

**SECD 2613: System Analysis and Design**

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Project 1

**Phase 1- Project Proposal and Planning**

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**Case study**

**NexScholar Student Supervisor Management System**

University Technology Malaysia (UTM) has recently adopted NexScholar, a new academic collaboration platform designed to simplify research management and communication. A crucial module within NexScholar is the "Student Supervisor Management System," specifically intended for postgraduate students and their supervisors. The university administration has realized the existing manual processes—email communications, Excel tracking sheets, and informal meetings—are inefficient and problematic.

Currently, postgraduate students select their supervisors themselves; however, this selection process relies heavily on informal communications via email or WhatsApp. Students frequently complain about difficulties in reaching supervisors for guidance, slow feedback on drafts, uncertainty about meeting schedules, and unclear progression milestones.

Supervisors, on their side, struggle to manage communications, track the progression of multiple supervisees, and ensure timely feedback due to fragmented information and manual monitoring. This situation has led to delays in research progress, frustration among students, and even cases of students dropping out of programs.

Although UTM currently uses the Graduate Student Management System (GSMS), it is an outdated platform primarily focused on monitoring student statuses, such as enrollment status and academic standing, but lacks functionalities for actively managing supervisorstudent relationships.

To address these issues, UTM's Faculty of Computing has approached your team as System Analysts to propose a new integrated digital solution as part of NexScholar. The envisioned system should automate and streamline the entire student-supervisor engagement lifecycle from assignment through ongoing supervision until the completion of research.

As a system analyst, please ask relevant questions based on the case study.

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# Introduction

The University Technology Malaysia (UTM) has recently adopted NexScholar, a new academic collaboration platform. The NexScholar Student Supervisor Management System is being developed to address critical inefficiencies in postgraduate research supervision at University Technology Malaysia (UTM). As part of this initiative, our team has been approached by the Faculty of Computing at UTM to propose a new integrated digital solution: the "Student Supervisor Management System." Currently, the supervision process relies heavily on manual methods, including email correspondence, WhatsApp communications, and Excel-based tracking, which have proven inadequate for managing the complex student-supervisor relationship. These outdated practices have led to significant delays in research progress, with students reporting difficulties in obtaining timely feedback, unclear milestone expectations, and challenges in scheduling meetings. Supervisors, on the other hand, struggle to manage multiple supervisees effectively due to the lack of a centralized system for tracking progress and communications. The existing Graduate Student Management System (GSMS) is limited to monitoring enrollment status and academic records, failing to provide the necessary tools for active supervision management. This proposed system is specifically intended for postgraduate students and their supervisors and aims for streamlining research management and automating key processes such as supervisor-student matching, milestone tracking, and document sharing communication within the NexScholar platform. This report outlines the background of the problems currently faced by the postgraduate students and supervisors at UTM, proposes initial solutions, defines the scope and objectives of the intended system, and highlights the potential benefits of its implementation.

# 2.0 Background Study

Currently, the management of postgraduate student supervision at UTM relies heavily on manual. The manual matching process for students and supervisors is inefficient, often leading to mismatches in research interests or availability. The GSMS, which is functional for administrative purposes, does not support dynamic supervision activities, forcing faculty members to complain too about the time-consuming workarounds. Additionally, the case study also highlights that postgraduate students select their supervisors through informal communication channels, primarily email or WhatsApp. The absence of a unified platform means that critical documents, feedback, and meeting schedules are scattered across multiple systems, making it difficult to track progress. This fragmented approach has created bottlenecks in research completion, with many students experiencing extended delays due to inconsistent feedback and poor milestone visibility.

On the other hand, supervisors struggle to effectively manage communication with multiple supervisees, track their progress efficiently, and ensure timely feedback due to the fragmented nature of information and the reliance on manual monitoring. This situation has been identified as a contributing factor to delays in research progress, increased frustration among both students and supervisors, and, in some unfortunate cases, students dropping out of their programs.

The existing Graduate Student Management System (GSMS) at UTM, is useful for monitoring student enrollment and academic standing, that is already described as outdated and lacking the specific functionalities required for effectively managing the dynamic relationship between supervisors and their students throughout the research journey.

Therefore, the proposed system aims to consolidate these processes into a single, user-friendly platform, providing real-time updates, automated reminders, and structured workflows to streamline the entire supervision lifecycle from initial matching to thesis completion. The need for a dedicated, integrated solution within the NexScholar platform has become apparent.

# 3.0 Problem Statement

The current reliance on manual processes and the absence of a dedicated digital platform for managing student-supervisor interactions in postgraduate studies at UTM result in significant challenges, including:

* **Inefficient Communication:** The use of email and WhatsApp, leading to delays, miscommunication and lack of centralized records.
* **Lack of Progress Transparency:** Students lack clarity on expected progression milestones, and supervisors find it difficult to gain a holistic view of each student's progress.
* **Supervisor Overload:** As faculty members juggle multiple supervisees without tools to prioritize tasks or manage workloads effectively.
* **Delayed Feedback Mechanisms:** The manual feedback process is often slow and can hinder students' research momentum.
* **Difficulties in Scheduling and Coordination:** Arranging meetings and coordinating supervision-related tasks are cumbersome without a dedicated system.
* **Limited Functionality of Existing Systems:** The current GSMS does not address the specific needs of managing the student-supervisor relationship effectively.

These issues collectively contribute to a suboptimal research environment, potentially leading to prolonged research timelines, decreased satisfaction among both students and supervisors, and an increased dropout rates.

**4.0 Objectives**

The primary objectives of the NexScholar Student Supervisor Management System are to:

* Improve communication efficiency between postgraduate students and their supervisors.
* Enhance transparency in research progress and milestones.
* Streamline the feedback process on student work.
* Facilitate easier scheduling and management of meetings.
* Provide tools for effective task management and assignment.
* Integrate seamlessly with the existing NexScholar platform.
* Ultimately contribute to a more productive and satisfactory postgraduate research experience.
* Decrease postgraduate dropout rates within two years of implementation.

# 5.0 Scope of the Project

The NexScholar Student Supervisor Management System will be developed and implemented in phases. The initial scope of the project, focusing on the first phase of development, will include several core functionalities to address the most pressing needs identified in the problem statement. This encompasses the development of a user management system, providing secure login and role-based access control for both postgraduate students and supervisors. Also, a communication module will be implemented to facilitate direct messaging, announcements, and notifications specifically related to supervision activities. Progress tracking functionality will be included, enabling the definition, updating, and visualization of research progress against established milestones.

Furthermore, the system will feature a document management component, providing a secure repository for students to submit research-related documents and for supervisors to access them. To streamline the feedback process, tools for supervisors to provide structured written feedback on submitted documents will be integrated. Meeting management features will be developed, allowing for the scheduling and sending of reminders for supervision meetings. Finally, task management functionality will be incorporated, enabling supervisors to assign tasks to students, set deadlines, and track task completion.

It is important to note that the initial scope of the project will specifically exclude certain features. Integration with external systems beyond the core NexScholar platform, such as plagiarism detection software or library resources, will not be included in this phase. Advanced analytics and reporting capabilities related to supervision activities are also outside the initial scope. The automated matching of students and supervisors, while a potentially valuable feature, will not be addressed in the first phase of development. Support for undergraduate student supervision is also excluded from the current scope. Additionally, the development of dedicated mobile applications will not be part of the initial implementation; access to the system will primarily be through a web-based interface. For offline functionality, the Student Supervisor Management System will leverage UTM's current infrastructure, such as GSMS for enrollment data, but will not modify core functionalities of these legacy systems. By maintaining this focused scope, the project ensures efficient resource allocation and timely delivery of high-impact features to resolve the most pressing supervision challenges identified in the case study.

# 6.0 Proposed Solutions (include feasibility study – technical, operational, economical - CBA)

**Proposed Solutions**

The proposed NexScholar Student Supervisor Management System aims to address the problems by introducing a centralized and integrated digital platform with the following key functionalities:

* **Centralized Communication Tools:** Secure messaging and notification features to facilitate direct and organized communication between students and supervisors. Integrate seamlessly with the existing NexScholar platform.
* **Progress Tracking and Milestone Management:** A system for defining, tracking, and visualizing research progress incorporates progress tracking and milestone management.
* **Document Sharing and Feedback Management:** A platform for students to submit research documents (proposals, drafts, etc.) and for supervisors to provide structured and timely feedback.
* **Meeting Scheduling and Management:** Tools for scheduling supervision meetings, sending reminders, and potentially recording meeting minutes.
* **Task Management and Assignment:** Features for supervisors to assign specific tasks to students with deadlines and track their completion.
* **Supervisor Allocation Management:** A module to manage the assignment of supervisors to students (the specifics of this will be further explored in the feasibility study).

**Benefit and Overall Summary of Proposed System**

The NexScholar Student Supervisor Management System offers significant potential benefits for UTM's postgraduate research environment. By addressing the inefficiencies of current manual processes, the system promises to enhance communication, improve progress tracking, streamline feedback mechanisms, and facilitate better coordination between students and supervisors. This will contribute to a more productive and satisfactory research experience, potentially leading to improved research outcomes and reduced attrition rates. Integration within the NexScholar platform ensures a cohesive and accessible solution for the university's academic community. Overall, this proposed system represents a crucial step towards modernizing and optimizing postgraduate research management at UTM.

**Feasibility Study**

# 7.0 Project Planning

## 7.1 Human Resource

**Project Manager**

The project manager is responsible for overseeing the entire project lifecycle, managing the project schedule, budget, and ensuring effective communication across all teams.

**System Analysts**

System analysts are responsible for gathering system requirements, analyzing the current issues, and defining system functionalities. They act as a bridge between the stakeholders and the development team.

**Software Developers**

The development team includes front-end and back-end developers who are tasked with building the core system functionalities, including supervisor-student communication, scheduling, progress tracking, and feedback systems.

**UI/UX Designers**

UI/UX designers will focus on creating a user-friendly interface, ensuring the platform is easy to navigate and accessible for both students and supervisors.

**Database Administrator (DBA)**

The DBA is responsible for designing and managing the database system, ensuring data integrity, performance, and security.

**Quality Assurance (QA) Testers**

QA testers will perform system testing to ensure the system is free of bugs, secure, and functions according to the specified requirements.

**Security Specialist**

Responsible for implementing security protocols, ensuring compliance with Personal Data Protection (PDP) requirements, and maintaining system confidentiality.

**Academic Advisors**

Academic advisors provide insight into the existing processes and help align system features with real academic needs and university regulations.

**End Users (Students and Supervisors)**

Students and supervisors will be engaged throughout the development process for requirement validation, usability testing, and feedback.

**IT Support Staff**

Post-deployment, IT support staff will manage system maintenance, user support, and troubleshooting.

**Finance Officer**

The finance officer handles budgeting and monitors software development, operational, and maintenance costs.

**Legal and Compliance Officer**

Ensures the system complies with all relevant laws and university data protection regulations, especially in terms of user data processing and storage.

## 7.2 Work Breakdown Structure (WBS)

**Level 1: NexScholar Student Supervisor Management System Development**

**Level 2: Project Phases**

**1. Project Initiation**

**1.1 Define Project Scope**

**1.2 Identify Stakeholders**

**1.3 Feasibility Study**

**1.4 Project Approval**

**1.5 Risk Assessment**

**2. Planning**

**2.1 Develop Project Plan**

**2.2 Define Budget**

**2.3 Set Timeline & Milestones**

**2.4 Resource Allocation**

**2.5 Develop Communication Plan**

**3. Requirements Analysis**

**3.1 Gather Business Requirements**

**3.2 Conduct User Research**

**3.3 Define Functional & Non-Functional Requirements**

**3.4 Stakeholder Sign-off**

**3.5 Develop Use Cases**

**4. System Design**

**4.1 System Architecture**

**4.2 UI/UX Wireframes**

**4.3 Database Schema**

**4.4 API & Integration Planning**

**4.5 Security Framework**

**4.6 Develop Data Flow Diagrams (DFD) for Process Optimization**

**5. Development**

**5.1 Backend Development**

**5.2 Frontend Development**

**5.3 Database Setup**

**5.4 Messaging System Integration**

**5.5 Supervisor-Student Matching Algorithm**

**5.6 System Integration**

**6. Testing & QA**

**6.1 Unit Testing**

**6.2 System Testing**

**6.3 User Acceptance Testing (UAT**

**6.4 Performance Testing**

**6.5 Security Testing**

**6.6 Regression Testing**

**7. Deployment & Maintenance**

**7.1 Deploy to Production Server**

**7.2 Configure SSL & Security Policies**

**7.3 User Training**

**7.4 Ongoing Bug Fixes & Support**

**7.5 Monitor System Performance**

**7.6 Collect User Feedback**

**8. Post-Implementation Review**

**8.1 Gather Feedback from Stakeholders**

**8.2 Evaluate System Success**

**8.3 Identify Areas for Improvement**

**8.4 Plan for Future Updates**

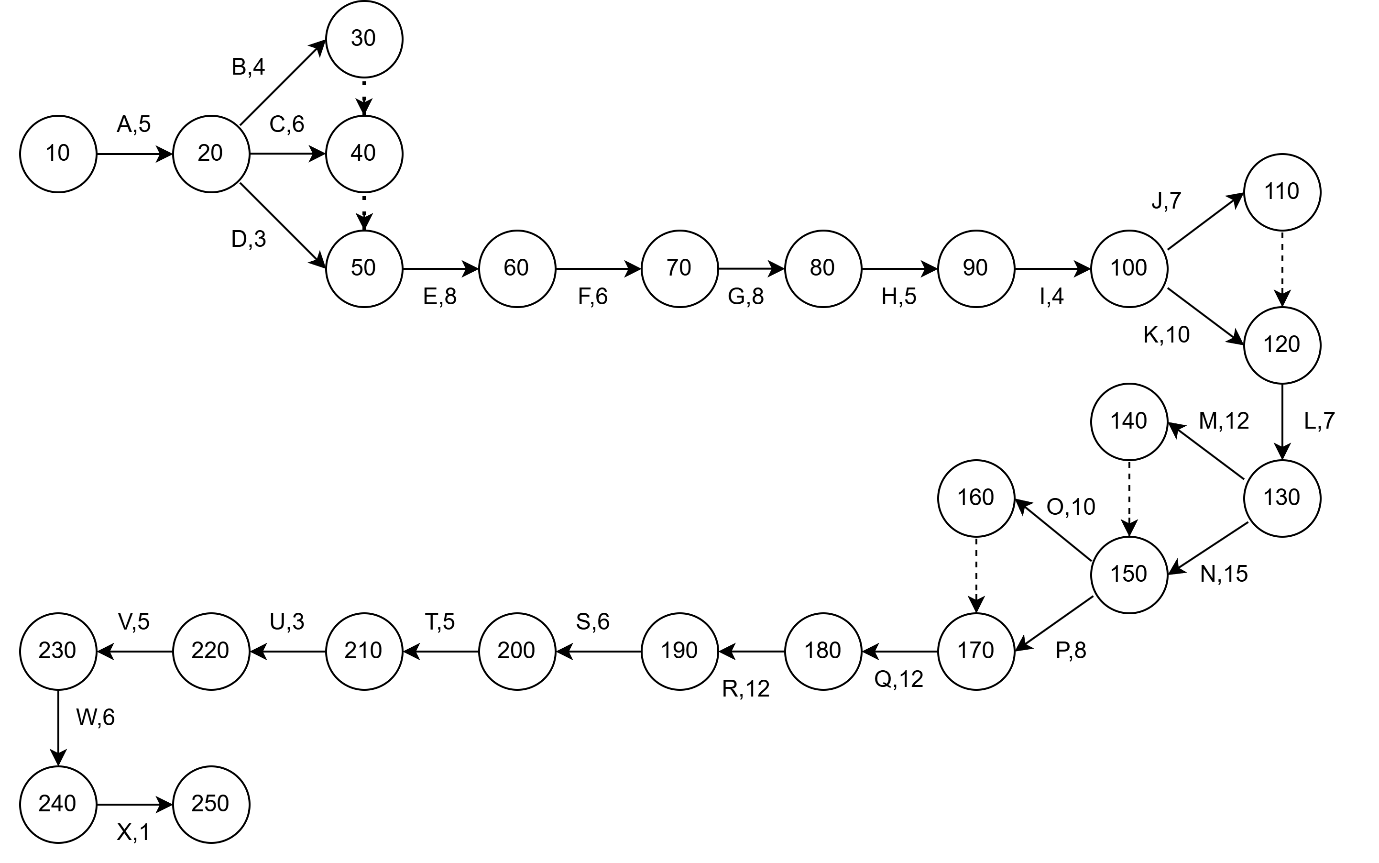
**8.5 Develop Change Management Plan**

**8.6 Address Legal and Compliance Issues**

## 7.3 PERT Chart (based on WBS)

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Description** | **Predecessor** | **Adjusted Estimated Time (days)** |
| A | Define Project Scope | - | 5 |
| B | Identify Stakeholders | A | 4 |
| C | Feasibility Study | A | 6 |
| D | Risk Assessment | A | 3 |
| E | Project Planning (WBS, timeline, resource allocation) | B, C, D | 8 |
| F | Gather Business Requirements | E | 6 |
| G | Conduct User Research | F | 8 |
| H | Define Functional & Non-Functional Requirements | G | 5 |
| I | Stakeholder Sign-off | H | 4 |
| J | System Architecture Design | I | 7 |
| K | UI/UX Wireframes Design | I | 10 |
| L | Database Schema & API Planning | J, K | 7 |
| M | Backend Development | L | 12 |
| N | Frontend Development | L | 15 |
| O | Develop Messaging System Integration | M, N | 10 |
| P | Develop Supervisor-Student Matching Algorithm | M, N | 8 |
| Q | System Integration | O, P | 12 |
| R | Testing (Unit, System, UAT) | Q | 12 |
| S | Bug Fixing & Optimization | R | 6 |
| T | User Training | S | 5 |
| U | Deploy to Production | T | 3 |
| V | Collect User Feedback | U | 5 |
| W | Post-Implementation Review | V | 6 |
| X | Ongoing Bug Fixes & Support | W | 1 |

## 



Path 1: A-B-E-F-G-H-I-J-L-M-O-Q-R-S-T-U-V-W-X

Length: 5+4+8+6+8+5+4+7+7+12+10+12+12+6+5+3+5+6+1=

Path 2: A-B-E-F-G-H-I-K-L-M-O-Q-R-S-T-U-V-W-X

Length: 5+4+8+6+8+5+4+10+7+12+10+12+12+6+5+3+5+6+1=

Path 3: A-B-E-F-G-H-I-J-L-N-O-Q-R-S-T-U-V-W-X

Length: 5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=

Path 4: A-B-E-F-G-H-I-J-L-M-P-Q-R-S-T-U-V-W-X

Length: 5+4+8+6+8+5+4+7+7+12+10+12+12+6+5+3+5+6+1=

## 7.4 Gantt Chart

# 8.0 Benefit and Overall Summary of Proposed System