physical folders and filing cabinets by practicum coordinators. Figure 1 presents the current internship record management procedure implemented within the Internship Program Office.

The findings revealed that the existing record management procedure is highly dependent on physical documentation and manual verification processes, resulting in delayed validation, inefficient retrieval of student internship records, and increased administrative workload among internship coordinators. In addition, the absence of centralized digital storage mechanisms increases the risk of misplaced documents, redundant record handling, and inconsistencies in monitoring student submission compliance and internship requirement validation.

The current procedure also limits real-time accessibility of internship records since coordinators are required to manually search, organize, and verify physical documents during monitoring and evaluation activities. Such manual processes consume considerable administrative time and may affect the efficiency of internship deployment preparation, document verification procedures, and institutional record management operations. The findings indicate the need for a centralized digital document management system capable of improving accessibility, monitoring efficiency, and internship record organization within the Internship Program Office.

SOUTHEAST ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

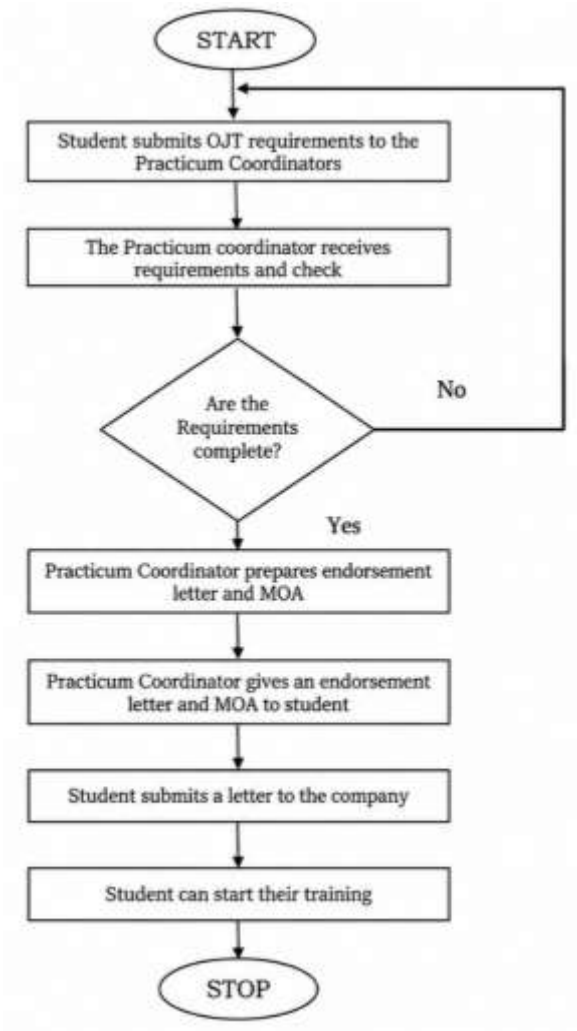

Figure 1. Record Management Process

Host Training Establishment Record Management

The current Host Training Establishment (HTE) record management procedure involves manually collecting and organizing company information such as company name, address, contact information, email address, and company description. Records of student interns assigned to each company are maintained separately using physical filing systems. Figure 2 illustrates the current procedure for managing HTE records.

The findings indicate that fragmented storage of company and student deployment records limits centralized monitoring and efficient information retrieval.

Figure 2. HTE Record Management

Monitoring of Student Interns

Monitoring procedures are currently conducted through manual review of weekly reports, evaluation forms, and Daily Time Records (DTRs). Practicum coordinators manually verify student compliance and internship progress based on submitted physical or printed documents. Figure 3 presents the current monitoring procedure for student interns. The existing monitoring process lacks real-time tracking mechanisms, resulting in delayed monitoring and increased administrative workload for internship coordinators.

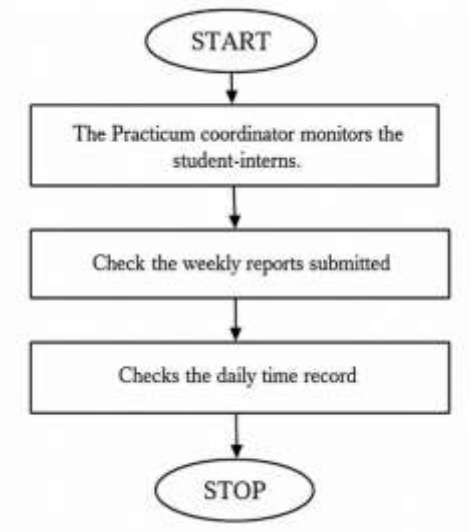

Figure 3. Monitoring of Student Interns

SOUTHEAST ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

Posting of Announcements and Events

Announcements and internship-related activities are currently disseminated through manual communication methods and social media platforms. Practicum coordinators prepare announcements and manually post updates for student interns. Figure 4 presents the current announcement dissemination process. The findings revealed that the absence of a centralized notification mechanism limits timely dissemination of important internship updates and activities.

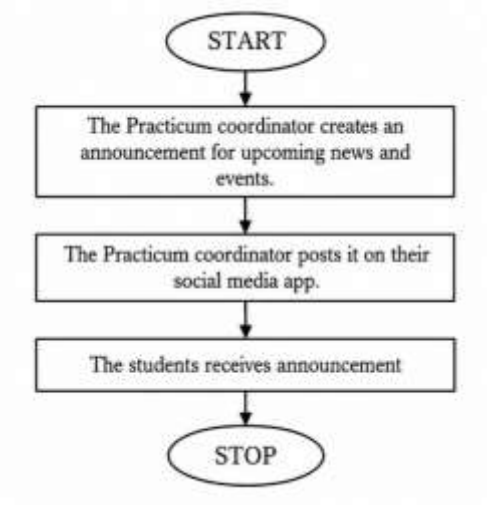

Figure 4. Posting of Announcements

Report Generation and Submission

Internship reports are manually prepared, consolidated, and compiled by practicum coordinators before submission to the Director of Internship. These reports include summaries of student interns, deployment records, attendance monitoring results, identified internship-related issues, and institutional recommendations. Figure 5 presents the current report generation and submission procedure implemented within the Internship Program Office.

The findings revealed that the existing reporting procedure relies heavily on manual encoding, repetitive documentation processes, and spreadsheet-based data consolidation, resulting in delays in institutional reporting and increased administrative workload among internship coordinators. The preparation of internship reports requires coordinators to manually gather data from multiple physical documents, evaluation forms, attendance records, and deployment files, making the reporting process time-consuming and prone to encoding inconsistencies and human error.

In addition, the absence of automated reporting and centralized data management mechanisms limits the efficiency of generating standardized institutional reports such as deployment summaries, student accomplishment records, and internship monitoring reports. The findings indicate the need for an automated and centralized reporting system capable of improving reporting efficiency, reducing repetitive administrative procedures, and supporting timely generation of internship-related institutional documents.

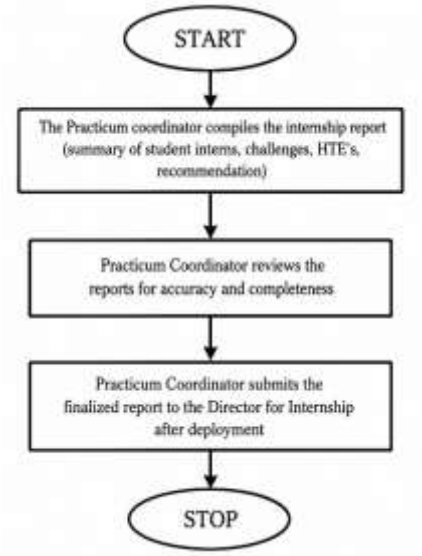

Figure 5. Report Generation and Submission

Developed System Features of TRACKTERNSHIP

To address the identified challenges, the study developed TRACKTERNSHIP, a web-based internship management system integrated with centralized document management, monitoring functionalities, automated reporting, student tracking, and employability analytics features. The developed system supports role-based access for administrators, practicum coordinators, student interns, and Host Training Establishments. The system was designed to improve internship monitoring efficiency, streamline document

SOUTHEAST ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

validation, centralize communication, and automate institutional reporting procedures.

As shown in Fig. 6, the system architecture of TRACKTERNSHIP. The system utilizes React.js for the frontend interface, Laravel for backend processing and API communication, MySQL for database management, and Python with the scikit-learn library for employability prediction using the Random Forest Algorithm.

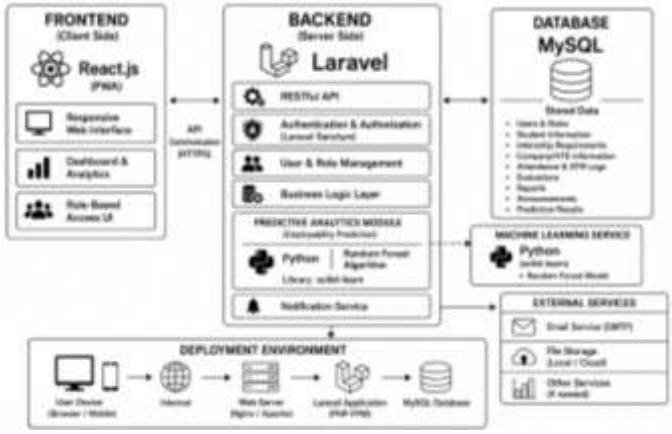

Figure 6. Architecture of TRACKTERNSHIP.

As shown in Fig. 7, the OJT Tracking File Uploads interface of TRACKTERNSHIP. The module allows internship coordinators to monitor the submission status of weekly reports, Daily Time Records (DTRs), Memorandum of Agreement (MOA) documents, and internship requirements of student interns. The interface displays the compliance status of each requirement including checked, assigned, and for checking indicators, enabling coordinators to efficiently monitor incomplete and pending submissions.

The centralized tracking mechanism improved monitoring efficiency by reducing manual spreadsheet tracking and minimizing delays in validating internship requirements. The interface also supports search functionality and categorized requirement monitoring for improved accessibility and operational organization.

Figure 7. OJT Tracking File Uploads Interface

As shown in Fig. 8, the File and Document Management module of TRACKTERNSHIP. The module provides centralized digital storage and management of internship requirements including Memorandum of Agreement (MOA), medical certificates, endorsement letters, application letters, and résumés.

The interface allows internship coordinators to organize, validate, and review submitted student documents through a unified dashboard. The findings indicate that the implementation of centralized digital document management reduced dependency on physical records and improved document accessibility and verification procedures within the Internship Program Office.

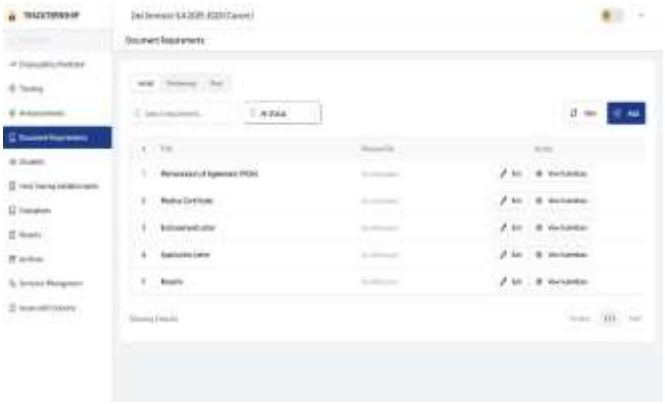

Figure 8. File and Document Management Module

As shown in Fig. 9, the Student Submission Monitoring interface utilized for monitoring the status

SOUTHEAST ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

of submitted internship requirements. The interface displays individual student submission records, assigned requirements, and verification status indicators. Internship coordinators are able to identify students with incomplete submissions and monitor pending requirement validations efficiently.

The implementation of submission monitoring functionalities improved transparency and reduced administrative workload associated with manual document verification procedures.

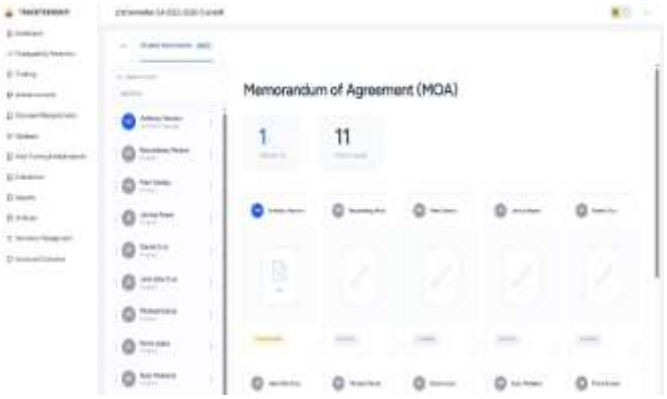

Figure 9. Student Submission Monitoring Interface

As shown in Fig. 10, the Employability Prediction Dashboard of TRACKTERNSHIP. The interface displays AI-assisted internship analytics and employability prediction results generated using the Random Forest Algorithm. The dashboard includes employability distribution charts, compliance summaries, prediction records, feature importance indicators, risk assessment classifications, and AI-generated employability insights.

The system analyzed internship performance indicators including OJT ratings, communication skills, attendance consistency, technical skills, employer evaluations, and task completion rates to generate employability classifications. The dashboard also provides visualization of prediction results categorized into Highly Employable, Average, and Low Employability classifications.

The findings indicate that the integration of predictive analytics and machine learning functionalities improved institutional monitoring capabilities and supported data-driven employability assessment procedures.

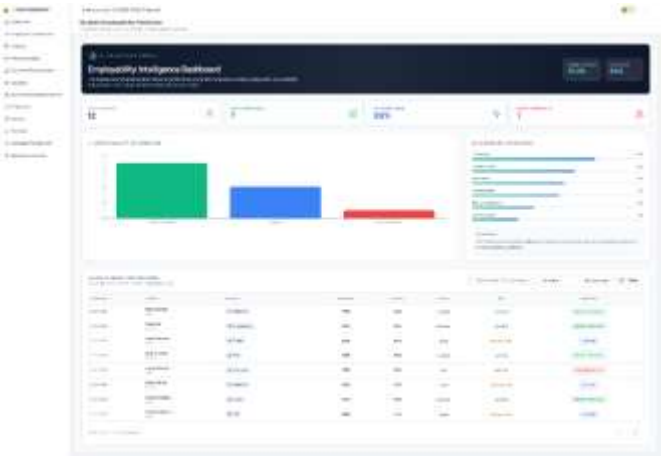

Figure 10. Employability Prediction Dashboard

As shown in Fig. 11, the Automated Report Generation module of TRACKTERNSHIP. The interface allows internship coordinators and administrators to generate institutional internship reports including Annex C, Annex D, student intern records, and Host Training Establishment (HTE) deployment reports.

The module supports print-ready and PDF-export functionalities, enabling efficient generation of standardized institutional internship reports. The implementation of automated report generation significantly reduced manual report preparation time and improved consistency in institutional reporting procedures.

SOUTHEAST ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

Figure 11. Automated Report Generation Module

As shown in Fig. 12, the Student Employability Analytics Dashboard of TRACKTERNSHIP. The interface provides AI-assisted employability monitoring using the Random Forest implemented through Python and the scikit-learn library. The dashboard displays employability classification results, internship progress, document compliance status, feature importance analysis, and recommended Host Training Establishments (HTEs) based on student internship performance indicators.

The system analyzes technical skills, communication competency, attendance consistency, completed internship hours, and employer evaluation results to generate employability predictions and internship recommendations. The implementation of predictive analytics functionalities improved student awareness regarding internship performance and workforce readiness.

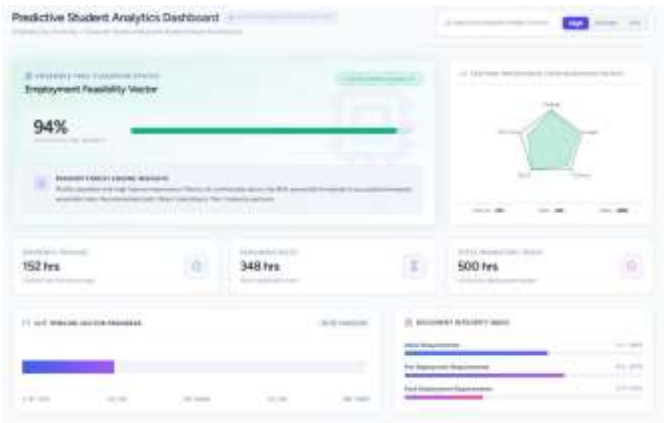

Figure 12. Student Employability Analytics Dashboard

As shown in Fig. 13, the Document Requirements Upload interface of TRACKTERNSHIP. The module allows student interns to upload and manage internship requirements including Memorandum of Agreement (MOA), medical certificates, and other required internship documents through a centralized digital platform. The interface displays document categories, upload functionalities, and requirement status indicators for monitoring submission compliance.

The implementation of digital document submission improved accessibility and streamlined requirement validation procedures between student interns and internship coordinators. The centralized document management functionality reduced dependency on physical document submission and improved monitoring efficiency within the Internship Program Office.

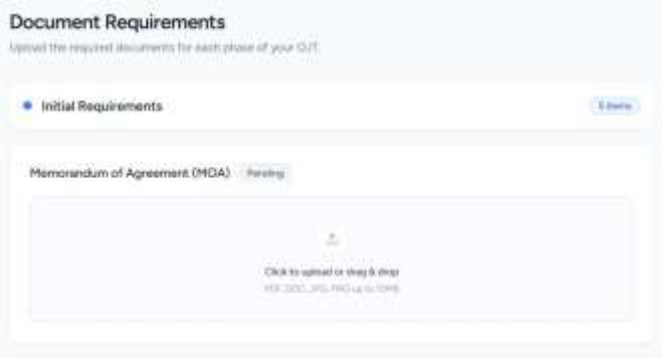

Figure 13. Document Requirements Upload Interface

As shown in Fig. 14, the Weekly Reports Management interface of TRACKTERNSHIP. The module allows student interns to manage, upload, and monitor weekly internship reports and signed evaluation documents. The interface displays report descriptions, submission schedules, uploaded files, and report status monitoring functionalities.

The module enables student interns to submit weekly accomplishment reports digitally while allowing internship coordinators to review and validate submitted documents efficiently. The

SOUTHEAST ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
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implementation of centralized weekly report management improved document submission monitoring, reduced delays in report validation, and minimized dependency on manual submission procedures.

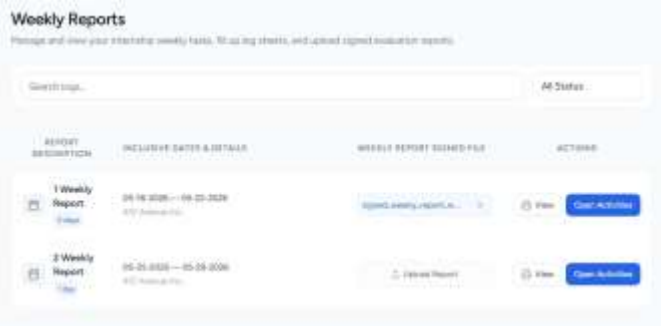

Figure 14. Weekly Reports Management Interface

As shown in Fig. 15, the Daily Time Records (DTR) Management interface of TRACKTERNSHIP. The module allows student interns to monitor attendance records, upload signed Daily Time Records (DTRs), generate print previews, and access monthly internship attendance reports through a centralized digital platform.

The interface displays logged internship hours, submission status indicators, reporting coverage dates, and report access functionalities for efficient attendance monitoring and validation. The implementation of centralized DTR management improved attendance tracking procedures minimized delays in report submission, and reduced dependency on manual attendance documentation processes.

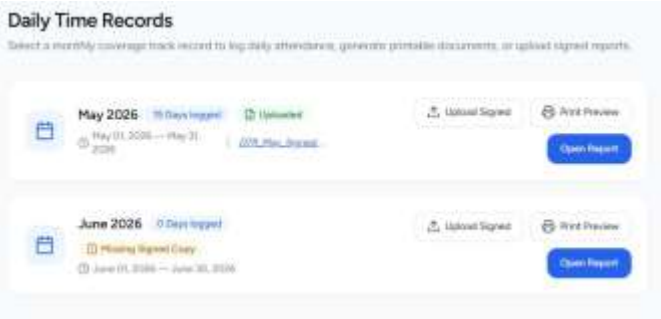

Figure 15. Daily Time Records (DTR) Management Interface

The developed system was evaluated in terms of Functional Suitability, Reliability, Performance Efficiency, Usability, Security, Maintainability, and Portability. Table 2 presents the summary of the ISO/IEC 25010 evaluation results.

Table 2. ISO/IEC 25010 Software Quality Evaluation Results

Evaluation Criteria	Weighted Mean	Verbal Interpretation
Functional Suitability	4.51	Strongly Agree
Reliability	4.37	Strongly Agree
Performance Efficiency	4.42	Strongly Agree
Usability	4.46	Strongly Agree
Security	4.35	Strongly Agree
Maintainability	4.28	Strongly Agree
Portability	4.33	Strongly Agree
Overall Mean	4.39	Strongly Agree

The results revealed that TRACKTERNSHIP obtained an overall weighted mean of 4.39 interpreted as Strongly Agree. Functional Suitability obtained the highest weighted mean of 4.51, indicating that the respondents perceived the system as capable of performing the required internship management functionalities effectively. Usability also obtained a high weighted mean of 4.46, suggesting that the respondents found the system accessible, understandable, and easy to navigate.

Reliability obtained a weighted mean of 4.37, while Performance Efficiency obtained 4.42, indicating that the system maintained stable operation and acceptable response performance during utilization. Security, Maintainability, and Portability also received positive evaluation results with weighted means above 4.20.

The findings suggest that the implementation of centralized internship management functionalities improved operational efficiency and monitoring procedures within the Internship Program Office. The positive usability and functionality results support the

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

observations of Khan and Algarni (2023), who emphasized that web-based internship management systems improve administrative efficiency, centralized monitoring, and operational accessibility in higher education institutions.

The usability level of TRACKTERNSHIP was further evaluated using the System Usability Scale (SUS). Table 3 presents the summary of the SUS evaluation result.

Table 3. System Usability Scale Result

Evaluation Tool	Score	Interpretation
System Usability Scale (SUS)	86.4	Excellent Usability

The computed SUS score of 86.4 indicates excellent usability and high user acceptability. The respondents reported that the system interface was organized, understandable, and easy to operate. Student interns were able to submit internship requirements and monitor deployment progress efficiently, while OJT coordinators effectively monitored attendance records, weekly reports, and internship documentation using the dashboard modules.

The findings indicate that TRACKTERNSHIP provided a user-friendly environment suitable for internship monitoring and management operations. According to Taherdoost (2022), systems with high usability scores generally improve user satisfaction, reduce operational complexity, and increase technology adoption among institutional users. The employability prediction component of TRACKTERNSHIP was evaluated using Accuracy, Precision, Recall, and F1-Score metrics. Table 4 presents the performance evaluation of the Random Forest Algorithm.

Table 4. Random Forest Algorithm Performance Evaluation

Evaluation Metric	Result
Accuracy	91.4%
Precision	0.89
Recall	0.92
F1-Score	0.90

The Random Forest Algorithm achieved an overall accuracy of 91.4%, indicating strong classification performance in predicting student employability outcomes. The obtained precision, recall, and F1-score values also demonstrate reliable prediction consistency and balanced classification capability.

The findings revealed that internship-related performance indicators such as OJT performance ratings, communication skills, attendance consistency, technical competency, and employer evaluations significantly contributed to employability prediction outcomes. These findings support the study of Sharma and Kumar (2024), who reported that Random Forest and ensemble machine learning techniques demonstrate strong predictive capability in educational analytics and employability assessment systems.

The integration of predictive analytics within TRACKTERNSHIP provided additional decision-support capabilities beyond traditional internship monitoring systems. The results indicate that machine learning algorithms may assist higher education institutions in identifying workforce readiness indicators and improving data-driven internship evaluation procedures.

CONCLUSION AND RECOMMENDATION

The study developed TRACKTERNSHIP, a web-based internship management and employability prediction system for the Internship Program Office of Urdaneta City University. The developed system improved internship monitoring procedures through centralized document management, automated reporting functionalities, attendance monitoring, and predictive analytics integration using the Random Forest.

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

Evaluation results revealed that TRACKTERNSHIP achieved high software quality and usability evaluation results based on ISO/IEC 25010 Software Quality Standards and System Usability Scale (SUS) assessments. The findings indicate that the developed system improved operational efficiency, internship monitoring capabilities, document accessibility, and institutional reporting procedures among student interns, OJT coordinators, and internship administrators.

The Random Forest Algorithm demonstrated strong predictive capability with an overall accuracy of 91.4%, indicating that internship-related performance indicators such as communication skills, technical competency, attendance consistency, and OJT performance ratings significantly contribute to employability assessment outcomes.

The findings of the study demonstrate that the integration of educational data mining, predictive analytics, and web-based information systems can support data-driven internship management and workforce readiness assessment within higher education institutions.

It is recommended that Urdaneta City University adopt TRACKTERNSHIP for official internship management operations across different academic colleges and programs. Future studies may integrate cloud-based deployment, mobile application support, and advanced machine learning models to further improve predictive performance, scalability, and institutional accessibility.

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