

Designing an Academic Progress Monitoring Information System for Engineering Education: A Case Study at UPLB

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Abstract

The Office of the College Secretary (OCS) manages academic records and transactions for the College of Engineering and Agro-Industrial Technology University of the Philippines Los Baños (CEAT-UPLB). CEAT has faced consistently low graduation rates, especially for students who entered in 2018 and 2019, motivating the introduction of the CEAT Student Progress Monitoring Flowchart (SPMF) in July 2022. However, SPMF faces challenges such as manual data entry, validation issues, and low data visibility, causing considerable processing time. This study aims to design an Academic Progress Monitoring Information System (APMIS) to improve efficiency and integrate business intelligence dashboards to cut data access time. The research involved system analysis, system design, system implementation, and testing and validation. Initial data gathering identified issues, design phase utilized use case diagrams, data flow diagrams, and entity relationship diagrams. Implementation included creating UI prototypes with Figma. The designed dashboard and UI interfaces (OCS, Adviser, and Student) received high SUS scores of 95, 86.25, and 92.50, respectively, all indicating "best imaginable" rating. Usability testing revealed significant time reductions: 99.74% decrease in accessing summary data (from 90 minutes to 0.233 minutes), 95% reduction in adviser review time (0.65 minutes), and 89% reduction in student review time (1.65 minutes). Thus, the study demonstrated the APMIS's ability to enhance progress monitoring efficiency. This design serves as a credible framework for actual development and deployment. Scalability of the system to university level still requires tailor-fitting to each of the colleges and requires a dedicated team for system maintenance.

Keywords

Academic Progress Monitoring, Systems Development, Dashboard, Digitalization and Efficiency.

1. Introduction

The University of the Philippines Los Baños (UPLB) comprises nine colleges, one of which is the College of Engineering and Agro-industrial Technology (CEAT). To ensure quality engineering education for its students, the Office of the College Secretary (CEAT-OCS) is responsible for managing the academic records and transactions of the college's students. In 2018 and 2019, a significant dip in graduation rates became particularly evident among college students most likely associated with the global COVID-19 pandemic. Thus, CEAT took a proactive step by introducing the CEAT Student Progress Monitoring Flowchart (SPMF) in July 2022, a document that visually maps the degree program curricula, assisting students in tracking their progress and facilitating validation with registration advisers. Figure 1 presents a sample of the SPMF for the BS Industrial Engineering Program.

Name: _____ Student No.: _____ SAIS No.: _____ Degree: _____

I hereby declare, upon my honor, that I will accomplish this form with utmost honesty _____
Signature

**FOUR-YEAR CURRICULUM LEADING TO THE DEGREE OF
BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING**
Effective AY 2018-19

First Year		Second Year			Third Year		Fourth Year		Extra Subjects	
1st Sem	2nd Sem	1st Sem	2nd Sem	Midyear Term	1st Sem	2nd Sem	1st Sem	2nd Sem	Subject	Sem/Year
ADTS 1	DETC 5AS 1	PI 10	ETHICS 1	IE 100*		ENSC 12	ENSC 13	ENSC 14		
STS 1	SS	MATH 20	ENSC 21		ENSC 11	PHYS 57 and MATH 20	ENSC 142	ENSC 12	IE 31	IE 90
	ENSC 11	PHYS 81	ENSC 12				ENSC 142	IE 100*		
MATH 27	MATH 20	IE 141	IE 142		ABE 41					
					STAT 101	IE 143	IE 144			
IE 10	IE 31	IE 130	IE 131		IE 132	IE 134	IE 135			
PHYS 81	IE 31	IE 130	IE 131		IE 132	IE 134	IE 135			
PHYS 51.3					MATH 20	ENSC 14	IE 134	IE 135		
CHEM 18	STAT 101				IE 132	IE 134	IE 135			
CHEM 18.3										
IE 11	IE 12 or 13	IE 12 or 13	IE 12 or 13							
NSIP 1	NSIP 2									
20 Units	21 Units	19 Units	20 Units	3 Units	18 Units	20 Units	19 Units	20 Units		
*Prerequisite: Consent of Instructor (COI)										Total: 160 units
Adviser's Signature	Adviser's Signature	Adviser's Signature	Adviser's Signature	Adviser's Signature	Adviser's Signature	Adviser's Signature	Adviser's Signature	Adviser's Signature		

LEGEND:
 corequisite
 prerequisite

Thesis Track:
 IE 135* → IE 200*
Innovationeering Track:
 IE 200* → IE 200*
Engineering Industry Research Track:
 IE 200* → IE 200*

Figure 1. Sample SPMF for the BS Industrial Engineering Program.

However, the SPMF currently faces challenges in implementation, manual data entry and validation, and data visibility. According to the preliminary survey, 21 out of 51 CEAT students reported insufficient guidance on the SPMF process, while another 17 claimed difficulties understanding the guidelines. Survey also indicates a small percentage of students accomplished the SPMF regularly and on time. As shown in Figure 2, only 64% of students accomplish the SPMF, 37% of which finish it on SPMF on time. The figure also shows problem on manual entry and validation where faculty members take time in verifying the SMPF of each student. In connection to this, the students surveyed also claim having to wait days or a week for their respective adviser's signature on the SPMF.

Moreover, despite gathering valuable data, the SPMF's potential is underutilized. The CEAT-OCS noted that the accomplished SPMFs are stored in the Google Drive solely for safekeeping. Another issue is extended data retrieval. Each semester, the CEAT-OCS staff needs to verify the accuracy of student records in the academic learning management system of UPLB. This summary data is obtained from their database which takes an average of 1.5 hours to complete. Querying alone takes 30 minutes while cleaning extends the process to 1-2 hours. The proposed solution is therefore a digital platform that integrates all processes including automated retrieval of finished courses and corresponding grades from UPLB's enrollment and grades management system, the Academic Management Information System (AMIS).

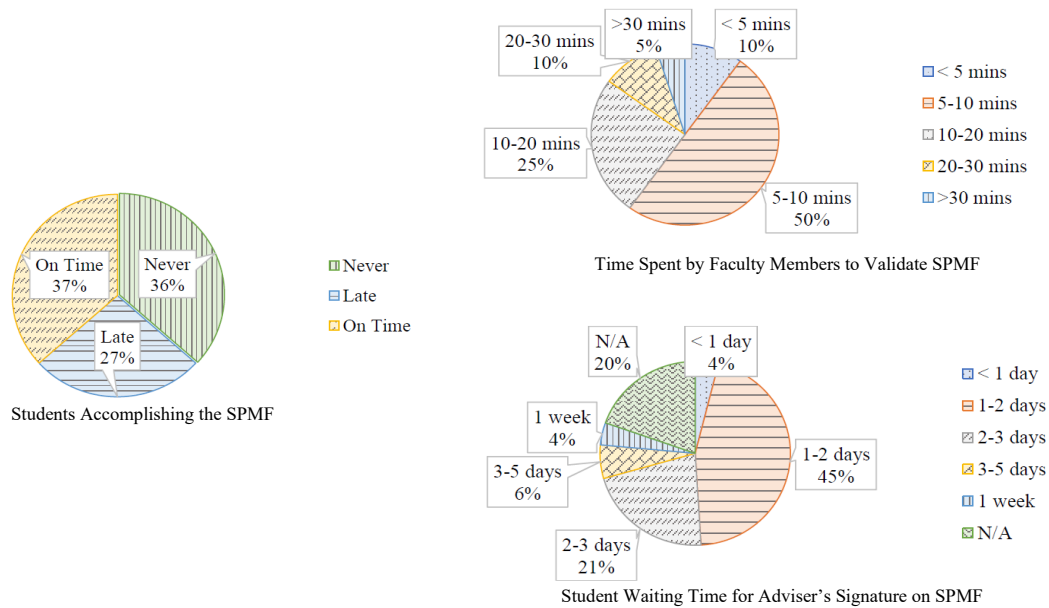


Figure 2. Summary result of student survey on their experience with SPMF

1.1 Objectives

The primary objective of this study was to design an Academic Progress Monitoring Information System (APMIS) for the Office of the College Secretary of the CEAT. Specifically, the study aimed to:

- Improve progress monitoring efficiency by reducing individual monitoring process time to at most 3 minutes through AMIS integration.
- Integrate business intelligence (BI) dashboards into the system to reduce access time to less than 1 minute, enhancing data accessibility and visibility.
- Validate and conduct usability and acceptability assessments of the proposed system framework and dashboard with stakeholders.

2. Literature Review

The literature review on this study focuses on how system digitalization could significantly improve the overall process of Academic Progress Monitoring. The latter is therefore discussed first, followed by streamlining and process improvement in general. The systems development life cycle then follows emphasizing the proposed solution of digitalized system. Lastly, previous studies that have successfully designed or developed such information systems are discussed to establish the study's viability.

2.1 Academic Progress Monitoring

Studies revealed that credit or unit accumulation is a vital element of academic progress monitoring. A study by Odle et al. (2022) emphasizes the importance of monitoring credit accumulation rate (CAR) and credit completion ratio (CCR). Martin (2023) also highlighted the crucial role of academic advising in improving graduation rates, as it significantly impacts the retention of returning students. The study by Harper-Young (2018) asserted that implementing progress monitoring enables the analysis of student progress aligned with curriculum objectives.

ISO 21001 provides a structured and internationally recognized framework that can serve as a foundation for developing Educational Organizations Management Systems (EOMS). As discussed by Gueorguiev, Sakakushev and Trifonov (2017), the standard extends ISO 9001 principles into the educational context by emphasizing learner-centered processes, quality assurance, and continuous improvement. Furthermore, ISO 21001 emphasizes data-driven

decision-making through performance evaluation, monitoring, and the use of key performance indicators (KPIs). This reinforces the role of information systems as critical tools for collecting, analyzing, and reporting academic data. The requirement for traceability of learner progress and protection of student data also highlights the importance of integrating secure data management and analytics capabilities within the system.

Several academic/education and management information systems exist and can already meet the needs academic organizations. Some of these Ellucian Banner (Ellucian, 2026) and MasterSoft (IITMS, 2026). Both are also customizable to certain extent which can be further explored by interested organization. Locally, however, the Academic Management Information System (AMIS) of the University of the Philippines Los Baños (2026) serves as a homegrown solution that integrates student, faculty, and administrative functions into a single system, supporting the full academic lifecycle of students. As also suggested by its name, APMIS is intended to be an extension of AMIS or more particularly, an additional module into the already functioning system.

2.2 Streamlining Administrative Tasks

In the pursuit of enhanced competitiveness, institutions and companies prioritize continuous improvement in their operations. This involves streamlining business processes and workflows by simplifying procedures and eliminating redundant or unnecessary tasks. As Classter Admin (2023) supports, streamlining manual administrative tasks in educational institutions significantly enhances efficiency. Thus, to facilitate effective streamlining, it is crucial to identify, reduce, and eliminate process wastes in current administrative tasks using the principles of Lean Manufacturing (Blijleven et al., 2017).

2.3 Systems Development Methodology

The System Development Life Cycle (SDLC) serves as a conceptual framework in systems engineering, covering all phases from inception to the retirement of an information system. SDLC encompasses processes from conceptualization to system maintenance, with seven distinct phases: planning, analysis, design, development, testing, implementation, and maintenance (Michigan Technological University, 2016). Waterfall or sequential model is one of the fundamental methodologies in SDLC. It requires completion of each phase before progressing to the next (Mishra & Alzoubi, 2023). The model aligns with the study since there is a clear, predefined plan for the system, established from the beginning. In relation to ISO 21001, SDLC can also guide in complying with the standards and guidelines throughout its step-by-step process (Gueorguiev, Sakakushev and Trifonov, 2017).

2.4 Related Studies

Syafariani and Devi (2019) developed a web-based information system that automatically generates report cards, utilizing flow map, context diagram, data flow diagram, data normalization, data dictionary, table relations, and entity relationship diagram. System implementation successfully improved assessment processing, reduced errors in calculating grades, and facilitated creation of assessment recaps, leading to timely submission of final grades.

Liu et al. (2021) aimed to address long query times, low information recall, and poor data accuracy in educational management information systems. They designed a relational database based on prioritization of query information. Anif et al. (2017) designed a web-based internship monitoring system for a college department using waterfall methodology. This study supported the appropriateness of the Waterfall methodology for a monitoring information system. Ishak and Lehat (2012) also constructed a conceptual framework for designing a web-based advising information system. The most important academic advising elements, according to 60% of the respondents, are course registration, course selection, academic progress, course information, and plan of study.

Azlan et al. (2016) evaluated students' acceptability of an online library database system through user acceptance testing (UAT) supporting that UAT can help evaluate whether the system meets its intended purpose. Similarly, the study conducted by Tolle et al. (2023) created a module in an existing academic application to monitor the academic progress of students. Satisfaction was measured using the System Usability Scale (SUS), and the resulting module obtained a high SUS score of 88.25, translating to an Excellent rating.

The ways in which system digitalization can enhance academic progress monitoring by improving credit tracking, advising effectiveness, and alignment with curriculum objectives are highlighted. The review also discusses the suitability of the System Development Life Cycle, particularly the Waterfall model, as a structured methodology for developing monitoring systems. Finally, related studies demonstrate the successful design, implementation, and

evaluation of web-based academic and administrative information systems, establishing the feasibility and effectiveness of the proposed digital solution.

3. Methods

3.1 Operational Framework

The Waterfall methodology in the System Development Life Cycle (SDLC) was employed to develop the proposed system, as illustrated in Figure 3. The major phases under this methodology as adapted from Hashim and Mohamed (2013) include system analysis, system design, system implementation, and testing and validation.

3.1.1 Systems Analysis

The initial phase of this study involved the preliminary data gathering and the documentation of the current system to identify the problem. These discussions were facilitated through interviews and surveys. The current process was then mapped to identify wastes and areas for improvement within the current system.

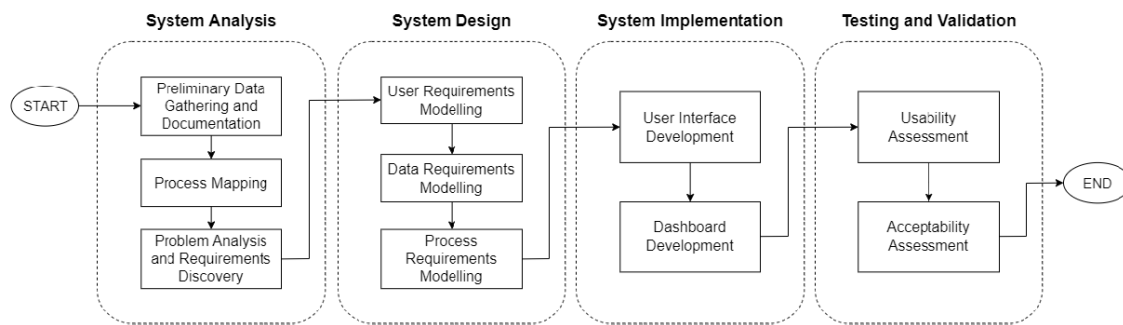


Figure 3. The Waterfall Operational Framework.

3.1.2 Systems Design

This stage is where the user requirements modeling, data requirements modeling, and process requirements modeling will be accomplished. This lays the foundation for the subsequent development process.

User requirements modeling. After defining the system requirements, these were used for the creation of the use case diagram, which systematically translates the user requirements into practical system functionalities.

Data requirements modeling. During this phase, the researcher performed structured data modeling alongside use case analysis. The resulting entity-relationship diagram then established a well-structured data model, outlining the relationships among entities.

Process requirements modeling. A level 0 context data flow diagram was constructed to vividly illustrate the processes and their data flows, highlighting system boundaries and interactions among entities and external systems.

3.1.3 System Implementation

This stage involved crafting mockups that integrate key features such as the progress dashboard and digital SPMF using Figma. Three distinct user interfaces (UI) were developed based on the roles of the stakeholders: CEAT-OCS, adviser, and student.

3.1.4 Testing and Validation

The user interface prototype of the proposed information system was validated based on usability and acceptability using SUS and Single Usability Metrics (SUM). Since only a user interface prototype will be created, the usability framework focused solely on two aspects: efficiency and satisfaction. Metrics of effectiveness were not evaluated because a fully functional system was not developed. To measure satisfaction, a SUS questionnaire adapted from Brooke (1996) was administered. This questionnaire features ten likert scale questions. Table 1 provides interpretations of SUS scores based on grading, adjective, acceptability, and Net Promoter Score (NPS) categories.

Table 1. Scale Interpretation of SUS Scores.

SUS SCORE RANGE	LETTER GRADE	ADJECTIVE RATING	ACCEPTABILITY	NPS
84.1 – 100	A+	Best Imaginable	Acceptable	Promoter
80.8 – 84.0	A	Excellent	Acceptable	Promoter
78.9 – 80.7	A-		Acceptable	Promoter
77.2 – 78.8	B+		Acceptable	Passive
74.1 – 77.1	B		Acceptable	Passive
72.6 – 74.0	B-		Acceptable	Passive
71.1 – 72.5	C+	Good	Acceptable	Passive
65.0 – 71.0	C		Marginal	Passive
62.7 – 64.9	C-		Marginal	Passive
51.1 – 67	D	OK	Marginal	Detractor

Source: Sauro, 2018

User acceptance testing (UAT) was also conducted to ensure that the UI prototypes are acceptable to the end users and to verify alignment with the defined requirements (Komischke, 2022). The researcher employed scenario-based testing for the user interface prototypes for advisers and students namely the by creating a list of tasks for the users to perform and making the users perform them. Table 2 discusses the validation plan that was carried out to measure and assess the system's significance and overall impact, ensuring the study's objectives are met.

Table 2. Validation Plan

Parameter To Measure	Process	Validation
Monitoring process time	Usability Metric: Task Time for advisers checking student progress of student. 1. Click the (👁) button in the row corresponding to Advisee 1. 2. Click the Remind button at the bottom of the page. 3. To exit, press the X button at the upper right corner of the page.	The task time should be at most 3 minutes.
Data retrieval time – time to access data summary	Usability Metric: Task completion time for CEAT-OCS accessing certain pieces of information from the dashboards. •What is the percentage of students who are on time in their degree progress based on number of earned units for all CEAT students? •What are the corresponding number of students identified to be Active, LOA, and for Dismissal?	The task time should be at most 1 minute.

4. Data Collection

4.1 Systems Analysis (Waste Identification)

The researcher identified process wastes (non-value adding activities in the current system), guided by the five types of waste as shown in Table 3 (Blijleven et al., 2017). It also lists down all the identified wastes for each type.

Table 3. Types of Waste Identified and their Description

Type Of Waste	Process Waste Description
Transportation	Non-value adding and unnecessary movement of people and information: Physical and virtual submission and returns between adviser and advisee as well as CEAT-OCS.
Extra-processing	Efforts that can be eliminated without disrupting task completion: • Manual highlighting of finished courses on paper • Separate email exchange for setting meeting • Separate checking via AMIS
Waiting	Time spent waiting for information to be processed or task to be completed (e.g. meeting invitations, validation and signing of SPMF).
Defects	Incorrect/missing data entry and file name, instruction non-compliance, nonstandard validation method: SPMF naming conventions, not fully filled SPMF inaccurate details (e.g. actual courses finished)
Inventory	SPMF information not being processed (i.e. some students miss to accomplish in a given semester).

4.2 Requirements Gathering

In response to the identified wastes, a list of requirements was made aiming to address them. Below is the summary list of the Functional Requirements identified.

1. **Automatic Progress Update:** The system shall automatically update the student's progress based on grades retrieved from AMIS.
2. **Color-Coded Visual Map:** The system will provide a color-coded visual map to help better monitor academic progress. The mapped courses will be color-coded based on the accomplishment and preferred semester in which the course is recommended to be accomplished.
3. **Progress Flowchart Viewing:** The system will allow the student and adviser to view the progress flowchart.
4. **Review Completion Feature:** The system shall allow users to mark progress reports as reviewed, enabling both students and advisers to indicate the completion of the review process for progress reports.
5. **Course Information Display:** Hovering over the course will show the student's grade and prerequisite (if any) for that course.
6. **Course Accomplishment Summary:** The system will present a summary of courses that were completed and not yet taken categorized by various course types.
7. **Downloadable Progress Report:** The system will allow the CEAT-OCS, adviser, and student to download the progress report for safekeeping purposes.
8. **Role-Specific UI/Dashboard:** The system will provide distinct user interfaces and dashboards for different stakeholders.
9. **Reminder and Notification System:** The system will implement a reminder and notification system to ensure timely and regular advising and necessary prompts.
10. **Advising Meeting Coordination:** The system will allow advisers to set advising meetings with their advisees. Email will then be sent to the student through Gmail.
11. **Synchronization of Grades between APMIS and AMIS:** The APMIS shall accurately reflect any updates and information from the student's course grades as recorded in the AMIS.
12. **Synchronization of Coursework between APMIS and AMIS:** The APMIS must reflect any information and changes (such as changes in elected courses nominated by a student) from the Plan of Coursework and GE Plan of Study modules in AMIS.

The role-based access of the system is in compliance with the General Data Protection Regulation (GDPR) ensuring that only authorized personnel (i.e. the Office of the College Secretary) have access to all data while the advisers can only access their advisees' data and the students can only access their own. A common practice in UPLB is for such systems to be automatically logged in using UP email address which further enhances the security of the system and its overall access.

5. Results and Discussion

5.1 Systems Design

There are three subsystems within the APMIS: progress monitoring subsystem, report subsystem, and reminder subsystem. The use-case model as shown in Figure 4 presents common transactions to all users – CEAT-OCS, adviser, and student— as well as ones that are unique to each of them. The progress report referenced in the use cases within the progress monitoring subsystem pertains to the same report being updated by AMIS in the reporting subsystem. In the report subsystem, the update progress report use case includes the real-time generation of college progress reports and individual student progress reports. In the reminder subsystem, the CEAT-OCS, advisers, and students should be regularly prompted by the APMIS to monitor student progress before the start of every semester.

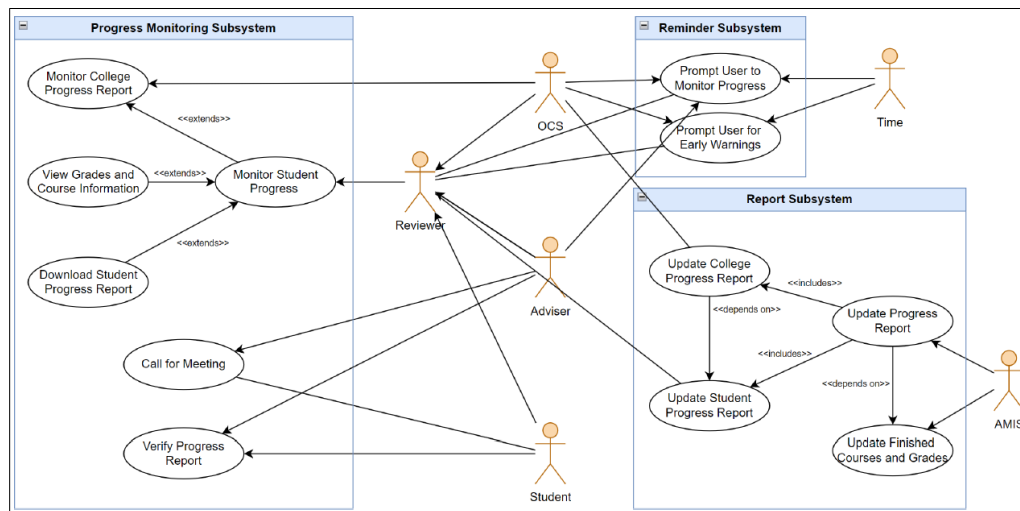


Figure 4. Use-Case Model Diagram of APMIS

Subsequently, for the system to support these system requirements, these requirements were modelled. Through the entity relationship diagram, the data (entities involved), their attributes, and the relationships within the APMIS are identified as well as how data will be captured and used within the system. APMIS' processes and the associated data flows in and out of the system for all the data presented in the entity relationship diagram were mapped using context data flow diagram. The entity relationship diagram and the context data flow diagram are shown in Figure 5.

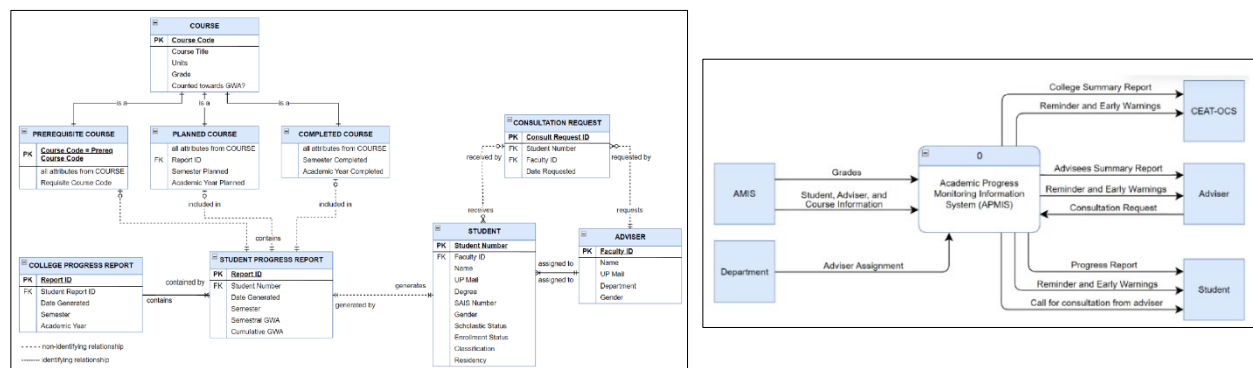


Figure 5. Entity Relationship Diagram and Level 0 Context Dataflow Diagram of APMIS.

All the data listed in the ERD are limited the ones that area actually needed in the system still in compliance with GDPR. Data needed are composed mainly of student courses whether they are already taken or only planned to be taken. Student's basic information such as email, scholastic status and enrollment status are also included since they are among the information that needs to be conveyed through the system. All of these make up the student progress

report that can be viewed individually by each student as well as the college progress report which shows all students' data only to the OCS.

5.2 System Implementation

After visualizing and representing the data relationships and flows within the APMIS, system implementation began with the development of user interface (UI) prototypes using Figma. The initial student interface design comprised of three sections namely the Degree Progress Overview, Monitoring Flowchart, and the Course Completion by Category. The primary navigation type to navigate from one section to another was primarily through scrolling down a page. These are shown in Figure 6.

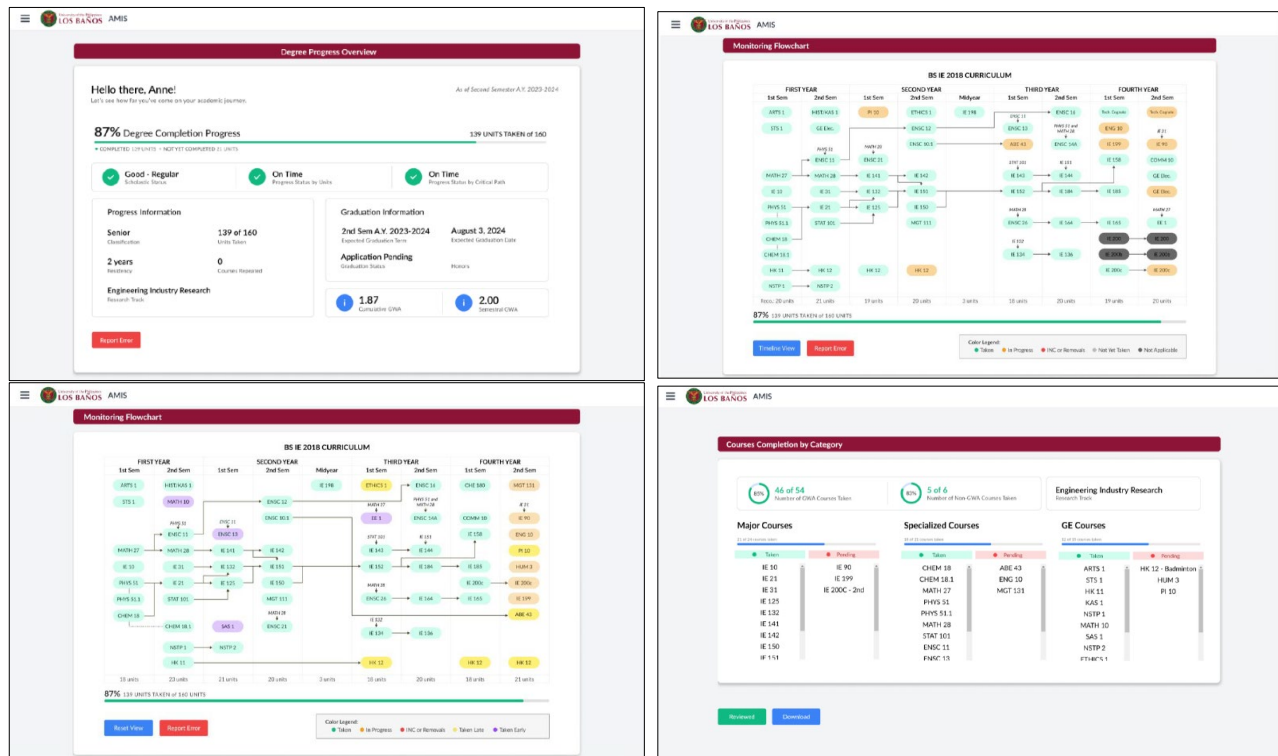


Figure 6. Initial Student Interface of APMIS.

The Degree Progress Overview section presents a summary of the student's overall progress in their degree program, including units taken, scholastic status and GWA. By scrolling down, the student can then navigate to the Monitoring Flowchart which visually maps the recommended courses for each semester. This section also features two views: the default view and the timeline view. Scrolling down further leads to the Course Completion by Category section. This section summarizes the courses the student has completed and those still pending.

This adviser interface comprises two divisions: Advisee Progress Overview and Advisees Summary. The adviser can also navigate between these sections by scrolling. Figure 7 shows a screenshot of the Initial Advisee Progress Overview section, which summarizes the monitoring status, progress, and classification of all advisees assigned to the adviser and the Advisees Summary, which displays a summary list of all the advisees under the adviser's supervision, monitoring status, progress by unit and critical path, and overall status/recommended actions for the adviser.

In the initial CEAT-OCS Interface, there are two major sections: the CEAT Progress Overview and the Summary of Advisers and Students. To navigate between sections, the user must scroll down the page. Both are shown in Figure 8. The summary of advisers within CEAT includes their department, the number of students they monitor, and relevant action buttons, such as reminding the adviser to monitor student progress and viewing the adviser's progress overview. The summary list of students within CEAT includes their department, their monitoring status, and relevant action buttons, such as reminding the student to monitor their own progress and viewing the individual progress report.

5.4 Testing and Validation

The user interface and dashboard of APMIS were validated and tested to ensure that the proposed system meets the business requirements of the stakeholders. Time study and scenario-based testing were used conducted the usability and acceptability testing.

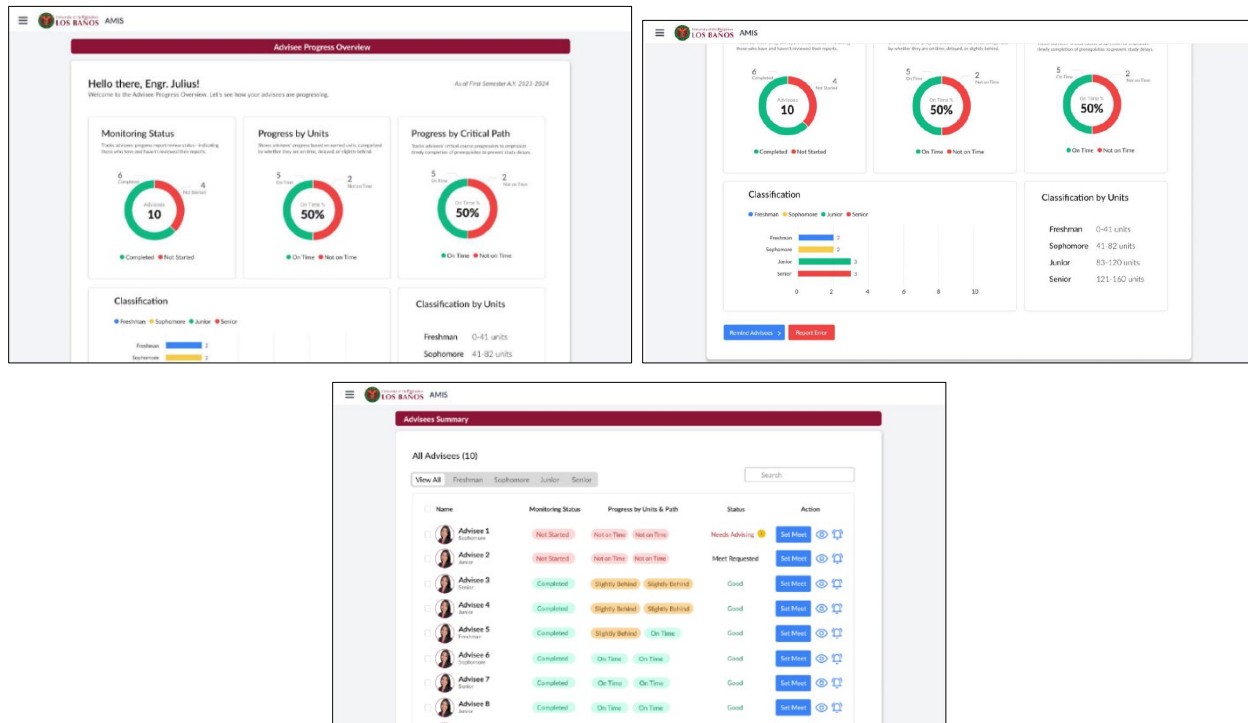


Figure 7. Initial Adviser Interface of APMIS.

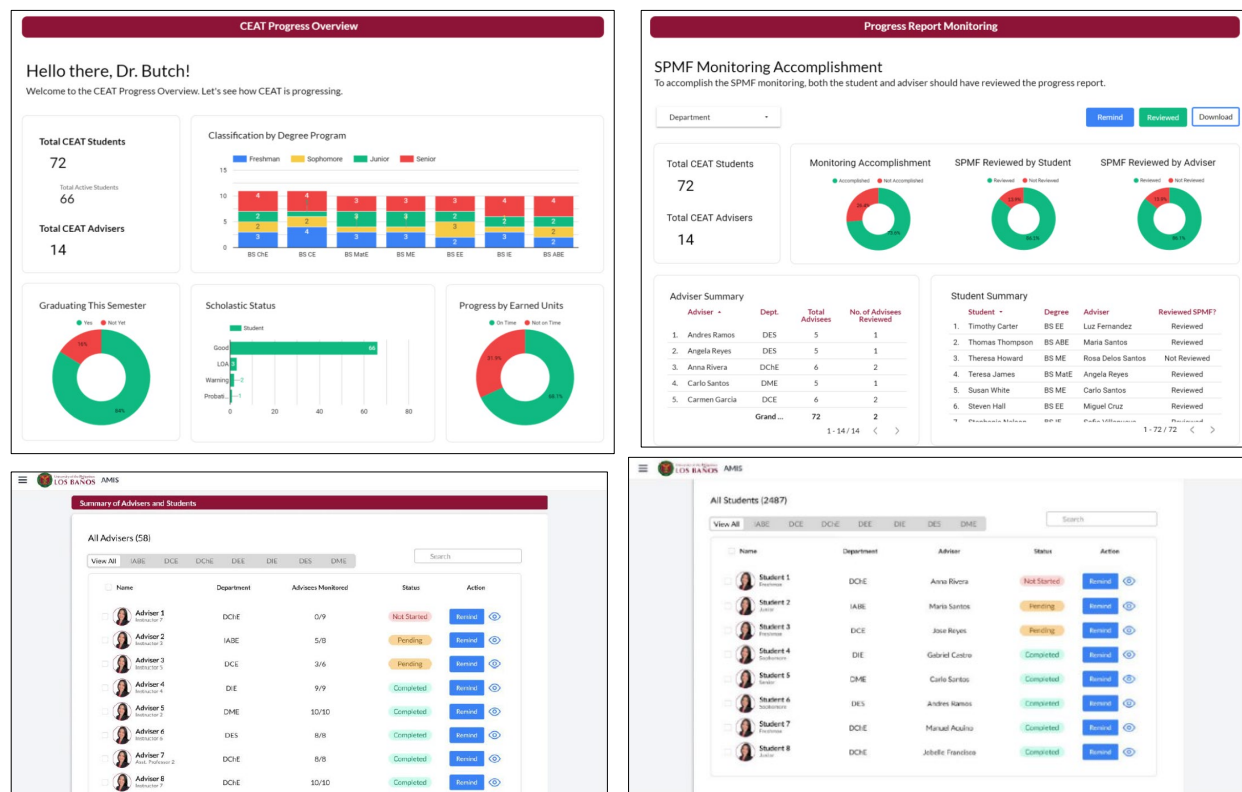


Figure 8. Initial OCS Interface of APMIS.

5.4.1. User Acceptance Testing

The acceptability of the user interface prototypes was evaluated through user acceptance testing (UAT). This test was conducted to validate the end-to-end business flow with the participation of system stakeholders by giving them a list of tasks to perform (Ahmad & Szali, 2021). The participants, including two students, two advisers, and the college secretary, were asked to read the instructions for the tasks and then perform them. All stakeholders also suggested minor revisions. The evaluation of efficiency and stakeholder satisfaction is discussed in detail in the usability testing section.

5.4.2. Usability Testing

Efficiency. To measure efficiency, task completion time is usually used, and the researcher used it as the primary indicator of efficiency for this study. The researcher conducted a time study and measured task duration by subtracting start time from end time. This was done for all the processes for each distinct user perspective (i.e. student, adviser and OCS). These were then compared to the time for each user perspective using the current system. These comparisons are presented in Table 4.

User Satisfaction. The usability and user satisfaction of the user interface prototype of APMIS were evaluated using an SUS Questionnaire. Table 5 presents the summary of SUS scores for each role-specific APMIS interface and dashboard.

Table 4. Summary of task times of APMIS vs SPMF.

Task	Average Duration (Minutes)		Decrease
	Current System (SPMF)	Proposed System (APMIS)	
For OCS: Accessing summary data for progress monitoring	90	0.233	99.74%
For adviser: Reviewing of individual progress report vs. validation of one SPMF	13	0.65	95%
For adviser: Reviewing of overall progress report for all advisees vs. validation of SPMFs of all advisees	13	1.483	88.59%
For student: Reviewing of own progress report vs. accomplishing of own SPMF	15	1.65	89%

Table 5. SUS scores of APMIS UI interfaces and dashboard.

Apmis	Sus Score	Letter Grade	Adjective Rating	NPS
OCS Interface	95	A+	Best Imaginable	Promoter
Adviser Interface	86.25	A+	Best Imaginable	Promoter
Student Interface	92.5	A+	Best Imaginable	Promoter

The APMIS CEAT-OCS Interface underwent a thorough evaluation for usability and user-friendliness by the primary stakeholder—the college secretary himself. The Adviser Interface were evaluated by two advisers while the Student Interface was evaluated by two students. All of the scores correspond to an A+ grade with a “best imaginable” adjective rating, which signifies the highest level of usability and user satisfaction. In the Net Promoter Score scale, this SUS scores also obtained a “promoter” rating. Thus, all interfaces were able to satisfy the requirements and expectations of the stakeholders.

5.4.3. User Feedback and Recommendation

After the UAT was conducted and the SUS questionnaire was administered, a short interview was conducted for comments and suggestions of the users. The recommendations for improvement areas in APMIS OCS dashboard are summarized in Table 6. The comments and feedback of the stakeholders were then incorporated into the user interface design for students, advisers, and the OCS.

Table 6. Recommendations of the Users for the APMIS Interface Prototype.

CEAT-OCS Interface	Create separate charts for enrollment status. Enrollment status should include “Active,” “LOA,” “AWOL,” and “Not Enrolled.”
	Revise categorization of courses to “Foundational,” “Core Courses,” “Specialized Courses,” and GE Courses.
	Revise Scholastic Status chart. Scholastic status should include “Good,” “Warning,” “Probation,” “Dismissed,” and “Permanently Dismissed.”
Adviser Interface	Instead of scrolling down to navigate the sections, create taskbars for the subsections.
	Remove the “Default View” of the monitoring flowchart. Instead, use “Timeline View” which presents the chronological and actual courses taken by the student per semester.
Student Interface	Instead of scrolling, create taskbars for the subsections.

Addressing the recommendations from the user testing, a more enhanced version of the wireframe was developed. This version, as presented in Figure 9, is the one turned over to the Office of the College Secretary.

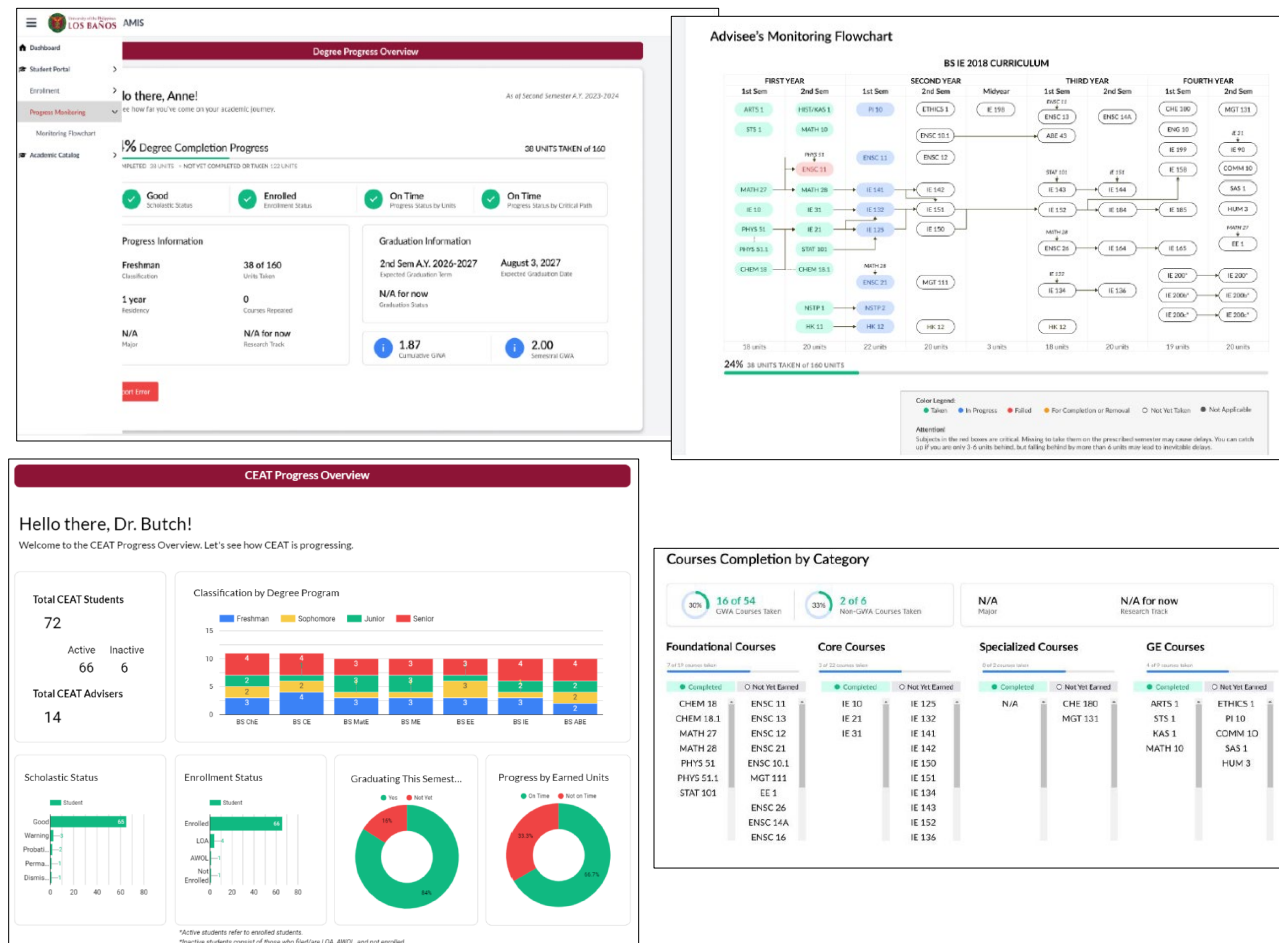


Figure 9. Revision on the wireframe based from the user feedback.

In the upper left of the figure, it is shown that the wireframe now has a sidebar which is true for all three interfaces even though only the one for student is shown. The upper right shows the timeline view per advisee for the advisers to more efficiently monitor progress. The lower left shows the revised version of scholastic and enrollment status. Lastly, the lower right shows the revised classification of courses. In consideration of the discussed feedback and the revisions made, the system is proposed to be implemented A team of dedicated on development and maintenance need to be created as an initial step initiated by the UPLB Digital Transformation Team. This model is expected to be scalable to university level with a few modifications to tailor-fit to different colleges. The said team, once formed will be the main implementor of the system through all Colleges. Shown in Table 7 is a proposed composition and task list of the development team.

Table 7. Draft development plan for the implementation of APMIS.

Team Composition	
Project Leader	oversees the entire project and manages the team
System Analyst	mainly performs the extended usability testing and all coordination with end users regarding system requirements (e.g. updates and revisions)
Programmers/Developers	computer science experts who will do the actual coding and configuration of the working system
Next Steps	
Creation of Initial Working Prototype	The team first evaluate integration with the existing Academic Management Information System (AMIS) of UPLB. The interface of APMIS was designed to be an additional module included in AMIS.
System Testing	A thorough simulation of transactions to be conducted in order to verify that all functionalities (i.e. from functional requirements) are covered.
Extended Testing	With the working prototype based from the final wireframe, usability testing is to be conducted once again but on more students with at least one coming from each of the 7 degree programs.
Improved Working Prototype	Enhanced based from feedback during extended testing
Initial Implementation	System is deployed and actual use begins

6. Conclusion

The primary objective was to design an Academic Progress Monitoring Information System (APMIS) for the CEAT-OCS. Methodology comprises four major phases: system analysis, system design, system implementation, and testing and validation, following the waterfall model. User testing achieved a 95% reduction in the time advisers spent reviewing individual progress reports (down to 0.65 minutes) and an 89% reduction in the time students spent reviewing their progress (down to 1.65 minutes), meeting the first specific objective of reducing individual monitoring process time to a maximum of three minutes.

Usability testing for efficiency then resulted in a 99.74% decrease in time required to access summary data for progress monitoring (from 90 minutes to 0.233 minutes), addressing the second specific objective of reducing access time to less than a minute. By conducting UAT and usability testing, the study also addressed its third specific objective, substantiating and validating the contributions of the proposed system. It is acknowledged that the usability testing conducted is limited to 5 respondents even though they represent all three types of users of the system. Moving forward it is recommended to extend the testing to more students and advisers to further reinforce the findings. Additionally, since only a wireframe was presented and tested, the extended testing should now make use of a functioning prototype.

Overall, the implementation of the APMIS has demonstrated significant potential in enhancing academic progress monitoring at CEAT, addressing the critical issue of low graduation rates and improving the overall efficiency and effectiveness of academic advising and monitoring.

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