FACULTY OF COMPUTING
UTM Johor Bahru

Project : Phase 2

SECD2613 - SYSTEM ANALYSIS AND DESIGN

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Section: 2

1.0 Project Overview

This project should develop an advanced system that would greatly enhance the current process of supervising postgraduates in colleges and universities; the project will be aimed at enhancing interaction between the postgraduates and their supervisors. The inefficiencies and associated problems with the current manual coordination system in use shall be rectified. Comprehensive requirements shall therefore be collected and the use of various methodologies for an understanding and design of the most optimum solution applied.

It will be easy to engage the stakeholders in seeking the detailed information since our Google Forms have nominal and scale questions to that effect, all meant to collect information on the people, goals, data, and procedures. Doing this will ensure that we obtain various views capturing the right information about people, goals, data, and procedures. Therefore, this information is a basis on which to build our understanding of business functions/processes in postgraduate supervision.

Some of these inefficiencies are fixed schedules by supervisors, the lack of an interface for scheduling communication between the center or centralized system and the supervisors, and lack of systematic feedback in case of rejection of requests by supervisors leading to delays and uncertainty. This may, in turn, perhaps overload the supervisors and result in a drop in the quality of supervision.

For the purpose of business flow, we will show the existing system using Data Flow Diagrams only. We will start our explanation with the high-level context diagram. This context diagram shows the flow of information between the business system of the college and all the external entities, such as students, supervisors. It shall lay down the basis for all the more detailed parent and child diagrams to show the flow of external entities and data along with information stores and the functions. Then, the function in the parent diagram will be exploded into a child diagram at the end to keep the integrity of the inputs and outputs.

After doing this, we shall proceed to draw the ERDs that will show the relationships in the system. Be reminded also, the existence of concepts of data requirements and transaction requirements because they imply how data is used, as they provide the examples of data usage. With such a structured analysis, we will have brilliant coverage of the current systems and the flow of information.

At the end of the project, we would have developed a background understanding of the existing system, to be represented using data flow diagrams, entity relationship diagrams, and information requirements. This background will guide in developing an advanced system that caters to the inefficiencies and enhances the postgraduate supervision process.

2.0 Problem Statement

2.1 Scheduling manual inefficiency of human-based coordination and scheduling

The current postgraduate supervision set-up creates a high level of dependency on manual coordination between the student and the supervisor. The scheduling of supervisory sessions is fixed and students are expected to arrange the meeting within these constraints. It is a time-consuming process and normally results in delays, missed appointments, and inefficiency in time utilization by students and

supervisors. This makes the scheduling inefficient in the sense that the assignment of schedules is often characterized by much back-and-forth communication, a scenario which discourages better productivity in academics.

2.2 Lack of a Centralized Platform for Communication and Management

As a result, central scheduling of appointments, deadlines, and communication between student and supervisor is lacking. This makes the whole process scattered and ineffective. Therefore, most important information sits in these scattered places, be it email inboxes, paper records, or personal notes that should be kept in order to not miss deadlines, miscommunicate, or generally have disorder in postgraduate supervision management.

2.3 Lack of Transparency in Rejection Feedback:

This is to say that rejection of an application for supervision would not occur through any systematic process whereby the students get feedback and are left guessing what was wrong. This would in turn rob them a chance to improve their profiles or even approach other supervisors with a better strategy. This apparently creates frustration and an undefined fear in them of how to progress forward in their academic pursuits.

2.4 Overloading of the supervisor and quality of the supervision:

Such an arrangement in the system does not limit the number of students that one supervisor can hold, hence overloading some of them. Supervision is adversely affected regarding quality, since overworked supervisors may have inadequate time and the much-needed attention that suffices to give an elaborate and satisfactory response to every student. Without this even distribution of the supervisory duty, disparities are realized in the quality of academic guidance among the students and hence affect their academic performance and other experiences.

2.5 Security and Data Management Issues

The manual system is very prone to a high level of risk in security and hence very hard to manage the sensitive data dealing with academics. This raises issues related to the integrity and confidentiality of records for students, supervision notes, and any other important information. Poor security measures make the system vulnerable and susceptible to security threats of data leakage and unauthorized access, therefore compromises privacy and trust between these parties.

Taken together, these problems point out inefficiencies, lack of transparency, and finally issues with scalability in the current system of postgraduate supervision. There is a need to address them against the background of quality enhancement in academic supervision and attaining an efficient, clear, and secure process for stakeholders concerned.

3.0 Proposed Solutions

To overcome the identified issues, we propose the following features and functionalities in a comprehensive, automatically driven system:

3.1 Automated Scheduling and Calendar Integration:

Like the Google Calendar, it will have an advanced scheduling tool to view the availability of supervisors, respectively, to get appointments. This will eliminate totally the need for manual coordination, which most often proves to be a source of delays as one has to engage the other in order to schedule a meeting. Time availability for the supervisor is done by being keyed into the system, and then a student selects an appropriate time that fits into a student's days. Automatic reminders and notifications ensure that no appointment goes by the wayside. This leads to better time management and productivity.

3.2 A central platform for communication and management.

The new system will be the main centralized place where scheduling, deadline management, and communication take place. Such a unified system will facilitate the process, making it much easier for students/supervisees to keep track of important dates, deadlines, and the quantity of interaction. The system will also entail dashboards that the student and supervisors can view for upcoming appointments, deadlines, and the history of previous communication. This is also going to give transparency and centralize all the critical information.

3.3 Feedback Mechanism for Rejected Requests:

Since all this would be in place, it should be systematic feedback so that the student knows exactly why his or her request was not accepted. For this, the supervisors will feed reasons for rejection of the request from a predefined set of reasons or with custom feedback in the system. The same will be conveyed automatically to the student. This will thus make sure that the student does not remain in an uncertain, helpless, and frustrating state but can rather take corrective action for effective profiling.

3.4 Manager Capacity Management:

The system should be able to allow the supervisor to set voluntary limits over the number of students to be supervised in order to avoid supervisor overload. This will ensure supervision of quality at all levels and that the supervisors are not overwhelmed. The supervisor will set the maximum number of supervisees available in a profile, and the system will track the number of supervisees for each supervisor. Notifications shall be sent when limits are getting close in order for supervisors to manage workload effectively.

3.5 Messaging Features and other Communications:

It is going to implement a messaging feature that allows students to communicate with supervisors directly. In fact, this feature will allow real-time messaging and help share documents to a great extent. The messaging feature will be available from the main dashboard so that the users can send messages, share files while at it, or even view notifications on the status of new messages sent. The archive will be made available on request in the future to hold the history of the communications so as to ensure that all the sets of interactions are documented and can easily be retrieved.

3.6 Strongly Secure:

Some of the technical measures to be incorporated within the system include password hashing and risk assessment protocols to guarantee security and integrity. It will hash every user's password to be stored in the database. Assurance against identification of possible vulnerabilities is through regular security

audits. The system will comprise of some features in both user authentication and authorization, which are controls of access to sensitive information hence ensuring privacy and trust.

3.7 Development and maintenance are economical:

The development will go for the free software tools to control the cost within estimations effectively. This selection of technology will offer a strong base for system development besides keeping the budget within the estimated range of 40k—50k. The development team will apply Laravel for back-end development, which is coupled with a favorable framework for front end development. Interns will be involved in developing routine updates and maintaining the system post-development to make the system functional properly within a low budget.

3.8. Adoption Support and Training:

Support and training shall be put in place fully to understand the possible difficulties that may arise in moving over the system from the current means into the new system through, but not limited to, video tutorials and detailed documentation and involving the students in the training. Continuing education will be done on the platform, where there will be webinars and workshops guiding the use of the system. The support system comprises a help desk to assist the user in case of any problem, making it a smooth transition and having the best user adoption rates.

The system is intended to address, among other things, all inefficiencies and inconsistencies in the current postgraduate supervision process: lack of transparency and scalability. This advanced system will offer the interface that fosters a better and smooth experience in the postgraduate supervision procedure to the students and the supervisors at large, thereby facilitating the many ways toward betterment in the academic outcome and research development. This system will ensure effective scheduling, transparency in the communication process, easy ways to handle supervisor loads, and most importantly, security in the postgraduate supervision process.

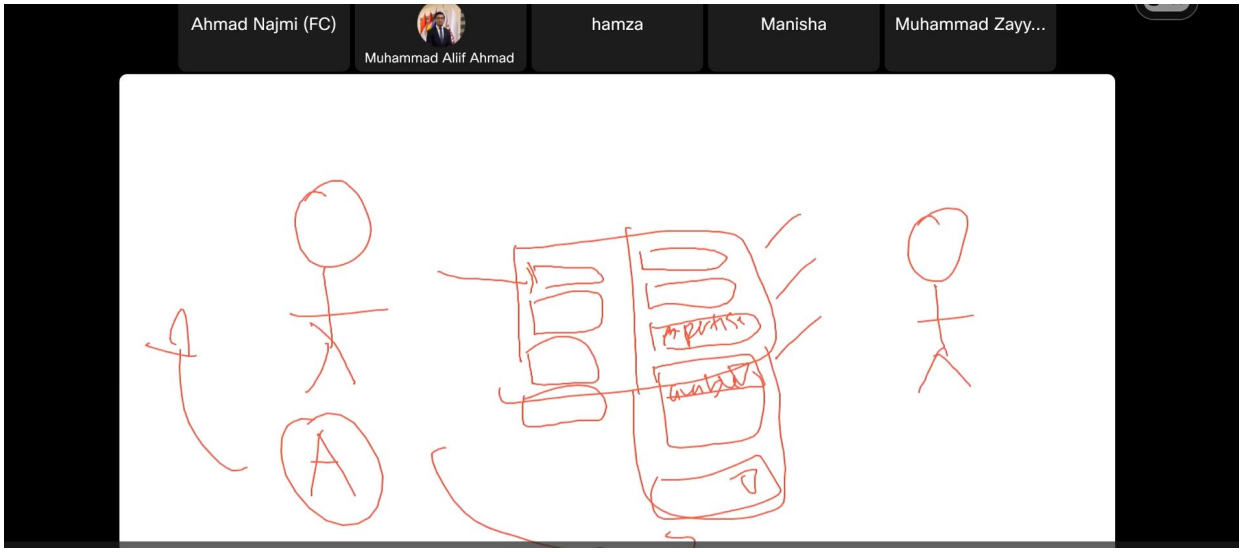
4.0 Information Gathering Process

Information collecting is important to learn as much as possible about the postgraduate supervision system. These facts were acquired from Dr. Najmi , a stakeholder in our project based on the postgraduate supervision system.

4.1 Method used

To learn more about postgraduate supervision, we did an interview with Dr. Najmi through Zoom, an online meetings platform. The interview took about 45 minutes, our group and other groups from the same section attended the meeting. In the beginning, Dr. Najmi introduced the current system to us and how it works. Then, he listed for us some requirements that he wants us to include in the new system. At the end, we and the other groups asked him some questions to gather more information that would help us to develop the new system. The questions contain both open-ended and close-ended questions. In the interview with Dr. Najmi, a total of twelve questions were asked, the structure of the questions asked to Dr. Najmi in the interview appears to follow a funnel structure. This is characterized by starting with broad, general questions and gradually moving towards more specific, detailed ones. Our group’s question for Dr.

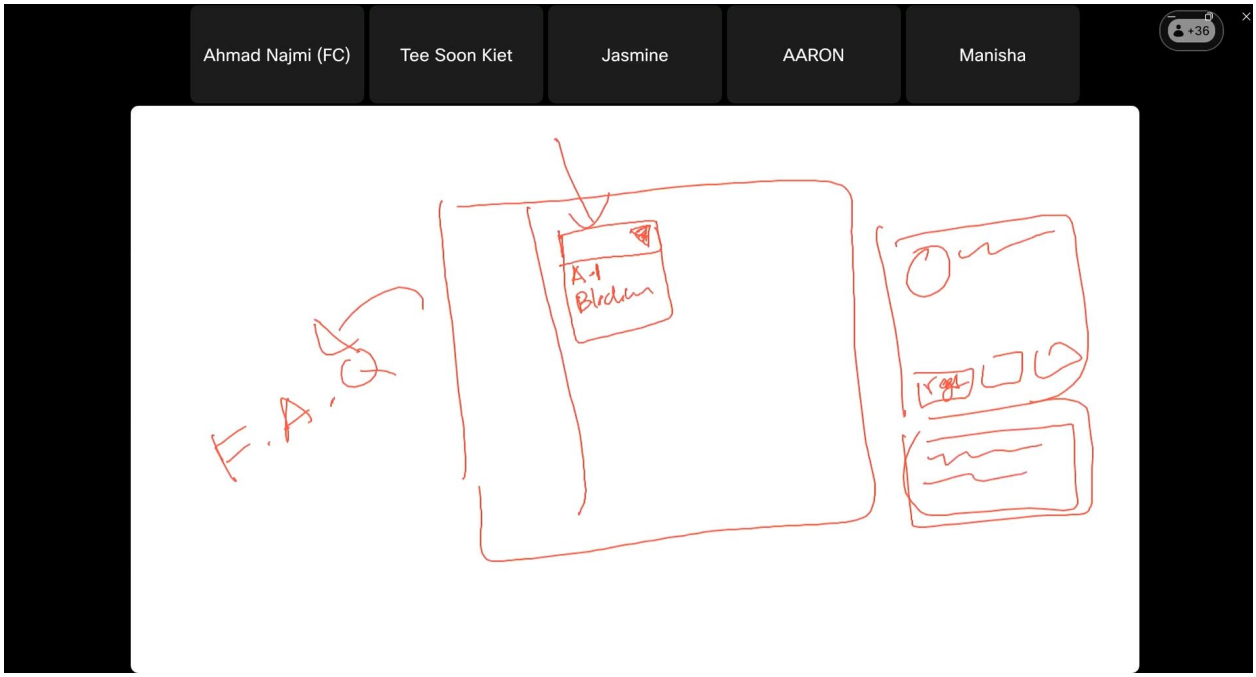
Najmi is how they interact with the current system, and his answer was that there is no system, it is just the traditional way.



4.2 Summary from method used

In the interview with Dr. Najmi, the questions we asked focused on various aspects of the postgraduate supervision system, including current challenges, desired features, and potential costs associated with developing the new system. The interview aimed to gather detailed information to help in the design and implementation of postgraduate supervision platform. Dr. Najmi talked about the problems with the current postgraduate supervision system, which requires students to search manually or use social media to find supervisors. He proposed a new centralized platform with features like a searchable supervisor directory, application and feedback tools, progress tracking, appointment scheduling, defense proposal management, and secure document uploads. These features aim to make it easier for students to find supervisors and for supervisors to manage their students' progress.

Dr. Najmi also discussed the technical and financial details of creating this new system, suggesting the use of cost-effective software like Laravel, and estimating the cost at 40K to 50K. He mentioned the challenge of getting supervisors to adopt the new system but believes it will significantly improve the supervision process by making it more efficient and organized.



4.2.1 sample of the questions

- How does the supervision module account for students' diverse backgrounds to foster an inclusive learning environment?
- How do you currently interact with the manual system?
- How do you collaborate and work together using the manual system?
- What are the advantages and disadvantages of the manual system?
- Can you point out areas where using computers or digital tools could make things faster and easier?
- How do you make sure the information you put into the manual system is correct and stays that way?
- How do you make sure the information you put into the manual system is correct and stays that way?
- How much are the shareholders willing to invest in the project?
- How many postgraduate students that the supervisor can supervise?

5.0 Requirement Analysis (based on AS-IS analysis)

5.1 Current business process

Project Initiation: The first part of the project is the project planning which involves setting the boundaries of the project, its objectives and formulating the teams that will participate in the project. There is a formalization process that is associated with the project and comprises of the project charter along with the specifications regarding the expectations. The next activity after problem definition is requirements gathering; this involves interviewing stakeholders so as to have an idea of specified needs. Review and final presentation of functional specifications is made to incorporate final requirements.

The design stage is the stage where the architecture of the system and the system's software, the database, and the interface are planned. All of the interfaces and dialogs for the student registration, supervisor dashboards, and appointment scheduling systems are both aesthetically pleasing and practical for use by the intended users. Password protection of the data is also mentined as are access restrictions to the data. Then the development follows and this is not too hard to do since you are using Laravel to configure how the app is to do its backend work as well as how the interface and front end work is to be done. The user then completes the testing cycle to test whether the system can function correctly. They include functional testing and also performance and security testing. Then comes Implementation after all the tests are done and the system's suggestions are implemented. It does not hang on live servers of users and trained. The first official concern for support is set up to overcome the issues emerging at initial stages.

The next phase is Maintenance and Support where the system is expected to function as planned and free from any security breach of security. Whenever needed developments and enhancements are being done and some user support is always going on. As for the effects of Documentation and Reporting it includes: It is maintained throughout. The manuals describe the user's actions and processes within the system and are included in the documents. Project status is maintained through regular reports which are issued on a weekly basis. Project Closure stage is when the deliverable end products/test results are evaluated and postmortem documents generated. The system is then passed on to the operational team who will take over the system's upkeep and maintenance in future. This model allows organizing the whole process of development by putting it in shape as a structure; therefore, the system that will be developed will be secure and reliable for its operation with the best performance that meets customer expectations.

5.2 Functional Requirement (input, process and output)

The system starts with the registration of participants which includes personal information such as name, age, marital status, level of studies, abilities, skills, and interests about the research. The supervisors use institutional expertise and availability to choose their supervisory preferences. It also includes system configurations at the administrative level that dictates the roles and rights of users. These inputs are understood by the system and interpreted to match students to appropriate supervisors depending on their research interests and supervisors' availability. For instance, students can search and find the supervisor in a particular research area and access their publication records with an integrated Google Scholar ID. Lecturers receive requests from students which they either deny or accept and allow the student to schedule an interview. Outputs include messaging supervisors and students about requests and this meeting appointment.

In addition, the system also creates potential interactions between students and supervisors e. g. appointments and progress logs. The system is controlled by the administrators through a dashboard which is responsible for control of bickering, user account management and system configuration as well as resolving the problems raised by users. The system should effectively adhere to the data protection laws and ensure that the passwords are encrypted and storing the details of the user in a secure place cannot be

accessible by unauthorized users. They perform such performance maintenance functions as supporting the system's software execution and providing technical support for the system.

5.3 Non-functional Requirement (performance and control)

1. The performance grade for UTM's website is 98, equivalent to a grade of A.

2. The page size of UTM's website is 6.2GB.

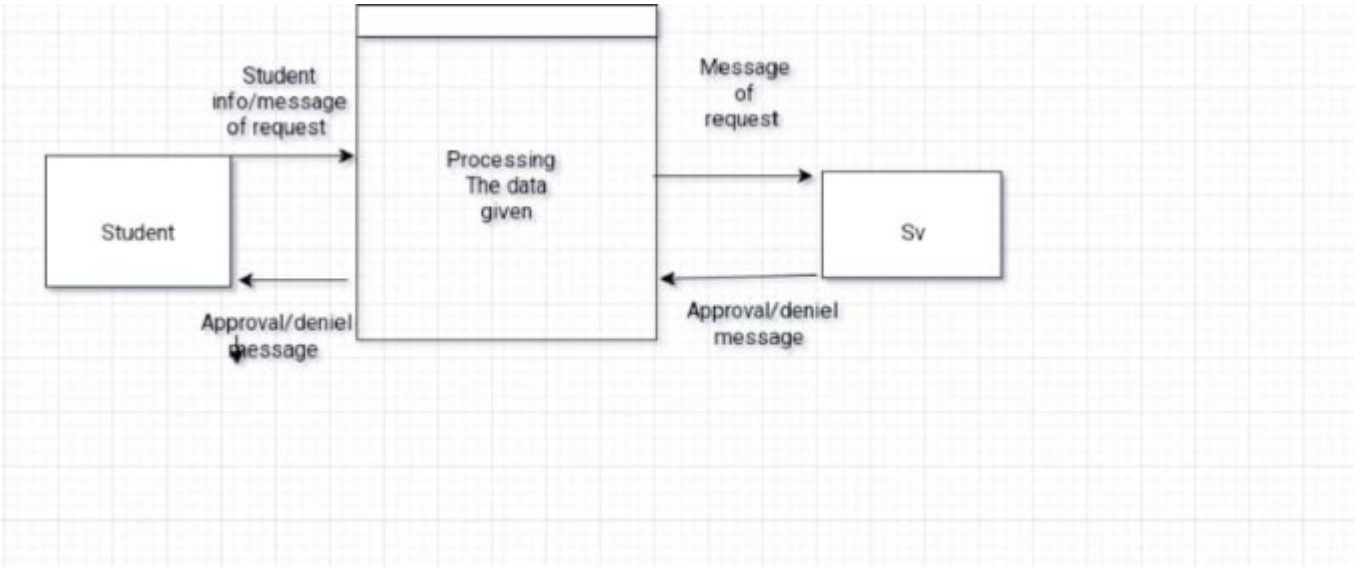
3. The load time of UTM's website is 9.13s.

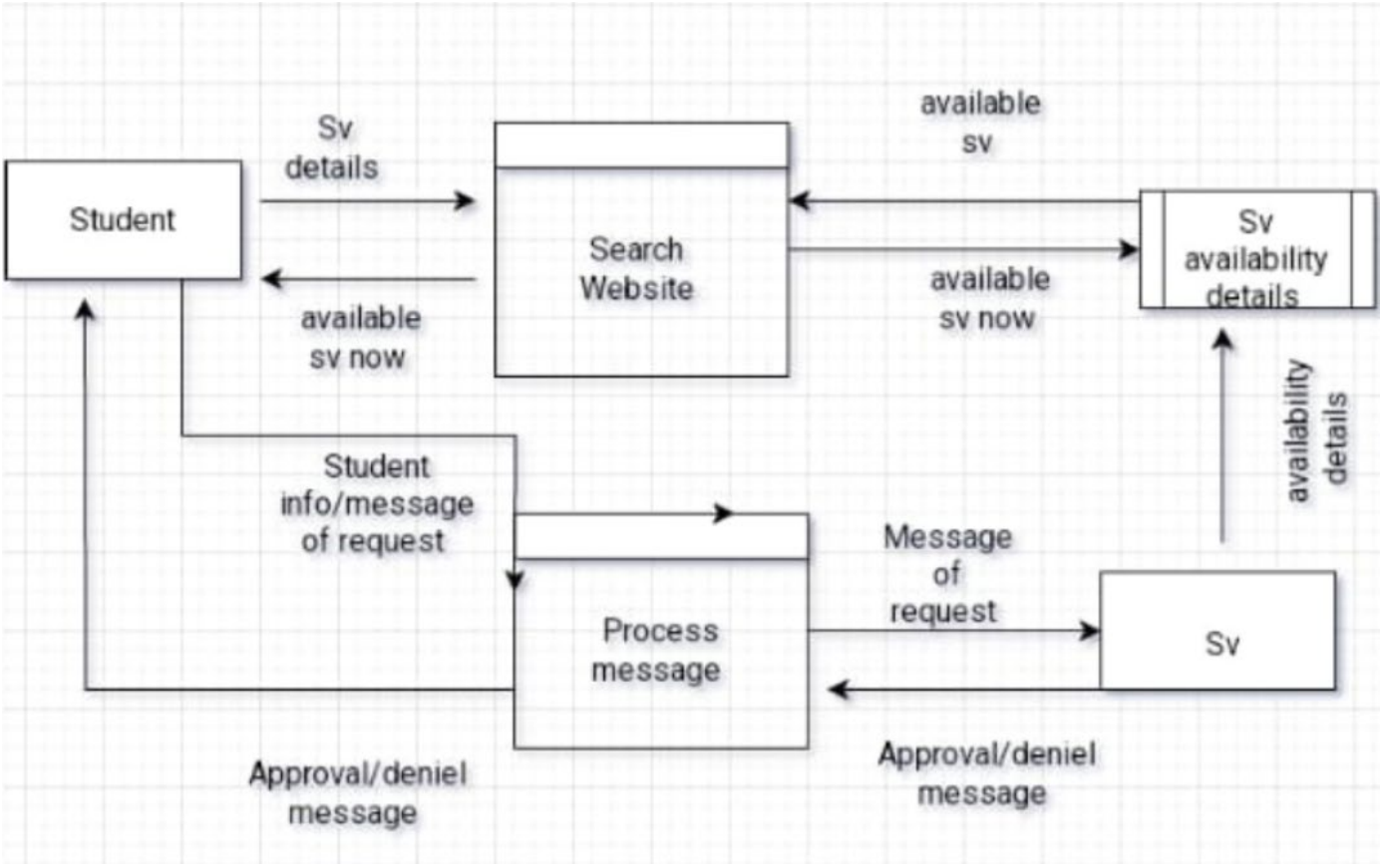
Security:

1. communication between supervisor and student are encrypted and secure = 1/4

2.system makes sure the student is real and info is correct

5.4 Logical DFD AS-IS system (Context Diagram, Diagram 0, Child)

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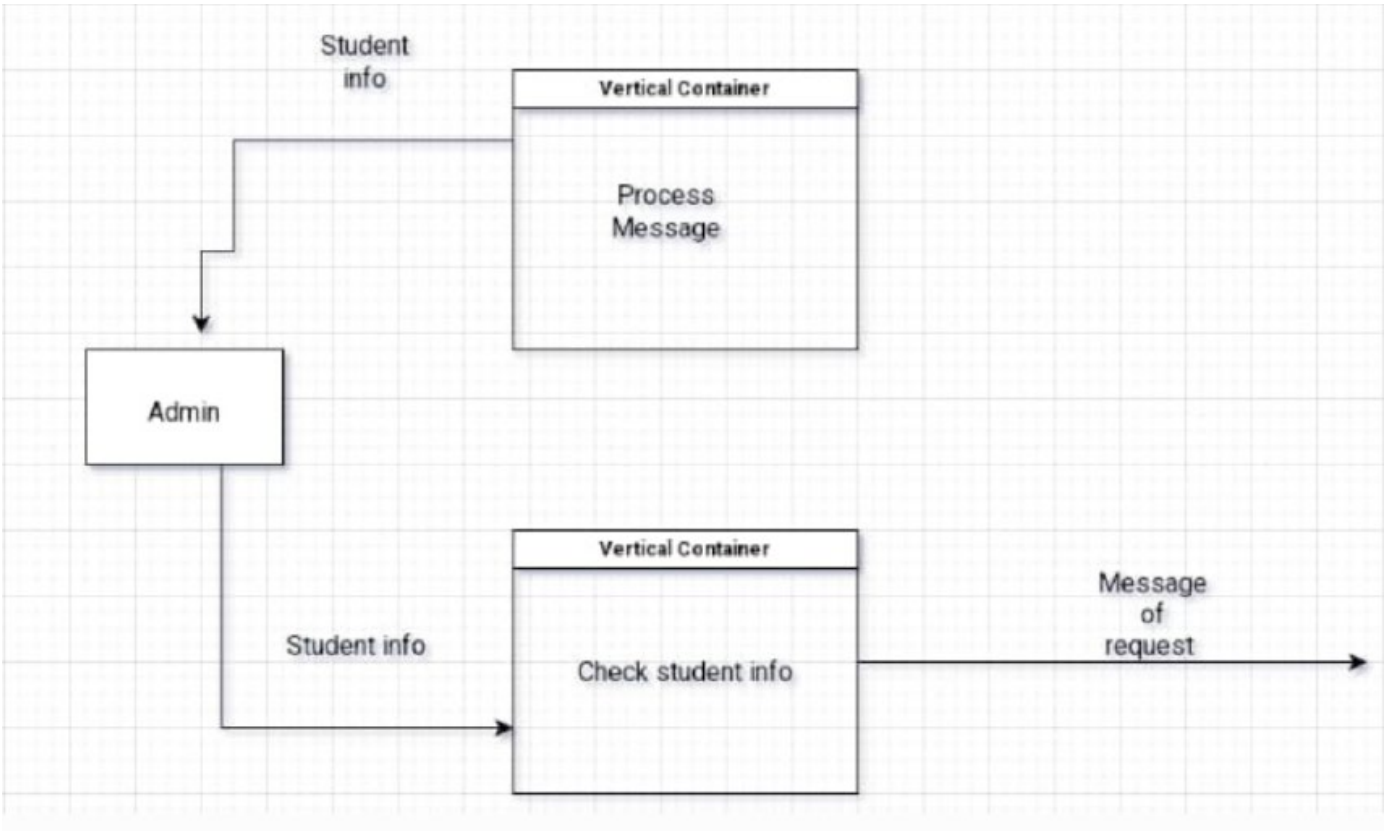

6.0 Summary of Requirement Analysis process

The general objective of the proposed system is to seek a postgraduate supervision platform that is efficient, transparent, and secure. The new system is expected to better the current inefficiency of the system and, through new features for scheduling, communication, feedback, and security, improve the quality of the whole postgraduate system. This means that the system is associated with better academic outcomes, better research development, and a better academic environment that is more supportive and more productive for both the students and their supervisors.

Therefore, the summary of requirement of analysis process are:

1. Students at UTM can search through any section from any city, allowing for students to choose from any course and register from any location.

2. Students send messages to their supervisors, allowing direct communication for guidance or requests.

3. Supervisors have the authority to either accept or reject student requests, if it doesn't fit their schedule student and refer them to other supervisors

4. Administrators have the responsibility to verify the make sureof student details, ensuring the student info is legit and it’s an actual student in the system.