

COLLABORATIVE WEB-BASED ELECTRONIC SUPERVISION SYSTEM

¹Nwoduh Udochukwu Justine & ²Agbakwuru Alphonsus Onyekachi. (Ph.D)

¹Department of Computer Science, Federal Polytechnic Nekede Owerri

²Department of Computer Science, Imo state University Owerri

udofifa2@yahoo.com

ABSTRACT

Collaborative electronic supervision system is a software solution, designed to address challenges in managing final year student projects in higher education institutions. Traditional methods of project supervision face issues such as inefficient allocation of supervisors, difficulty in scheduling meetings, limited access to resources, inadequate communication tools and inability of existing software to integrate most required features into one system. This paper proposes an integrated web-based system using the Dynamic Systems Development Model (DSDM) to streamline project management. The system employs a hierarchical structure involving admins, coordinators, supervisors, and students. It enables students to create personalized dashboards for managing project-related activities, facilitates communication and collaboration between stakeholders, and offers features like progress tracking, peer reviews, and centralized document storage. The system's advantages include reduced stress and time consumption, remote work capabilities, improved documentation, reduced recycling of topics, and efficient report generation. By centralizing information and providing interactive tools, the system enhances the overall management of student projects. It supports personalized supervision, early intervention, and fosters a sense of community among stakeholders, ultimately contributing to improved educational outcomes and the holistic development of students.

Keywords: *collaboration, electronic, project, repository, supervision, software, web-base*

1.1 Introduction

Project is a carefully planned and executed individual or collaborative activity aimed at achieving specific objectives, which can be defined in terms of outputs, outcomes, or benefits. Its success is determined by meeting the acceptance criteria and timeline agreed upon.

The final year project, also known as a dissertation or thesis depending on the program, holds significant importance in undergraduate, graduate, and post-graduate programs. It offers students a valuable opportunity to develop essential skills in time management, creative thinking, and effective communication of findings through report writing. Managing a project and producing a comprehensive report require considerable resources and support from the department and faculty in terms of supervision, resource allocation, assessment procedures, and overall support.

Ensuring a seamless management process and consistent engagement of students throughout the project period is crucial. This involves efficient project allocation, effective supervision, easy access to necessary resources, and proper preservation of the completed work. However, with the growing number of students in higher institutions, meeting these needs while considering the workload of supervisors poses challenges. Therefore, it is imperative to develop efficient ways to address these challenges.

Background

The primary focus of this research is centered on project writing, supervision, and archiving of students' projects. In Institutions of higher learning, as part of the requirements for obtaining different degree certificates, students are assigned research projects to be conducted either individually or as a group. The project activities typically commence with the allocation of project supervisors to the students. Subsequently, the students submit their project proposals for approval before the major project work commences. It is important to note that the sequence of these activities may vary slightly across different institutions, departments and faculties.

Once the project proposal is approved, the student proceeds to carry out the project and write a report, under the close guidance of the assigned supervisor. This process involves the submission of multiple progress reports periodically, which may span between 6 months to one academic session or more, depending on the academic program's duration. During this time, the student researcher is expected to meet regularly with the supervisor for corrections and feedback.

However, the current project management practices as still obtained in most institutions are manual or some isolated aspects computerized. This practice poses numerous challenges due to the increasing number of constraints caused by the rise in student numbers, leading to difficulties for both supervisors and students undergoing supervision.

Below are some of the identified challenges of the traditional face to face method project supervision as well some drawbacks of existing software systems designed for management of students' projects.

1. Inefficient allocation of project supervisors to students, resulting to limited opportunities for students to receive adequate mentorship, guidance, and support from the project supervisor
2. Difficulty associated with scheduling and managing regular meetings between students and project supervisors, leading to inadequate monitoring and tracking of project progress, making it challenging to identify and address issues in a timely manner.
3. Limited access to resources and materials necessary for students to complete their projects effectively as a result of lack of central repository for completed projects.
4. Insufficient communication and collaboration tools in manual system, hindering effective information exchange.
5. Challenges in maintaining accurate and up-to-date documentation of student projects, leading to potential data loss or mismanagement and other administrative challenges.
6. Inability of existing related software to integrate adequate interactive features for effective communication and collaboration among the student, supervisors and coordinators

Review of Related Literature

Concept of Project

The concept of a project is well-defined within academia, emphasizing its distinctiveness from other forms of work. The Project Management Institute (2017) characterizes projects as temporary endeavors aimed at creating unique products or outcomes. Yarbrough (2022) highlights projects as a collection of essential tasks that lead to specific outcomes, achieved through defined goals and prerequisites. Projects, regardless of scale, revolve around formulating targets supported by reasoned objectives.

Prachi (n.d) emphasizes the uniqueness of project outcomes, while Turner (1999) as cited in Al-Turfi (2017) underscores projects' coordination of resources to achieve defined scopes, adhering to constraints of time and cost. Projects possess a finite duration, limited resources, and follow a structured approach towards objectives and performance goals (Project Management Institute 2017; Gasik 2011; Prabhakar 2008; Turner 1999).

Supervision

Supervision holds diverse forms and functions, lacking a single definition. The Health & Care Professions Council (HCPC, 2021) describes it as a process for professional growth, involving regular support and reflection. In academia, supervision aids postgraduate, graduate, and undergraduate research students, providing both moral support and scholarly guidance. A supervisor acts as a mentor, guide, and facilitator, aiding students in their research journey (Remenyi & Money 2004). It is a critical factor in integrating

research and education, nurturing independent researchers (University College London (UCL) Arena Centre, 2019).

Related Works

The emergence of E-learning platforms has led to innovative techniques for academic project supervision. One of such models is Peer and Group Online Undergraduate Research Supervision (POURS) proposed by MacKeogh (2006). This model combines online supervision and peer collaboration with face-to-face meeting to enhance project supervision. POURS includes diverse project activities such online platform, peer reviews, and supervisory discussions to improve student performance and understanding in their research projects.

MacKeogh (2006) emphasizes that POURS goes beyond traditional supervision, offering a wide array of substantial support for undergraduate project supervision such as furnishing feedback on research subjects, tackling statistical quandaries collaboratively, suggesting scholarly resources, facilitating the organization of survey participants, managing questionnaire dissemination, and offering guidance on technical issues using SPSS. MacKeogh's depiction underscores the model's role in not only enhancing academic research but also providing a platform to address diverse challenges faced by supervisees.

Paul Newman's team at Loughborough University also introduced a noteworthy innovation in academic writing named ProjectList, an online solution designed to streamline project writing. This software serves as a collaborative platform, catering to both supervisors and students. While its foundation lies in generic project allocation functionality, ProjectList puts into consideration the unique methodologies embraced by diverse faculties and departments. The system is organized into four pivotal modules - Author, Approver, Allocator, and Administrator - each fulfilling a distinct role in the supervision process. By encapsulating these critical roles within a singular framework, ProjectList aims to harmonize the supervision activities. This ensures efficient allocation of topics and seamless approval processes, transcending the barriers of time and location.. (Loughborough University 2011)

The Cambridge Colleges' Online Reports for Supervisions (CamCROS) is another breakthrough within the realm of project supervision systems. Functioning as a specialized supervision reporting system, CamCROS facilitates the digital processing of supervision reports. This system empowers supervisors with the ability to generate tailored report forms for individual students, subsequently populating them with

relevant content following each supervision session. Notably, these completed reports are seamlessly submitted to the university upon completion of supervisory activities. CamCROS plays a pivotal role in enhancing communication dynamics between supervisors and university administrators. Through digitization of the reporting process, the system streamlines the exchange of crucial information, expediting administrative workflows and reinforcing efficient data management practices within educational institutions. (Romdhani, Tawse & Habibullah 2011)

Summary

Existing research reveals partial computerization of project management, primarily focused on allocation and documentation. Systems like MacKeogh's POURS model show promise but still rely on face-to-face interactions for progress approval. ProjectList and CamCROS offer partial solutions, emphasizing limited aspects. Inability of ProjectList to integrate other aspects of the project supervision like submission of progress report and repository is a critical downside of the system. CamCROS major weakness is the inability of students to have access to the system hence it is designed only for supervisors to keep track of their meetings with students and for reporting to appropriate authorities. All these weaknesses underscore the need for comprehensive integration and collaboration in project supervision systems.

Methodology

The methodology utilized in this study involves the implementation of the Dynamic Systems Development Model (DSDM) for software development. DSDM is originally based on the Rapid Application Development methodology and follows an iterative and incremental approach, emphasizing continuous user involvement. The primary objective of DSDM is to deliver software systems within the specified time and budget. This model is built on the understanding that perfection cannot be achieved in the initial attempt and therefore embraces the concept of an ever-changing process.

The DSDM life cycle comprises four phases:

1. **Feasibility and business study:** During this phase, developers define project requirements and select an appropriate approach for the development process.
2. **Functional model and prototype iteration:** Developers create prototypes to demonstrate the system's functionality.
3. **Design and build iteration:** In this stage, developers refine the prototypes until an acceptable functional model is achieved.
4. **Implementation:** Users undergo training, and the software is deployed in an operational environment.

The decision to adopt the DSDM methodology is influenced by several factors. Firstly, the active involvement of users in the development process allows them to have a better understanding of the software development project. Additionally, the DSDM approach ensures rapid delivery of the basic functionality and continuous delivery of additional features at frequent intervals. Moreover, the method facilitates direct access for developers to end-users, fostering effective communication. As a result of these attributes, projects developed using this methodology is more likely to be delivered on time and within the designated budget.

Existing System

The existing system predominantly relies on manual processes for project management and collaboration. The initial stages involve manual allocation of project supervisors to students, followed by the submission of project topics and proposals for approval. Once approved, students engage in project work under close supervision, submitting progress reports periodically. Throughout this process, students are required to meet with supervisors face to face for corrections and guidance. On completion, hardcopies of projects are submitted to the department and library. While some project aspects like allocation and record keeping have been computerized, significant limitations remain.

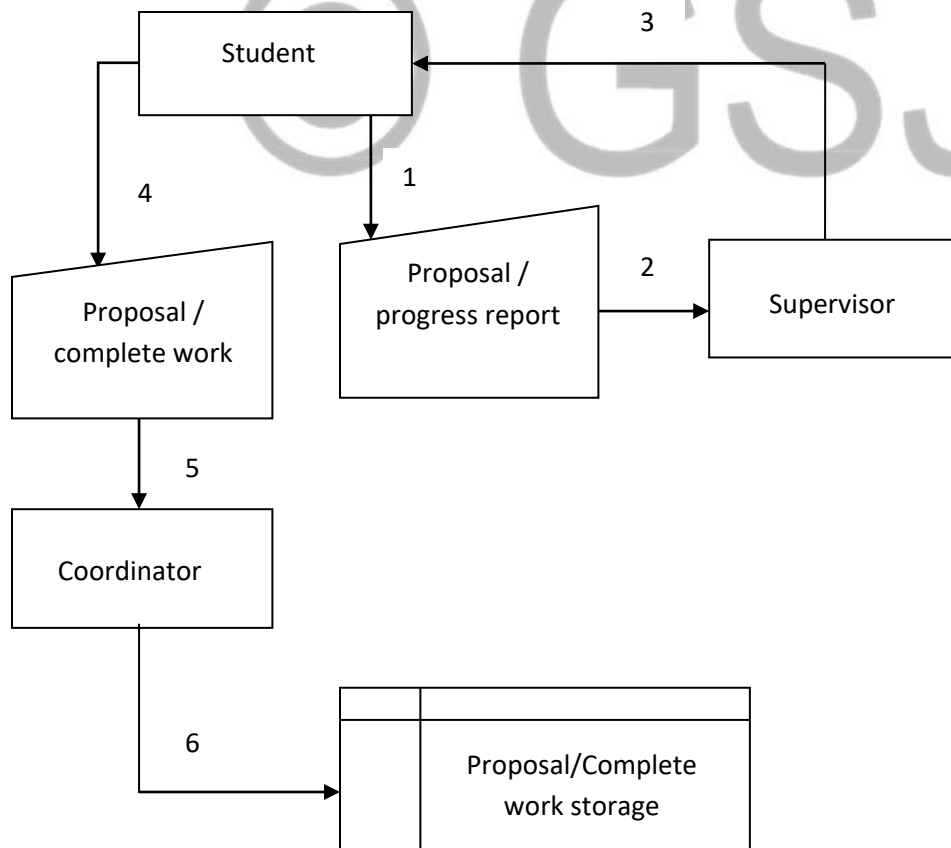


Figure 1.1: Data flow diagram of the existing system

Weakness of the Existing System

The traditional face-to-face project supervision method and existing software systems for project supervision exhibit several shortcomings. Some of the identified shortcomings include

- 1) Difficulty associated with meeting physically which is stressful, time consuming and hampers effective project progress monitoring, identification of challenges and timely resolution.
- 2) Manual updates and retrieval of project records prove cumbersome and hinder seamless record management, particularly when modifications occur post-topic approval.
- 3) The lack of robust communication and collaboration tools in the manual system which impedes effective information exchange among stakeholders.
- 4) Absence of a centralized repository for completed projects which lead to inefficiencies, limited access to resources, and potential plagiarism concerns.
- 5) Existing software systems covers only isolated project management tasks.

Analysis of Proposed System

The proposed system introduces a hierarchical structure, commencing with a super admin who activates sessions and establishes admins. These admins then assign coordinators to different programs. Coordinators manage supervisors, project allocation lists, progress reports, and defense schedules. The system aims to match student interests with suitable supervisors.

Both supervisors and students will access personalized dashboards. Supervisor dashboards facilitate project proposal review, approval, progress monitoring, and comments. Supervisors can engage with students, utilize keyword searches, and review project-related documents. Students submit proposals and progress reports, with supervisor/coordinator comments displayed on their dashboard. Students can provide input on relevant sections as needed.

Upon completion, students upload projects to a repository, promoting improved documentation, reduced duplication, and addressing plagiarism. The proposed system aims to enhance collaboration, improve the documentation process, reduce duplication or recycling of project work, and address plagiarism-related activities.

Objectives of the Design

The study aims to develop a web-based collaborative electronic supervision for coordinating and managing students' research projects in educational institutions. In accomplishing this aim, the system will achieve the following specific objectives:

1. Enable user friendly registration process to create personal dashboards for project-related activities.
2. Streamline project management by providing a centralized platform for collaboration and information access.
3. Promote effective communication and collaboration among students, supervisors, and coordinators throughout the project lifecycle.
4. Equip supervisors and coordinators with a query feature to check project reports for plagiarism, ensuring academic integrity.
5. Develop a digital repository for completed projects, enhancing accessibility while reducing physical storage requirements.

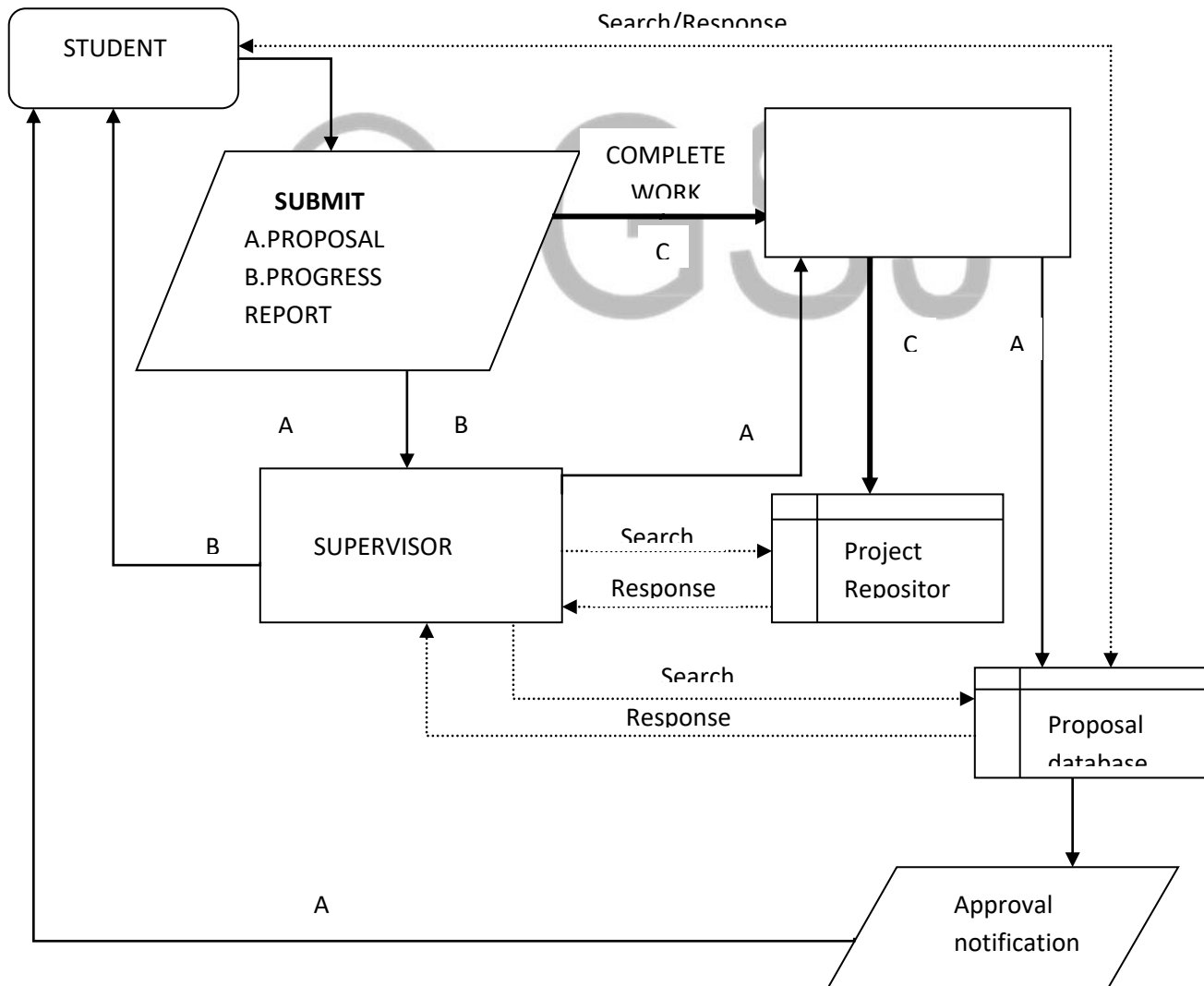


Figure 1.2 Data flow diagram of the proposed system

Advantages of the Proposed System

Upon completion, the system offers multiple advantages, including:

1. **Process Automation:** Automating project coordination reduces time and stress for supervisors and supervisees.
2. **Location Independence:** Both supervisors and students can engage in project activities from any location.
3. **Integrated Collaboration:** Integrating various project management functions together enhances collaboration among stakeholders.
4. **Enhanced Documentation:** The system improves documentation, curbing topic recycling and facilitating management reporting.

Overall, the proposed system seeks to revolutionize project supervision, enhancing efficiency, accessibility, and collaboration.

System Requirement

Server: Minimum 4GB RAM, 2GHz processor, 250GB hard disk space

Client: Minimum 2GB RAM, 1GHz processor

Operating System: Windows 7 and above

Web Browser: Google Chrome, Mozilla Firefox,

Conclusion

In conclusion, the new system plays a crucial role in enhancing the overall management of the processes involved in students' final year project. By centralizing student information, facilitating communication, and providing tools for tracking progress, the System helps streamline administrative processes and promotes effective collaboration among students, supervisors and coordinators.

With features such as academic progress tracking, live chat, highlights and comment boxes, the system enables management of educational institutions to have a comprehensive view of student performance and provide timely support or intervention when needed. It promotes independent learning capabilities; develop central repository for all completed projects that can be easily accessed by project supervisors and students for future references. The system fosters a sense of community and engagement by providing a platform for communication and collaboration among stakeholders.

Overall, the system empowers educational institutions to optimize their resources, improve communication and coordination, and ultimately enhance the educational outcomes for students. It supports personalized supervision, early intervention, and continuous improvement, contributing to the holistic development and success of students in their academic pursuits.

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