



Analysis and Design of a Student and Admin Portal with a Pomodoro Technique Feature for Mindanao Kokusai Daigaku (Mindanao International College)

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ABSTRACT

Academic institutions have become so accustomed to using antiquated paper recording methods to store and process student data that transitioning to a more advanced technological method may not be a top priority at first. Many educational advancements have been demonstrated to be beneficial, however, some educational institutions are falling behind.

Mindanao Kokusai Daigaku's lack of a centralized system is the reason for the university's foregoing problems. The college is still managing student data through paper records and an obsolete enrollment information system, which has been very inconvenient for both students and admins, especially during the Covid-19 pandemic.

The main objective of this paper is to design a student and admin portal for Mindanao Kokusai Daigaku with a Pomodoro technique feature as an advanced approach for the university's internal operations to improve user convenience, secure documents, and make information more accessible to students while also encouraging productivity.

Various methodologies and models were used in this study to further clarify the proposed system's operations and purpose. Based on the results of the findings, the researchers conclude that the suggested portal system is feasible and will address Mindanao Kokusai Daigaku's current challenges.

Key words: student portal, system analysis, system design, web-based portal

1. INTRODUCTION

1.1 Background of the Study

Over the past years, advancements in technology have become prominent. Our way of life is constantly evolving as a result of all the continuous innovations in various fields. However, some organizations may find it difficult in keeping up with the latest trends. In the field of Education, most universities have implemented several automations like E-learning, Augmented Reality, and various systems to help with the school's processes. Over time, portals have gained favor among educators. A portal is a web-based platform that collects information from different sources into a single user interface and presents users with the most relevant information for their context [1].

This can be used in universities for students and admins to access information related to the school and academics [2]. An enrolled student, for example, can use the portal to access course materials such as articles, discussion videos, pdf files, and other academic-related resources. In some portals, students can also access their class schedules, course details, the school's academic calendar, and more.

Administrators, on the other hand, can utilize this portal to update student materials, grades, and timetables. Despite its evident advantage, several universities do not have such systems implemented. Some colleges still traditionally manage student data; by using paper recording methods, which can have a few drawbacks [3].

Mindanao Kokusai Daigaku is one of the several universities that are yet to impose a portal system. The college is currently managing student data through online and paper records which have been a very

inconvenient process, particularly during the Covid-19 pandemic.

Based on the foregoing statements from the students, there is no direct way of accessing their grades, class schedules, and financial statements. They have to email the finance office and the registrar for a copy of the aforementioned documents which takes at least 1-2 days to receive. A student has no way of knowing their remaining balance or overall tuition fee until they request a copy of their current financial statement via email. This current procedure is very inconvenient not only for the students but also for the admins in charge. The lack of a student and admin portal system is a major challenge for the university and is limiting them to develop and advance as an international college.

On the topic of educational advances, the Pomodoro technique has been increasingly popular in recent years. The Pomodoro Technique is a time management method created by Francesco Cirillo in the late 1980s when he was a University Student [4]. Cirillo was struggling to focus on his studies and complete his assignments. Feeling overwhelmed, he asked himself to commit to only 10 minutes of focused study time. Encouraged by the challenge, he discovered a tomato-shaped kitchen timer (Pomodoro in Italian), and the Pomodoro technique was born [5]. It uses a timer to break work into intervals called Pomodoro; typically, 25 minutes in length, separated by short breaks [6].

This method provides users with improved focus and productivity, allowing them to study effectively and complete tasks faster with lesser distractions. This technique can turn workloads into a game; the timer acts as a countdown for the task at hand, and you'll feel like you're working against the clock, trying to "finish a level" or "win the game." Gamifying important tasks can help boost your productivity as it entertains; breaking up boring moments with a challenge [6]. It is also proven to help people who struggle with procrastination as it can keep one motivated and more organized which can help boost productivity.

Due to a slew of apps and websites that provide study timers, the technique has grown in popularity. Educational institutions, on the other hand, are not actively promoting this strategy as it may be unfamiliar to older generations or just considered irrelevant.

1.2 Objectives of the Study

The primary goal of this paper is to design a student and admin portal for Mindanao Kokusai Daigaku (Mindanao International College) to improve user convenience, secure documents, and make information more accessible to students while encouraging productivity. Activities and operations within the institution will be carried out efficiently and conveniently through this system, which will be used by

both students and administrators. These are the specific objectives of the study:

1. Design a portal that allows students to get real-time access to their class schedule, grades, financial statements, academic calendar, and E-classroom links.
2. Design a portal that can allow admins such as professors and finance employees to change and adjust student records and upload academic-related materials that will reflect in real-time.
3. Design a portal that is user and mobile-data-friendly by developing a light GUI (Graphic User Interface) that will be free of unnecessary data and graphics that could result in lesser bandwidth consumption.
4. Implement a Pomodoro feature in the portal system that students can use as a focus timer to track their tasks and study time.
5. Implement a Ranking feature in the portal system for topstudents who have the highest Pomodoro focus time that refreshes weekly.

1.3 Significance of the Study

This proposed system addresses the aforementioned challenges that the university is currently facing, which became more prominent during the Covid-19 pandemic while adding a little feature for productivity purposes.

One of the solutions provided by the system is the automated and paperless approach, which is very much beneficial considering the constraints we have in the time of a pandemic. Issues regarding the access to financial statements will also come to an end; after processing a student's online payment, (usually through bank transfers and mobile wallet applications) the finance staff will confirm it and promptly update the student's remaining balance and account statement in the portal.

1.4 Scope and Limitations

This study focuses on the development of a portal system with a Pomodoro technique feature for the students and admins of Mindanao Kokusai Daigaku located in Davao City. Issues that are not related or relevant to the development of the system will be excluded from the study. Environmental scanning and interviews will be conducted online through a video conferencing platform and via email. All necessary information to be gathered will solely be based on the interviews with the chosen representatives.

Because of the system's light GUI approach, learning how to use the portal will not be challenging for the staff and students to learn. However, the system promises to be linked with most of the university's operations; including the students' enrollment procedure, the processing and distribution of class schedules and

grades, and the integration of the students' financial data, therefore the installation process could take days.

Only users who log in as Admins are allowed to make changes and post content in the portal. Students are only allowed to view the information given through their respective portal accounts, meaning they have no option to edit their own schedules or make direct comments using the platform. The Pomodoro technique feature, on the other hand, is only available to Students.

The Pomodoro technique ranking feature does not assure accuracy, as some students might use the timer even without performing academic-related tasks. This issue is a matter of responsibility and honesty, therefore, excluded from the study.

1.5 Operational Terms

For the purpose of clarification, the important terms used in this study have been defined. The following terms are:

Administrators - one who administers and manages the processes of a school.

Advancements - the development, improvement, or progress of something.

Augmented Reality - an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information, sometimes across multiple sensory modalities, including visual, auditory, haptic, somatosensory, and olfactory.

Automations - a term for technology applications where human input is minimized.

Bandwidth - a range of frequencies within a given band, in particular, that is used for transmitting a signal.

E-classroom - a form of online learning, offering various educational programs in an online form.

E-learning - learning conducted via electronic media, typically on the internet.

GUI (Graphic User Interface) - a form of user interface that allows users to interact with electronic devices through graphical icons and audio indicators such as primary notation, instead of text-based user interfaces, typed command labels, or text navigation.

Innovations - a new method, idea, product, etc.

Mobile wallet applications - a type of payment service through which businesses and individuals can receive and send money via mobile devices.

Pomodoro Technique - a time management method based on 25-minute stretches of focused work broken by 3-to-5 minute breaks and 15-to-30 minute breaks following the completion of four work periods.

Portals - a website or web page providing access or links to other sites.

Systems - a set of interconnected components that have been designed to fulfill a particular function without further human design input.

Tech-savvy - a person who is well informed and proficient in the use of modern technology, especially computers.

Trends - a general direction in which something is developing or changing.

2. METHODOLOGY

2.1 Existing Business Process

Mindanao Kokusai Daigaku directly handles student enrolment processes from the management of financial account statements, processing of class schedules, course subjects and professors, dissemination of grades, and more. The university is currently carrying out its operations through paper documentation and a basic Enrollment Information System, which hinders the university's ability to implement more advanced procedures that would benefit the organization's processes management.

2.2 Project Development Methodology

The Waterfall Methodology is the proposed system development method in this study. The Waterfall model is a sequential development method that flows through all phases of a project like a waterfall, with each step completed before the next phase begins [7]. The time required for each phase will be accurately estimated using this process, shown in figure 1 below, resulting in much more predictable release date.

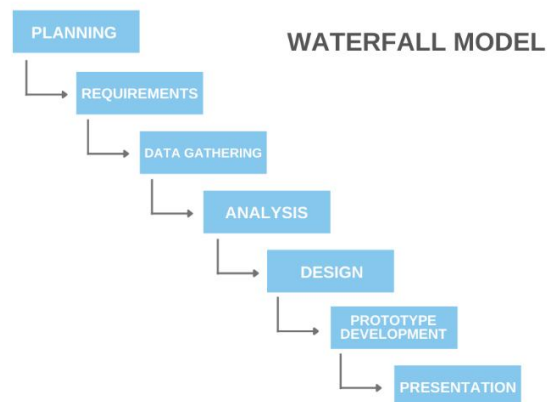


Figure 1: Waterfall Methodology

2.3 Project Planning

The analysis and design of the proposed system, which included interviews and environmental scanning, began with a request for approval from the chosen organization and the gathering of necessary data. The development of the portal’s models and charts comes next, followed by prototype development, and finally, the final presentation.

Work Breakdown Structure

A work breakdown structure is a visual, hierarchical, and deliverable-oriented deconstruction of a multi-step project [8]. The purpose of a work breakdown structure is to make a complex project more manageable. Breaking it down into smaller parts allows multiple team members to work on it at the same time, resulting in higher team productivity and easier project management [9].

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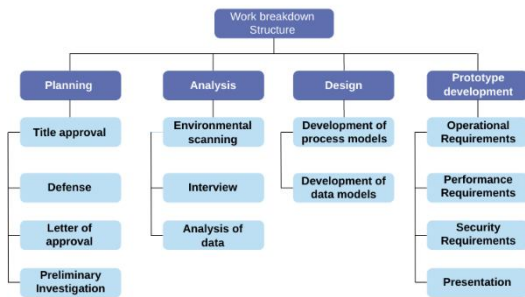


Figure 2: Work Breakdown Structure

The Work Breakdown Structure for the Analysis and Design of a Student and Admin Portal for MKD has 4 phases of activities which includes Planning, Analysis, Design, and Prototype development, is shown in figure 2 above.

GANTT Chart

A Gantt chart is one of the most popular and practical ways of displaying activities (tasks or events) against time. A list of the activities is on the left side of the chart, and a suitable time scale is along the top. Each action is represented by a bar, whose location and length indicate the activity's start, duration, and end dates [10]. The Gantt chart in figure 3 shows the dissemination of activities and their respective schedules.



Figure 3: GANTT Chart of Project Activities

2.4 Feasibility of the Study

This section evaluates the proposed project to see if it is technically feasible, functional within the school vicinity, and serviceable. The researchers created the following feasibility analysis for the Student and Admin Portal with a Pomodoro feature for Mindanao Kokusai Daigaku.

The goal of feasibility is to find the best solution that fits all of the requirements. This contains a description of the project, the costing of the proposed systems, and a choice of the best system for the job. The system's needs are defined by a collection of constraints, such as system objectives and output descriptions. The Analyst's job is to assess the viability of the suggested system for generating the outcomes.

Based on our research, Mindanao Kokusai Daigaku is currently using the manual and a fair amount of computerized systems in processing the student’s enrollment, finance, registrar, and storing of data. The proposed system will help the students access their grades, schedules, and school announcements with ease. It will also help the admins lessen the load work of manually processing and disseminating the student’s grades and data. The system will undoubtedly help the organization. Table 1 below shows the projected expenses for the development of the system.

Table1: Projected Expenses Project

Desktop Computer	Php 37,000
Mobile Phone	Php 10,000
Staff (Admin)	Php 30,000
Adobe Photoshop / year	Php 1,000
TOTAL COST	Php 87,000

Organizational Feasibility

The MKD students wanted change on how they can have access to or copy of their report cards. The traditional way of sending a request email to the registrar and waiting for its reply is inconvenient for the students. Knowing that most college students are heavily inclined in using their mobile phones, computers, and gadgets; a computerized system that will help them view and access their data is a turning point. The computerized student and admin portal is simple and user-friendly. The students and admins can take advantage of the system’s practical and future-proof features to help them work efficiently.

Table2: Personnel Requirements

JOB	JOB DESCRIPTION
ADMIN	An Administrator provides office support to either an individual or team and is vital for the smooth running of a business. Their duties may include fielding telephone calls, receiving and directing visitors, word processing, creating spreadsheets and presentations, and filing. In our system's case, it is their responsibility to organize, install and support an organization's computer system.

Technical Feasibility

The system that will be developed requires the students and admins to have basic knowledge of using the computer or mobile phone, these are the platforms that will enable them to search and run the student portal. Fortunately, the students and employees of MKD are computer literate. It is critical to use the most recent unit model in order to assure that the suggested student portal will function efficiently and precisely while avoiding errors.

To get the best system performance, there must be a well-known hardware and software brand, and conflicts should be avoided to avoid problems, system crashes, and interruptions of system needs. Table 3 below shows the required specifications for the system that will be used.

Table3: Systems Requirements

SYSTEM REQUIREMENTS	SPECIFICATIONS
Desktop Computer	Intel Core i5 (sixth generation or newer) or equivalent, Microsoft Windows 10 x64, 8 GB RAM, and 500 GB internal storage drive.

Economic Feasibility

The system that has been devised and implemented will be beneficial to the company. The system will be designed and run on top of the existing hardware and software infrastructure. The most common way for analyzing the effectiveness of a candidate system is economic analysis. The method, also known as cost-benefit analysis, involves determining the projected advantages and savings from a proposed system and comparing them to the expenses. If the advantages outweigh the costs, the decision to develop and deploy the system is made.

It demonstrates that the system has a good probability of improving the company's bottom line significantly. The total benefit was discovered to outweigh the system's cost. This merely means that the system is viable financially.

2.5 Requirements Elicitation

Information - Interviews will be conducted by the researchers in order to obtain relevant information and determine the current system and processes of Mindanao Kokusai Daigaku.

Analysis - The information acquired from the environmental scanning, interviews, and preliminary investigation will be analyzed by the researchers.

Development - The researchers will create processing models and data models to show how the system will operate and what it will require to function properly.

2.6 Technology and Tools

The following are the technologies and software tools required in designing and developing the proposed system.

Adobe Photoshop - a graphics editor software that will be used for designing and developing models and charts.

Figma - a web-based vector graphics editor and prototyping tool. This will be the primary tool for creating prototypes for the proposed system.

Sublime Text - a shareware cross-platform source code editor that supports many programming languages and markup languages.

PHP - a general-purpose scripting language geared toward web development.

MySQL - an open-source relational database management system.

Google Chrome Browser - a cross-platform web browser developed by Google. This will be used for reading HTML documents and web pages.

3. THE PROPOSED SYSTEM

The proposed system is suggested to Mindanao Kokusai Daigaku as an advanced approach for the university's internal operations. The suggested portal can be accessed by either an Admin or a Student user, with different information and access.

Professors, financial managers, and registrar managers are all given an Admin account by the institution. A student account, on the other hand, is issued when a student enrolls in the university for the first time.

The proposed system will have a minimalist interface, making it easier for new users and people who aren't tech-savvy to navigate through the portal. The system will also exclude animations or heavy graphics that could consume a lot of bandwidth. This attribute is

favorable to users who access the portal using mobile data on their smartphones.

The Pomodoro technique will also have a ranking feature that will display the names of the top 50 students with the highest Pomodoro focus time - which will refresh weekly. This feature would increase student productivity while decreasing procrastination.

3.1 Problems and Weakness of the Current System

Privacy Issues - Bonafide Students of Mindanao Kokusai Daigaku will be registered for an account for the portal upon enrolment using their own email address and a password using their respective student ID number. This reduces the possibility of students forgetting their login details. However, if a student knows their classmate's email address and student ID number, they may be able to log in to other accounts.

Security Issues - The proposed portal system is vulnerable to harmful attacks from hackers and many others. This could jeopardize both administration and student data, as well as the university's operations.

Availability Issues - The portal system, like any other online platform, is dependent on the availability of the internet. In cases of an inevitable internet outage, the system will not be available. Therefore, delays in processing are expected. Davao City, where Mindanao Kokusai Daigaku is located, experiences internet disruptions once in a while, which hinders communication between admin and students.

System Issues - In the case of a power outage, the portal may have system problems such as crashing or glitches especially when an admin user is in the process of input during the blackout. This type of issue could lead to data loss.

3.2 Functional and Non-Functional Requirements

Non-functional Requirements

1. Operational Requirements

Admin users can update only through a computer. Student users can use the portal through both computers and mobile phones.

2. Capacity Requirements

Because the university has a large number of students, the system must be able to accommodate as many as possible.

3. Performance Requirements

The system's delay in response should be fast and smooth for ease of user experience.

4. System management and maintenance Requirements

Admins should always be present to be able to fix bugs, crashes, or glitches if the system encounters such inevitable issues.

5. Security Requirements

Every user has different access - Finance Admins can update the students' financial records and generate reports; Registrar Admins can create/remove classes, assign classes, and update the students' class schedules; Professors can edit class schedules of their respective classes, post class updates, and assign grades; System Admins can add/remove users, update the academic calendar, and update the database; Students, on the other hand, can only view their schedules, grades, class updates, financial records, and use the Pomodoro technique feature.

Functional Requirements

1. Log in

The first process in the system is the option if you are logging in as an 'Admin' or a 'Student'. If 'Admin' is clicked, you will be prompted to choose among Finance Admin, Registrar Admin, Professor, or System Admin. After choosing, the login form will be displayed where admins must input their university-issued email and password. As for Students, after clicking the 'Student' option, they will be asked to input their email address and Student ID number.

2. Password and verification/Authentication

The system should be able to authenticate the accuracy of the information the users' input in the login form.

3. Adding and removing users

When you are a system admin, you are able to remove users or add new users.

4. Database update

Admin users should be able to perform the aforementioned respective access within the proposed system.

5. Pomodoro ranking feature

The system should be able to generate a ranking feature of the top 50 students with the highest Pomodoro focus time - which refreshes weekly.

6. Generate reports

The system should be able to report financial reports for Finance Admins.

3.3 Process Modelling

The graphical representation of business processes or workflows, known as process modeling, is presented in this section. It enables firms to visualize business processes in order to better understand their internal business procedures [11].

Use Case Diagram

Figure 4 below shows the suggested system's Use Case Diagram for Mindanao Kokusai Daigaku. It shows a graphical depiction of a user's possible interactions within the system [12]. The illustration includes 5 different users, all with varying access to the system, namely; Student, Professor, Registrar Admin, Finance Admin, and System Admin. This five personnel help illustrate how they interact with the proposed system and what functions the system possesses.

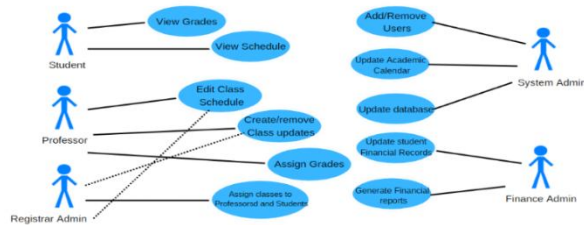


Figure 4: Use Case Diagram of MKD's Student and Admin Portal

System Flowchart

A system flowchart is a graphical representation that displays how data flows through a system and how decisions are made to regulate events [13]. Figure 5 below illustrates the proposed system's flow.

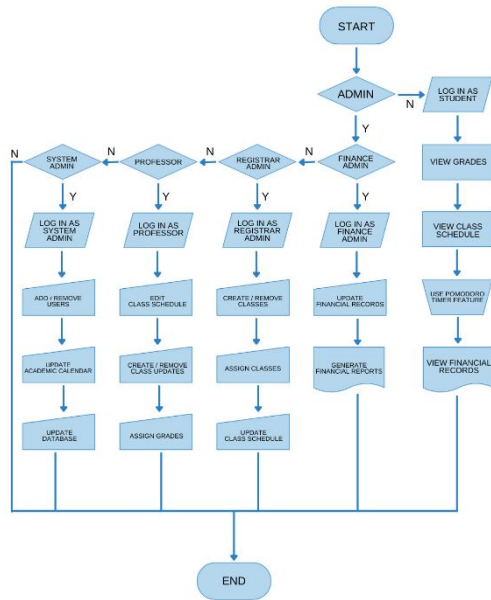


Figure 5: System Flowchart of MKD's Student and Admin Portal

3.4 Data and Object Modelling

This section covers flow diagrams to further specify the system's structure and design.

Context Data Flow Diagram

Context diagrams are illustrated to establish and clarify the software system's boundaries. It identifies information flows between the class system and external entities [14].

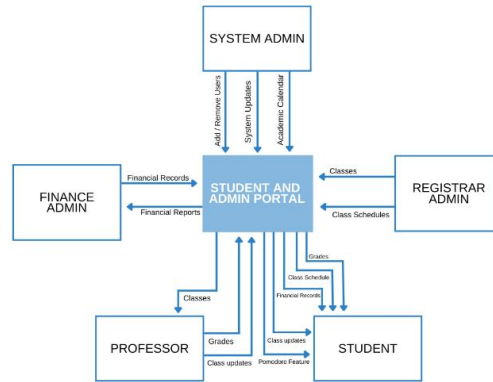


Figure 6: Context Data Flow Diagram

The Diagram above, shown in Figure 6, presents relationships between process and exchange of information.

Entity-Relationship Diagram

An Entity-Relationship Diagram is another type of flowchart which shows how entities such as people, objects, or concepts interact within a system [15].

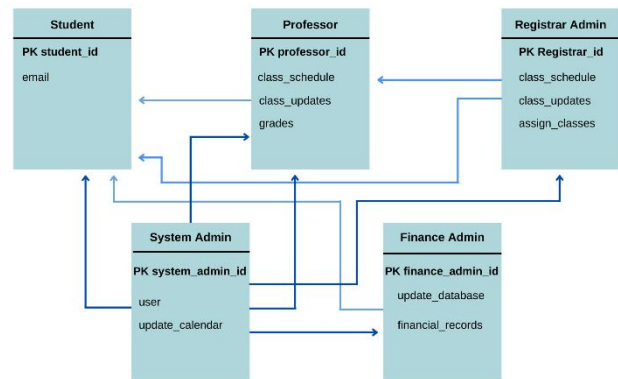


Figure 7: Entity Relationship Diagram

Figure 7 above displays the interconnection of entities, relationships, and their qualities using a defined set of symbols.

Data Dictionary

The Data Dictionary presented in Figure 8 below is a collection of names, definitions, and attributes of data elements that are being used in the proposed system.

TABLE	FIELD	TYPE	DESCRIPTION
Student	PK student_id	Integer	Identification for the user address
	Email	Varchar	Email for the users
Professor	PK professor_ID	Integer	Identification for the user address
	Class_schedule	Varchar	List of classes schedule
	Class_updates	Varchar	Class updates
	Grades	integer	Grades of the students
Registrar admin	PK Registrar_id	Integer	Identification for the user address
	Class_schedule	Varchar	List of class schedule
	Class_updates	Varchar	Class updates
	Assign classes	Varchar	Assign classes
System admin	PK system_admin_id	Integer	Identification for the user address
	User	Varchar	Name of user
	Update_calendar	Varchar	Calendar update
Finance admin	PK finance_admin_id	Integer	Identification for the user address
	Update_database	Varchar	Database update
	Financial_records	Integer	Documents that provide evidence of or summarize business transaction

Figure 8: Data Dictionary

3.5 System and User Testing Plan

The main goal of this testing is to ensure that the system will accurately serve its purpose and that each function of the system will meet the needs or requirements of the organization for which it was developed.

A. Developer testing

Before releasing the proposed system to the general audience, it is necessary to implement a beta test. The portal system will be tested by 10 faculty members and 20 students for a few days where they will report any encountered errors or bugs within the given time frame.

B. User Review

For the post-development testing, all observations from the beta test will be recorded; including possible errors, overall user experience, and feedback from the selected beta testers. The aforementioned 10 faculty members, and 20 students who will be testing the system are encouraged to send their honest feedback via university email.

4. CONCLUSION AND RECOMMENDATION

4.1 Conclusion

The researchers analyzed the acquired data and designed a system based on the objectives after conducting interviews, environmental scanning, and gathering the necessary data for the study. The researchers also created various models that further clarify the operations and purpose of the proposed system.

As a result of the findings of the research, the researchers believe that the proposed portal system will address Mindanao Kokusai Daigaku's foregoing issues regarding the availability and accessibility of student grades and financial records. Students at Mindanao Kokusai Daigaku have had trouble getting access to their records, particularly during the Covid-19 Pandemic. The university also mentioned in one of the interviews that they are currently using a web-based

platform and a manual paper recording approach to process student information.

In this day of rapid technological advancements, it is essential that organizations keep up with the latest developments in order to optimize their processes. Not only would the proposed technology improve Mindanao Kokusai Daigaku's operational processes, but it would also make operations safer, more accurate, more accessible, and more cost-effective. The proposed portal system will be beneficial not only to students but also to administrators and the university as a whole.

4.2 Recommendation

The system that is convenient for managing students' grades, schedules, and finances is a student portal. The traditional way of processing the students' information is inefficient, it is prone to delays and faults that will impact the productivity of both the students and staff. The student portal is a term commonly used to describe a login page where students can provide a username and password to access the institution's programs and educational materials. It is helpful in providing school information, course details, schedules, learning resources, and contact details.

The student portal also refers to an entire section of the 'LMS' learning management system. A learner enrolled in an LMS can use it to access online course material stored on a server, such as articles, lectures, and videos. Some student portals connect to other systems to give students convenient access to personal information, such as tracking financial aid disbursements and service usage. This is frequently part of a bigger LMS that parents and faculty can access. A college/university, school district, or private educational institution may potentially build and run this system internally.

The recommendation was based on the study's result that the Mindanao Kokusai Daigaku should use a student portal in order to enhance the availability and accessibility of student grades and financial records. This will help the students and staff to have an exchange of information smoothly. In a digital-first education setting, student portals are critical. As previously indicated, it serves as a hub for all school-related announcements, information, and resources. Students may keep track of their assignments, course materials, grades, and announcements in one spot, allowing them to meet all of their school-related demands in one location, and reducing the number of accounts they must manage.

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