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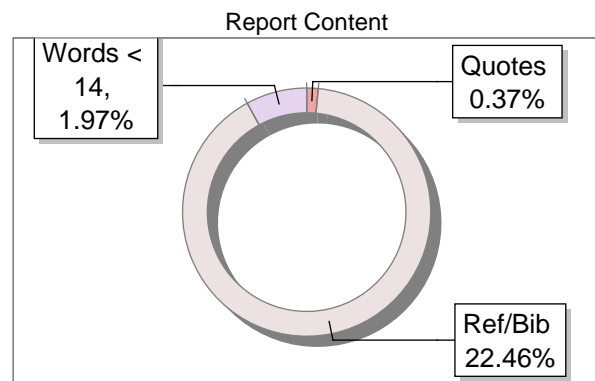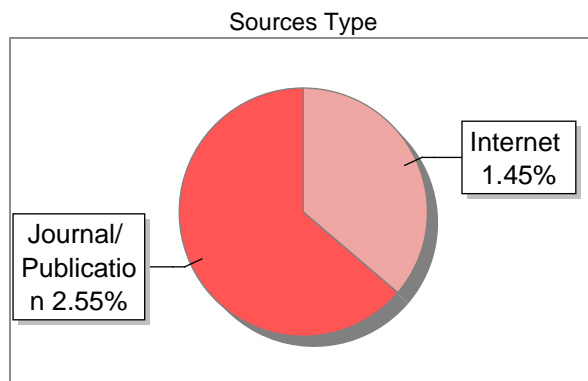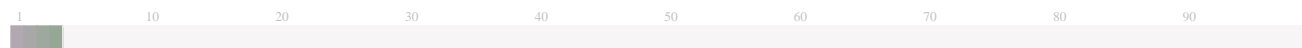
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MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF COMPUTING AND INFORMATICS

DEPARTMENT OF COMPUTER SCIENCE

COMPUTER SECURITY AND FORENSICS

UNIT CODE: CCF 3403

UNIT TITLE: COMPUTER SYSTEMS PROJECT

RESEARCH PROPOSAL: PROJECTS PROGRESS MONITORING SYSTEM

BY

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CT206/106172/21

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DECLARATION

This Research Proposal document is presented in partial fulfilment of the requirements for the award of Bachelor of Science in Computer Security and Forensics Proposal.

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DEDICATION

I dedicate this proposal work to my family, course mates and colleagues whose unwavering support, inspiration, and encouragement have been instrumental in its development. May God bless you all.

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I first and foremost thank the Almighty God for the gift of life and energy that saw me accomplish this research proposal. The role played by my family members is worthwhile as the moral support have received from my family was immense throughout the education period. I would like to acknowledge the efforts made by my trainer Dr. Dorothy Bundi as she has gone out of her way to make sure I get the necessary practical skills. Finally, I most sincerely thank Meru University of Science and Technology for granting me an opportunity to gain skills which will help me accomplish this task, and also propel my career to the next level.

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CHAPTER ONE

INTRODUCTION

1.1 Background of study

The need for project management is critical for organizations to develop and implement projects progress monitoring systems due to evolving complexity of projects management. Institutions of higher learning like Meru University of Science and Technology, needs to deploy system feature to track their students' academic projects progress due the increased complexity towards projects management. Projects progress monitoring is a significant part of projects management. All project activities should be carefully monitored while the project is being accomplished. This helps project supervisor to keep informed of work progress, and apply timely correctives. It is essential that project monitoring is simple and not time-consuming. Projects progress monitoring system may really help to simplify this process. Project Progress monitoring is an essential task of the Software Project Management, which is executed during the development process of software projects. In the market today, several tools are available for monitoring the progress of a project. However, most of these tools lack sufficient progress monitoring mechanisms, making them unattractive for many organizations. Moreover, some of the tools do not report and/or visualize useful information regarding the project status(Alaidaros et al., 2019).

According to the research made at Meru University of science and technology the current system uses manual form to record students projects and also to track the projects progress where project supervisors keep on updating the projects manually. The timely and high-quality completion of power transmission and transformation, project construction has a decisive impact on the power supply quality and efficiency of the power system (Oštir et al., 2024). Setting milestones, assigning work to team members, and defining project durations are all aided by project planning and scheduling. Users can track completion rates, adjust task statuses, and keep an eye on the overall progress of a project via progress tracking. Reporting and Analytics Produces detailed reports that include deadlines, resource consumption, important milestones, and project performance data. Users are informed by the notification system of impending deadlines, past-due assignments, or project modifications. Role-based access is supported by user management, guaranteeing authorized individuals can see or change specific project details (Ghazal et al., 2020).

Automated tracking ensures that data is updated in real time, reducing errors associated with manual entry (Zheng et al., 2024). Monitoring systems assist in spotting possible hold-ups. This lowers project risks and guarantees a more seamless delivery by enabling project managers to swiftly implement corrective measures (Elokby et al., 2021).

Project managers are able to make well-informed decisions by utilizing historical data and real-time tracking. They are better at identifying trends, allocating resources wisely, and modifying plans of action to achieve objectives (Pek & Lim, 2019).

The research aims at developing a system that will enable the supervisors to store and protect projects records. The system can by ensure availability ensuring data stored is easily retrievable after it is stored. (Butt et al., 2023) activity monitoring schedule tracking that is the start date task progress and milestones, achievements. Implementing a layered security by encrypting shared files, defining the level of access and using a secure communication protocol will guarantee security of the projects progress monitoring system. The system will also ensure security by implementing modern monitoring techniques that comply with industry standards. Privacy is not or the passive

(Singh, 2021).

1.2 Problem Statement

Most colleges and Universities should be using an automated Projects Progress Monitoring System that provides real-time tracking of project milestones, ensures secure storage of project documents, and allows for collaboration between employers, supervisors, and employees. The system would offer role-based access control, where users can access the information relevant to their responsibilities. It would also ensure that project data is timely submitted for evaluation of project deliverables.

However, the current system of Meru University of science and technology relies heavily on manual project monitoring processes. This includes paper-based submissions of project reports, physical storage of progress documentation, and face-to-face interactions for feedback. The lack of an automated system introduces several challenges, such as inefficiencies in tracking projects progress, delays in communication between employees and supervisors, and the risk of misplaced

or tampered documentation. This manual approach creates a significant gap to be addressed. This hampers productivity but also experience delays in receiving feedback, and faculty may struggle with disorganized project data management. Furthermore, the absence of a centralized system makes it difficult for the department to monitor the overall progress of multiple projects, making quality assurance and timely decision-making a challenge. The proposed solution is to implement an automated Projects Progress Monitoring System that Automates the tracking of projects progress by allowing students and supervisors to upload, review, and evaluate projects online.

1.3 Objectives

1.3.1 General Objective

- To develop a system to monitor projects progress effectively providing real-time tracking of milestones in project management.

1.3.2 Specific Objectives

- To design system interface which will enable the supervisor be able to view progress of all active projects.
- To design system interface module which will enable system administrator share files.
- To design a secure login system to allow students access the student portal and update their projects progress status.
- The system should be able to generate weekly report on projects progress.

1.4 Research Questions

What challenges are associated with the current manual project progress monitoring system?

What impact will the implementation of automated system have to the employers, supervisors and employees?

How will an automated project progress monitoring system improve the efficiency and effectiveness of tracking and managing projects?

What technologies should be used to develop a scalable project progress monitoring system?

How will the system support real-time updates and notifications for project progress?

1.5 Significance of Study

The study of projects progress and monitoring system is very vital as it will enhance the simplicity of the tracking projects taking place within an organization. Due to the advancement of technology as days go by, it is important to ensure that the security of the system tracking the projects is also improved to cope with the growing technology. Many stakeholders who place a great deal of importance on the Project Progress Monitoring System , including team members, clients, project managers, and organizational leaders. The system improves decision-making, resource allocation, and project completion timeliness by offering real-time tracking and thorough insights into project progress (Bushuyev et al., 2022). First, the study will ensure that the level of access in the projects progress monitoring system has been set, roles are divided among the users by the level, an individual level is set and given certain priorities to execute and manipulate the monitoring and managing the system(Alexandru et al., 2022).

Second, by enabling the early detection of possible delays and bottlenecks, the system helps project managers take corrective action before problems worsen. As a result, project delivery schedules, quality, and budgetary compliance all improve (Sahoo et al., 2020). Team members are motivated and feel a sense of ownership when tasks are well-defined and progress is easily monitored (Chen & Li, 2021). Increased transparency regarding the progress of the projects they are funding benefits the clients. They become more confident in the project's direction with frequent updates and instant access to progress reports, which lessens the need for frequent check-ins and increases confidence in the project team (Zhao et al., 2022).

Third, the system is a tool for measuring overall project performance across multiple projects for organizational leaders. The system's data-driven insights can support effective resource management throughout the company, performance assessment, and strategic planning (Irena Gutandjala et al., 2021).

In conclusion, by encouraging a culture of openness, responsibility, and efficiency, the deployment of a Project Progress Monitoring System greatly enhances project management procedures. In the end, this results in enhanced client satisfaction, improved project outcomes, and resource efficiency.

Benefits of project progress monitoring system include;

    I.   Risk Identification and Mitigation- The monitoring system provides early warnings, enabling project managers to implement corrective actions before issues escalate.

   II.   Collaboration and Communication- Because the system makes all pertinent project information easily accessible and centralized, team members are able to communicate more effectively.

  III.   Real-Time Project Progress tracking- Real-time updates on task completion, resource usage, and project milestones are provided by the system. This makes it possible for stakeholders and project managers to keep an eye on the project's progress at all times, assisting in the early detection of problems or delays.

1.6 Scope of Study

1.6.1 Geographical delimitation

The research study aims at developing a projects progress monitoring system for Meru University of Science and Technology. The study focuses on the projects management departments in the Institution. Since the current manual projects monitoring system does not implement some of the features such as real-time project tracking of the ongoing projects, early risk detections, enhanced accountability and improved decision making that makes up projects progress monitoring system partially insecure.

1.6.2 Methodological delimitation

The research will involve conducting interviewing to the projects supervisors and giving out online questionnaires as part of data collection which will be of use in developing a project progress monitoring system. The online questionnaire will be administered to supervisors and students so as to write down their views on the challenges experienced during the monitoring of the departmental projects. An advantage of administering online questionnaire to supervisors is that they will be free to write anything and no one will judge them. An online questionnaire promotes openness as they can express themselves freely.

Tools that will be used to develop the system are; HTML, CSS and JAVA SCRIPT on the frontend while the backend tool will be PHP.

1.7 Limitations of Study

The accuracy of the system's performance relies heavily on the quality and timeliness of data provided by supervisors. Inconsistent or incomplete data may limit the system's ability to deliver reliable progress updates. Resistance to change or lack of enthusiasm among users may limit the system's effectiveness and impact its adoption.

Unexpected technical issues, such as system crashes, network downtime, or software bugs, could affect the system's reliability. Limited financial resources may restrict the scope of features, maintenance, or timely updates for the system.

Changes in project scope or objectives during development may affect the relevance of the system. The system's functionality may be limited in areas with poor or unstable internet connectivity, affecting real-time monitoring.

Sensitive project data could be vulnerable to breaches or unauthorized access, impacting stakeholder trust. Strong encryption protocols are implemented with mechanisms of secure authentication, and role-based access control. Regularly conduct security audits to identify and address vulnerabilities.

1.8 Assumption of Study

It is assumed that stakeholders involved in the project will provide accurate and timely data for monitoring purposes.

It is assumed that stakeholders, including project managers, team members, and sponsors, will actively engage and cooperate in using the monitoring system.

It is assumed that users will receive adequate training and resources to effectively utilize the project progress monitoring system.

It is assumed that the system will operate on a stable and reliable technological infrastructure with minimal interruptions.

It is assumed that the scope and objectives of the project will remain consistent throughout the project lifecycle.

It is assumed that team members will adhere to the defined processes and protocols for data input and system usage.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

A system for monitoring project progress is crucial for overseeing the different phases of project development, guaranteeing that goals are achieved promptly and effectively. It offers stakeholders, managers, and teams immediate insights into project status, key performance metrics, and possible obstacles. Research on project progress monitoring systems covers various areas, including project management, software engineering, and construction management. A crucial component of project management is project monitoring, which makes sure project activities follow the budget, scope, and timeline that have been established. To make sure the project is on course to achieve its objectives, it entails monitoring, assessing, and reporting on its progress.

Recent studies indicate that the future of project progress monitoring systems lies in further automation and the use of AI. Predictive analytics, machine learning, and Internet of Things (IoT) sensors are expected to play larger roles, especially in industries like construction and manufacturing, where real-time data from various sources can be aggregated to provide a more comprehensive understanding of project progress.

2.1 Function of existing project progress monitoring system

2.1.1 Communication and Coordination

In the existing system teams offer regular meetings as a controlled setting for project participants to discuss challenges, progress, and future plans, the teams' meetings are a crucial component of traditional manual project management. Depending on the intricacy of the project, these meetings could take place every week, every two weeks or even every day, status updates via phone calls or emails, WhatsApp groups and written memos are used to communicate progress. These methods facilitate coordination among project members, ensuring everyone is informed about the project's current status and any changes to the plan is communicated as well (Li, 2019).

2.1.2 Risk Management

In the existing project monitoring, risk management mostly dependent on the expertise and instincts of team members and project managers, who see possible calamities during routine meetings and project evaluations. This method entails keeping a log of risks in which calamities

are listed and their consequences likelihood. Based on the project's development and new issues, managers evaluate these risks regularly and decide how best to reduce or eliminate them. Using the team's expertise and prior experiences, mitigation strategies are frequently created through group brainstorming. The risk log is updated as the project progresses to make sure new risks are noted and that old ones are reviewed to modify the mitigation strategies as necessary. Although thorough, this hands-on approach necessitates careful tracking (Su et al., 2022).

2.1.3 Budget Monitoring

In order to maintain financial control over the course of the project, budget monitoring in the existing project progress monitoring entails manually tracking expenditures and costs against the predetermined budget. In order to record expenses as they happen and classify them in accordance with the project's budgetary structure, project managers usually collect financial data using accounting software or physical ledgers. Regular assessments are necessary for comparing projects allocations with actual expenditure, enabling management to see any disparities or areas where expenses might be higher than anticipated. In order to avoid budget overruns, changes are taken if overages are found, either by reallocating cash, reducing expenses elsewhere, or changing the project scope. Despite the manual and frequently time-intensive nature of the project, this careful control helps maintain financial stability and guarantees that the project stays in line with its financial objectives (Liu, 2023).

2.2 Component of existing project progress monitoring system

The existing manual project progress monitoring system is made up of essential parts that track different project aspects using simple tools and human oversight. Spreadsheets or Gantt charts will be used for task and milestone tracking, which helps to keep the project on track. In order to keep stakeholders informed, resource management entails manually allocating and tracking the use of financial, material, and human resources. Regular status reporting is carried out via emails, meetings, or written reports. In order to ensure coordination among members, communication is facilitated through team meetings, phone calls, and memos. While risk management depends on team discussions to identify and record risks in a log, with mitigation strategies created manually, budget monitoring uses accounting software or spreadsheets to track expenses against the project budget.

2.3 Features of existing project progress monitoring system

The existing manual projects progress monitoring system based on a number of fundamental components that depend on human supervision and the application of simple instruments like spreadsheets, paper documents, and straightforward communication techniques (Ma et al., 2024). Task and milestone tracking is one of the main features, where teams and project managers manually keep track of deadlines and tasks using spreadsheets, Gantt charts, or checklists. Although it necessitates frequent manual updates to remain up to date, this procedure guarantees that tasks are finished within the project's specified timeframe. To keep the project on track, team members must confirm the status of each task or milestone, frequently through meetings or status updates. If updates are not given regularly, this may cause delays, underscoring the difficulty of preserving accuracy in absence of automated systems.

Another component of the existing manual project monitoring systems is coordination and communication; team meetings, phone conversations, emails, and memos are used to share updates and progress. Virtual group meetings provide enormous potential for remote group communication (Rings & Steinicke, 2022). Regular meetings for discussing project updates, resolving issues, and aligning the team's efforts and can also be time-consuming and dependent on the availability of all members are essential. To keep stakeholders updated on the project's progress, status reports are manually created and distributed. This process frequently entails gathering data from multiple sources. Despite its potential to ensure team alignment, this communication method is slower than real-time digital updates and may cause decision-making to be delayed, particularly when urgent issues arise.

Another crucial component of the existing manual system is resource management, in which financial, material, and human resources are allocated and tracked by hand. Maintaining logs or ledgers that document resource availability and usage (S.Venkatesan et al., 2024). However, managing resources can become difficult without automated tools, particularly in large or complex projects where the project manager must constantly monitor the situation. Making decisions about resource reallocation or adjustment relies on experience and manual reviews of progress reports, which, if not done proactively, can result in inefficiencies or resource bottlenecks.

Lastly, existing system use spreadsheets or accounting software to track costs and risks, and budget monitoring and risk management are done by hand. Financial data is regularly reviewed to ensure the project stays within its budget, while risks are identified and logged based on team discussions and experience. Due to the manual nature of this process, managers must remain alert and regularly review project data because any budget overruns or new risks might not be identified right away (Bradley et al., 2023). These manual reviews serve as the basis for budgetary or risk mitigation plan adjustments, which frequently rely on past performance and professional judgment rather than forecasting tools. Despite these difficulties, manual systems can work well in smaller organizations or projects where automation might not be feasible.

2.4 Types of existing project progress monitoring system

2.4.1 Student Performance Tracking System

Engage school management system incorporates student performance tracking seamlessly within the software to capture and analyses student progress. This user-friendly tool allows educators to track individual pupils over time, presenting data through graphs and tables exportable to Excel. It effortlessly integrates external assessment data, providing a holistic view of student performance. With tracking points, Engage auto-populates target grades for the year, streamlining goal-setting (Sagala et al., 2022).

2.4.2 ICT Project Progress Monitoring Software

Software for ICT project management is essential for expediting the planning, carrying out, and overseeing of technology-driven projects. These tools improve project transparency and guarantee on-time delivery with powerful features like task scheduling, resource allocation, risk management, and real-time progress tracking. They assist teams in maintaining transparent communication and collaboration, minimizing bottlenecks and avoiding scope creep by centralizing project data and automating repetitive tasks (Aizaz et al., 2021). Additionally, managers are able to optimize performance across multiple projects and make well-informed decisions thanks to the integration of analytics and reporting functions. ICT project management software is therefore essential for attaining operational efficiency.

2.4.3 Project Management Software

Project management software is necessary makes it possible for teams to work together more easily, monitor progress in real time, and allocate resources more effectively. The provision of

scheduling, task assignment, and deadline monitoring tools contributes to the timely and cost-effective completion of projects. Managers can reduce risks, maximize performance, and make data-driven decisions with the help of sophisticated features like analytics and reporting. Project management software guarantees successful project outcomes and greatly increases productivity by streamlining workflows and improving communication (Darussalam & Widyani, 2021).

2.5 Challenges of existing Manual Project Progress Monitoring System

The effectiveness and precision of project management initiatives may be compromised by the substantial difficulties associated with manual project progress monitoring systems. Inaccurate reporting frequently results from human error in data entry, endangering project outcomes and decision-making. The collection, organization, and analysis of data for these systems take a lot of time and effort, which delays the identification of problems and the implementation of solutions. The absence of real-time updates hinders managers' ability to precisely monitor progress, which causes them to react slowly to new issues as they arise. Furthermore, because information is frequently dispersed and difficult to share across teams, manual methods make collaboration more difficult. Project delays or cost overruns may result from ineffective resource management and a greater chance of resource misallocation. Both reporting and analysis are laborious, which hinders the production of timely insights.

2.6 Related works

(Farah et al., 2022), conducted research on the prevalence of Enterprise Resource Planning (ERP) the most popular and successful IT solution, newly used in organizations to exchange the information among different business entities, to improve and maximize productivity. The system is expensive, time consumer and complicated to implement and manage. The challenges of ERP implementation have caused a high rate of failure based on the stories of numerous organizations that have deployed the solution. ERP brings together data from all business functions, giving the entire organization a broader perspective. They can control the whole company by monitoring purchasing, requests, ordering, finished products in stock and other business-critical information needed for management.

(Zhang et al., 2021), in order to implement the water and soil conservation plan, strengthen the design and construction management of water and soil conservation, optimize the prevention and control measures of water and soil loss, and coordinate the progress of the water and soil

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conservation project and the construction of the main project; timely and accurately grasp the project soil erosion status and prevention effect, put forward soil and water conservation improvement measures, reduce man-made soil and water loss; to find out major soil erosion hazards in time and put forward countermeasures and suggestions on soil erosion prevention and control; to provide the technical basis of water and soil conservation supervision and management and the basic information of public supervision, to promote the effective protection and timely recovery of the ecological environment in the project area, Yellow River Institute of Hydraulic Research was specially entrusted to carry out the water and soil conservation monitoring work of the project.

(Elkahlout et al., 2020), conducted research aimed at Internet of Things(IoT)-based healthcare systems of elderly. The paper also includes a description of basic IoT-based healthcare systems architecture and ways of its implementation, including wearables, at hospitals and at home. The paper concludes with a presentation of the security challenges imposed by the nature of IoT systems implementation that require remote access to personal data and data storage. It is recommended from the surveyed studies that IoT will continue to expand as a technology trend that allows for development of inexpensive, reliable and secure elderly healthcare and monitoring systems.

(Han et al., 2022), For safe, transparent project tracking, blockchain technology is being investigated, especially for large-scale projects with numerous stakeholders. Blockchain-based systems can improve accountability and lower fraud by offering an unchangeable record of all project activities. This guarantees that project milestones are appropriately documented and communicated. In view of the shortcomings of traditional engineering project management methods, the construction based on block chain technology is hoped to provide of construction project management.

(Tulsiani et al., 2024), conducted research aimed on machine learning-based Intrusion Detection System system for electric vehicle charging stations. The proposed technique uses data from. It checks many classifying methods and gives results for both two-class and mixed-traffic models. Using this plan in a computer system for electric vehicle charging points will make it more stable

and reduce hacks that disrupt everyday life. With the growth of electric cars, it's very important to make a system that is easy and safe for users. This paper looks at the safety risks of a network. It finds weaknesses and gives possible ways a cyber-attack could happen. Looking at Electric vehicles charging facts quickly can spot dangers. This shows important things about new studies on online safety for cars that run only on electricity , This study discusses about the challenges in Internet of Table security. The research looks at different computer learning ways to find Distributed Denial of Service attacks within the net area.

(Syed et al., 2023), conducted research aimed at relationship between risk management and project management methods by examining prior research on risk management processes, tools, and techniques in traditional and agile software development projects. Additionally, it analyzes numerous peer-reviewed articles on risk management. The study's findings indicate that the impact on risk management varies between traditional and agile project management methodologies. Agile project management methods prove more effective in managing risk in complex and uncertain software development projects. In contrast, traditional project management methods are better suited for projects with well-defined requirements and low uncertainty. This study underscores the importance of selecting the appropriate project management approach based on the project's unique characteristics to enhance risk management in software development projects.

2.7 Summary

This chapter reviews the importance of project progress monitoring systems in ensuring project timelines, budgets, and goals are met. Manual systems rely on methods like meetings, spreadsheets, and risk logs, but face challenges such as human error, inefficiency, and lack of real-time updates. These systems, while functional, are slow, prone to errors, and hinder collaboration. Recent studies suggest a shift toward automated systems, integrating technologies like AI, IoT, and blockchain to improve accuracy, efficiency, and accountability in project management across various industries.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

A projects progress monitoring system is a structured framework used to track and evaluate the progress of a project against its predefined objectives, timelines, and deliverables. It involves the continuous collection, analysis, and reporting of data related to project activities, resources, and performance metrics. This system ensures that supervisors are informed of the project status, identifies any deviations from the plan, and enables timely decision-making to address issues and risks. By incorporating tools like Gantt charts, dashboards, and progress reports, it facilitates effective communication and ensures that the project stays in line with its goals, budget, and deadlines.

3.1 Research Design

(Dobos & Varga, 2024), Innovation, and within its research and development, is the engine of progress and sustainability in today's world. The academic sector is a key cornerstone of this activity. This publication addresses the challenges and strengths of innovation projects and project management, particularly in the academic sector. The core of research design involves converting a research issue into analyzable data to yield pertinent responses to research inquiries while minimizing expenses. It specifies the types of analyses that will be conducted to achieve the intended outcomes. Research design aims to offer a suitable structure for a study.(Mohammed & Fiaidhi, 2023). A research design can be a qualitative method used to collect the in-depth . This approach assumes a single person represents the group feelings and emotions of a person are equally important to interpret which are ignored by the quantitative method. This approach is used by the interpretive scientific method and its grounds are identified in positivist paradigm (Yang, 2021). Similar to this we discuss that the quantitative strategy works on objective and measures it through opinions which help researcher to define the data rather to interpret the data (Yanqion et al., 2023). One or more dependent variables were modified to assess their impact on variables. (Horváth, 2023), Experimental research focuses on the cause-and-effect relationships within a chosen subject. It utilizes two groups: the experimental group, which receives treatment, and the control group, which remains unaltered (Ye et al., 2021) .The proposed system will use experimental research design since it enables evaluation of effectiveness of access controls and

encryption in our case which we want to implement in the proposed system. The control group is the existing system.

3.2 Population Sample and Sampling

A population is a set of individuals with common characteristics (Willie, 2022) .The proposed system will mainly be used in education sector. The target population, in contrast, is distinct and conceptually defined group of potential participants. (Casteel & Bridier, 2021) The target population should be sufficiently specific to study's requirements. In this instance, students and lecturers at Meru University of Science and Technology is my target population because they will be the ones engaging directly with the system.

A sample is a proportion or subset of a larger group called population (Jian & Lai, 2021). A sample should represent all characteristics in a population. Sampling on the other hand can be defined as "the process of selecting a smaller group of participants to tell us essentially what a larger population might tell us if we asked every member of the larger population the same questions" their Different sampling methods exist, including random sampling, stratified sampling, systematic sampling, and cluster sampling. Random sampling involves selecting of a specific size which has an equal chance of being chosen. Stratified sampling is a technique that allows for the extraction of a sample that accurately represents the various segments of the population by treating these segments as strata. (Liu & Cheng, 2022).Cluster sampling is a probability sample in which each sampling unit is a collection, or cluster, of elements(Khandokar et al., 2022) and finally systematic sampling which will be the direction am taking is defined as a type of probability sampling in which every unit or individual is selected according to a predetermined sequence from a list (Shih et al., 2022) .

The proposed projects progress monitoring system will use systematic sampling because it lacks the biasness of random sampling and then given the size of our population it is most suitable.

3.3 Data Collection, Instrumentation and Procedure

Data collection refers to the systematic process of obtaining and quantifying information about specific variables that are of interest, which allows researchers to address clearly defined questions, validate hypotheses, and assess results.(Lee et al., 2023) . Different approaches to data collection exist, like questionnaires, interviews, observations, and surveys. Surveys are frequently utilized to

evaluate people's thoughts, opinions, and emotions. Research conducted through surveys can either be narrowly focused or have broader, more extensive objectives. (C et al., 2023). Primary Data and Secondary Data Observation Method example. Book Magazines, Questionnaire Method Literature Interviews Method, Schedule Method Case Study Method, Survey Method. Observation is way of gathering data by watching behavior, events, or noting physical characteristics in their natural setting .For this particular study online questionnaires will be used. Online Questionnaires can be described as a form with a set of questions and secure answers that respondents (from a specific population) fill to give the researcher information needed for the study(Taherdoost, 2021) .The proposed system preference to use online questionnaires is influenced by the fact that some of target population are not available for physical interviews and online questionnaires are more convenient . Online Questionnaires with relevant questions concerning this research, then issue them out and provide a timeline in which to expect them to be filled so to retrieve them. The online questionnaires will have closed ended questions which will require the respondents to tick the one they mostly agree with.

3.5 Tools and Materials

For the development of this proposed project, several tools will be used: Google cloud for backups and recovery. The system will store backups here because it is secure. It offers 15 gigabytes of free storage for new users. The proposed system will use hash functions MD5 for hashing of the shared files to prevent the data from being tampered with.

Laptop with windows 10 professional operating system will be used since windows is compatible with tools needed for coding like php and javascript. Visual studio code will be the development environment . MySQL database will be used for the proposed system. Encryption will be deployed the Advanced Encryption Standard (AES) which is the standard symmetric encryption algorithm.

3.6 System Development Methodology

Software development is a process of different stages but related to each other. Each stage has a specific time frame in which the result is delivered. Each stage of the weight depends on the project. These stages are research, planning, design, development, testing, configuration, and maintenance(Saeed et al., 2019).There are a couple of examples of system development methodologies, they include: waterfall, agile, spiral and RAD. RAD(rapid application development) is a development lifecycle designed to give much faster development and higher

quality result. Agile is a strategy to manage projects by segmenting them into several phases (Afshari & Gandomani, 2021). Continuous improvement is needed at every level, as well as ongoing cooperation with stakeholders (Viera & Methodologies, 2023). Spiral Model is a combination of a waterfall model and iterative model. Each phase in spiral model begins with a design goal and ends with the client reviewing the progress. For the proposed project will use waterfall which involves plotting the proposed project in different and continuous stages, with every stage starting after the first stage has finished (Santonanda et al., 2022).Waterfall works best when the requirements are clear, stable and are unlikely to change significantly during the project.

3.7 Data Processing and Analysis

Data that that will be collected during the research will be processed. Data processing will involve the following activities, editing, classification and analysis. The process of editing will, to carefully scrutinize the questionnaire response received from the students need to have a complete, error-free and readable data. The data collected will be edited using the interactive editing method which will involve, checking for specified edits during data entry and correct the wrong data.

The other step of data processing will be classification. The purpose of classification will to divide the received questionnaire on basis of their group. The study divided the received questionnaire in two groups, group one will be the supervisors while group two will be the students.

The last step of data processing will be tabled. The purpose of tabulation will to summarize data and insert them in the appropriate tables. The results will be filled in a table. The table will have a row of code against a column of admission groups. This will to make comparison and statistical analysis easy.

 Once the data has been processed, it will move on to the next stage of analysis. The analysis of data involves taking raw data and transforming it into information that can aid the researcher in decision-making. The aim of data analysis is to help the researcher address questions, evaluate hypotheses, and challenge existing theories. (Li, 2021). During analysis statistical measures will be used to analyze data. The following are the statistical measures, descriptive and inferential statistics. (Becerra et al., 2021) Descriptive statistics is a method used to describe and the main features of a data set, such methods are measuring of the mean and the median. Inferential statistics

is the practice of using sampled data to draw conclusions or make predictions about a large data or population. My study will use both descriptive and inferential statistics. Descriptive statistics functionalities such as standard deviation and frequency distribution will be used. Inferential statistics will be used to get the relationship between the data collected.

3.8 Ethical Considerations

Ethical principles will guide this research to ensure, confidentiality, and well-being of participants are protected throughout the study. Consent will be obtained from participants before their involvement, with clear communication about the study's objectives, procedures, and potential risks or benefits. Participants will have withdrawal right at any stage without penalty or prejudice. Participants will be assured that their personal information will remain confidential. Those wishing to remain anonymous will have their identities safeguarded. Data collected will be used for research purposes, and all identifiable details will be removed upon the study's conclusion. To further ensure privacy, access to the data will be restricted to the researcher.

The collected data will be disposed of responsibly following the completion of the research. Digital data will be permanently deleted using secure data destruction tools to ensure it is irretrievable. Physical records will be shredded or incinerated under supervision to prevent unauthorized access.

The study will fully adhere to the Kenyan Data Protection Act, 2019, ensuring compliance with its provisions. These include obtaining informed consent, restricting data processing to its original purpose, securing data, and upholding principles such as data minimization and accountability. Any potential data breaches will be addressed swiftly and effectively to protect participants' information.

Lastly, the research will commit to complete transparency. The results, whether favorable or unfavorable, will be reported honestly, with no fabrication, omission, or bias in the presentation of findings.

3.9 Summary

This chapter outlined the research methodology adopted for the study, emphasizing the framework guiding the data collection, analysis, and overall approach. The research design was defined as the structure for translating research questions into analyzable data, ensuring relevance and efficiency. Sampling techniques were detailed, with systematic sampling identified as the most appropriate

for the study's target population. Data collection methods, particularly the use of questionnaires, were justified based on convenience and accessibility for participants.

Additionally, the chapter described the tools and system development methodology selected, highlighting the waterfall model for its sequential structure and clarity. Data processing activities, including editing, coding, classification, and tabulation showing how raw data will be transformed into meaningful insights. Lastly, ethical considerations were addressed, ensuring the study adheres to high standards of participant protection, confidentiality, and integrity.

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APPENDICES

Appendix I: Risk Matrix

Risk Matrix for Projects Progress monitoring System

Risk ID	Risk Item Description	Risk Statement Condition	Risk Statement Consequence	Probability	Impact	Earliest the Risk Could Occur	Latest the Risk Could Occur	Mitigation Plan	Contingency Plan
R-1	Failure to consult with the project supervisor	If unable to meet the lecturer due to scheduling conflicts or communication on lapses.	project delays missing key guidance and oversight	Low	High	During system development	System deployment	Maintain regular communication with the lecturer. .	Reschedule a later date for consultation.
R-2	Uncontrolled addition of features to the system.	If stakeholders continually request new features outside the defined project scope.	Development timelines and budgets will overrun.	High	High	During the design phase	Before deployment	Define a clear project scope and agree on it with stakeholders.	Prioritize essential features and schedule additional features for future system updates.
R-3	Delays in completing development milestones due to unforeseen technical issues.	If system modules take longer to implement and debug than expected.	The project will miss the planned delivery date.	Medium	Medium	During the development phase	Before project completion	Set realistic milestones	Extend deadlines slightly

Appendix II: Gantt Chart

Projects Progress Monitoring System Gantt Chart by Erick
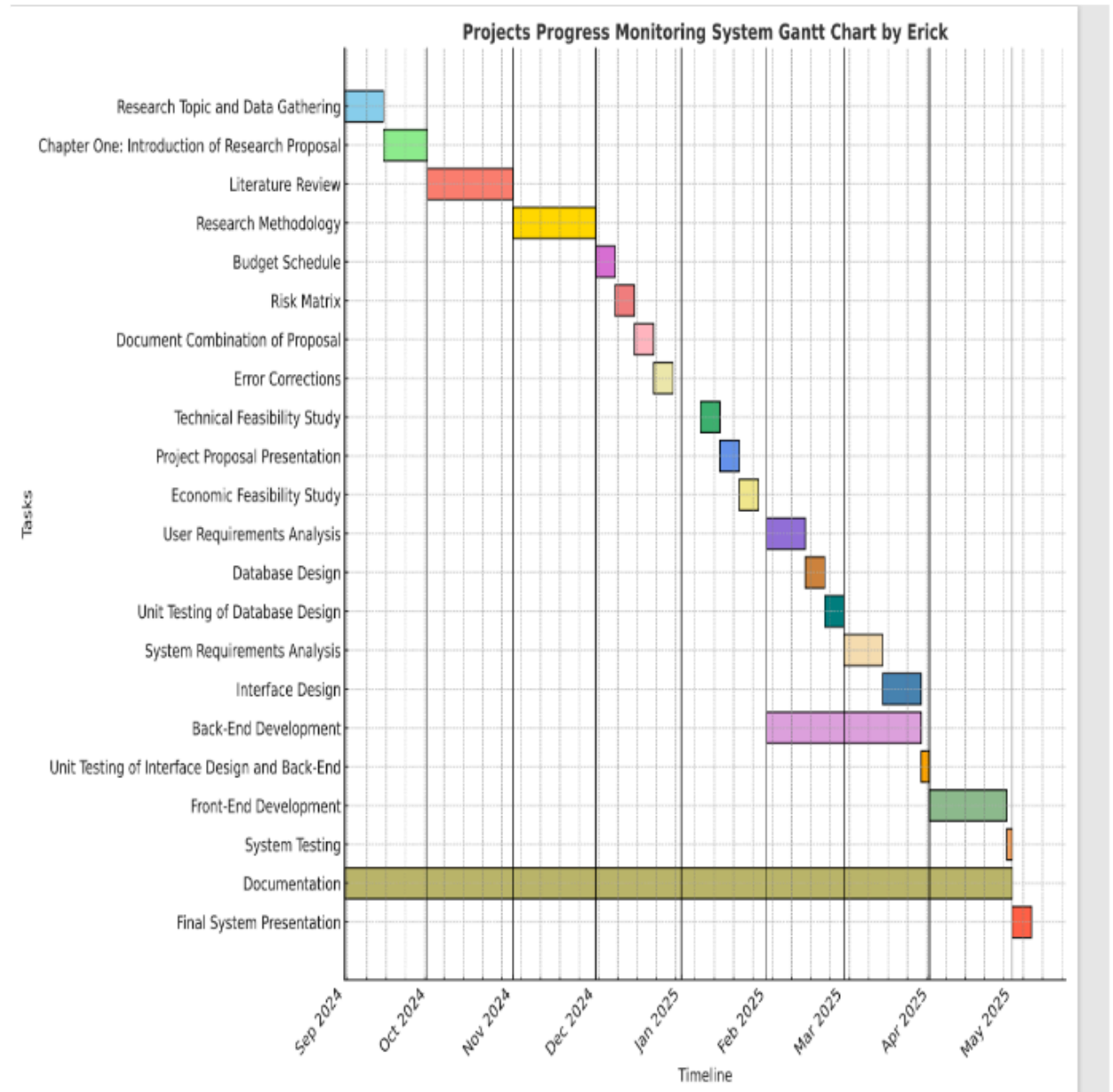
Appendix III: Budget

PROJECTS PROGRESS MONITORING SYSTEM BUDGET

Budget Breakdown

Category	Details	Estimated cost (Ksh)
Transport fee		500.00
Wifi installation and Internet subscription	5MBPS	1750.00 (monthly) x3
Printing cost	150 Estimated number of pages	150 x10=1500.00
Binding cost		300
Contingency	Unforeseen expenses	750.00

Estimated Total Cost =Ksh 8,300/