TVET DOCUMENT MANAGEMEN SYSTEM

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In Partial Fulfilment of the Requirements for the Degree
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

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CHAPTER I

INTRODUCTION

PROJECT CONTEXT

Technical and Vocational Education and Training (TVET) institutions constantly generate and manage a large volumes of documents, including assessment records and training records. Traditionally, these documents have been stored physically, leading to challenges such as data loss, retrieval delays, difficulty in tracking document histories, and inefficient use of space.

(Alokluk, 2019) highlighted the important role of digital systems in educational institutions when it comes to handling different information. The manually managing documents is no longer sufficient because it often leads to inefficiencies and sometimes errors. At Taibah University, they have started using digital systems like network drives, cloud services, and regular backups to organize and protect important files for students, staff, and researchers. While their systems helps improve storage and security, the study points out that it's still not perfect and the archiving is limited. The costs can also be an issue, and there's no single, fully integrated system yet. That's why Universities and TVETs too must adapt to digital document management to take a significant steps forward in ensuring efficiency and better information accessibility.

Despite the success in managing documents, TVET employees still face operational challenges, primarily due to reliance on manual processes. They spend a lot of time searching for important documents, which can be tiring and hassle. In terms of

scheduling, they often struggling to track their meetings and training sessions. The manual archiving, particularly when documents are urgently needed, often leads to delays and causes possible errors. Additionally, it is crucial for TVET employees to be able to add, edit, and update documents quickly to ensure everything runs smoothly. As they are often required   for their reports in   assessment and trainings, these need always an accurate and up-to-date information to avoid small mistakes that can lead to misleading data or confusion. Without proper digital tools, their work can be time-consuming and is prone to errors.

The researchers therefore proposed the TVET Document Management System. The design and development of the system will help TVET employees manage their documents more accurately. Using a digital solution, the system will make them more organized and efficient and will lead to better data handling and an improved overall workflow.

PURPOSE AND DESCRIPTION

The purpose of this project   TVET Document Management System, is to significantly enhance the efficiency of managing important documents in TVET building.

The system will assist the TVET employees in generating accurate reports without the need for paperwork. This platform aims to streamline tasks such as storing, updating, and retrieving important documents, allowing TVET employees to work faster, reduce errors, and ensure that information is always accurate and up to date. On the other

hand, the system will improved also the data management, where it will be eliminating the need for manual document searches and making it easy to update information about upcoming and ongoing meetings or training sessions. Since they often require managing reports for assessment and training, employees must ensure that all document records are accurate and readily accessible.

The "TVET Document Management System" indicates a transformative resource aimed at improving the reports generation process through digitalization. With the integration of technology, this project will make employees more organized and provide quick access to all important data information. This is the vision behind this platform, where a digital solution focuses on what truly matters. By replacing a manual process with a digital solution, it will reduce paperwork, minimize possible errors, and save time.

CONCEPTUAL FRAMEWORK

The study utilizes an Input-Process-Output (IPO) framework, which clearly illustrate the flow of data throughout the system development process.

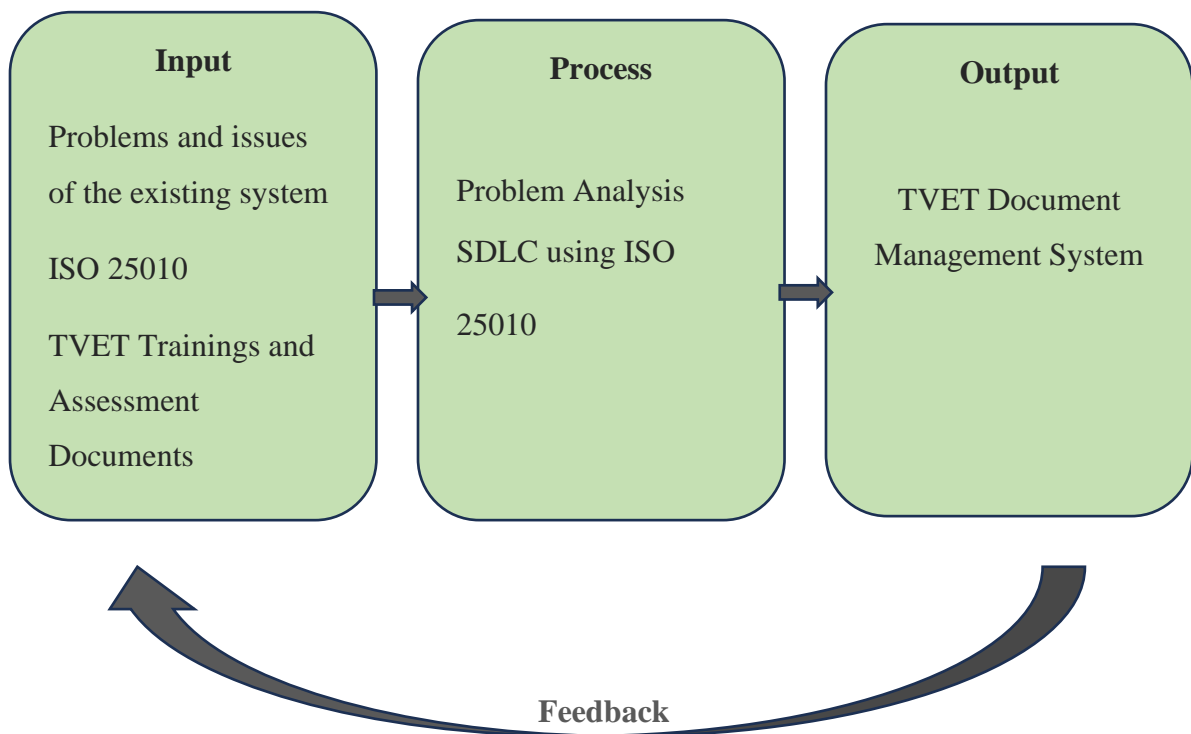| Input	Process	Output
Problems and issues of the existing system ISO 25010 TVET Trainings and Assessment Documents	Problem Analysis SDLC using ISO 25010	TVET Document Management System

Feedback

Figure 1. Conceptual Framework

The diagram illustrates the Input-Process-Output (IPO) framework for TVET Document Management System. Input covers the data flow of the system, where it includes the problem/issues of the system, the TVET assessment and training documents, as well as the ISO 25010 standards. The output delivered results with a fully functional system.

OBJECTIVES

General Objectives

This study generally aims to innovate the traditional methods of managing documents within the TVET employees of Cagayan State University – Gonzaga Campus.

Specifically, it aims to develop a system that:

1. Determine the problems encountered in TVET Document Management System.

2. Develop the core features of the proposed system.

3. Evaluate the level of compliance with ISO 25010 in terms of:

    3.1 Functional Sustainability

    3.2 Performance Efficiency

    3.3 Compatibility

    3.4 Usability

    3.5 Reliability

    3.6 Security

    3.7 Maintainability

    3.8 Portability

4. Implement the developed system to the intended user.

SCOPE AND LIMITATION OF THE STUDY

SCOPE

This study focused on the development of an TVET Document Management System to help their employees aiming to streamline and modernize the existing manual processes they usually used.

The system will focus on the following areas:

TVET Employees: The system is accessible to authorize users only. TVET Employees will have full access, allowing them to easily manage all documents and update the information if needed.

Platform Accessibility: The system can be accessed through both web and mobile devices.

Location of the Study: The system will conduct at Cagayan State University Gonzaga campus, focusing especially on the employees of TVET building.

System Focus: The system concerns only for documents and daily reports and intended solely for on-campus.

Security features: The system incorporates robust security, including secure login, role-based access control, and a backup module to recover data from unauthorize access and accidental loss.

LIMITATION

However, the system is intended for authorized users, meaning only individuals with the necessary credentials can access and interact with the platform. Non-authorized users will be restricted from accessing the system. The system required stable internet connection to be accessed the system. Although the system is tailored to meet the specific needs identified during its development, it may not cover all future requirements or scenarios that may arise. Continues updates and user feedback will be important to improve the system and keep it aligned based on user needs.

SIGNIFICANCE OF THE STUDY

This project will improve the way CSU- Gonzaga TVET   Employees manage and organize documents. With a meaningful step forward with digitalization, the system aims to make more efficient and effective**.**

Specifically, this project benefits the following:

TVET Employees – The system will provide the best way   on how TVET employees can easily make their work less stressful and easy to access.

Cagayan State University Gonzaga – This will benefited the CSU- Gonzaga campus by making the traditional process they usually used faster and more efficient.

TESDA - Technical Education and Skills Development Authority (TESDA) will benefit from more efficient and accurate handling different records.

Future Researchers - This study can serve as a helpful reference that can use as their guide for future researchers. It offers a clear overviewed that can help them build on this work and improve their own studies.

DEFINITION OF TERMS

Access Control – A feature that limits what each user can see or do based on their role in the system.

Admin – A user with full access to the system.

Archive – The process of storing and retrieving documents for long-term preservation and future access.

Automation – The use of technology that perform tasks automatically, reducing the need for manual intervention.

Database – A structured space where all the system's data is stored securely.

Digitalization – The process of converting information from a physical format (like paper) into a digital one.

Document – A written or any uploaded file.

ISO 25010 – An international standard that provides a model for software product quality.

SDLC – Acronym for Software Development Life Cycle, a systematic process for planning, creating, testing, and deploying software systems.

TESDA – Acronym for Technical Education and Skills Development Authority.

TVET – Acronym for Technical Vocational Education and Training.

TVET Employee – A system user who can access and manage all documents.

Workflow Schedule – A calendar-like view that can shows users upcoming meetings, trainings, and tasks.

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter provides a summary of the literature and studies that support the significance of the project.

Automated Document Management System

Automation is a tool that can be used to facilitate records management and archival functions (Yakel, Elizabeth). It refers to all administrative processing tasks in records and helps to ensure valuable tasks. With automation, this will lead to efficiency, perform routine tasks automatically and analyze data more quickly.

In a university from the Philippines, (Caluza, 2017) studied how a great innovation made in its registrar's office by introducing an electronic system referred to as EDAMS (Electronic Document Archive Management System). The system purpose was to eliminate the issues of lost, hard-to-find, and time-consuming paper records. After putting EDAMS in place, staff could store, find, and manage documents much faster and more securely. The study shows how moving to a digital system can really help schools work more efficiently and serve students better.

Over the past years noted by (Hafizhelmi Kamaru Zaman et al., 2017), All records tasks are done manually. The traditional process takes large amounts of time and involves tedious works that can cause sometimes a problem especially in case of emergency.

As a digital solution to automate all importance documents programmed within an organization. From records storage to cost accounting, these systems are less prone to errors, more time-efficient and more compliant than their manual counterparts. (Biondi, 2023)

Furthermore, (Saquin & Marcial, 2016) said that automated systems promote transparency and accountability by maintaining detailed logs of activities. They support a long-term data storage and ensure compliance making them a reliable and modern solution for managing records.

SYNTHESIS

The term "automated" refers to processes that are operated automatically by machines or computers without any human intervention. Traditional records have always been handled manually. The manual process takes large of times often leading to delays and errors especially in case of emergency. With automated record keeping management system, however, these processes become streamlined and will lead to efficiency, perform routine tasks automatically and analyze data more quickly. It supports also a long-term data storage and ensure compliance making it a reliable and modern solution for managing records.

Common Challenges of Manual Document handling

Noted by (Taiwo, 2019), records are defined in any paper, books, photographs, or any other materials which document official actions, decisions, policies, or procedures will take by an individual or an organization.

The issues become improper practices that become common issues of many organizations (Mat Ripah et al., 2022). Due to manual processes causing delays and information, it's involved some of errors that harder to manage. Without proper way of using a digitalize record system, the manual documenting may lead to poor data management.

One of the most essential problems is the unsuitability of the file management system that is often unable to find the necessary record. This is clearly ascribed to the lack of innovative and well-managed filing systems or lack of proper procedures. The absence of document management policies, retention schedules, and disposition guidelines also makes the situation worse as it is not able to keep and process important documents through time (Azumah, 2018).

Noted by (GovOs Team 2024), making all records easily and quickly accessible has always been a main challenge in managing records, whether paper or digital. It has been stressed and hassle of ensuring documents are easily searchable and accessible to multiple users on different devices. With the continues challenges that may affect handling documents for annual reports, these may contribute to risks such as data loss, poor decision-making, inefficiency, and legal exposure (4 (1), n.d.).

SYNTHESIS

Manual processes are always challenging when it comes to the compliance and management of database files. It always often leads to inefficiencies and become the common issues of many organizations. The lack of clear policies and procedures for storing and handling documents only makes things worse. As noted by experts, making records easily accessible and searchable is a constant challenge, whether the files are paper-based or digital. The continues challenges may contribute to risks such as data loss, poor decision-making, inefficiency, and legal exposure. Moving to a more organized, digital system can help solve these challenges and make handling documents reports much easier and safer.

Importance of Security and Data Privacy

Security and data privacy are essential in any system that handles personal information. In the era of big data, people are the beneficiaries of Internet technology where it holds a great value and provides numerous benefits to people. With the rapid development of the Internet, people leave a lot of data traces that come with significant risks that can impact individuals and society (Zhang, 2018).

As technology continues grow in our society, the needs of strong security and data privacy becomes increasingly important. Every school, mostly in TVET institution, when it comes to handling different documents or important data, there must also be protection. Without proper security measures, this sensitive data might be exposed to cyber threats, unauthorized access or misuse. It was a threat landscape evolving at the rapid rate with

many organizations continuously facing complex and malicious cyber threats (Abu et al., 2018).

Despite the challenges issued by (Psomiadi, 2024); there is always a way to prevent it. One of the major proper needs is by implementing robust security measures. This measure involves strong encryption methods to safeguard sensitive data. By encrypting sensitive data, it can ensure that even if data is being accessed without authorization, it remains unreadable and unusable.

By studying the level of awareness for the need to protect personal information, and examining perceptions of which information requires protection, we can better understand how individuals value data privacy (Boo, Y.-K., et al. 2015).

Living in an environment where technology is constantly used, (Salazar, M., & Woodward, B. 2017) reminds us to always consider data privacy as a cause for concern. It's a mindful reminder for us especially when utilizing an online platform.

SYNTHESIS

Navigating TVET Document Management System needs a strong Security and Data Privacy for all the sensitive data that might be exposed to cyber threats, unauthorized access or misuse. With the rapid development of the Internet, keeping information safe will builds trust and ensures that all data's remains secure and reliable. Living in an environment where technology is constantly used, always consider data privacy as a cause for concern. It's a mindful reminder for us especially when utilizing an online platform.

The Importance of Digitalization

In every aspect of our lives, Technologies has become paramount where it has influenced the way we live. A rapidly growing complexity and scale of the preservation and accessibility of historical records have become paramount and can transform how local governments operate and interact with their citizens (Bawamohiddin et al., 2024)

The technology itself continues to evolve and rapidly changes around the world. The beauty of it becomes more interactive and provides something new and unique experiences (THE FUTURE OF EVENT TECHNOLOGY: A MIX OF REALITIES, n.d.). With the strategic advancements, technology is shaping more immersive and efficient ways to connect with people and create meaningful interactions.

(Granicus, 2024) highlights that digitalization also makes an easy to maintain compliance and reduce paper with convenient and easy to-use online tools for managing the entire conflict of interest process. Securely fill out, file, and amend conflict of interest will disclosure documents digitally. It will continuously adapt to technological advancements and enhances to the overall success of managing documents. It strengthens how it is possible to automate a variety of planning and management that can increase efficiency and save time (Thirusanku & Poh Ai, 2024). With the use of technology, overall related work can lead to better planning.

Incorporating these digital technologies into document management and archiving system not only improves operational efficiency but also enriches attendee experiences. These innovations make more interactive, accessible, and environmentally conscious (The Role of Digital Technology, n.d.).

SYNTHESIS

The continues growing of digitalization in every aspect of our lives, has brought a significant change the way how we live. With the strategic advancements, technology is shaping more immersive and efficient ways to communicate. The technology itself continues to evolve and rapidly changes around the world. As noted by experts, Digitalization makes it easy to maintain compliance and reduce paper with convenient, easy to-use   online tools for managing the entire conflict of interest process.

Enhancing Document Management System through Mobile and Web-Based Applications

A user experience and usability are key to making a System easy and enjoyable to use. Its well-designed, user-friendly interface ensures that it can engage and navigate the website with ease.

User experience is the process design teams that use to create a product to provide meaningful and relevant experiences to the users. It covers everything and not just about how something looks but how easy and enjoyable to used *(What Is User Experience (UX) Design_ _ IxDF, n.d.).* However, according to (Jordan, n.d.) when it comes to usability, this is all about designing products that are easy, efficient, and satisfying to use. It focuses more on making interactions simple so users can achieve their goals without frustration.

(Nakamura et al., 2017) explored the issued on how the students struggle and are confused without offering solutions. With the poor feedback encountered, A user friendly platform should make the user experience more effective.

The advancement of technology has made e-learning evolving in a complex manner regarding the educational content, technological resources and interaction possibilities. Noted by (Maslov & Nikou, 2020) users who are familiar with a system perform tasks faster and more accurately. This means that handling different documents should be designed with clear navigation, intuitive controls, and minimal learning effort so that both new and experienced users can use it effectively.

(Gokul et al., n.d.) highlights the enhances of user experience and usability. A well-designed interface, students can easily navigate and gain benefit from a more organized using the system. This collaborative space not only promotes transparency, but it also contributes to a more connected and informed educational community. A clear navigation and responsive design, the students and administrators can easily interact with the system, reducing time spent on tasks will improve overall engagement. Focusing on usability creates a stress-free and efficient way to manage document management.

SYNTHESIS

Implementing Document Management System must be truly effective to make user-friendly and accessible for all. It helps users to easily navigate and achieve their goals without frustrations. A clear navigation and responsive design, we can easily interact with the system, reducing time spent on tasks and improving overall engagement.

CHAPTER III

TECHNICAL BACKGROUND

SYSTEM REQUIREMENTS

This section outlines the requirements for TVET Document Management System. The hardware requirements include at least a Core i3 laptop with 8GB RAM, 128GB SSD, a 1080p monitor, and basic input devices like a keyboard and mouse. The software requirements include Windows 10 or Linux (Linux Mint Xia), uses PHP 8.3 and C# 13.0 for development, and is built on the .NET MAUI framework. It operates with a MySQL 8.3 database and an Apache 2.4.63 web server, with VS Code as the development environment and compatibility with browsers like Brave, Chrome, and Firefox. The peopleware requirements include a system administrator and employees.

A. Hardware

ASPECT	MINIMUM SPECIFICATION
Laptop	Core i3 or Higher 8GB RAM 128GB SSD
Monitor	1080p resolution

Input devices	Keyboard and Mouse

Table 1: Hardware

B. Software

ASPECT	MINIMUM SPECIFICATION
OS	Windows 10, Linux (Linux Mint xia)
Programming languages	PHP 8.3 and C# 13.0
Framework	.NET MAUI (part of .NET 9)
Database	MySQL 8.3
Web server	Apache 2.4.63
IDE/ Text Editor	VS Code 1.89.0
Browser	Brave, Chrome, Firefox (latest versions)

Table 2: Software

C. Peopleware

ASPECT	USER ROLE

Admin	Responsible for managing records, users, andd documents for their generating report
Employees	Responsible for managing files and documents for their generating reports.

Table 3: Peopleware
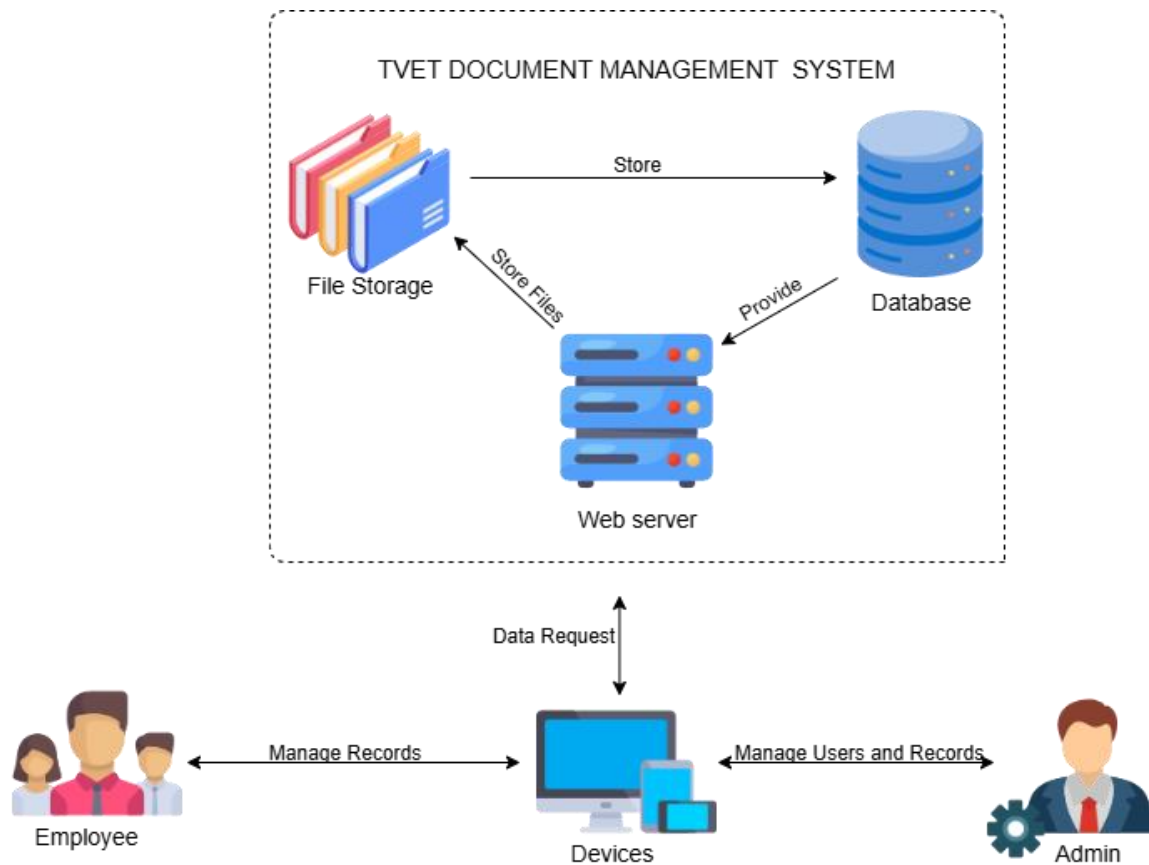
D. System Architecture

Figure 2: System Architecture

CHAPTER IV

RESEARCH METHODOLOGY

This chapter explains the methods and procedures used to develop the system. It begins with research design, instrumentation, data gathering procedures, participants of the study, development methodology, data analysis, requirements analysis, requirements documentation, and implementation.

RESEARCH DESIGN

This study used both descriptive research design and developmental research design. Descriptive research will used to analyze the compliance of the proposed system to ISO 25010. Developmental research will used during the planning, analysis, design, development, testing, and evaluation of the developed system.

INSTRUMENTATION

The researchers gathered data from the employees of Technical Vocational Education and Training (TVET) at the Cagayan State University Gonzaga campus, employing various types of techniques in data gathering for this capstone project.

Interview: To determine the problems and issues encountered in the current system, an interview guide was used. Through interviews, the researchers may gathered and obtained

valuable insights from the TVET employees regarding their experiences and perspectives on the TVET Document Management System.

Questionnaire: For the assessment of the system's quality, the ISO/IEC 25010 standard was used. A survey questionnaire was utilized to identify the problems and issues. The feedback gathered from the survey was helped to analyze the issues and come up with solutions.

DATA GATHERING PROCEDURES

A request letter was presented first, granting the researchers the authority to conduct a project proposal inside the campus and submitted to the office of the Campus Executive Officer of CSU-Gonzaga.

Upon approval, the request letter was then forwarded to the TVET center administrators for the study's final approval. This process ensured that the researchers had the proper authorization to carry out the project within the designated area.

The researchers developed a questionnaire for the interview guide on TVET employees focusing on the current situation problems they usually encountered.

The researchers conducted interviews with the TVET employees inside the campus of CSU- Gonzaga to gather system requirements, and information to identify problems and issues encountered during their work. Observing the traditional process helps identify the problems and gain valuable insights into the strengths and weaknesses of the current system.

Finally, after the interview gathered, the researchers defined the objectives of the proposed system to identify the specific needs required for its development. Through this step, the system would directly address the challenges faced by TVET employees in terms of managing and archiving documents.

PARTICIPANTS OF THE STUDY

The participants of this study involved various stakeholders that is relevant to the development of the system. Participants include TVET Employees as well as IT experts. Through surveys and interviews, the researchers gathered insights on the possible issues and problems encountered in the system to determine the needed system requirements and figure out the key features quality standards of the proposed system.

PARTICIPANTS	NO.	PERCENTAGE
TVET Employees	5	33.33%
IT Experts	10	66.67%
Total	**10**	**100%**

Table 4: Participants of the Study

DEVELOPMENT METHODOLOGY

The proposed TVET Document Management System have utilized the Agile Development Methodology for its iterative approach, flexibility, regular feedback, and alignment with the project's scope and requirements. This methodology supports continuous improvement and adaptability throughout development.
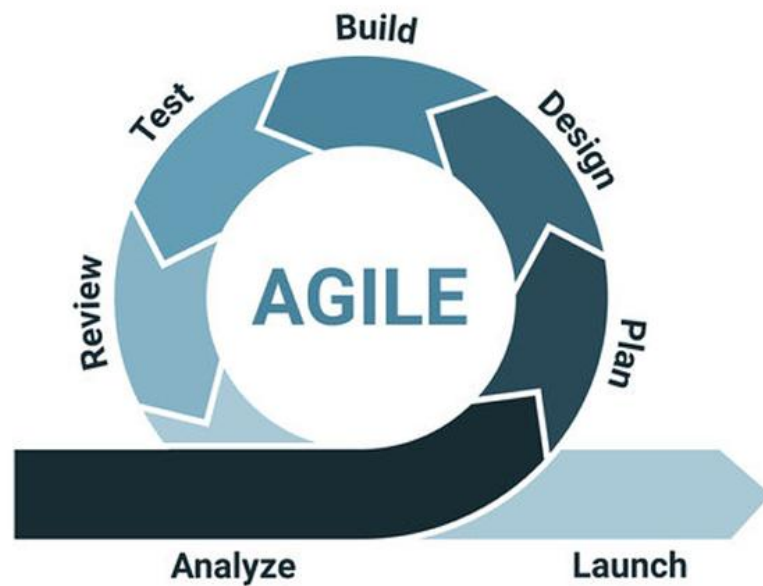

Figure 3: Development Methodology

Phase 1: Requirements Planning

This is the initial phase step in developing the TVET Document Management System. During this phase, the project context is thoroughly studied to identify the current

challenges face by TVET employees. Data is gathered from stakeholders to gather insights and specific needs of the users and defined scope of the system and its functionalities.

Phase 2: User Design

With the requirements gathered, the development of the system was design featuring a user-friendly interface and basic functionalities. This system served as an early version of the TVET Document Management System, showcasing its core features to potential users for feedback. During the system's development, the user expectations must meet ensuring the system is easy to navigate, and address the specific needs of TVET Employees and Admin.

Phase 3: Rapid Construction

Once the design is well defined, the researchers moved to rapid construction phase. Guided by the feedback from the prototype, the development process was began using the modular approach or "sprints". Each sprint focuses on building and testing specific modules using technologies and allows for parallel development and accelerates the overall timeline. To streamline coding, existing libraries and frameworks, integrated pre-existing functionalities to accelerate the process of implementation. This approach allowed continuous testing and refinement to ensure each module is functional and integrates seamlessly with others throughout the development.

Phase 4: Cutover

The final phase involved the deployment of the system to ensure a smooth transition from any traditional record-keeping methods to the new TVET DMS.

Throughout the system, this includes functionality, reliability, and performance. A pilot implementation was conducted with selected users   from the TVET office. During this stage, training sessions were held, data   migration was performed, and feedback was collected to   further refine the system. The following successful testing and positive user response, the full-scale rollout was initiated for broader use across the department.

DATA ANALYSIS

The level of compliance of this study with ISO 25010 will be evaluated using Weighted Mean method. The system's level of compliance will be assesed using the following matrix below.

The table illustrates how the system complies with the ISO 25010 standard, using a scale from 1 to 5. Each scale corresponds to specific   range of statistical limits, with descriptive values assessing the system's performance. For example, a score between 4.20 and 5.00 is considered Very Excellent, 3:49- 4:19 is labeled as Excellent, while 2:60- 3:39 is Good. The other ratings include Average and Fair.

Scale	Statistical Limits	Descriptive Value
5	4.20 – 5.00	Very Execellent
4	3.40 – 4.19	Excellent
3	2.60 – 3.39	Good

| 2 | 1.80 – 2.59 | Average |
| 1 | 1.00 – 1.79 | Fair |

Table 5: Level of Compliance

REQUIREMENTS ANALYSIS

The requirements analysis phase   aims to thoroughly understanding the needs and expectations of the client's need for the "TVET Document Management System" project.

Here's the functions that classified into two main   categories that serve as the foundation of the project.

Non-Functional Requirements

- **Accuracy**: The system should store and   retrieve data and ensure that all generate reports are accurate.

- **Maintainability**: The system should be easy to fix its components.

- **Manageability**: The system should be easily to manage.

- **Performance**: The system should execute fast and efficient.

- **Recoverability**: The system should work normally after system updates or shutdowns.

- **Reliability**: The system should work smoothly and provide accurate reports.

- **Security**: The system must ensure data security against unauthorize access.

- **Usability**: The system should be user-friendly.

Functional Requirements

- Automating managing documents to reduce manual work.

- Make it quicker and easier for employees to find important files.

- Keep documents organized and up-to-date to support audits and reporting.

- Provide an archival system to easily access and retrieve documents when needed.

- Provide a clear schedule so users can easily see their upcoming meetings and training sessions.

REQUIREMENTS DOCUMENTATION
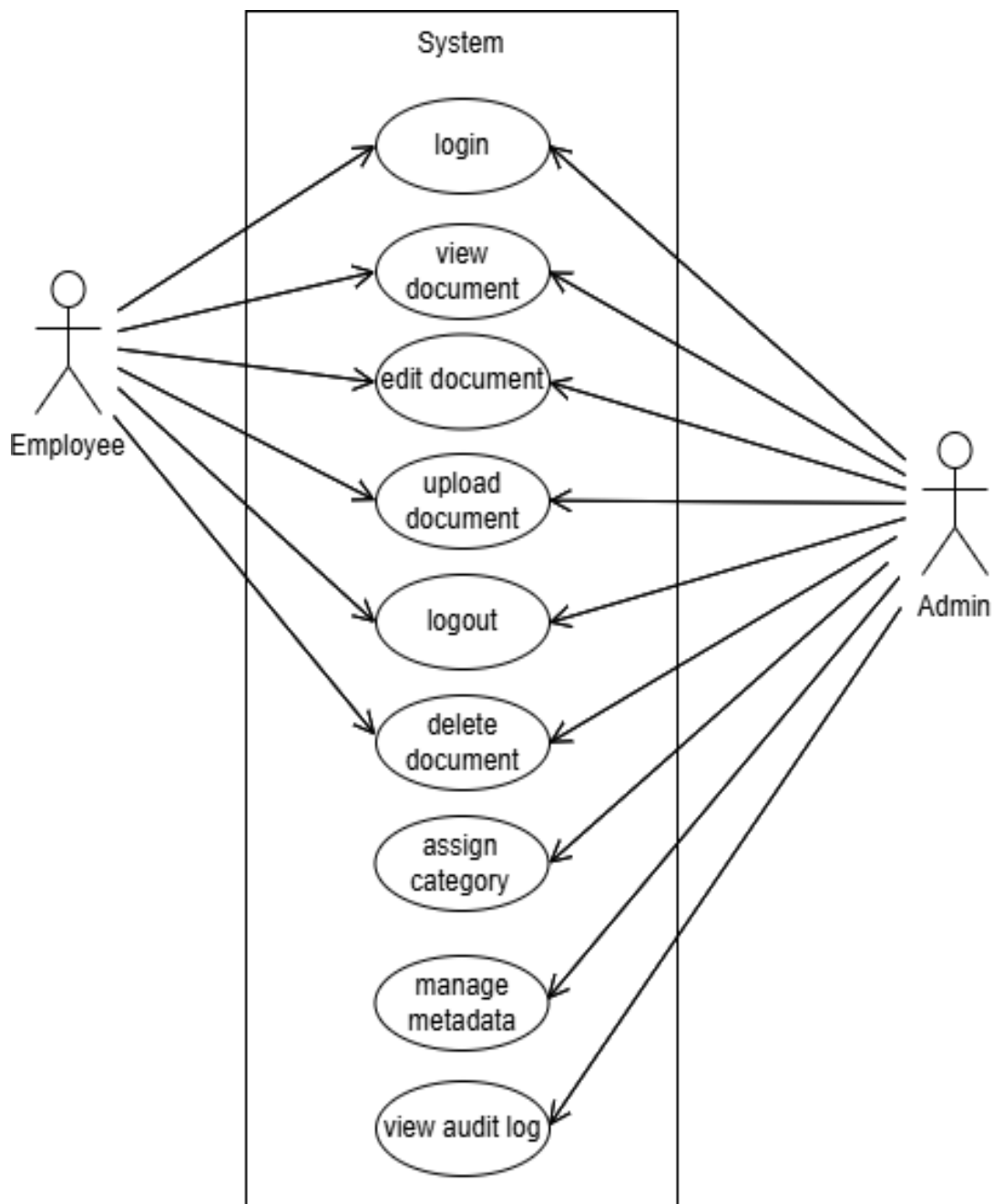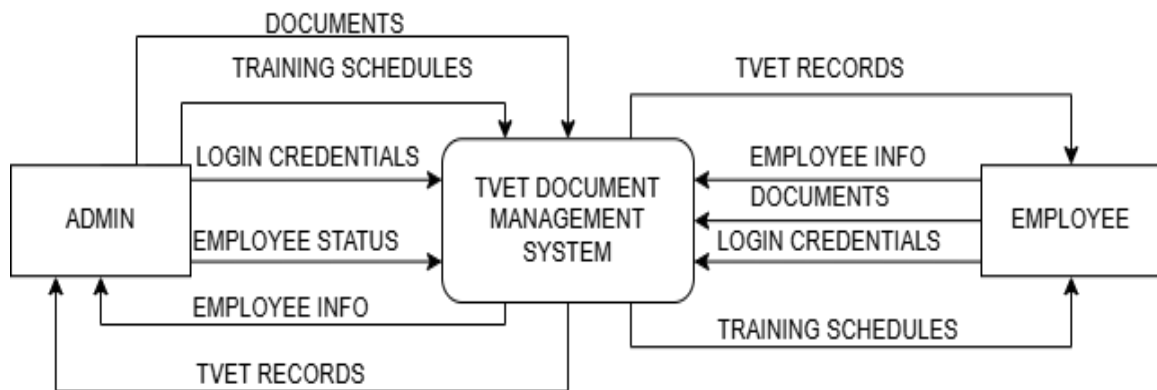

Figure 4: Use-Case Diagram
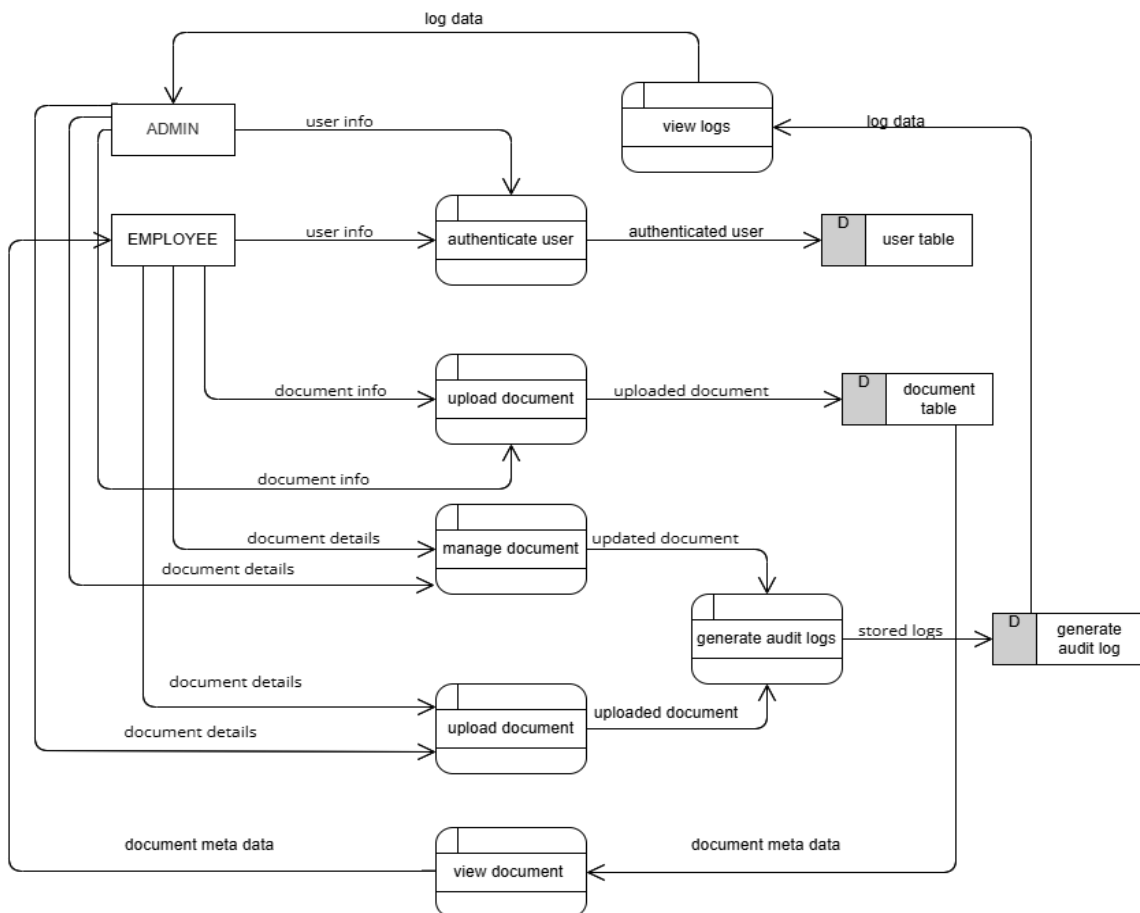
Figure 5: Context Diagram
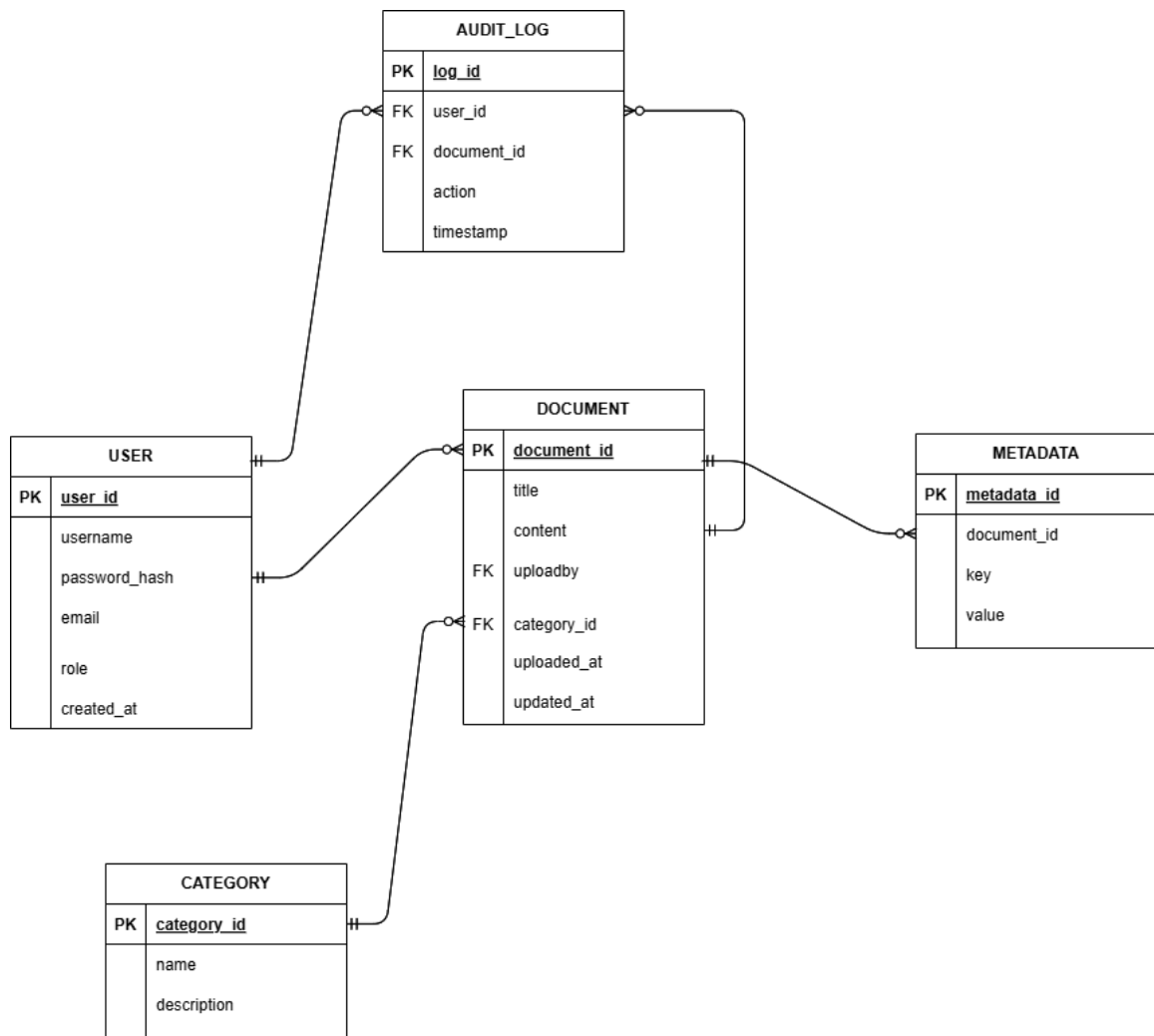

Figure 6: Data Flow Diagram

Figure 7: Entity Relationship Diagram

IMPLEMENTATION PLAN

The pilot implementation methodology was applied to roll out the TVET Document Management System. The researchers and the client collaborated to select a specific section of the organization to begin using the system before introducing it organization-wide. As part of the process, the admin user received training to become

familiar with the system's features and how to operate them effectively. This approach allowed for a smooth transition with minimal disruption. By limiting initial use to a smaller group, the team ensured the system could be tested, refined, and confirmed as fully functional and satisfactory before full deployment across the entire organization.