TUPATH: A WEB-BASED PLATFORM INTEGRATING ACADEMIC PROFILE MANAGEMENT SYSTEM TO ENHANCE CAREER PREPAREDNESS FOR CS, IS, AND IT STUDENTS OF TUP-MANILA

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Chapter 1

THE PROBLEM AND ITS SETTING

Background of the Study

In today's rapidly evolving job market, students face numerous challenges in preparing for their professional careers. One major challenge is uncertainty about career paths, largely due to rapid changes in industry requirements. According to Steven and Fallows (2018), fresh graduates are ill-prepared for the transition from education to employment if they lack essential skills necessary for the workforce. This highlights the pressing issue of graduates facing difficulties in transitioning into employment due to a skills gap. Such challenges emphasize the urgent need for interventions that bridge this gap and better prepare students for the demands of the job market.

Additionally, according to the research conducted by Gonzalez (2020), student profiling systems play a role in alleviating the workload associated with manual data management tasks. Implementing such systems in schools streamlines the retrieval of portfolio-based information, enabling educators to track students' progress and competencies more efficiently. TUPath, a portfolio-based Career Preparedness Platform for Computer Science (CS), Information Science (IS), Information Technology (IT) students in TUP-Manila, centralizes academic achievements and professional development records, empowering students with clear career pathways and opportunities for growth. In this context, TUPath, a web-based Career Preparedness Platform integrated with an Academic Profile Management System for TUP-Manila students, directly addresses these needs. TUPath centralizes academic works and achievements, fostering career preparedness among students. This illustrates how TUPath serves not only as a tool for record-keeping and profiling but also as a system that empowers students, providing them with

clarity on their chosen career paths and exposing them to opportunities for professional growth and development.

In contrast to Technological University of the Philippines' (TUP) existing system (ERS), which primarily focuses on administrative tasks such as admissions and course management, TUPath is a platform dedicated to holistic career preparedness. While ERS manages certain student details for administrative purposes, its functionality is limited to course registration, grades, and communication tools compared to the comprehensive capabilities of TUPath. TUPath goes beyond record-keeping by offering a dynamic Career Preparedness Platform seamlessly integrated with an Academic Profile Management System. By centralizing academic achievements, TUPath empowers students to showcase their skills and experiences, fostering self-confidence and professional growth. TUPath's emphasis on leveraging technology to bridge the gap between academic preparation and career readiness demonstrates its commitment to equipping students with the necessary tools and insights to thrive in today's competitive job market.

The researchers behind TUPath aim to empower students by providing holistic support throughout their academic and professional journey. Through a blend of Career Preparedness and Academic Profile Management, TUPath helps students take control of their education and career paths. By centralizing academic works and achievements, TUPath fosters self-confidence and equips students with the tools to succeed in today's competitive job market. Ultimately, the researchers seek to enhance student success and ensure TUPath serves as a valuable resource for students as they navigate their academic and professional endeavors.

Objectives of the Study

The objective is to develop TUPath, a web platform that integrates academic profile management with career preparedness for students under the Information Technology, Information System and Computer Science course of TUP-Manila, ensuring alignment between academic achievements and future career aspirations.

Specifically, it aims to:

1. Design a Web-based Academic Profile Management System (APMS) with the following features:

   a. Integrate an Academic Profile Management (APMS) into the platform to facilitate a Student Showcase section. Here, users can display their academic achievements, projects, skills, and other accomplishments to showcase and compile their expertise and experiences.

   b. Implement Simple Mail Transfer Protocol (SMTP) for Multi-Factor Authentication.

   c. Implement Role Based Access for different user types to control system permissions.

   d. Incorporate Profile Creation functionality to allow users to create and manage their profiles.

   e. Integrate a record management that provides comprehensive record-keeping functionalities for academic achievements and credentials.

   f. Implement a search feature using a keyword search to allow users to find students based on various criteria such as expertise, skills, achievements, and other relevant attributes.

g. Implement a forum that allows students and employers to post internships, announcements, and other relevant information. This feature will facilitate communication and engagement between students and employers

h. The project will implement a scoring system that allows employers to view graded projects based on an rated evaluation in a dynamic form with indicators from IT experts specific preferences, ensuring a comprehensive and consistent assessment of each submission.

2. Develop the system with various developmental tools, such as:

   a. MongoDB

   b. Express

   c. Vite

   d. React.js

   e. HTML

   f. CSS

   g. Bootstrap

   h. Node.js

   i. Postman API

   j. Visual Studio Code (VSCode)

   k. GitHub

3. Conduct tests on the TUPath platform, focusing on functional suitability, usability, security and maintainability while collecting feedback from TUP-Manila students and faculty to identify areas for improvement.

4. Evaluate the system's acceptability based on the relevant criteria of ISO 25010, including functional suitability, usability, security and maintainability

Scope and Delimitations of Study

This study aims to develop TuPath, a web-based platform that focuses on career preparedness, specifically for Computer Science (CS), Information Systems (IS), and Information Technology (IT) students of the College of Science (COS) at Technological University of the Philippines (TUP) - Manila. The platform features a Student Portfolio module that allows students to showcase their achievements, skills, and certifications. The inclusion of a point-based system replaces traditional academic grading and skill assessments to offer a more holistic representation of the students' readiness for employment.

The platform is built using the MERN stack (MongoDB, Express.js, React, Node.js) for enhanced functional suitability, usability, security and maintainability. It will adhere to institutional policies and security requirements, incorporating strong encryption and role-based access control mechanisms to protect confidential data and ensure compliance with data privacy laws.

The Institutional Relations and Job Placement (IRJP) will oversee the management and operation of TuPath, ensuring that the system aligns with the career support objectives.

A sample of 40 students from TUP-Manila will evaluate the system to assess its effectiveness in enhancing career preparedness. The platform's quality will also be measured against the ISO 25010 Software Quality Model to ensure it meets industry standards for software development.

The platform will also collaborate with IT professionals, ensuring that students are evaluated on competencies that align with real-world job roles and expectations.

Significance of the Study

The researcher's aim was to fuse together the existing systems such as Academic Management System and Career Preparedness services to help students have a comprehensive toolkit to explore, plan, and execute their career aspirations by taking advantage of rapid technological advancements.

This study about TUPATH: A Web-Based Platform Integrating Academic Profile Management to Enhance Career Preparedness for TUP-Manila Students will be very much beneficial to the following:

Students - This will help them gather ideas for their job choices by keeping track of their academic works and achievements to understand possible skill requirements in the industry.

TUP-Manila Industrial Relations and Job Placement (IRJP) Administration - Industrial Relations and Job Placement Office can significantly strengthen its relationships with companies. This alignment demonstrates to potential employers that the university is not only focused on academic education but is also committed to equipping students with practical, industry-relevant skills

Institutional Partners - Partner companies can efficiently identify and recruit well-prepared, competent graduates who have been rigorously rated based on IT experts specific competencies and skills preferences.

The success of TUPath could revolutionize career preparedness and academic profile management for TUP-Manila students, offering them a comprehensive, user-friendly platform that seamlessly integrates academic works and achievements with personalized career exploration tools. This success would empower students to make informed decisions about their educational and professional paths, leading to improved academic performance, enhanced career readiness, and stronger connections with industry partners. Additionally, streamlined administrative processes and data-driven insights would enable the university to better support student success and make a good reputation as a leader in innovative education and career development.

Chapter 2

CONCEPTUAL FRAMEWORK

This chapter presents the study's conceptual model as well as operational definitions of terminology. This chapter also offers a list of cited literature and studies. The topics mentioned in this chapter served as the foundation for the researchers' decision to prove the study's claim and relevance.

Related Literature

This section introduces major concepts and ideas related to the research. It covers topics such as the development of Project Management System, Record Management System, challenges in students' career preparedness, keyword search, web development tools, and ISO 25010 standards.

Project Management System

Project management is the application of skills, information, instruments, and techniques to project activities that meet project specifications. The organizational method to managing continuous operations is frequently referred to as project management. This method, which is more accurately referred to as management by projects, applies project management methods to many parts of continuous operations by treating them as projects. A project management system is a software that can assist in resource estimation, streamlining, and managing streams of resources (Aaron, A. I. , 2016).

Organizations can establish a centralized repository for all project-related documents by using an RMS. Project managers and team members may quickly access critical papers from this repository, cutting down on the amount of time they spend looking for information. The ability to follow each record through its many stages improves document traceability and creates a transparent audit trail that can be very helpful for accountability and compliance. Effective records administration has a direct impact on organizational performance by facilitating teams' efficient retrieval and use of historical data (Agu et al., 2022).

Record Management System

A strong Record Management System (RMS) guarantees that all project-related documentation is methodically captured, categorized, and safely stored throughout its lifecycle, improving accountability and regulatory compliance. Project Management Systems (PMS) help with project planning and execution by allocating tasks and resources.

Records management systems (RMS) are essential for the efficient handling of an organization's records throughout their lifecycle. Records management involves the creation and maintenance of a system to manage records throughout a company's lifecycle. This includes the processes of capturing, classifying, storing, securing, and retrieving records as needed. The importance of RMS lies in its ability to support regulatory compliance, enhance information governance, and mitigate risks associated with record-keeping (Smartsheet, 2017).

Records management systems are defined as tools that facilitate the systematic control of records from their creation to their eventual disposal. RMS is significant because it may help with regulatory compliance, improve information governance, and reduce record-keeping hazards. According to the study, data acquisition, classification, storage, security, and retrieval are all essential elements of a successful RMS. Effective decision-making and regulatory compliance depend on the correctness, dependability, and accessibility of records, all of which are maintained by these essential services. Organizations must have efficient records management systems in place in order to manage their documents effectively and adhere to legal obligations. Organizations can improve operational efficiency, lower risks, and strengthen information governance by putting in place a strong RMS (Saquin, M. D. C., & Marcial, D. E. , 2016).

Role-Based Access Control and Permission

The study of TUPATH is crucial, it ensures the security and integrity of sensitive student data by regulating access based on user roles. In a platform where academic profiles and achievements are stored, it is essential that only authorized students, administrators and the Industrial Relations and Job Placement Office (IRJP) can view the student data. Role-Based

Access Control (RBAC) allows TUPATH to efficiently manage permission, minimizing the risk of unauthorized access or data breaches.

According to Hamid (2018), enhancing security measures to maintain trust and safeguard student information can be achieved through the implementation of a Role-Based Access Control (RBAC). System simplifies security management by assigning permission through roles rather than direct users. The use of roles is to enhance the assigned roles, reducing human error. Moving towards a more secure and privacy-conscious digital environment, Role-Based Access Control (RBAC) plays a pivotal role by regulating access to sensitive data while aligning with stronger privacy regulations, addressing concerns about unauthorized access and ensuring the integrity of academic achievements and credentials.

Cloud-Based Functionality

Building upon the fundamental ideas of Resource Management Systems (RMS), the incorporation of cloud-based features improves academic profile management even further by offering accessible, scalable, and secure storage options for private student information.

According to Kaur and Sood (2022), cloud computing improves accessibility, scalability, and efficiency in library and information services. Developments in cloud-based academic profile management systems in recent years have greatly improved how schools manage student records. For the management of academic profiles, this technology is essential since it enables institutions to safely store and remotely access large volumes of data. Cloud-based technologies, according to the authors, simplify the administration of academic records and digital libraries while promoting cooperation between administrative and faculty personnel.

Furthermore, a study by Mula et al. (2023) emphasizes how cloud technologies let students access data in real time. These systems give students the ability to monitor their academic progress, which empowers them to make well-informed decisions on their career and educational pathways. According to the study, educational institutions can better assist students' career readiness by implementing cloud technologies, which provide them with improved access to resources and information. In addition to encouraging collaboration, this incorporation of cloud computing into academic record management helps students match their academic experiences with their professional aspirations.

Impact on Career Preparedness on Educational Platforms

Real-time access to students' academic progress and verified accomplishments enables them to make well-informed decisions about their educational and career paths, which in turn promotes greater alignment between their academic experiences and professional aspirations. This is one way that educational platforms can greatly improve students' career readiness by utilizing cloud-based functionality in academic profile management.

There are questions regarding trustworthiness because social media sites like LinkedIn don't always validate user claims about their accomplishments or talents. Some educational platforms do, however, have internal verification procedures that might be modified. To guarantee that academic and skill accomplishments are genuine, for example, higher education establishments frequently place a strong emphasis on verification through internal quality assurance procedures. Peer reviews and external audits are common assessment techniques used in these systems to ensure the validity of student evaluations and credentials (Wedderkopp, N., & Rutz, E., 2024).

Challenges and Factors of Students in Their Career Preparedness

The researchers aim to understand the challenges and factors affecting students' readiness for their careers. Through survey results, this study seeks to uncover the specific obstacles students face as they prepare for their future professional paths. Their participation in this survey will provide valuable insights to help identify areas where students need more support. Additionally, this study seeks to explore the underlying reasons behind these challenges. By looking into the factors influencing students' career preparedness, the researchers can better understand the root causes and develop focused strategies to address them. Tang (2019) emphasizes the crucial role of students' clear understanding of their interests, skills, and abilities, which continue to evolve throughout their lives, highlighting its significance for their career readiness.

The survey results reveal that many TUP-Manila students are interested in using TUPATH, a web platform for career readiness (see Appendix B). Some are very keen, while others are a bit cautious but still see its benefits. Everyone agrees that having easy access to academic records online is essential. Despite individual worries about future careers, all see the value in a platform like TUPATH for managing academic profiles. This shows that TUPATH could be really helpful for students at TUP-Manila as they get ready for their careers.

These findings not only shed light on the challenges and factors influencing students' career preparedness but also underscore the importance of addressing these issues effectively. One significant finding is the varying levels of confidence among students regarding their career readiness. While some express high levels of confidence, others harbor concerns about their future career prospects, such as uncertainties about job availability and readiness for licensure

exams. These concerns highlight the need for tailored interventions to boost students' confidence and equip them with the necessary skills and knowledge for their chosen professions.

Moreover, the survey responses reveal a common thread of reliance on traditional methods for managing academic achievements and credentials, such as maintaining hard copies of documents. However, concerns about the accessibility of university-issued documents and the competitiveness of the job market emphasize the need for a more streamlined and efficient approach. The enthusiasm expressed by students towards utilizing a centralized platform like TUPATH demonstrates the potential for such technological solutions to address existing challenges in managing academic profiles.

Furthermore, participants' reflections on their academic programs provide valuable insights into areas for improvement. While many acknowledge the effectiveness of their programs in providing practical experiences and preparing them for career paths, concerns about resource limitations, such as inadequate laboratory equipment, underscore the importance of enhancing infrastructure to support students' learning and development adequately.

In conclusion, the survey findings underscore the multifaceted nature of challenges and factors affecting students' career preparedness. By understanding these challenges and leveraging technological solutions like TUPATH, educational institutions can better support students in navigating their career journeys and ensuring their readiness for the ever-evolving demands of the workforce.

The study highlights the multifaceted challenges and factors influencing students' career preparedness, emphasizing the need for comprehensive support and technological integration. Survey results from TUP-Manila students reveal a mix of enthusiasm and caution towards using TUPATH, a career readiness platform, indicating a widespread recognition of the importance of

easy access to academic profile. Despite varying levels of confidence in career prospects and concerns about job availability, students see the value in centralized digital solutions for managing academic profiles. The findings also point to a reliance on traditional document management methods and highlight resource limitations in academic programs, such as inadequate laboratory equipment, which affect students' learning experiences. By addressing these issues and leveraging platforms like TUPATH, educational institutions can better equip students for their professional futures and enhance their readiness for the workforce's evolving demands.

The survey findings highlight the multifaceted challenges and factors affecting students' career preparedness, demonstrating the need for comprehensive support and technological integration. By leveraging platforms like TUPATH, educational institutions can better equip students for their professional futures and ensure their readiness for the evolving demands of the workforce. As the researchers consider the technological advancements that can support these goals, one crucial component is the utilization of keyword search.

Keyword Search

Keyword search is a type of technology utilized in information retrieval systems. These enable users to find relevant information by inputting keywords or phrases into a search interface. The goal of keyword search is to efficiently and accurately retrieve documents or resources that match the user's query.

Furthermore, an effective keyword search can be achieved by combining the openings of keywords within the database of information, ensuring that both the file content and keyword privacy are properly protected. To provide users with the most relevant files, it is preferable to

retrieve only the files that match their interests instead of retrieving all files. This means that the files should be ordered of high relevance based on users' interests, and only the files with the highest relevance should be sent to users as search results (Rajan, et al. 2017).

Keyword Search Indexing

Keyword search indexing is essential for information retrieval systems, facilitating efficient and user-friendly entity searches. This method, also referred to as text-based search, utilizes existing models to establish scalable indexing mechanisms (Zong et al., 2017). By adapting information retrieval models, keyword search systems can offer users a seamless experience when searching for specific entities. These systems are designed to manage a wide range of queries and ensure users can easily access relevant information.
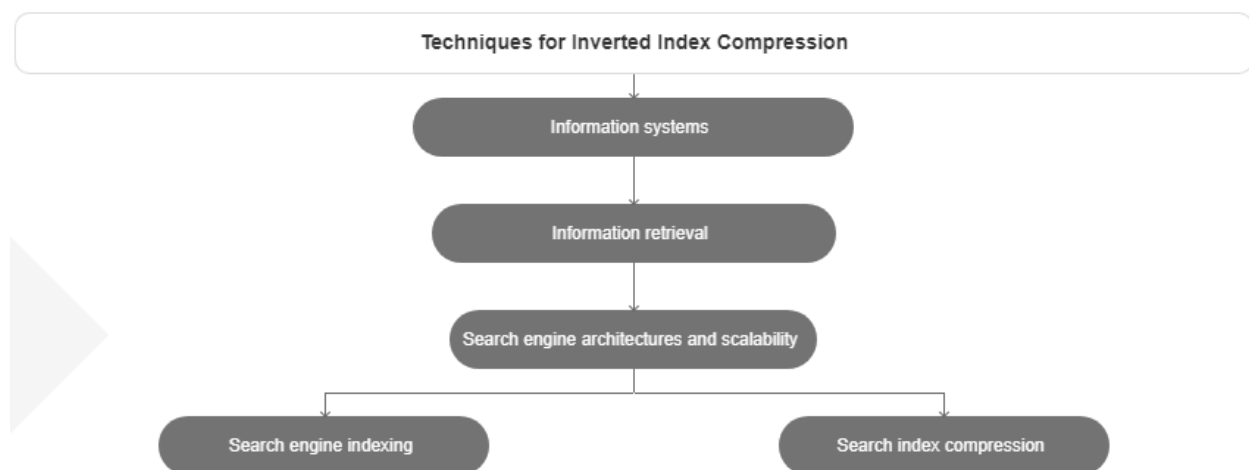

Figure 1: The Techniques for Inverted Index

Figure 1 shows a breakdown of techniques for compressing inverted indexes, starting from broad concepts to specific methods. At the top level is "Information systems," which covers a wide range of topics. This narrows down to "Information retrieval," which deals with how information is accessed and retrieved. Next, it branches into "Search engine architectures and

scalability," focusing on the design and performance of search engines. Finally, it splits into "Search engine indexing," which is about organizing and storing data for easy retrieval, and "Search index compression," which is about making the storage and retrieval process more efficient.

In large search engines, the inverted index is a key data structure that consists of sorted lists of numbers called inverted lists. Since these search engines index a huge number of documents and need to handle many user queries quickly, they must manage billions of numbers efficiently. Compressing these indexes is crucial because it helps make better use of computer memory, speeds up query processing, and reduces the number of storage machines needed. The article surveys different algorithms for compressing inverted indexes and evaluates their performance through experiments, as shown in the figure (Pibiri & Venturini, 2021).

Keyword Data Search

The study of keyword data search is fundamental to improving information retrieval. By understanding how users interact with search engines, we can optimize search and enhance user experience. This is particularly relevant in the context of cloud computing, where securely searching and sharing encrypted data is challenging yet crucial. The work of (Chunpeng et al., 2020) introduces a mechanism that enables efficient keyword search and data sharing in encrypted environments, making significant strides in cloud data security.

Furthermore, traditional search engines have made steps in document discovery, structured data search introduces unique challenges. Dataset search engine demonstrates how these challenges can be addressed. Auctus enables users to explore datasets through a rich set of queries, supporting data augmentation to improve machine learning models and enrich analytics. This dual focus on secure, efficient search in both unstructured and structured data underscores

the significance of this study in enhancing the accessibility, security, and usability of data in an increasingly complex digital landscape. Moving from the theoretical aspects of data search to web platforms, let's focus on the key web development tools needed to create user-friendly and responsive applications. One example is TUPATH, a tool that helps deliver intuitive user experiences.

MAGHANAP NG STUDY PA NA MALAPIT OR RELATED DUN SA BAGONG FEATURE, TAPOS BANGGITIN DIN NA SUPORTADO NG IT EXPERTS UNG MGA GAGAWIN NA INDICATORS

Web Development Tool

In an increasingly competitive job market, students need more than just academic excellence to succeed in their careers. They require holistic support and resources to enhance their career preparedness, including managing their academic profiles effectively. Acknowledging this imperative, the creation of TUPATH utilized the following web development tools:

MongoDB: MongoDB is scalable in nature and written in C++ libraries. This instance made the NosQL databases follow high scale systems with faster access. The main reason for migrating from relational databases is to make scaling easier. The concept of "rows and columns" is replaced with a model called "document". By using document properties and array functionalities, it is possible to represent a hierarchical relationship in terms of a single record. This made the performance evaluation of MongoDB scalable in different operational occurrences . MongoDB as a NoSQL database and RDBMSs are different in

terms of their implementation and operational concepts. *Figure(#).* shows the

terminology

Relational DBMS	MongoDB
Table	Collection
Column, Rows	JSON document
Index	Index
Join	Embedding & Linking across documents
Partition	Shard
Partition key	Shard key
Fixed schema	Schema less

Figure 2. Functional difference between RDBMS and MongoDB

MySQL is a relational database where data is stored in rows and columns, structured according to a schema that defines the blueprint of how the data should look. Scaling MySQL typically involves vertical scaling. On the other hand, MongoDB is a non-relational (NoSQL) database that structures data differently, not storing it in related tables like SQL databases. Despite this, relational data can still be stored in NoSQL databases. NoSQL databases come in various types, including key-value, wide-column, graph, and document databases. MongoDB is a document-oriented database that stores data in documents formatted in JSON (JavaScript Object Notation) structure, with key-value pairs defined using curly brackets and colons to separate keys from values. Although MongoDB stores data in JSON-like documents, it actually uses BSON (Binary JSON), an extended version of JSON that supports additional data types. Unlike MySQL, MongoDB features a flexible schema with no strict rules, allowing any data to be stored in any document. Moreover, MongoDB supports full-text search capabilities, enhancing

search functionality by allowing users to quickly find relevant profiles and information based on keywords.

Express.js: a minimalist web application framework for Node.js. It provides a set of features for building web applications and APIs, such as routing, middleware support, and template engines. Express.js simplifies the process of building server-side logic and handling HTTP requests, making it a popular choice for backend development in Node.js applications. It would serve as the backend framework for handling HTTP requests and managing the server-side logic of the platform. It would handle user authentication, data retrieval, and updates from the MongoDB database.

React.js: a JavaScript library for building user interfaces, developed by Facebook. It allows developers to create reusable UI components and manage their state efficiently. React.js uses a virtual DOM to improve performance by minimizing DOM manipulation, making it well-suited for building interactive and dynamic web applications. React.js would power the frontend of the platform, providing an interactive and dynamic user interface for TUP-Manila students to manage their academic profiles and career preparation activities. React.js components could be used to display student information, allow for profile editing, and showcase achievements.

Node.js: a runtime environment for executing JavaScript code outside of a web browser. It allows developers to build scalable and high-performance server-side applications using JavaScript. Node.js uses an event-driven, non-blocking I/O model, making it efficient for handling concurrent requests. Node.js would serve as the runtime environment for running the Express.js backend server. It would handle incoming HTTP

requests, manage asynchronous operations, and ensure efficient communication between the frontend and backend components of the platform.

Bootstrap: a front-end framework for building responsive and mobile-first websites and web applications. It provides a set of pre-designed CSS and JavaScript components, such as grids, buttons, forms, and navigation bars, that can be easily customized and integrated into projects. Bootstrap components could be utilized to create a consistent and visually appealing user interface, enhancing the user experience for TUP-Manila students as they navigate the platform to manage their academic profiles and career preparation activities.

HTML: the backbone of any website, and while it is essential for structuring web pages, it lacks the capability to add many effective features (Bharamagoudar, Geeta, & Totad, 2013). To enhance the effectiveness and efficiency of web pages, additional platforms such as CSS are used. Furthermore, JavaScript is employed to make web pages dynamic (Bharamagoudar et al., 2013). It would enable the creation of organized and accessible content sections, such as student profiles, and career resources. HTML forms would facilitate user input for registration, login, and updating profiles. Additionally, HTML would support embedding multimedia elements like images and videos to enhance user engagement and understanding. Navigation elements structured with HTML would ensure users can easily access various sections of the platform, making it user-friendly and efficient.

CSS: A style sheet language called Cascading Style Sheets (CSS) is defined by the W3C and is used, more specifically, to style Web documents and describe how a text written in a markup language is presented. The elements of the target documents that need to be styled are chosen by selectors, which are organized by a set of stylistic rules in a CSS file.

A CSS file arranges a collection of stylistic guidelines into selectors, which are in charge of choosing which target page components need to be styled. A good amount of redundancy and a large number of rules are common in CSS files seen by researchers. Using CSS preprocessors can help you save time and maintain all these rules in a more flexible manner. Because these tools leverage features like variables, functions, and mixins that were previously unavailable when building style sheets, they make it simple to maintain huge, sophisticated style sheets. By using these techniques, developers may work more quickly and error-free because the code is more organized (Queirós, 2018).

The MERN stack is a JavaScript stack that's designed to make the development process smoother. MERN includes four entirely open-source components: MongoDB, Express, React, and Node.js. Adopting the stack also addresses critical but repetitive development tasks that redirects efforts towards building and innovating upon a breakthrough application and its testing. Another useful aspect of using MERN stack is developing Single Page Applications (Mansuri et al., 2021).

The MERN stack is designed for rapid development, and it offers a wide range of tools and libraries that can speed up the development process. This allows developers to quickly build and deploy applications, reducing the time to market and allowing for faster iteration and feedback (Kadam et al., 2021).
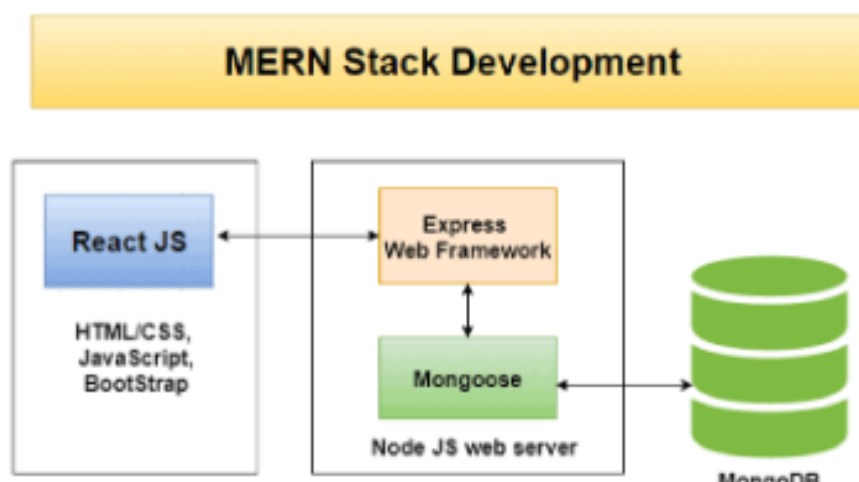
Figure 3. MERN Stack Architecture

In summary, MongoDB would store student data, Express.js would handle server-side logic, React.js would power the dynamic frontend interface, Node.js would manage runtime operations, and Bootstrap would ensure a visually appealing and responsive design. Together, these tools would enable the development of "TUPATH," providing TUP-Manila students with a comprehensive platform to manage their academic profiles and enhance their career preparedness.

The adoption of the MERN stack streamlines the development process, enabling rapid iteration and deployment of features. By leveraging these advanced web development tools, TUPATH not only addresses the immediate needs of students but also fosters innovation and continuous improvement, ultimately empowering students to thrive in an increasingly competitive job market.

By embracing the MERN stack, TUPATH accelerates development, fostering innovation and continuous improvement, essential for student success in a competitive job market. Transitioning from development strategy to quality assurance, adherence to ISO 25010 standards ensures TUPATH meets stringent quality benchmarks. Here's an analysis of TUPATH's adherence to ISO 25010:

ISO 25010

ISO 25010 is a vital international standard that provides a structured approach to assess software quality. It was not just a very important step to improve Software Quality Management, but a significant event in model evolution that reflected changes in software engineering as well (Gordieiev, Kharchenko, Fominykh, & Sklyar, 2014). It covers key aspects like functionality, reliability, usability, efficiency, and maintainability. Following this standard helps developers ensure that their software meets user needs and industry standards. By adhering to ISO 25010, developers can create dependable and effective software solutions. In the development of TUPATH, the researchers integrated ISO 25010 principles to enhance the quality and reliability of the final product, the following analysis are outlined below:

Functional Suitability: Ensuring that the system provides all necessary functionalities such as academic profile management, career resources, job matching, and skill assessments. Verify that these features work accurately and cover all intended use cases. This quality factor describes the extent to which a software product or system provides functions that satisfy the stated and implied needs of stakeholders when used under specified conditions (Peters & Aggrey, 2020).

Usability: Designing an intuitive user interface for TUPATH that is easy to navigate. Conduct usability testing with students and career counselors to gather feedback and refine the user experience. Ensure that the system is accessible to users with disabilities. Usability factor describes the extent to which software or system products can be used to achieve specific goals with effectiveness, efficiency and satisfaction in a specified context of use. (Peters & Aggrey, 2020).

Security: Ensures incorporation of strong authentication and authorization mechanisms. Protect sensitive student data with encryption and secure storage practices. According to Peters and Aggrey (2020), the security factor is about how the software products or systems protect its information and data (information resources) from unauthorized persons or from other software products or systems.

Maintainability: Write clean, modular, and well-documented code for the system.Design the system with scalability in mind to allow future enhancements. The ability of software products or systems to be modified, corrected, or adapted to current changes in the environment describes its maintainability feature (Peters & Aggrey, 2020).
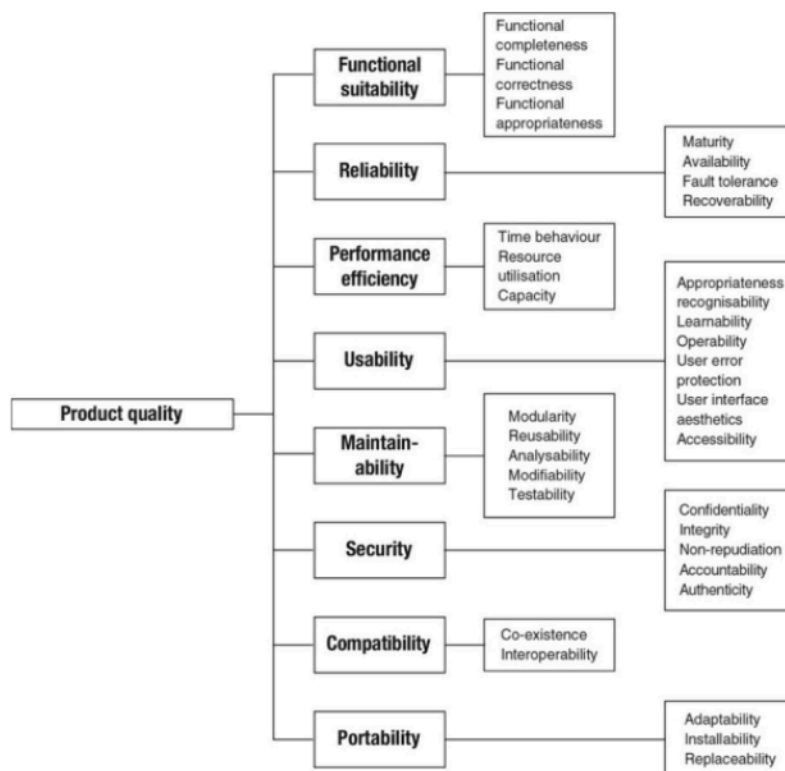

Figure 4. Product quality model of ISO/IEC 25010 [(Wagner, 2013)]

The integration of ISO 25010 principles into the development of TUPATH ensures a comprehensive approach to assessing software quality. TUPATH prioritizes functional suitability by providing essential academic and career management functionalities, while optimizing performance efficiency to handle multiple users seamlessly. Together, these efforts result in a robust and dependable solution that meets user needs across all dimensions of software quality.

Related Studies

Student academic management system plays a key role in modern educational institutions. There is a growing need for effective management of student academic records and information to improve student data management, according to Gurudev (2023). A Student Academic Management System, also known as a Student Information System (SIS) or Student Management System (SMS), is a software application designed to manage and organize various aspects of student data within an educational institution. It serves as a centralized platform that integrates and automates processes related to student admissions, enrollment, attendance, online assessments, grades, scheduling, and more.

The student management system is crucial for any organization looking to minimize paperwork and streamline operations. By reducing time wastage, it plays a vital role in improving efficiency. This system facilitates better communication between teachers, students, and the organization. Therefore, this project is expected to significantly aid in managing academic tasks more effectively (Fatin et al., 2018).

Record Management Systems (RMS) equipped with dynamic forms offer a significant advancement in the way data is collected, stored, and managed within educational institutions. These systems allow for real-time customization of data entry forms, enabling users to capture

relevant information specific to their roles, such as students, faculty, or administrators. Research shows that dynamic forms enhance user engagement and data accuracy by adapting to the specific needs of the user, ultimately improving efficiency in record-keeping processes (Serpa et al., 2017).

In a recent study, Saquin and Marcial (2016) developed an automated student academic record management system aimed at enhancing the efficiency of handling student records. This system features dynamic forms for grade submissions and assessments, ensuring real-time updates and easy access for students and faculty alike, addressing the common issues of manual record-keeping and inefficiencies within educational institutions.

According to the International Journal of Library and Information Studies (2023), RMS with dynamic forms can greatly improve the overall efficacy of data management strategies in higher education settings by enabling institutions to customize forms according to user requirements.

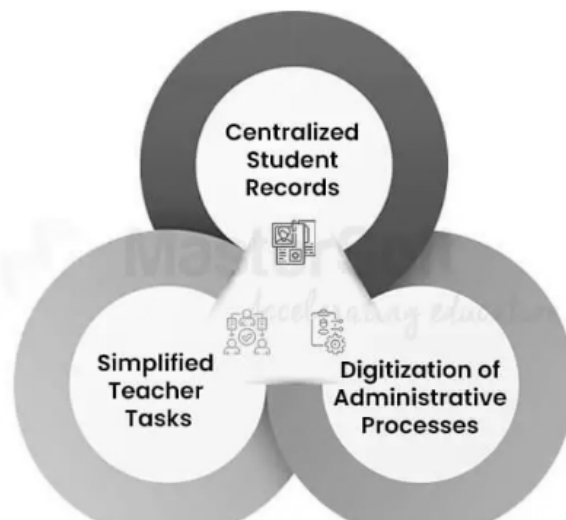*The Significance Of Student Academic Management Systems*

Figure 5. Significance Of Student Academic Management Systems

The implementation of academic management systems revolutionizes educational institutions by offering centralized student records, digitizing administrative processes, and simplifying teacher tasks. These systems streamline data management and retrieval, providing a central portal for storing and accessing student records, thereby eliminating the time-consuming and error-prone manual process. Additionally, they automate administrative workflows such as document processing and storage, saving time and effort. Moreover, academic management systems support teachers by offering tools for grade management, lesson planning, and student communication, allowing them to effectively manage multiple tasks and focus more on teaching and student engagement.

Streamlined Communication and Improved Data Accuracy

A student management system offers streamlined communication channels, facilitating efficient interaction among students, parents, teachers, and administrators. Through features such as notification alerts, messaging systems, and chat boxes, communication within the academic environment becomes seamless. Additionally, the system enhances data accuracy by replacing error-prone manual record-keeping methods. Standardized data entry procedures and validation checks ensure the integrity of student information, mitigating inaccuracies common in traditional systems.

A student management system (SMS) is pivotal in modern educational institutions, offering comprehensive solutions for managing and organizing student data. By integrating and automating processes related to admissions, enrollment, attendance, assessments, grades, and scheduling, SMS enhances operational efficiency and minimizes paperwork. These systems streamline communication between students, parents, teachers, and administrators through features like notification alerts and messaging systems. Moreover, they improve data accuracy by replacing manual record-keeping with standardized data entry procedures and validation checks, ensuring the integrity of student information. Overall, SMS supports educational institutions in managing academic tasks more effectively, leading to a more organized and productive academic environment.

Building on the importance of effective student data management and communication, it is crucial to explore practical implementations of student management systems. For instance, a study conducted by the Department of Computer Engineering at New Horizon Institute of Technology and Management in Thane, India, showcases the benefits of implementing an SMS.

Another related study authored by Bhanushali et al. (2022) for the Department of Computer Engineering at New Horizon Institute of Technology and Management in Thane, India, focused on the development and implementation of a Student Management System (SMS). This system aimed to assist colleges in maintaining accurate student records and providing remote monitoring and control capabilities. By centralizing student data storage, the SMS facilitated easy access to information such as registration details, fee payments, and internship records. By compiling all relevant data in one accessible platform, the SMS contributed to the creation of high-quality student databases, enabling colleges to generate various reports and effectively manage student information from enrollment to graduation.

The study by Bhanushali et al. (2022) demonstrates the effective implementation of a Student Management System (SMS) in colleges. This system centralized student data storage, facilitating easy access to critical information such as registration details, fee payments, and internship records. By compiling all relevant data in one accessible platform, the SMS helped create high-quality student databases, enabling the generation of various reports and effective management of student information from enrollment to graduation.

Building on the foundational understanding of student management systems, it is also important to examine how users interact with and accept these technologies. User acceptance plays a crucial role in the successful implementation and effectiveness of such systems. Exploring the user acceptance of predictive analytics in educational settings provides valuable insights into how these advanced systems can be integrated into academic environments to further enhance student performance monitoring and management.

Another related study authored by Hernandez et al. (2019) named "User Acceptance of Predictive Analytics for Student Academic Performance Monitoring: Insights from a Higher Education Institution in the Philippines" shares a significant similarity with the current study. Student academic performance describes how well a student meets the standards of a course or a whole of the program. Through a learning management system, these student performance data can be analyzed using predictive models integrated into information systems. This study aims to understand the user acceptance of an information system that predicts students' academic performance using the technology acceptance model, through a survey conducted among the users in a higher education institution in the Philippines. Results show that perceived ease of use has a significant influence on perceived usefulness. Moreover, there is no significant relationship between perceived usefulness and attitude towards use of technology. Overall, the technology
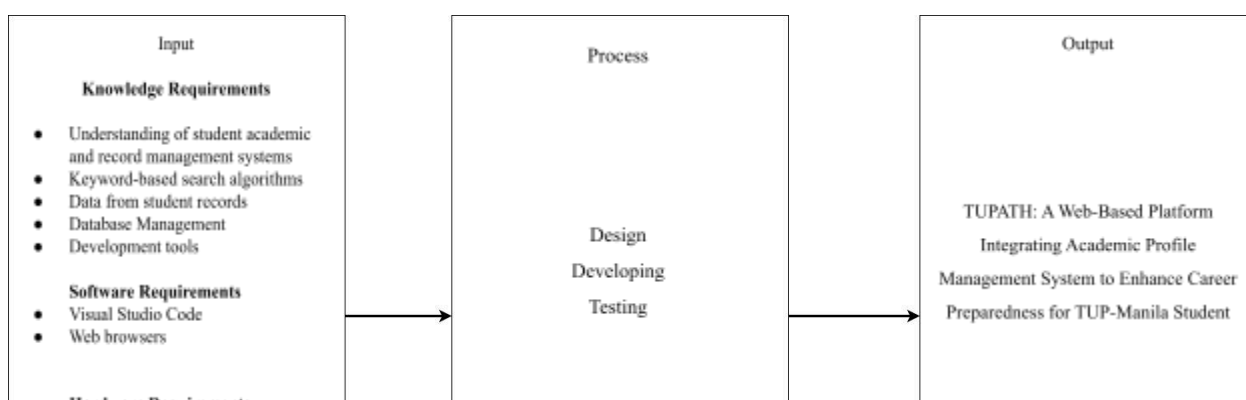
acceptance model explains the determinants of adoption of predictive analytics on student academic performance.

Hernandez et al. (2019) found that user acceptance of predictive analytics for student performance hinges on perceived ease of use, rather than attitude towards technology. This underscores the importance of user-friendly designs. In developing "TUPATH: A Web-Based Platform Integrating Academic Profile Management System to Enhance Career Preparedness for TUP-Manila Students," it's crucial to prioritize intuitive interfaces to foster adoption.

Moreover, a study by Kong et al. (2019) titled *"Academic Social Networks: Modeling, Analysis, Mining, and Applications"* highlights the significance of academic social networks (ASNs) in fostering relationships between entities such as publications and scholars. The study discusses how ASNs are formed by complex networks and how data mining tasks can be applied to analyze these relationships for insights. This aligns with TUPath's goal of creating a robust academic profiling system that allows students to build meaningful networks based on shared academic interests and career goals. By incorporating data-driven insights, TUPath can help students optimize their academic profiles and enhance their career prospects, while fostering professional relationships within the TUP community.

Conceptual Model of the Study

The conceptual model of the study is split up into three sections: input, process, and output. The system's components must work together towards a single goal to accomplish the study's main goals.

Input	Process	Output
Knowledge Requirements • Understanding of student academic and record management systems • Keyword-based search algorithms • Data from student records • Database Management • Development tools **Software Requirements** • Visual Studio Code • Web browsers	Design Developing Testing	TUPATH: A Web-Based Platform Integrating Academic Profile Management System to Enhance Career Preparedness for TUP-Manila Student

Evaluation

ISO 25010

Figure 6. Conceptual Model of the Study

Input

The input for "TUPATH: A Web-Based Platform Integrating Academic Profile Management System to Enhance Career Preparedness for TUP-Manila Students" included various knowledge requirements and technological tools essential for the study. Knowledge requirements encompassed understanding student academic and record management systems, keyword search, and web programming languages. Additionally, the study utilized data from student records, administrative sources, and relevant literature. Regarding technological tools, MongoDB, web browsers, and Visual Studio Code were among the software requirements, while the hardware requirements included computer units and laptops.

Process

The process involves designing, developing, and testing the TUPath platform, a web-based system that integrates an Academic Profile Management System to enhance career preparedness for TUP-Manila students.

Design. In this phase, the researchers create the system and implementation scheme for TUPath. This includes developing detailed diagrams such as use case diagrams, and collection schema diagrams. The use case diagrams specify the expected functionalities and interactions between users (students, employer, and administrators) and the system. Collection schema diagrams represent the structure of the MongoDB collections, detailing how data is stored and related within the database. This phase ensures a clear and detailed blueprint for the development of the platform.

Develop. During this phase, the actual development and construction of the TUPath platform takes place. This includes coding the front-end using React.js, developing the back-end with Node.js and Express.js, and managing the database with MongoDB. The researchers use Visual Studio Code for coding and GitHub for version control. Establishing connections between different components, such as API endpoints and the database, is a critical part of this phase. Additionally, the phase includes extensive debugging to address any errors or bugs, ensuring that each component functions correctly and integrates seamlessly with others. The output of this phase is a fully constructed and functional TUPath platform.

Test. After development, the TUPath platform undergoes rigorous testing to ensure its functionality, usability, and performance. This phase involves conducting unit tests, integration tests, system tests, and user acceptance tests (UAT) to identify and resolve any

issues. Specific tests focus on the accuracy of academic record management, the effectiveness of the search functionality, and the reliability of the messaging system. Proper adjustments and refinements are made for any failed test cases to ensure the system meets the required standards. The final output is a thoroughly tested and validated platform ready for deployment and user evaluation.

Output

The output section presented the finalized "TUPATH" platform, including its functional user interface, academic profile management system, and career readiness resources. The platform underwent thorough evaluation to ensure its effectiveness and quality in enhancing career preparedness for TUP-Manila students.

Operational Definition of Terms

The terms are defined both operationally and technically in alignment with the context of the study.

Centralized Storage of Student Data: Keeping all student information in one place to make it easy to access, update, and manage.

Cloud-Based Functionality: Using the internet to access data and perform tasks from any device in real-time.

Keyword Search: Tools that help users find relevant information by typing in keywords.

Keyword Search Indexing: Organizing data in a way that helps quickly find information based on keywords.

Keyword Data Search: Improving and optimizing information retrieval in user experience.

Record Management System (RMS): Software for managing student academic records.

Role-Based Access Control: Security that limits who can see sensitive information based on their role.

Student Record Management System: Software for keeping track of student details.

Unauthorized Use of Systems Resources: Illegally accessing files or hardware.

Web Development Tools: Programs used to build web-based applications.

ISO 25010: A standard for making sure software is good quality.

Chapter 3

METHODOLOGY

This chapter entails the research methodology of the study with the following sections: project design, project development, operation and testing procedure, and evaluation procedure.

Project Design

The study will develop TUPath, a web-based platform integrated with an Academic Profile Management System to enhance career preparedness for TUP-Manila students. This platform is designed to centralize academic records such as achievements, and career resources, providing a comprehensive toolkit for students to explore, plan, and execute their career aspirations. The system will be developed using the MERN stack (MongoDB, Express.js, React.js, and Node.js), ensuring scalability, flexibility, and performance.

Software Design

The scope of the TUPath system is represented through a Use Case Diagram, as depicted in Figure 7. This diagram illustrates the interactions between external entities, such as students, employers and administrators, and the TUPath platform. It delineates the various functionalities and expected behaviors of the system, including profile management, academic record updates ,

and communication features. By specifying the roles and actions of each user type, the Use Case Diagram provides a clear overview of the system's requirements and functionalities, ensuring that all user interactions are effectively captured and addressed.

TUPATH: A WEB-BASED PLATFORM INTEGRATING ACADEMIC PROFILE MANAGEMENT SYSTEM TO ENHANCE CAREER PREPAREDNESS FOR CS, IS, AND IT STUDENTS OF TUP-MANILA

Student

Employer

Admin

Manage Profile

Create Profile

Upload Projects/ Academic Achievements

Search Students

Post Forum

Skill Assessment

Post Job Opportunities

Post Announcement
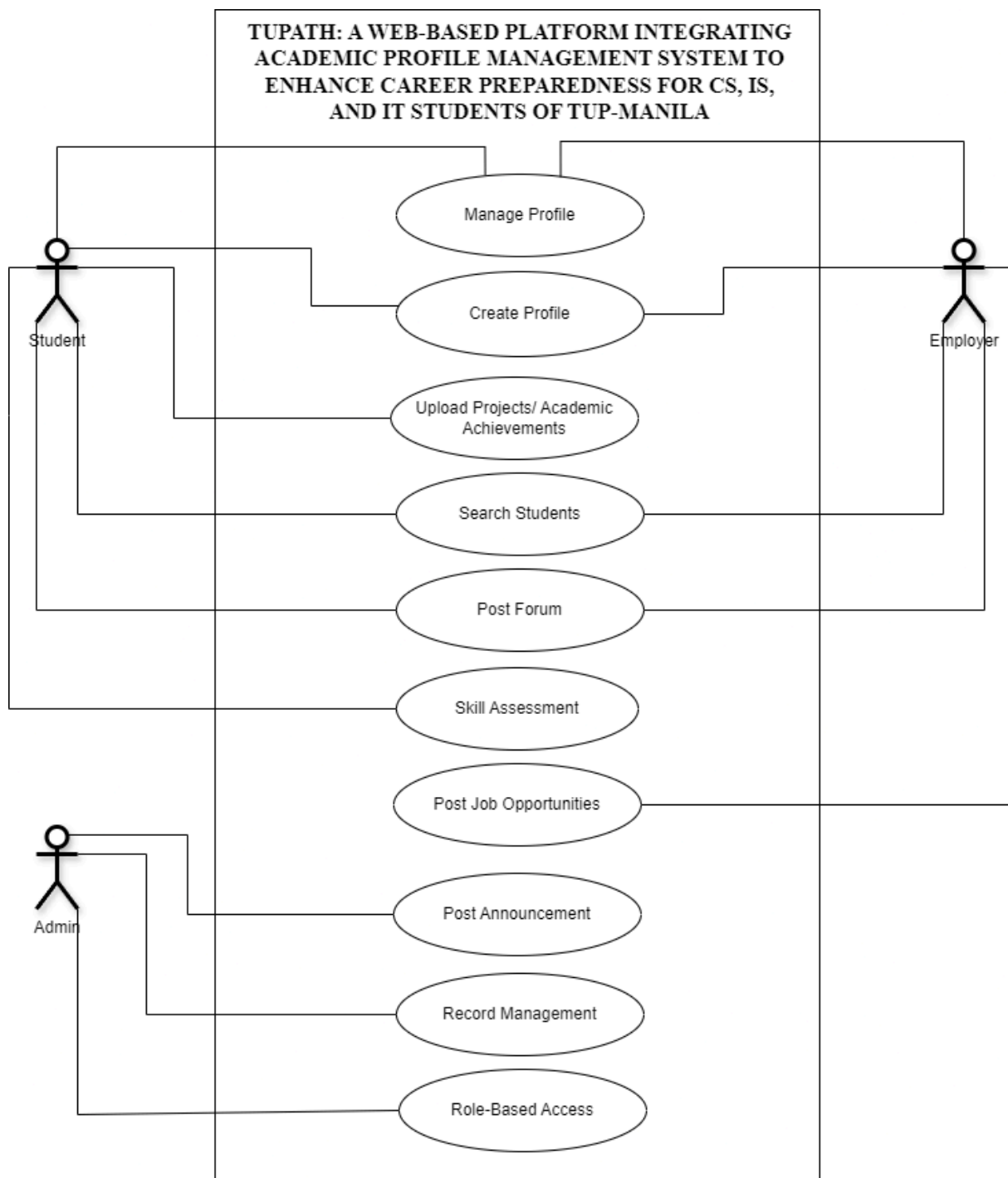
Record Management

Role-Based Access

Figure 7. Use Case Diagram of the TUPath: Web-Based Platform Integrating Academic Profile Management System

Figure 7 highlights the key features of the TUPath platform, tailored for students, employers, and administrators. Students can register, log in, and create or update their academic profiles. They can also view their academic achievements and credentials within the system. A notable feature for students is the skill assessment tool, which allows them to evaluate their skills in relation to industry requirements, as outlined by the CHED memorandum, helping identify strengths and areas for improvement. The platform further enables students to search for job opportunities posted by employers and to communicate with them through a built-in messaging system. Additionally, students can participate in forums for discussions and announcements that support their career development.

For employers, the platform provides the ability to post job and internship opportunities, as well as relevant announcements. Employers can search for students based on their profiles, skills, and qualifications, and engage directly with them through the messaging feature.

Administrators have control over managing user roles and permissions, ensuring the smooth operation of the platform. They can also post important announcements and updates to keep students and employers informed about opportunities and system notifications. Overall, TUPath supports academic and career readiness, skill evaluation, effective communication, and serves as a centralized platform for all users.

Database Design

  The database design for TUPath leverages MongoDB, a NoSQL database excellent choice due to its flexibility, scalability, performance, and ease of use. The ability to handle complex and varying data structures, and search capabilities, makes MongoDB ideally suited for managing academic profiles and enhancing career preparedness for TUP-Manila students. By leveraging MongoDB, TUPath can provide a robust and dynamic platform that meets the evolving needs of its users, ensuring a scalable and high-performance data storage solution.
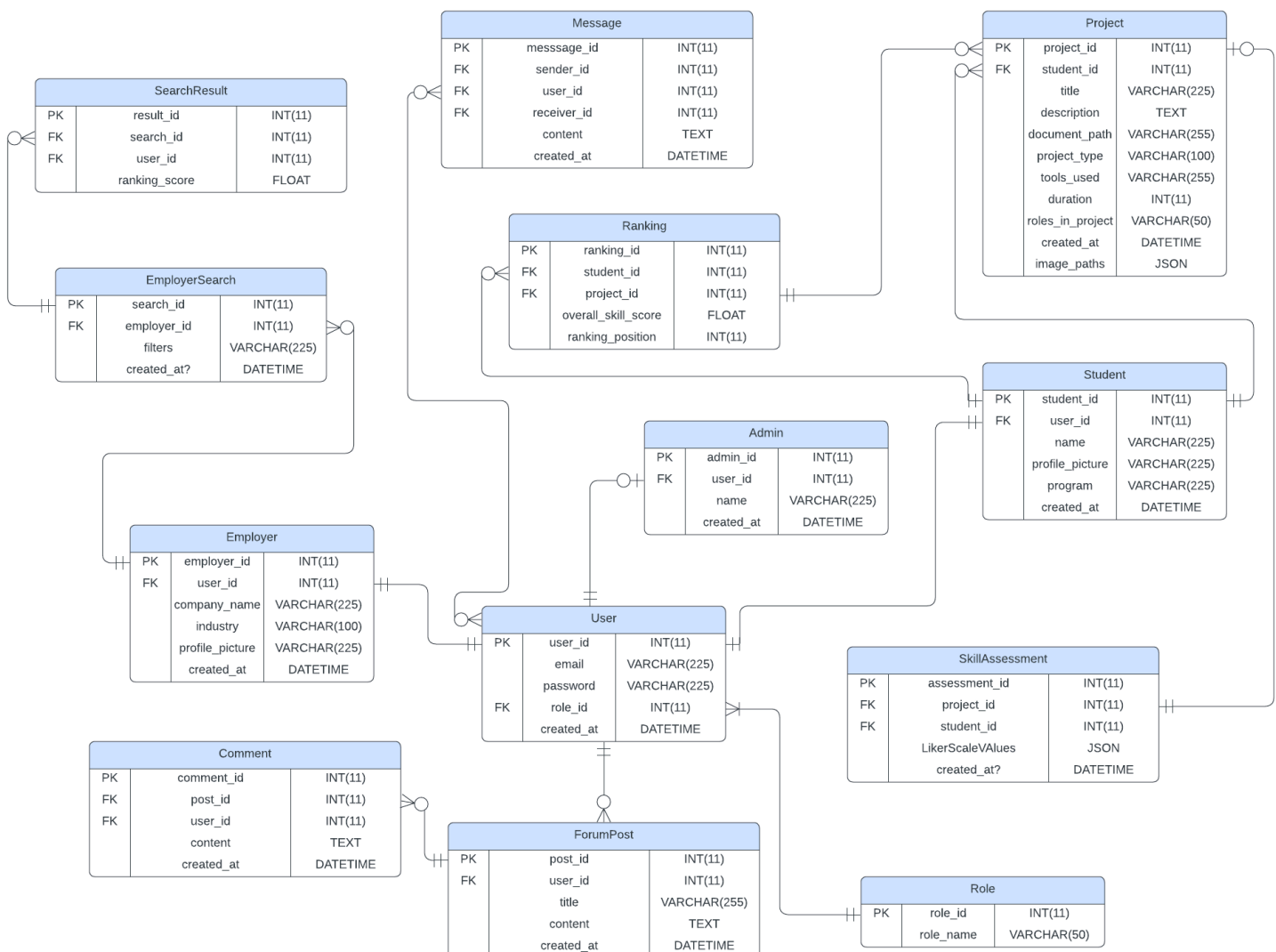

Message

PK	messsage_id	INT(11)
FK	sender_id	INT(11)
FK	user_id	INT(11)
FK	receiver_id	INT(11)
	content	TEXT
	created_at	DATETIME

Project

PK	project_id	INT(11)
FK	student_id	INT(11)
	title	VARCHAR(225)
	description	TEXT
	document_path	VARCHAR(255)
	project_type	VARCHAR(100)
	tools_used	VARCHAR(255)
	duration	INT(11)
	roles_in_project	VARCHAR(50)
	created_at	DATETIME
	image_paths	JSON

SearchResult

PK	result_id	INT(11)
FK	search_id	INT(11)
FK	user_id	INT(11)
	ranking_score	FLOAT

Ranking

PK	ranking_id	INT(11)
FK	student_id	INT(11)
FK	project_id	INT(11)
	overall_skill_score	FLOAT
	ranking_position	INT(11)

EmployerSearch

PK	search_id	INT(11)
FK	employer_id	INT(11)
	filters	VARCHAR(225)
	created_at?	DATETIME

Student

PK	student_id	INT(11)
FK	user_id	INT(11)
	name	VARCHAR(225)
	profile_picture	VARCHAR(225)
	program	VARCHAR(225)
	created_at	DATETIME

Admin

PK	admin_id	INT(11)
FK	user_id	INT(11)
	name	VARCHAR(225)
	created_at	DATETIME

Employer

PK	employer_id	INT(11)
FK	user_id	INT(11)
	company_name	VARCHAR(225)
	industry	VARCHAR(100)
	profile_picture	VARCHAR(225)
	created_at	DATETIME

User

PK	user_id	INT(11)
	email	VARCHAR(225)
	password	VARCHAR(225)
FK	role_id	INT(11)
	created_at	DATETIME

SkillAssessment

PK	assessment_id	INT(11)
FK	project_id	INT(11)
FK	student_id	INT(11)
	LikerScaleVAlues	JSON
	created_at?	DATETIME

Comment

PK	comment_id	INT(11)
FK	post_id	INT(11)
FK	user_id	INT(11)
	content	TEXT
	created_at	DATETIME

ForumPost

PK	post_id	INT(11)
FK	user_id	INT(11)
	title	VARCHAR(255)
	content	TEXT
	created_at	DATETIME

Role

PK	role_id	INT(11)
	role_name	VARCHAR(50)

Figure 8. Database Design of TUPath: Academic Profile Management System

In this system, an Entity Relationship Diagram (ERD) is utilized to visually represent the relationships and structure within the TUPATH Academic Portfolio Management System (APMS), as presented in Figure 7. The diagram illustrates key components such as users (students, employers, and administrators), their roles, and the various functionalities provided by the system. The primary entities include User, Role, Student, Employer, Project, SkillAssessment, Ranking, EmployerSearch, SearchResult, ForumPost, Comment, and Message.

Project Development

This section outlines the steps followed to develop the TUPath web-based system according to the design specifications.

Program Code

Server-Side Development (Node.js & MongoDB)

1. The development environment was set up by installing Node.js and MongoDB. A code editor, Visual Studio Code, was used to handle the project. The project was initialized using npm init, and essential packages such as Express.js, Mongoose, and bcryptjs were installed.

2. The database was created using MongoDB under the name tuPathDB, and necessary collections like users, profiles, academicRecords, and messages were defined.

3. A secure connection to MongoDB was established using Mongoose, with error handling and credentials ensured for security purposes.

4. For user registration and authentication, React forms were developed to allow users to register and log in. Express.js routes were created to handle form submissions, validate input, and communicate with the MongoDB database. Passwords were hashed using bcrypt to enhance security.

5. CRUD operations for user profiles were implemented, allowing students to create, update, and delete their profiles. Express.js routes were set up to manage these actions, and validation was integrated to ensure data integrity.

6. A messaging system was implemented, where Express.js routes were created to handle sending and receiving messages. React components were developed for the messaging interface.

7. For the skill assessment integration, custom routes were created to record the results of Google Forms-based quizzes, which are aligned with CHED competency standards. These quizzes assess student skills, and the results are stored in the system for display on student profiles. Additionally, Express routes were used to process quiz results, ensuring that they are securely saved and retrieved when students view or update their profiles.

Client-Side Development (React.js)

1. The layout of the system was designed by creating wireframes and mockups for the user interface. HTML was used to structure the content, while CSS provided the styling for the pages.

2. User interface components were developed, including navigation bars, forms, and buttons. These components were made responsive using Bootstrap to ensure compatibility across different browsers and devices.

3. AJAX was implemented using Axios to handle dynamic updates, allowing real-time communication between the client and server. This enabled features like profile updates and job searches to be reflected immediately.

4. To enhance the user experience, a notification system was added to inform users about profile updates, messages, and skill assessment results. CSS animations and modal dialogs were used to provide alerts and confirmations to users in an interactive way.

5. The application was thoroughly tested and debugged to ensure that all features were functioning correctly. Specific attention was paid to usability and performance across different platforms and devices.

6. The final step involved deploying the application from the local development environment to a production server, ensuring that proper configuration and security measures were in place for the live system.

Database Setup

Based on the database design of the system in figure 8, the equivalent NoSQL Document

Model for TUPath: Academic Profile Management System is shown in figure 9.


```javascript
db.createCollection("users")
db.users.insertMany([
  {
    "userID": "string",
    "username": "string",
    "password": "string",
    "email": "string",
    "role": "string",
    "studentID": "string",
    "employerID": "string",
    "adminID": "string"
  }
])

db.createCollection("profiles")
db.profiles.insertMany([
  {
    "profileID": "string",
    "studentID": "string",
    "name": "string",
    "contactInfo": "string",
    "skills": ["string"],
    "experience": ["string"],
    "projects": ["string"],
    "achievements": ["string"]
  }
])

db.createCollection("academicRecords")
db.academicRecords.insertMany([
  {
    "recordID": "string",
    "studentID": "string",
    "courseName": "string",
    "grade": "string",
    "semester": "string"
  }
])
```

```javascript
db.createCollection("jobOpportunities")
db.jobOpportunities.insertMany([
  {
    "jobID": "string",
    "employerID": "string",
    "jobTitle": "string",
    "jobDescription": "string",
    "requirements": ["string"],
    "location": "string",
    "postingDate": "string"
  }
])

db.createCollection("messages")
db.messages.insertMany([
  {
    "messageID": "string",
    "senderID": "string",
    "receiverID": "string",
    "content": "string",
    "timestamp": "string"
  }
])

db.createCollection("skillsAssessments")
db.skillsAssessments.insertMany([
  {
    "assessmentID": "string",
    "studentID": "string",
    "assessmentName": "string",
    "score": "number",
    "dateTaken": "string"
  }
])

db.createCollection("announcements")
db.announcements.insertMany([
  {
    "announcementID": "string",
    "adminID": "string",
    "title": "string",
    "content": "string",
    "datePosted": "string"
  }
])
```

Figure 9. Database Setup using MongoDB

Operation and Testing Procedure

This section outlines the comprehensive steps taken to ensure the TUPath functions as intended. This chapter is crucial for validating the system's effectiveness, usability, and reliability. By detailing both the operational workflow and the testing methodologies employed, the researchers aim to provide a clear understanding of how users interact with the system and how its various components were rigorously tested.

User Operation

1. The user should navigate to the web page of TUPATH.

2. The user must directly go to the registration page upon first visit and fill up the required fields which are composed of username, name, age, course, year, email, and password field.

3. The user must specify if they are registering as student, employer, or admin.

4. Upon filling up, they can submit the registration form and would automatically send a verification through email.

5. Users must verify the registration via email confirmation link.

6. The user should direct to the login page after verifying their registration to the page.

7. Login page would require the user to input the email and password they registered.

8. The user would be able to reset their forgotten password through a forgot-password link below the input fields which would only require them to input their registered email and would send a reset password link through email.

9. If the user is already done filling up they can click the login button to access the user dashboard.

10. In the dashboard, the user would be able to navigate to the profile management section where they can fill in or update their profile information (e.g., academic background, publications, certificates, company background).

11. When the user uploaded a project, a form would pop up that would ask details about the project they are uploading, after filling up they can proceed to upload and the system would rate their skills from the answers they have given.

12. The user would be able access the home, search, and message tab.

13. In the home tab, the user can post and find works of other users.

14. In the search tab, the user would be able to search content and users.

15. Then in the skills assessment tab, the system would provide a different set of questionnaires per skill that the user wants to take.

16. After using the page, the user can log out their account.

Testing Procedure

The following tables show the testing procedures to be conducted on the web-based platform, TUPATH, to ensure its functionality and reliability.

Table 1.

Testing Procedure for Student Side

Test Case	Steps to be Taken	Expected Results
Navigate to Registration Page	1. Open the TUPATH homepage. 2. Select Student as registration type.	The student should be redirected to the registration page, where all required fields are displayed.

Registration Form Submission	1. Fill in the required fields: username, name, age, course, year, email, and password. 2. Submit form.	The student should receive a verification email after submitting the registration form.
Registration Email	1. Open the email and click on the verification link.	The student should be redirected to the login page after successful email verification.
Login Process	1. Enter the registered student ID and password. 2. Click "Login".	The student should be able to access the profile creation after logging in.
Profile Management	1. Navigate to the "Profile Management" section. 2. Update academic background, publications, etc.	The profile details should be updated and saved in the system.
Project Upload	1. Click "Upload Project". 2. Fill in project details in the pop-up form. 3. Submit.	The project should be uploaded successfully, and the system should provide a skills rating based on the details.
Skills Assessment	1. Navigate to the "Skills Assessment" tab. 2. Select a skill and complete the provided questionnaire.	The system should provide a skill rating based on the questionnaire responses.
Forgot Password Process	1. Click the "Forgot Password" link on the login page. 2. Enter the registered email.	A password reset link should be sent to the student's email.
Reset Password	1. Open the password reset email and click the reset link.	The student should be able to successfully reset their password and access their

	2. Enter a new password.	account.
Logout	1. Click the "Logout" button.	The student should be logged out and redirected to the homepage.

Table 2.

Testing Procedure for Employer Side

Test Case	Steps to be Taken	Expected Result
Navigate to Registration Page	1. Open the TUPATH homepage. 2. Select "Employer" as registration type.	The employer should be redirected to the registration page, where all required fields are displayed.
Registration Form Submission	1. Fill in required fields: company name, email, password, etc. 2. Submit form.	The employer should receive a verification email after submitting the registration form.
Registration Email	1. Open the email and click on the verification link.	The employer should be redirected to the login page after successful email verification.
Login Process	1. Enter the registered email and password. 2. Click "Login".	The employer should be able to access their dashboard after logging in.
Forgot Password Process	1. Click the "Forgot Password" link on the login page. 2. Enter the registered email.	A password reset link should be sent to the employer's email.
Reset Password	1. Open the password reset email and click the reset link. 2. Enter a new password.	The employer should be able to successfully reset their password and access their account.
Post Job Offer	1. Click the "logout" button.	The job offer should be posted successfully and

		visible on the platform.
Search for Students	1. Navigate to the "Search" tab. 2. Use filters to search for students based on skills or qualifications.	The employer should be able to see a list of students that match the search criteria.
Logout	1. Click the "Logout" button.	The employer should be logged out and redirected to the homepage.

Table 3.

Testing Procedure for Admin Side

Test Case	Steps to be Taken	Expected Results
Navigate to Admin Login Page	1. Open the TUPATH homepage. 2. Click on "Admin Login".	The admin should be redirected to the admin login page.
Admin Login Process	1. Enter the admin credentials (email and password). 2. Click "Login".	The admin should be able to access the admin dashboard.
Manage Users	1. Navigate to the "Manage Users" section. 2. Search for a specific user (student or employer).	The admin should be able to view, edit, or delete user accounts.
Review Projects	1. Navigate to the "Review Projects" section. 2. Click on a submitted project for review.	The admin should be able to approve or reject project submissions.
Generate Reports	1. Navigate to the "Reports" section.	The admin should be able to generate and download the

		2. Select the type of report (e.g., user statistics, project data).	selected report.
Logout		1. Click the "Logout" button.	The admin should be logged out and redirected to the homepage.

Evaluation Procedure

The evaluation procedure applied to evaluate the acceptance of the system was influenced from the ISO 25010 paper "Systems and software engineering – Systems and software Quality Requirements and Evaluation (SQuaRE).

To determine if the TUPath platform was acceptable, the following approach were used:

1. Invited 40 student respondents from the Technological University of the Philippines - Manila under the College of Science (COS) department, specifically from the Computer Science (CS), Information Systems (IS), and Information Technology (IT) programs.

2. Explained how to use the TUPath platform.

    a. The evaluators were informed about the profile creation and management features, which allow students to build comprehensive academic profiles showcasing their skills, and achievements. This aspect was expected to help students in their career preparation and provide a professional platform to present their qualifications to potential internship employers.

3. A 4-point Likert Scale was used by the evaluators to assess the expected usability and functionality of the TUPath platform based on the provided forms.

4. The completed evaluation forms were manually processed, and the mean ratings were calculated using the data obtained.

Table 4.

Likert's Scale

Scale	Adjective Rating	Range
4	Highly Acceptable	3.4 - 4.0
3	Very Acceptable	2.6 - 3.3
2	Acceptable	1.8 - 2.5
1	Not Acceptable	1.0 - 1.7

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APPENDIX A

SURVEY QUESTIONNAIRE

Survey on Challenges and Factors Affecting Students' Career Preparedness

Welcome to our survey on career preparedness at TUP-Manila! As part of our ongoing research, we are gathering valuable insights from students like you to better understand the challenges and factors affecting career readiness. Your feedback will help us identify areas where students may need additional support and inform the development of potential solutions, such as a web-based platform called TUPATH. This platform aims to integrate academic profile management tools to enhance career preparedness for TUP-Manila students.

Your participation is crucial in shaping the future of career support services at our university. Your responses will remain anonymous and confidential. Thank you for taking the time to share your thoughts and experiences with us.

ajhorca10@gmail.com Switch account

Not shared

* Indicates required question

Name: *

Your answer

How likely would you be to utilize a web-based platform like TUPATH to enhance *
your career preparedness?

	1	2	3	4	5	
Very Likely	○	○	○	○	○	Very Unlikely

How would you rate your level of confidence in your career preparedness on a scale of 1 to 5? *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

How important is it for you to have easy access to your academic records and credentials online? *

	1	2	3	4	5	
Very Important	○	○	○	○	○	Not Important

Have you faced any difficulties or challenges in planning for your future career? *

○ Yes

○ No

Do you feel adequately supported in your career planning and development during your time at TUP-Manila? *

○ Yes

○ No

○ Maybe

Would you find it helpful to have a section on the platform where you can showcase your skills and abilities to potential employers? *

○ Yes

○ No

○ Maybe

Do you think having a centralized platform for managing academic profiles would streamline the process of applying for internships or jobs? *

○ Yes

○ No

○ Maybe

How do you currently manage and track your academic achievements and credentials? *

Your answer

What worries or concerns do you have about starting your career after graduation? *

Your answer

What specific challenges do you anticipate encountering when preparing for your * future career?

Your answer

Do you feel that your academic program adequately prepares you for your desired * career path? Why or why not?

Your answer

APPENDIX B

RESULT SHEETS

How likely would you be to utilize a web-based platform like TUPATH to enhance your career preparedness?
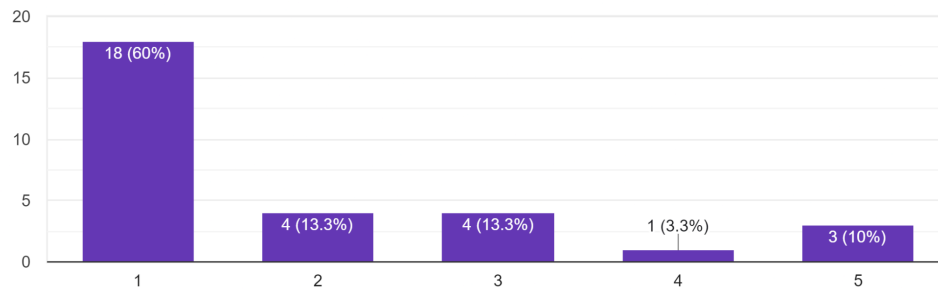30 responses
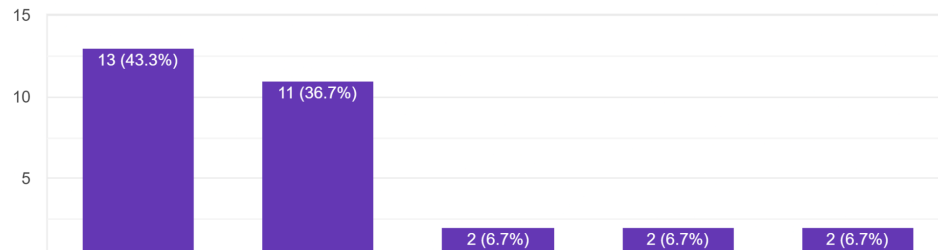
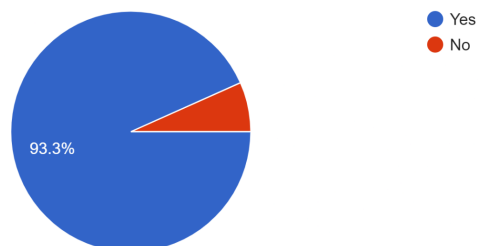How would you rate your level of confidence in your career preparedness on a scale of 1 to 5?
30 responses
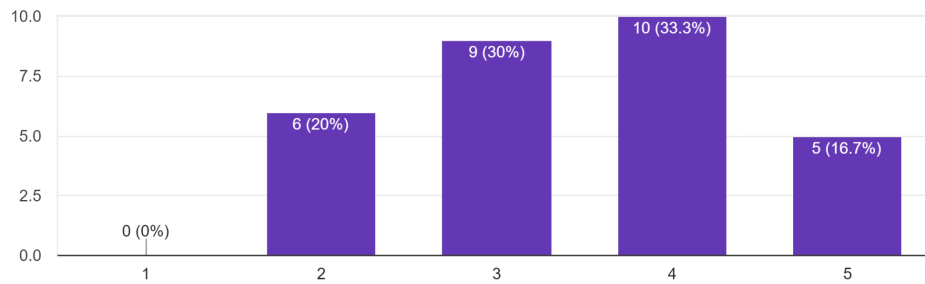
How important is it for you to have easy access to your academic records and credentials online?
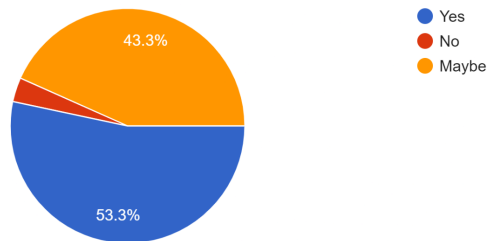30 responses

Have you faced any difficulties or challenges in planning for your future career?
30 responses

Do you feel adequately supported in your career planning and development during your time at TUP-Manila?
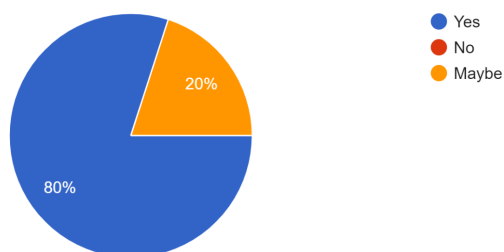
30 responses

- Yes
- No
- Maybe

43.3%

53.3%

Would you find it helpful to have a section on the platform where you can showcase your skills and abilities to potential employers?

30 responses
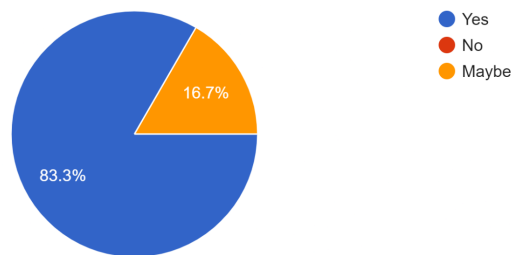
- Yes
- No
- Maybe

16.7%

83.3%

Do you think having a centralized platform for managing academic profiles would streamline the process of applying for internships or jobs?

30 responses

- Yes
- No
- Maybe

20%

80%

How do you currently manage and track your academic achievements and credentials?

5 responses

Manage my time

I keep all my hard copy documents in one folder or case file and all my soft copy documents in one drive, so I can track them easily.

Currently, I use a variety of tools and methods to manage and keep track of my academic achievements and credentials. I keep a detailed record of all my coursework, projects, and assignments in an online spreadsheet or document. This helps me remember deadlines, grades, and feedback from my instructors. I also create a portfolio of my best work, which includes essays, research papers, and creative projects. I regularly update this portfolio to showcase my skills and abilities. I make sure to keep copies of all my certificates, transcripts, and official documents in a secure digital and physical location. This ensures that I can access these important records whenever needed. To stay organized, I set reminders and alerts for important deadlines, exam dates, and submission deadlines for my academic commitments. I also regularly review my progress, identify areas for improvement, and set new goals for continuous growth and development. These methods help me stay organized, focused, and motivated throughout my academic journey. They also prepare me for future opportunities, whether it be further studies or entering the job market.

By journaling

What worries or concerns do you have about starting your career after graduation?

5 responses

As a future teacher, I feel nervous about the LET. And I don't know where I'll go if I don't pass the exam.

Finding the right type of job

I think I might have a hard time getting my documents from the university, as I heard that some recent graduates are experiencing difficulties with this.

As a student, I have similar concerns and anxieties about starting my career after I graduate. These concerns include looking for a job, deciding on a career path, having financial stability, meeting expectations, adjusting to a new work environment, and maintaining a balance between work and personal life. I also worry about if my degree or major will be useful in the job market, how my lack of experience will affect my job search compared to others, and if I have the right skills for my career.

Di ko alam saan magsisimula

What specific challenges do you anticipate encountering when preparing for your future career?

5 responses

Financial, but aside from that, the pressure that has been on you since your family is expecting that after you graduate you'll become a professional teacher, but they didn't know that's not easy because there's still a lot of things to do, not just pass the exam, but there's a lot of training and such.

Changes in industry

Aside from getting my documents from the university, I anticipate facing challenges in finding a suitable company to work for. The job market is competitive, and securing a position that matches my skills and career goals can be difficult.

Preparing for my future career will involve adapting to new technologies, building a strong network of contacts, developing leadership and management skills, balancing work and personal life, and navigating job transitions. Anticipating challenges and taking proactive steps that can help me succeed.

Decision-making

Do you feel that your academic program adequately prepares you for your desired career path? Why or why not?

5 responses

I don't know, maybe. This program helps me in terms of being a future educator, but in my major, I think this program still lacks preparation since in animation there is still a lack of laboratory equipment. Even in a room, we don't have a proper room in our building, which is the CIE.

YES, It prepares me for thinking clearly about complex issues.

Yes, I believe my academic program effectively prepares me for my chosen career path. It provides practical experience through seminars, projects, and lab work, which helps connect academic knowledge with real-world applications.

My academic program gives me a strong foundation in my field and teaches me different theories, concepts, and practices. It provides chances for research, internships, and hands-on experiences. The program connects me with faculty and industry professionals to help me build connections and gain insights into my field of choice. I acknowledge that academic readiness is important, but I also need to focus on developing my soft skills, attending workshops, participating in extracurricular activities, and pursuing independent learning to excel in my chosen career.

Yes. With the help of our subject IPVPS, we have an introductory knowledge what is happening in the field.