RAMS Mobile: A Mobile Design Application for Students Portal of Asia Pacific College (APC) Using User-Centered Design Methods

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Abstract

Over time, the use of smart device and mobile apps evolved in education systems as it offers educators new platform to engage students with class materials, facilitate online class discussions, and mobile-web service adaptation of student's information system. Specifically, the student portal plays a crucial role in academic and registration process for students in technological age, however, students still encounter problem accessing their portal caused by outdated User Interface (UI) design and problems in responsiveness and mobile optimization of web portals in their smartphones. Having said this, this project aims to enhance student's experience of Asia Pacific College's (APC) by creating a mobile version of the student web portal to enhance their mobile experience and provide a comprehensive student portal as part of a broader initiative to improve their academic life. This study explored the impact and efficiency of mobile applications and the ways in which design can address this issue by utilizing the User Centered-Design (UCD) theory to gather and evaluate the user's characteristics, goals, and their workflow. The design intervention successfully addresses the mobile optimization of the student web portal as test results showed positive feedback from the target users and had a higher overall point average in terms of design and experience. Based on the prototype testing result with 16 college students, the project was able to increase students' satisfaction and experience from 3.75/5 point average for the student web portal to 4.78/5 point average with the high-fidelity prototype for the mobile design, with positive feedback on the additional features on the Calendar, Announcement, and Notification feature.

Keywords: UI/UX, student portal, mobile application, User-Centered Design

Introduction

Smartphones have made life easier with their convenience and portability. It became increasingly integrated into the daily lives of humans as people rely on it significantly for a variety of reasons including contacting loved ones, staying up to date on current events, and keeping in touch with other people online. Overtime, the use of smart device technologies and mobile apps evolved in education system as it offers educators new platform to engage students with class materials, facilitate online class discussions, and mobile-web service adaptation of student's information system (Mcgovern & Luna-Nevarez, 2018).

In addition to this, according to Hillyer (2020) in her article about the changes of technology in the past 20 years, she stated that at least half of the world's population has access to the internet with the help of technological advancement, and at the same time, it was becoming more personal and portable which has fundamentally changed our civilizations and way of life ever

since the dotcom bubble burst back in 2000. To localize the impact of technology, especially in the educational sector, between Filipino students, smartphones and social media is utilized to communicate with their classmates or educational activities. It is also used to assess academic performances to access their grades, student information, and academic events or activities. According to the Philippine Statistics Authority (2020), Filipinos aged 10 to 30 who were enrolled in school, 86.8% surf the internet for social media, 62.7% write reports/messages, and 61.9% uses their phones and socials to attend meeting or online classes every day. With these numbers in mind, a mobile approach for students to access their academic information within the institution should be considered to help students improve their academic life.

Furthermore, according to Tabuga and Cabaero (2021) in their discussion about the Filipinos access and exposure to ICT survey wherein 43,838 where sampled, among individuals aged 10 and above, nearly 79% percent of those aged 10 and up had used a smartphone, and among those who use cellular phones, 89% have only one device, while the remaining have more than one. Meanwhile, computer usage is minimal, gaining only 34%. This number resulted to the cause the smartphone businesses cater in them to the convenience, features, and dependency of customer to increase their advantage to their competitors. According to the survey, the primary elements that influences Filipinos, especially in the young generation, to purchase smartphones instead of laptops or desktop is the brand, features, and price. The convenience and their smartphone reliance are one of the major factors why Filipinos prefers smartphones (Briones et al., 2022).

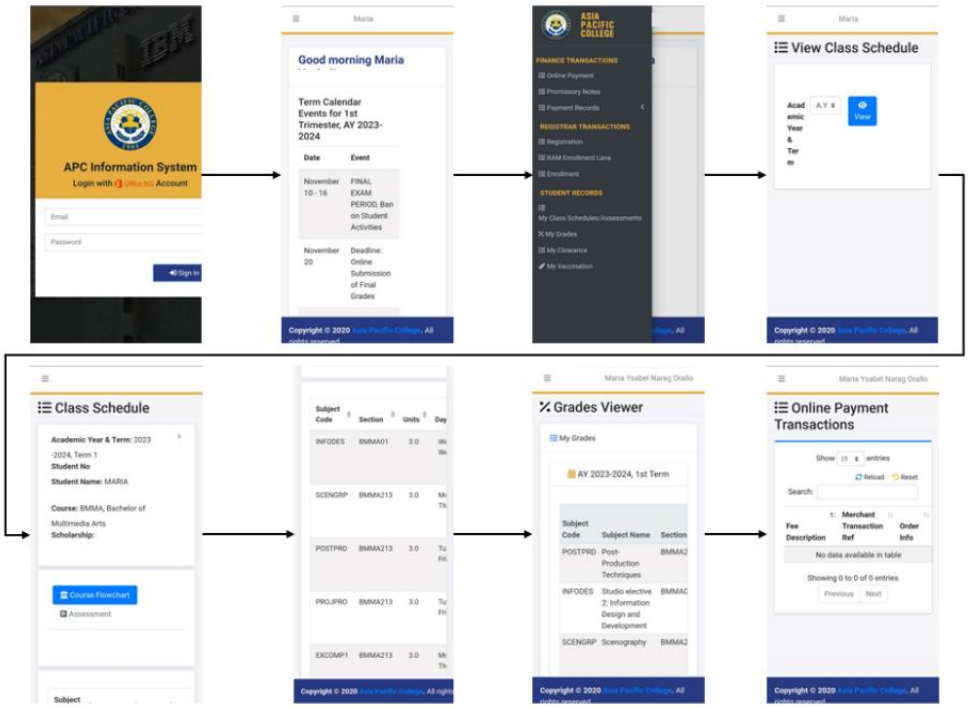
With technological advancement also comes the rise of digital graphic design tools. As an artist, I aim to contribute and design products that can help fill the gaps between people and digital technology through graphic design. Graphic designs helped people in ways didn't even realize – influencing through posters, publication materials, and UI/UX design for mobile apps and websites that people use daily. It has made more impact now that smartphones and computers are more personal and portable, resulting in a world where it affects almost everything we do.

My multimedia project will be a mobile design version of the Asia Pacific College's student web portal. Many APC students struggle to access their portal using gadgets with small screens such as smartphones or tablets because the interactive elements and layout of the website is not mobile optimized. With Figure 1 as reference, opening the APC Information System, the student portal of APC, with mobile browsers like Chrome, Opera, Safari, Firefox, and the likes, made the website appeared to be disorganized with some elements overlapping the screen and text appearing to be congested. In addition to this, the overall style of the portal is outdated compared to modern and minimalistic style of mobile apps in today's day and age where white space, alignment, and comprehensive color schemes are utilized.

With this, the project therefore introduces RAMS Mobile, a mobile design application for Asia Pacific College (APC) student portal that allows students to have an enhance mobile experience and comprehensive student portal as part of a broader initiative to improve their academic life. Specifically, this app allows students to check their grades, schedule, tuition balance, notifications, a chat feature, and stay updated to the latest announcements in this app made just for APC students.

Figure 1

APC Information System's View in Mobile Device



I chose the digital medium to create a mobile design because of the relevance of smartphone's usage in today's day and age. Smartphones are an integral part of an individual because of their capability as a tool to deliver information, socialization, online connection, and entertainment. With this, a mobile design that features a user-friendly and intuitive design will allow APC students to access vital school-related information within the palm of their hands.

Moreover, this project will be designed by integrating the principles of User Centered-Design (UCD) theory, a term coined by Norman (2013) that places the users' opinion, experiences, and needs are the forefront of the design process. The target user of this project will be APC students as they are the expected users of the student portal. By integrating UCD in the design process, I can ensure that the design solutions created will meet the needs and preferences of the target users. Furthermore, it will help to reduce the design cost – both in time effort and financial cost, as it identifies underlying issues even before the design is fully developed.

My creative output aims to assess and foresee how users will use the app in terms of design, as well as to verify the validity of the initial prototype with regards to the anticipated user behavior in real world operational testing. Each review and revision of the design involves understanding the target users, and continuously iterating the design based on the user's feedback. Moreover, this project aims to: Know the impact of mobile design in today's society and culture; understand the effects of design elements and its integration in mobile apps in relation to user engagement and satisfaction; and effectively promote digital product usability and user satisfaction by integrating User-Centered Design approach in design process.

Figure 2

Framework of the Visual Representation of Overall Process and Methods for APC Student Portal's Mobile Design

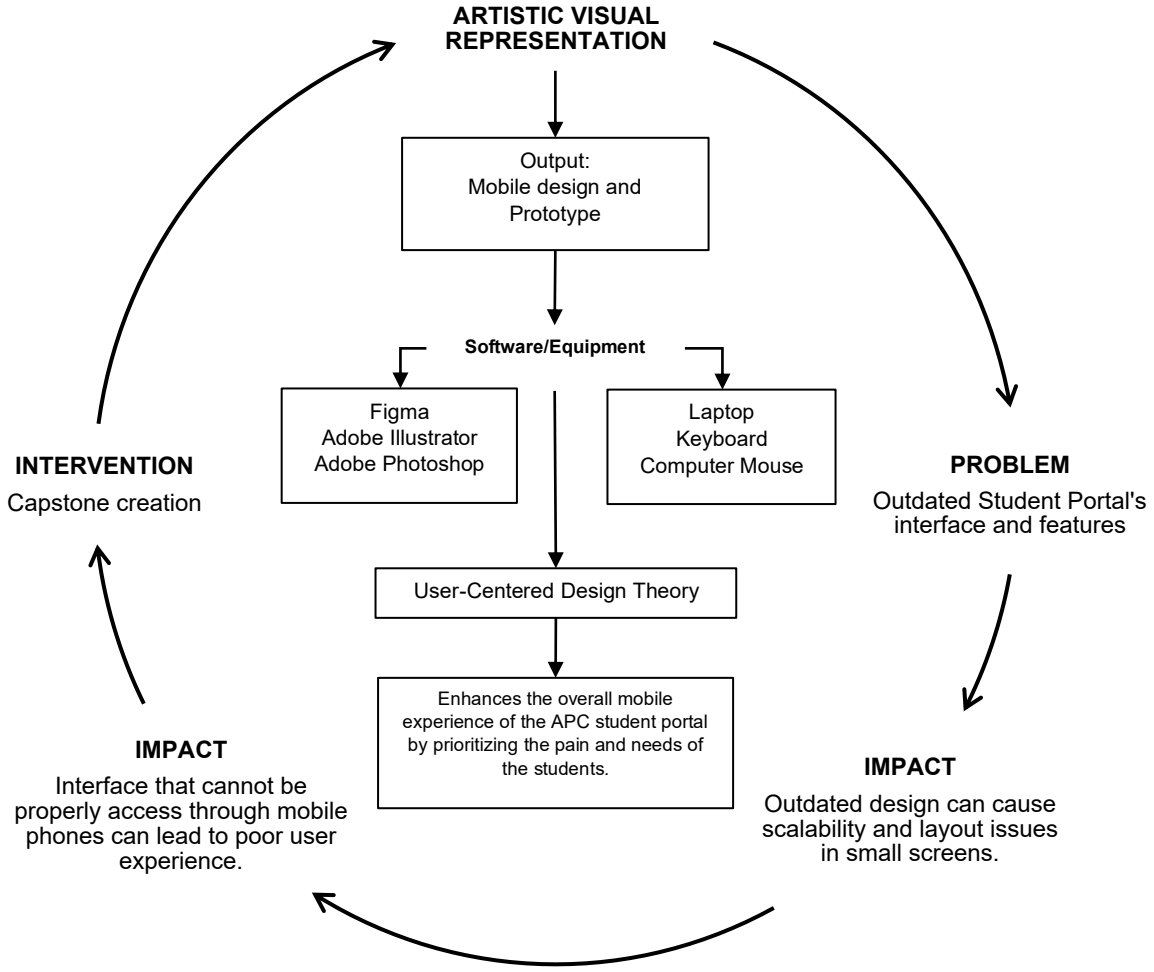


Figure 2 shows the creative framework for this project that showcases the overall components of concepts and methods used for the project itself. This section provides a visual representation of the information regarding the pain and gaps of the intended users, as well as the impact, purpose, and solution for these problems. The creative framework and research strategy of this project are discussed to a greater extent in the succeeding paragraphs.

It is important to first consider the existing gaps and needs for this project, in which, the scalability and mobile responsiveness of the APC Information System. At first, my idea for this project is about a community app for APC student wherein they can connect to each other through it, create sub-groups based on their interest, and to have a way for these students to donate to APC for campaigns and events exclusively. However, after further researcher and assessment within the APC students, I came to realize the problem of the lack of mobile-first support of the student portal website. With this and the relevant data gathered in a preliminary survey and

interviews, I also found out that there are features that are not consistent for every user such as “account balance” and “master list” feature for the student portal.

This problem is collectively experienced by APC students, particularly when using devices with small screen dimensions such as smartphones or tablets. The consequence of this issue manifests in the overlapping of interface elements or cut-off information, owing to the portal's lack of optimization for smaller screens. Furthermore, this issue negatively affects user experience, compelling users to resort to desktop or laptop devices for optimal portal access. Despite the alternative of utilizing smartphone browsers and adjusting browser’s settings to enable the "desktop site view", the workaround made the overall experience slow in terms of performance and intuitiveness.

Given this information, I chose to design a mobile application for the APC Information System. Digital tools like mobile app will help this project reach more users considering the factors such as accessibility and convenience of digital devices for Filipinos – according to the ICT survey wherein 43,838 where sampled, among individuals aged 10 and above, nearly 79% of those aged 10 and up had used a smartphone, and among those who use cellular phones, 89% have only one device, while the remaining have more than one. Meanwhile, computer usage is minimal, gaining only 34% (Tabuga & Cabaero, 2021).

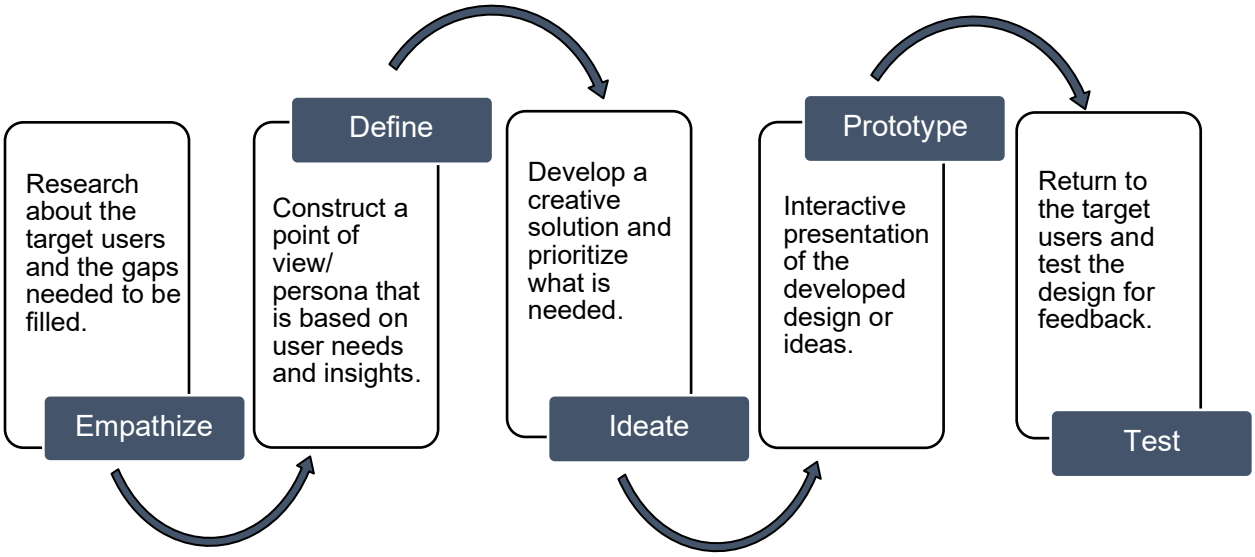
In addition to this, I chose to utilize the User-Centered Design (UCD) theory coined by Norman (2013) in his book “The Design of Everyday Things” that places the needs, goals, and preferences of users at the forefront of the design process. This approach encourages designers to incorporate awareness to the psychological principle of human behavior to empathize with them. In contrast to other design philosophies, UCD prioritizes optimization based on users' pain and needs in utilizing a product, rather than forcing users to adjust their behavior to adapt to the product. With this saying, I can ensure that the design and solutions presented for the existing problem align effectively with the requirements and preferences of the intended user demographic. Moreover, this helps facilitates a reduction in design costs, both in time effort and financial expenditures, as it identifies underlying issues at the early stage prior to the comprehensive development of the design.

Lastly, this project will be created with the use of digital software such as Figma, Adobe Illustrator, and Adobe Photoshop. Figma is a software wherein designers can create a prototype, user interface, and user experience design of an application, Adobe Illustrator is a vector graphics editor that designers used to create vector-based graphics for various purposes, including print, web, multimedia, and mobile applications, and Adobe Photoshop to primarily deal with raster graphics, which are composed of pixels, to edit photo and control pixel-level of an image.

This project utilized the **quantitative and qualitative research design method** in gathering data to analyze the pain point of the target users. To create a good mobile design application, there should be a clear understanding to the target users’ need and opinion while using the digital product. For this reason, I followed the Design Thinking Process with a UCD approach. According to Norman (2013), the design thinking process is a problem-solving

methodology used by designers to approach complex problems and find innovative solutions. This typically involves five stages: empathize, define, ideate, prototype, and test (see Figure 3).

Figure 3 *The 5-Step Design Thinking Process*



The process in gathering data involves personal interviews of APC students to ask for their opinion / experience, and suggestions for existing student portal, and a preliminary survey to gather more data to a wider demographic of APC students by utilizing Microsoft Forms. The preliminary survey questionnaire and personal interview will be documented to organize the student's opinion, experiences, needs, and frustration. Then, this information will be used for data analysis and creation of user personas based on the observation and shared problems among the students. The survey was dispersed through email and personal message to students where they answered 14 questions that took approximately 4 mins to do. It intends to know and observe the point of view of random students where they will answer some questions about the portal's main purpose for them as a student, their average rating in terms of their usage experience, their frustrations, and suggestions or recommendation for a mobile app version of the student portal.

Furthermore, I utilized the desk research method as a secondary study to gather existing information and data without conducting direct field research. This low-cost technique allows me to collect data from existing resources such as articles, reports, statistical data and other projects and manuals (Sileyew, 2019). I will be gathering data and exiting projects from reputable online journals such as Google Scholar, Research Gate, ERIC, and other similar academic research websites. I will then evaluate the process on how these projects are developed and the design process behind it, then compare it to other studies to make a contextual synthesis for my own design development for this project. By doing this, I will be able to give have foundation supported by existing resources, and references to guide me for my thought process.

In general, for this project, the desk research review has been completed and compiled for the review of related literature and review of creative works. The sections of this paper discussed in details the obtained data form studies and existing projects.

The **target user/respondents** of my project will be the students at Asia Pacific College as they are they are the expected end-user of this project in mind. Specifically, these target users range from the age of 19-24 years old, and mainly lives in Metro Manila. Having the students as both the respondents and users will help me solidify the validity of my design creation and prototype testing.

The design for the mobile application consisted of the color palette yellow and blue combination as it is the Asia Pacific College's (APC) default palette. It also consists of interactive icons to represent different tools and functions within the app as it helps to understand the features even without too many words to explain it to the users. The app was created mainly by using the three (3) important tools when design website and mobile interface such as (1) Figma – for designing and lay outing the mobile user interface, (2) Adobe Illustrator – for creating the icons and illustrations, and (3) Adobe Photoshop – for editing images.

Design Process

In UX/UI design, it is important to first know what kind of interface the target user needs. In my experience, when designing websites and mobile apps, clients will give you prompts about their desired concepts and functions for the interface that will naturally be aligned with their desired designs. For this reason, I conducted a survey about the students' experiences with the current student portal format. I also did a personal interview with some of them to get more clarified answers and observe their non-verbal behavior when talking about the pain they experienced when using the portal. After this, the results of the preliminary survey and interview are used to create personas as my guide to build user flow journeys for the project.

The personas and user flow are integral parts of building the wireframe for the UI design. A persona is a fictional user embodied in the user's behavior by soliciting their feedback, behavioral patterns, opinions, and pain points to empathize with the target users and identify exactly what they need from the product. On the other hand, the user flow is a diagram that serves as a visual representation of the path that users will undertake to complete a task on the app, and it serves as an outline for the overall navigation for interactive elements. With this, I created a mid-fidelity prototype—a semi-functional prototype that lacks design and aesthetics— with 430 x 932 screen size in Figma. Think of it as a sketching drawing or a plan because at this stage, the prototype will be on a grayscale palette and visual placeholders for interactive elements so it all can be tested before integrating the final and more detailed design of the interface. The home page contains the general function of the portal like registrar transaction, announcements, and calendar. Then specific features such as grades viewer, schedule, and students' profile can be accessed through the bottom pane. And finally, other features like account information and feedback form will be accessed through the student profile. New features such as balances, notifications, feedback, and a chatbot assistant were added based on the needs of the target user to improve their experience with RAMS Mobile. Moreover, creating components in Figma makes the UI elements reusable repeatedly through the design process. With this, it will make things easier when an element need design revision and it lessens the frames as it is already interactive.

After gathering approval and comments from the thesis panel, I proceeded to develop the design into high-fidelity prototype. If mid-fidelity prototype is like the sketching stage, high-fidelity

is rendering phase of this design process. It is an interactive depiction of the project that is close to the final design in terms of details and functionality before app development. This includes the UI style and visuals and demonstrates all the feature. With the high-fidelity prototype, I, then, conducted a user testing to evaluate the success of the redesigned and mobilized version of the APC Identity Service.

Personas

This project presents detailed personas based on extensive research and data collected about the target users. By creating these personas, I can better understand and empathize with the users, ensuring that the design decisions for the RAMS Mobile application are well-informed and user-centric. Each persona includes comprehensive information such as name, age, and their year level, which provides a clear picture of who the users are. Additionally, these personas outline the users' goals, ambition, and what they aim to achieve through the application. Understanding these goals helps in aligning the app's features with user needs.

Furthermore, the personas highlight common frustrations and pain points, which are crucial in identifying areas that require improvement or innovative solutions. Other relevant characteristics from the interview were also incorporated. This approach ensures that every aspect of the design process is tailored to meet the specific needs and preferences of the target audience, leading to a more intuitive and satisfying user experience.

Figure 4

User Persona-1

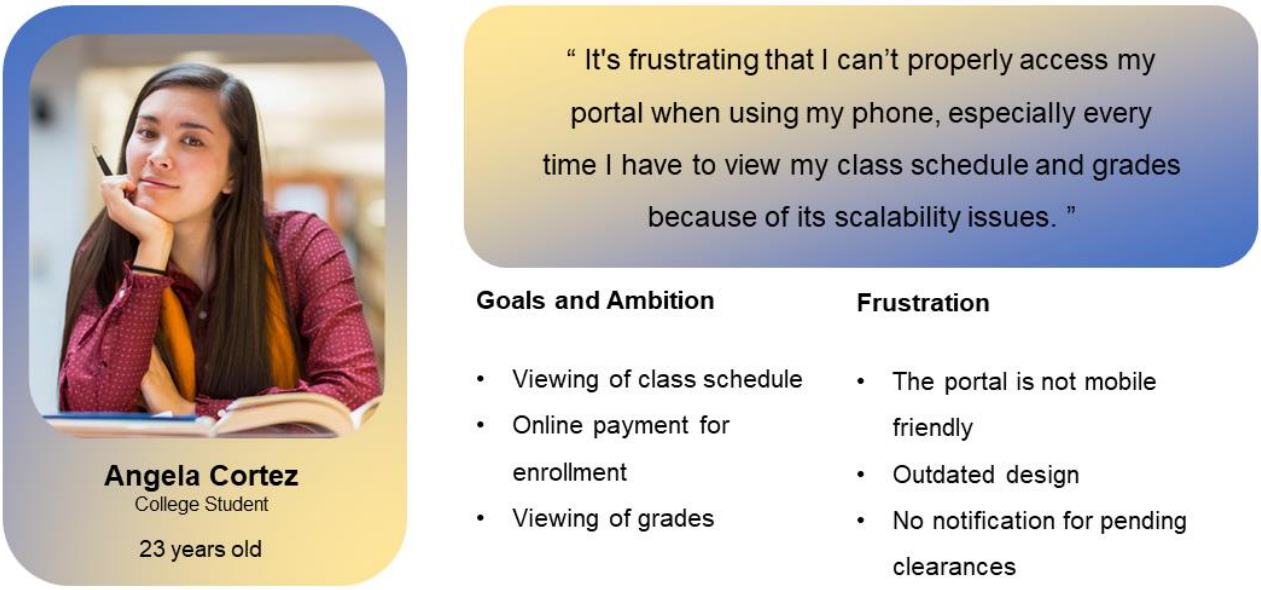


Figure 5

User Persona-2

Sean Valdez
SHS Student

18 years old

" The RAMS Portal is one of our most important gateways to access student information. But sometimes, I find it difficult to access my RAMS portal on my phone because of scalability issues. "

Goals and Ambition

- Tracking of grades
- To register and enrollment
- View his flowchart

Frustration

- Occasional errors on the website
- Portal is not mobile friendly
- Doing extra steps to properly accessed the portal in his phone

Figure 6

User Persona-3

Camille Ariola
College Student

20 years old

" It helps me to enroll online. But sometimes, it's annoying to always have to sign in every time I use it. It also lacks features that show my financial balance for tuition."

Goals and Ambition

- Tracking of grades
- Pay tuition balances
- For enrollment

Frustration

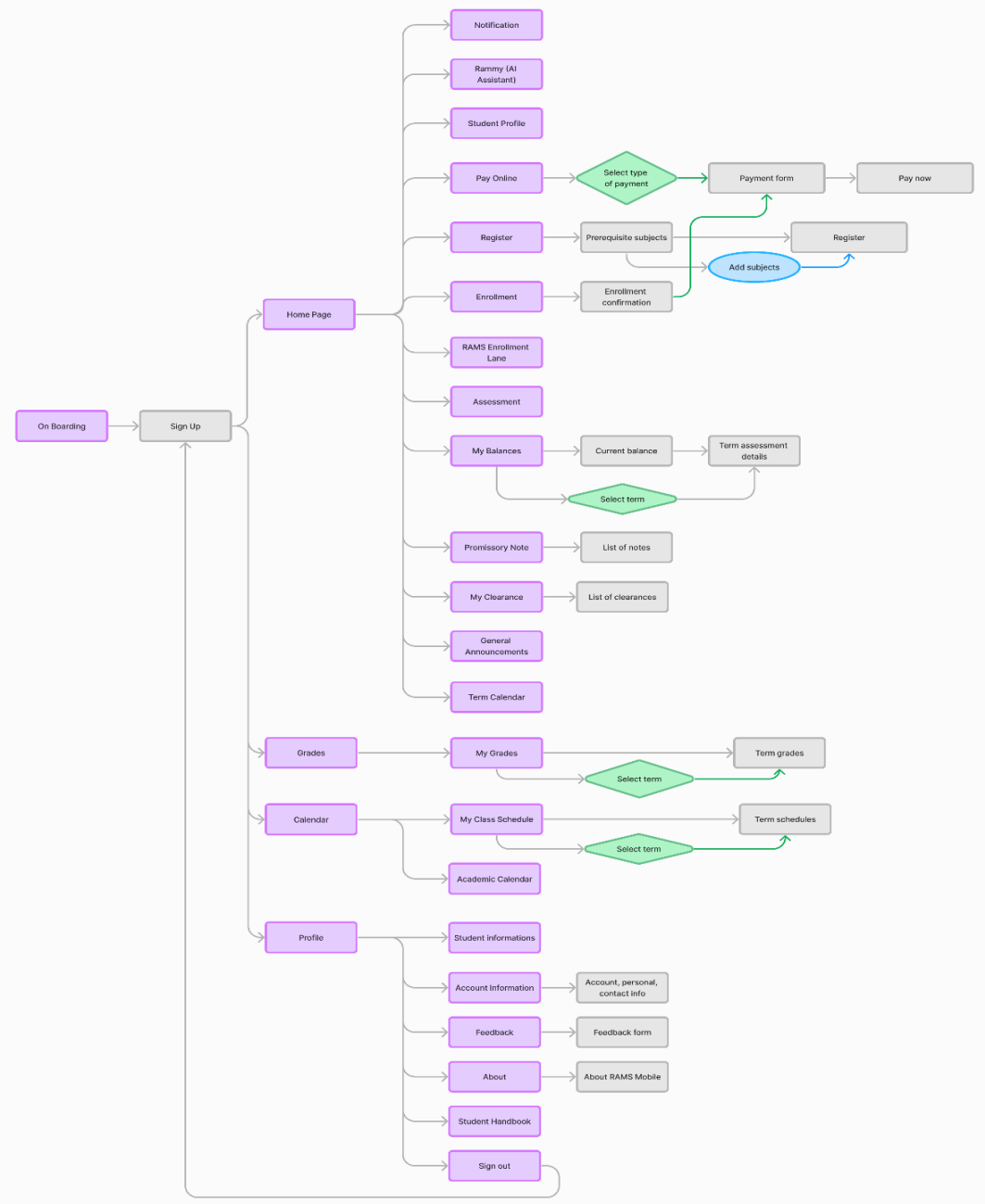
- No notification
- Each features opens another tab of her browser
- No tuition balance feature

User Flow

A user flow is a diagram serves as a graphic representation of the path that the target users will undertake to complete a task on the app. It is helpful for visualizing and understanding the entire journey and sequence of action of the users. Moreover, it serves as an outline or wireframe for the overall navigation and design for the app and what icons, or interactive elements leads to for the wireframing.

Figure 7

RAMS Mobile Design User Flow



Pre-Production Stage

The pre-production stage for the project consisted of planning the timeline and budgets using a Gantt chart timetable. This stage is where I analyzed and studied the related works of other mobile apps to appropriately understand the different kinds of approaches to designing a mobile application. As mentioned in previous parts of this paper, after thorough research and reviews, the User-Centered Design method and design thinking had been the most complementary for this project as it focuses on a specific target user. This is where I also formed a concurred plans for the development of this project, including the relevant proponents, the narrative flow of the design, design references, and the medium and tools needed to make sure that this project is feasible and successful within the given timeframe. Moreover, this stage is also the first step of design thinking called “empathize” where in gaps and pains of the target users were needed to be identified regarding the current format of APC student format through online survey and personal interviews.

Production Stage

The production stage consisted of a preliminary survey and personal interview with the students to know their overall experience and satisfaction with the student’s portal. The outcome of these interviews was the central idea of creating personas (see Figures 4, 5, & 6). This stage the second step of design thinking “define” where the results were used as a guide and reference for a user that shows their pain and needs. With this, the personas will help me in my design process and prototype of the app.

The app will be created mainly by using the three (3) important tools when designing a website and mobile interface, such as (1) Adobe Illustrator for creating the icons and illustrations, (2) Adobe Photoshop for editing images, and (3) Figma for layout and designing the mobile user interface. The development of mobile design was created two levels of fidelity: the mid and high-fidelity prototypes. The mid-fidelity prototype was often known as the wireframe as it is a digitally organized version of sketches made that is intended to be semi-functional but still lacks the design aesthetics and visuals while the high-fidelity prototype is where most of the relevant design assets and components have been built and integrated. Moreover, at this stage, the project will have a mid-fidelity prototype made to be tested before integrating the overall aesthesis and elements for the high-fidelity of the prototype. After the design process, I will test initial prototype with the target users to gather input and to make sure that the is functional and met their needs.

Assets

With the given personas (see Figure 4, 5, & 6) and the user flow diagram (see Figure 7), design components were created to recreate accessible features of the student portal website to familiarize the target users. But this will also present a new experience with the new modular components that will contribute to a cohesive and visually appealing user experience.

Interface Design System and Components

Components help to structure and organize information of the interface in project in a way that is intuitive and easy for target users to understand and navigate the app. By providing clear and consistent visual cues like colors and interactive icons (see Figures 8,9,10,11, & 12), these components will guide users through the interface, making it easier for them to accomplish tasks and find the information they need. Furthermore, it serves as building blocks for interactive elements and features within an interface like buttons, panel, dropdown menus, and other components that will allow the target users to interact with the interface and perform actions.

Figure 8

Primary Color Palette

Figure 9

Grey Palettes

Figure 10

Other Color Palettes

As stated, this project is a redesign of the student web portal with a mobile version. Thus, the color palette that will be used as a branding should also be familiar to the target users as they had already used a functional website. The color palette for this project will be the APC's palette – blue, yellow, and white (see Figure 8), while also using black and grey palettes for the color of text and shadows (See Figure 9), and other colors such as light yellow, green, pink, purple, pastel yellow, and red for the other parts of the app primarily for the calendar feature (see Figure 10).

Figure 11

Logo and Icons

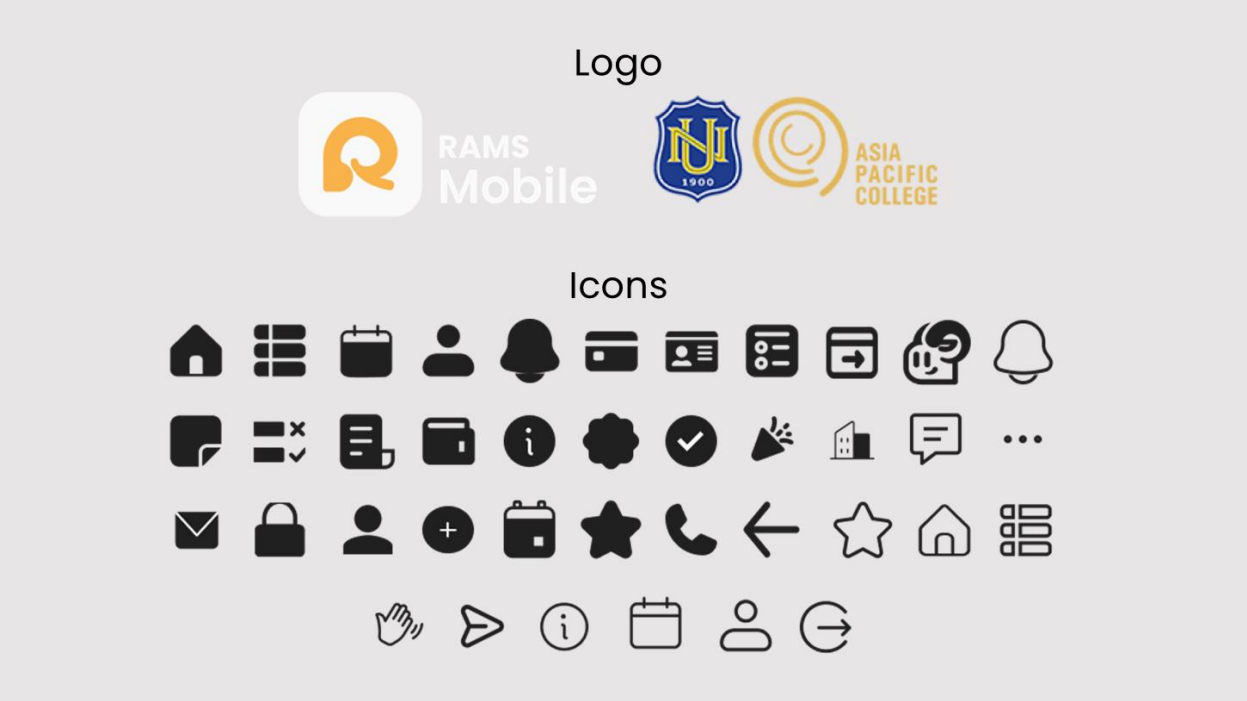


Figure 12

RAMS Mobile Functional Elements

Figure 13

RAMS Mobile Wireframe Sample

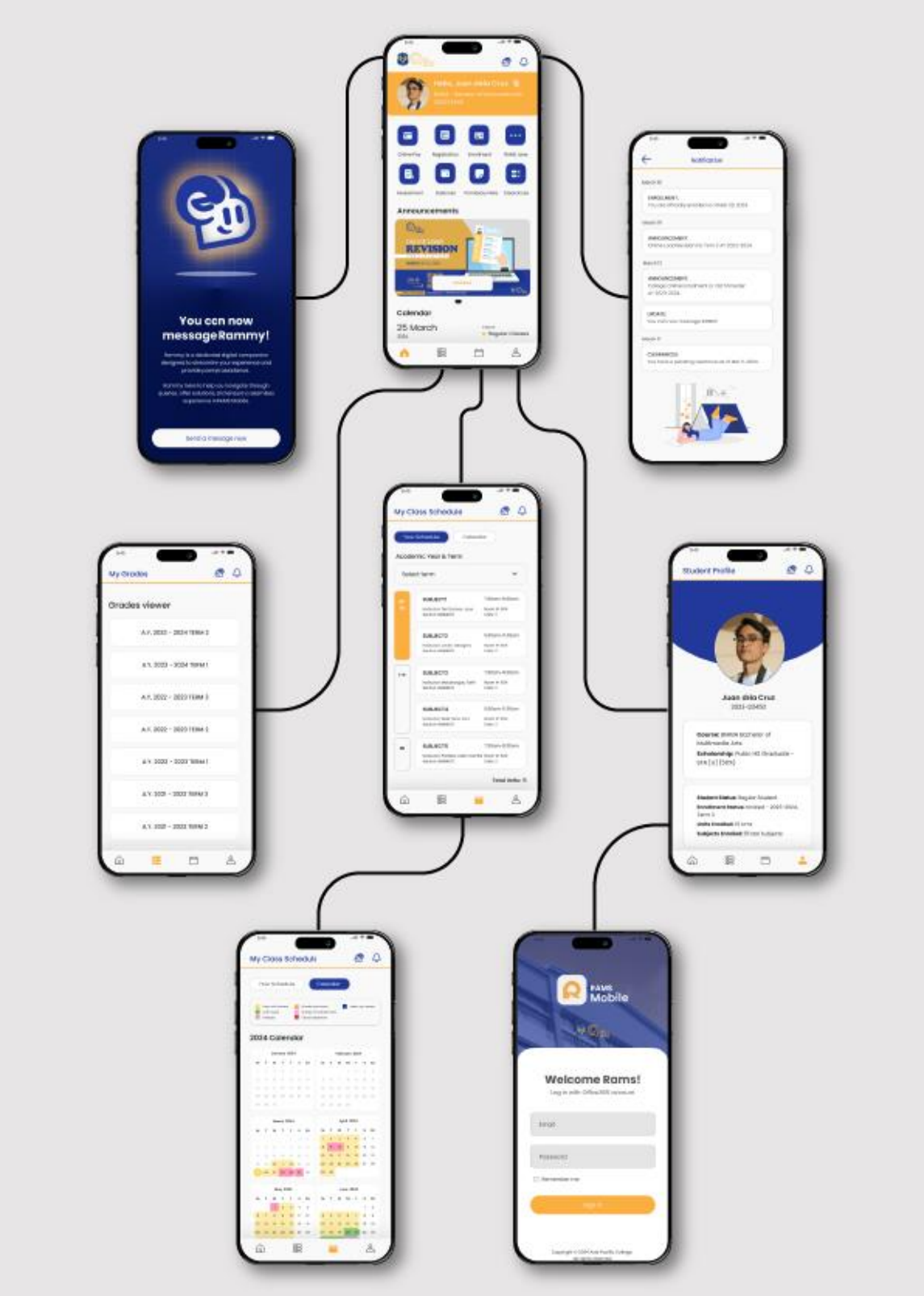


Figure 14

RAMS Mobile Other Screens

Post-Production

The post-production stage consisted of finalizing small details and the app development stage. During this stage, the prototype will be checked for small details and final tweaks in the color, layout, and workflow of the app in preparation for the final development and presentation of this creative project. It will be presented at an exhibit as a partial requirement for graduation along with marketing collaterals such as posters, cards, website, and motion graphic video.

Comparative Analysis of APC Student Web Portal and RAMS Mobile

This section of the paper is the comparative analysis of the student web portal and its counterpart of the project of this study. The analysis is focus on how the student web portal has changed design and features in the mobile app version in regard to the preliminary and personal interview from the target users. By looking at both versions side by side, we directly see the changes and improvements made as it helps us understand how the app were made to make access and navigation easier and simpler for the target users.

Figure 15

Web and Mobile Version of Sign In Page

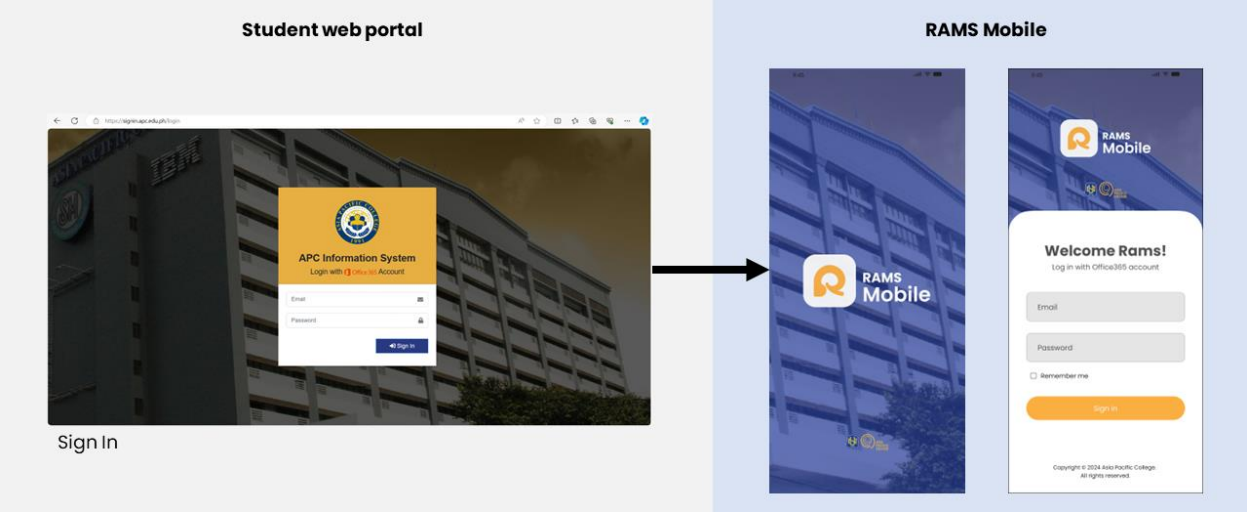


Figure 15 illustrates the sign-in interface of the student portal, which is displayed each time students log out of their accounts. Across web and mobile versions, the backdrop features the APC building. However, in the mobile version, the Rams Mobile logo has been introduced alongside the NU-APC logo, replacing the previous APC logo. This update was made to modernize the design and align with the school's branding. Additionally, the Rams Mobile version opts for a blue background, rather than black, for better consistency with the overall app aesthetic. A “Remember Me” option was also added to keep the account signed up even after using the mobile version – making access more efficient and faster for the target users.

Figure 16

Web and Mobile Version of Home Page

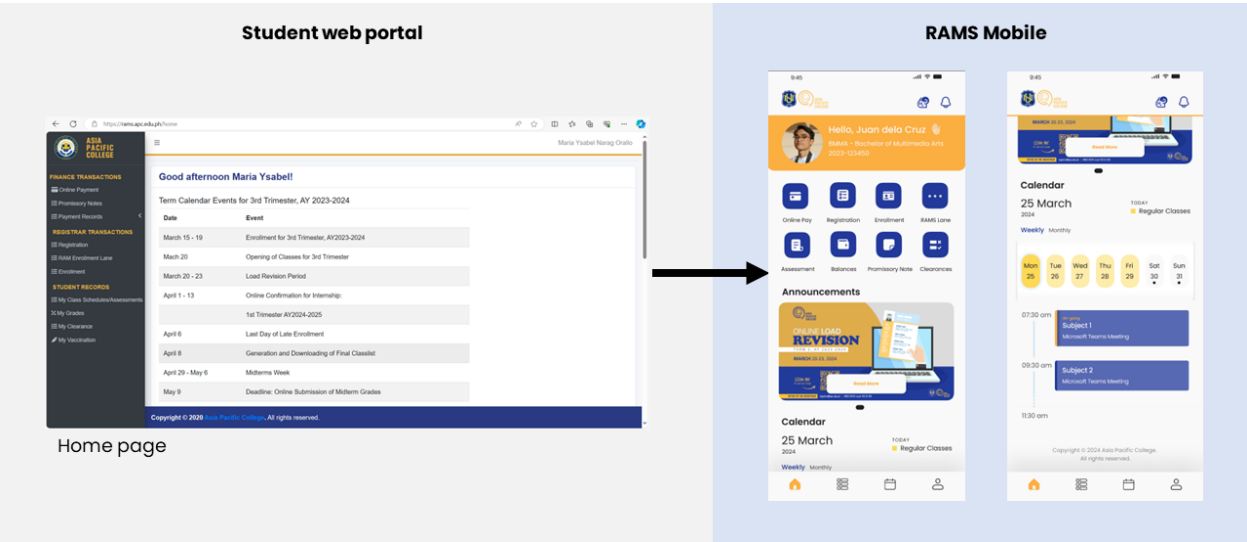


Figure 16 illustrates the homepage of the student portal, which is the very first page that users will see once they signed in. The homepage of the website was simple as it only shows the

important dates to remember for students, and a side menu to access other important features. However, on the mobile version, the side menu was omitted, opting to use icons to fit the small screen of a phone and makes access easier as it is already presented on the page rather than using a side menu. In addition to this, the mobile version also provides a short student profile to welcome the user.

The features included at the home page are the general and most relevant to the students in regards with registration, enrollment, and financial transactions. On the other hand, personal student records such as “Grades Viewer,” “Class Schedule,” and “Student Profile” were presented as the bottom navigation of the app. In addition to this, new features such as “Balances,” AI-chat bot, notification bell, announcement board, and a calendar have been added as it was the features that most students needed, according to both preliminary survey and personal interview, to make their using the student portal easier and relevant.

Figure 17

Web and Mobile Version of Grades Viewer

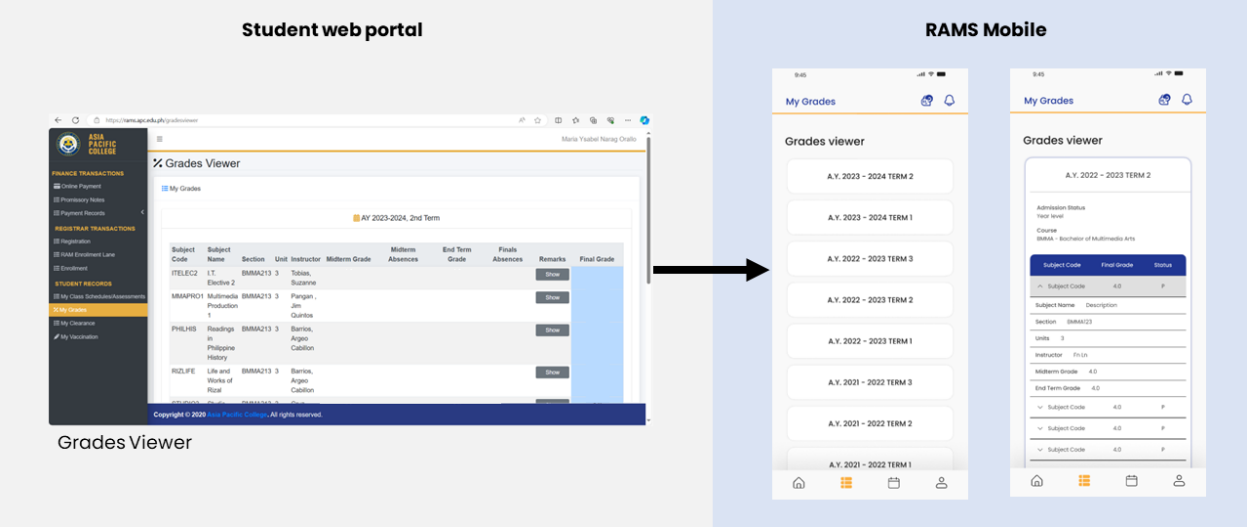


Figure 17 illustrates the “Grades Viewer” of the student portal wherein they can see their grades for midterm and final grades. Both web and mobile version presents the grades by using table to indicate the year and semester, subject, professor, midterm, end term, and final grade of the student. However, with the web portal presented the grades horizontally while the mobile version presents further information vertically through a drop-down menu to properly include relevant information on a small screen while also not overwhelming users with presented information.

Furthermore, in the discussion of the comparative analysis of the student web portal and the RAMS Mobile is the “Class Schedule” where in students can viewer their current schedule for the semester. With Figure 18 as reference for both the website and mobile version shows the option wherein students can choose a specific year and semester to access their previous schedule. However, while the website presents the information through a horizontal table, the mobile app presents is as a card and highlights the day of the schedule. For example, the

schedule will highlight what day they are now (eg: [M]onday or [TH]ursday) and their scheduled subject for that day. Moreover, the mobile version provides a comprehensive academic calendar for students to further access important dates and schedules for the academic year.

Figure 18

Web and Mobile Version of Class Schedule

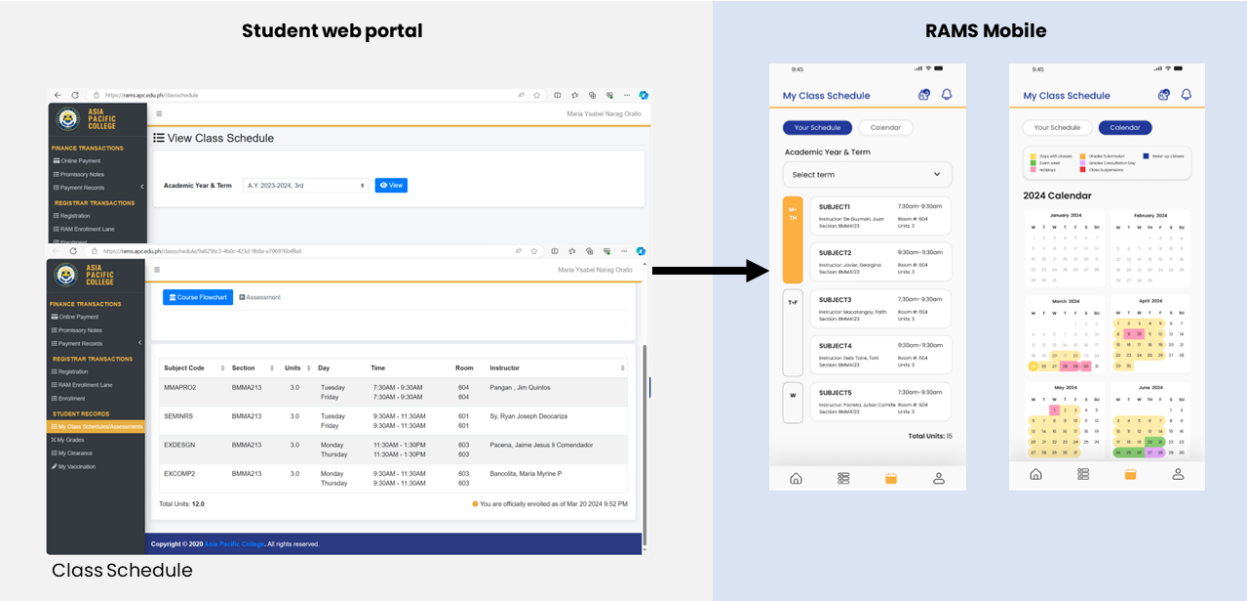


Figure 19

Web and Mobile Version of Student Profile

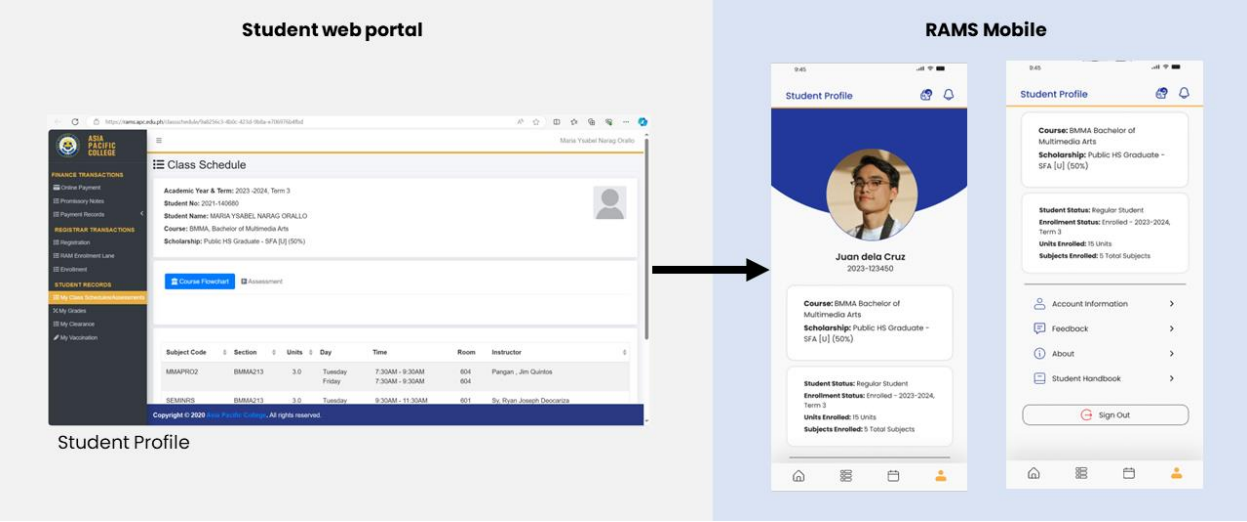
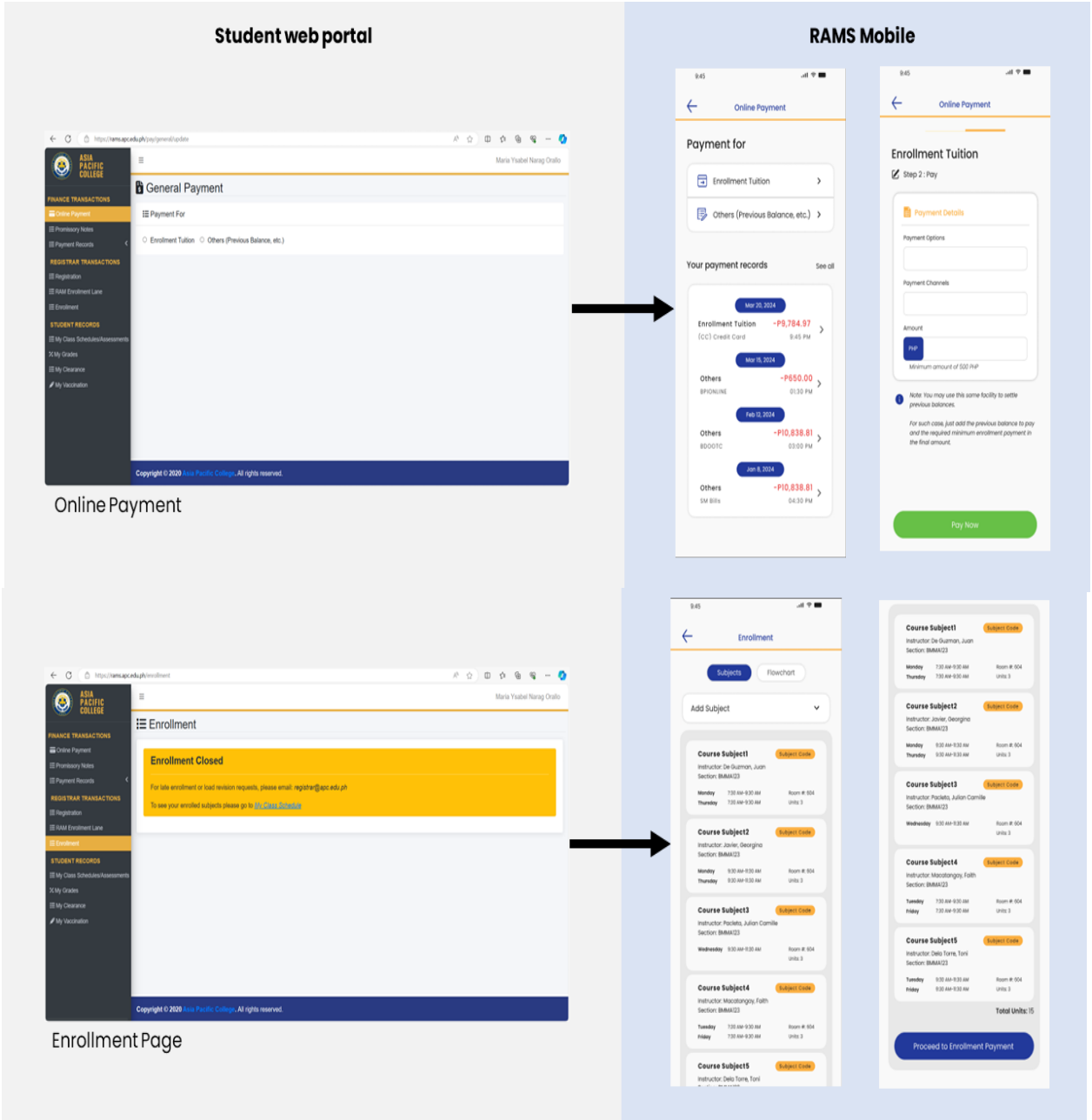


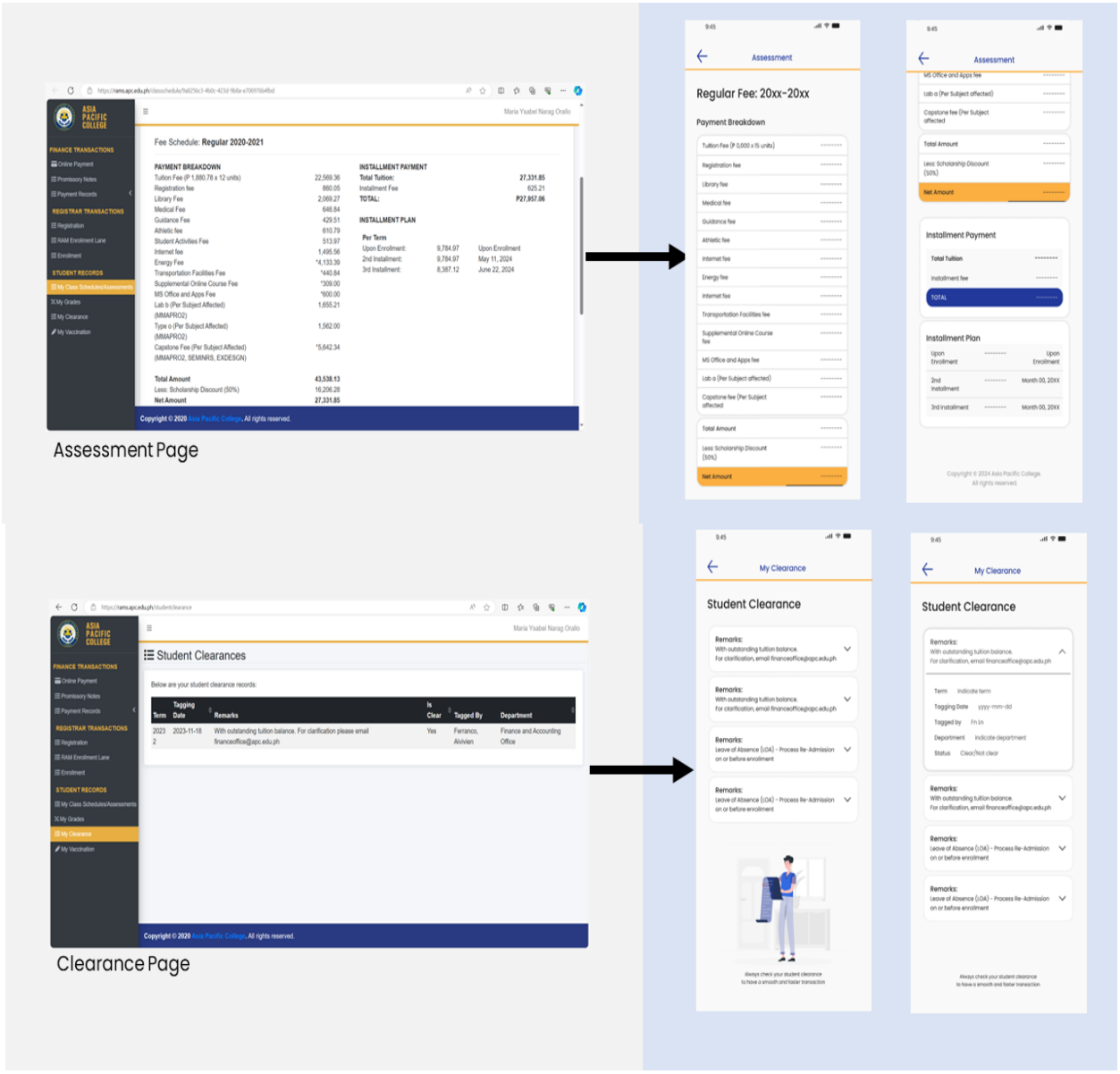
Figure 19 illustrates the “Student Profile” where students can access their student information. While the website does not have a specific page for the student profile as it only shows through the “Class Schedule” web page, the mobile version opted to have a separate page to make it more comprehensible for the users. At the mobile version, the profile provides

information like student name, student number, course, scholarship type, student status – if regular or irregular student, enrollment status – if enrolled or not enrolled, and the total units and subjects enrolled. This page also provides account information to access student account, personal, and contact information. Student can also submit feedback and access the “About” page and “Student Handbook.”

Figure 20

Web and Mobile Version Other Screens





Review Of Related Literature

Graphic design is a form of visual language that threads artistic expressions, technological developments, and cultural progress. This review of related literature dives into the psychology behind various design techniques, the origins, and the history of graphic design charting its path from the advertising market up to the UX/UI design techniques and its effect on educational engagement at age of new media of computers.

Design Techniques Based on Human Behavior

Throughout the years, people have believed that graphic design, or the arts in general, is only an artistic endeavor. It is something that people do as a habitual activity to relax or explore

the beauty and aesthetic around them. However, a sense of beauty and inspiration are insufficient to produce a proficient design, and because of that, understanding psychology is important for artist to build designs that can improve the experience for those who will use or see their creative product (Emeruwa, 2021).

One of the popular principles in design used by designers is the Gestalt Principles, or Gestalt Theory. It was developed in the 1920s by German psychologists Max Wertheimer, Kurt Koofka, and Wolfgang Kohler. They aimed to understand how humans typically gain meaningful perceptions from the chaotic stimuli around them. The term Gestalt means “unified whole,” which describes the overall notion on how individuals prefer to arrange visual objects into groups and how the whole is frequently larger than the sum of its parts (Fleck, 2021). This theory uses the brain’s natural self-organization of information in a manner of relating the six principles associated with Gestalt Theory. First is the (1) Proximity – the distance/closeness of elements, then (2) Similarity – similar elements are visually grouped, (3) Continuity – human eyes follows the smoothest path regardless of how lines are drawn, (4) Closure – the brain will fill in the missing parts of the design, (5) Order and Symmetry – perceives ambiguous shapes in simple and orderly as possible, and finally, (6) Multi-stability – takes advantage of the idea of negative space (Emeruwa, 2021).

Color Theory is also a fundamental aspect in design that draws the user's attention. The colors of a design are always associated with the branding of a product or a person and as a result, designers, as well as the consumers, employs color to express the essence of the product as it affects their mood, feeling, and emotion (Fleck, 2021). A well-chosen color palette influences the people’s experience and even impacts their performance. For instance, humans generally associate colors such as red for passion and love, yellow for joy and warmth, green for nature and money, blue for calm and sadness, etc. The color scheme can also affect the overall context of the design because a harmonious color combination of an image creates a visually appealing design that communicates meaning and emotion.

In contemporary times, the User-Centered Design theory, a theory made by Donald Norman in from his book “The Design of Everyday Things” published in 1988, was a relevant and common principle applied by designers with the emergence of new digital technologies that integrates interactive elements like UI/UX design. The basic concept of user-centered design revolves around prioritizing the needs, capabilities, and preferences of end users throughout every stage of the design process. Starting from the inception of the software development cycle, user scenarios, personas, and requirements are generated, analyzed, and reviewed. Incorporating user feedback and conducting testing are integral for refining functionalities as the product design progresses (Schmidt et al., 2020). The next year, Jiboku and Sodeinde (2021) had had made a comprehensive analysis of UCD and how the concept is connected to Human-Centered-Design (HCD). According to them, the user-centered design and human-centered design are often used interchangeably, but there is a distinction: the former is a subset of the latter.

Essentially, while all users are humans, not all humans will necessarily be your users. Therefore, user-centered design requires a deeper examination of your target audience. It goes beyond just understanding basic human traits; it involves understanding the unique habits and

preferences of your specific user base to devise appropriate solutions for their challenges. UCD considers factors such as age, gender, social status, education, professional background, influencing variables, expectations regarding product usage, and various other characteristics that may vary across different segments. What holds importance for one individual may be inconsequential to another.

For this project, understanding the visual language in design will make the project more effective and engaging for the intended user, especially since it was mentioned that this project integrates the user-centered design method. For me to have an educated hypothesis for the overall design and colors, I must understand and empathize with the users.

Impact of Graphic Design throughout the History

Graphic design as we know it today began with the creation of the printing press in 1440. According to Galvan (2020), although the origins of this may be traced back to prehistoric days, more specifically on the caveman time where in the paintings from stone walls in caves has the subjects like animals, handprint, and hunting in which this details were meant for the people at that time to visually communicate. In addition to this is the Sumerian written language, as shown in Figure 1, that began in 3300 BCE where it interprets abstract marks from the Latin Alphabet in the form of logography – meaning that words are represented through icons and symbols instead of their phonetic sounds.

Then, in the Industrial Revolution (1760-1840), the invention of the printing press in Europe happened, humans were able to reproduce text, art, and design on a large scale and at a low cost to advertise their business to generate capital. The ancestors of old companies, who were also on the rise in this time, quickly realized how such graphics may influence purchasing habits and improve revenues, and so, modern graphic design was created (Galvan, 2020). The Gutenberg Press, a moveable type printing press developed by Johannes Gutenberg, provided the path for individuals to demonstrate the excellence of their design by displaying the quality of their logos and typography.

After the rise of graphic design in industrial revolution, in 1903, a painter Koloman Moser, an architect Joseph Hoffman, and a patron Pritz Waerndorfer established the very first Graphic Design Agency, the Wiener Werkstätte (which translates to Vienna Workshop). The Werkstätte brought together architects, artists, and designers to create ceramics, fashion, silver, furniture, and graphic arts. They are recognized as contemporary design pioneers and an early impact on styles such as Bauhaus and Art Deco. They affected design standards for future generations as one of the first groups of professional artists to collaborate.

The review for the literature for graphic design and advertising can help this the development of my project in the aspect of understanding the foundation of design thinking and to further expound on how marketing a product using graphic and typography can affect how an individual interact with the product. With this, it can be used to know what to consider in the design and how it can attract user engagement.

Graphic Design in the New Media Environment

The term "new media" is relative and carries technical, rather than cultural, overtones. It was introduced in the 1990s to distinguish various means of producing and distributing content on magnetic media, such as CD-ROMs or even Web space, from "old media" represented to current information dissemination methods such as the written press, specific to newspapers, or the audio-visual press, in radio and television, new media denotes the plurality of communication media based on digital technology, with its expansions and domains of application (Soreanu, 2021).

In the contemporary time, the computer, in all of its forms and variations of computing - laptop, tablet, desktop, smart-phone, graphics station, smart-watch computing structure that mediates our daily interaction with immediate existence in an extensive, totalitarian, and implicit manner, is at the center of artistic practices as the main means of artistic expression to which the new media generation appeals (Netahata, 2021). Moreover, Netahala (2021) added that design is the first thing that people see when they visit a website or launch an application. The degree of user interaction is crucial to the success of multimedia solutions such as online movie theaters or streaming services. As a result, the relevance of the service resides not only in its look but also in its convenience of use. The simpler and more convenient the relationship between the audience and the product, the greater market success this product will have.

It is important in this section of review of related literature to discuss the Analog Media, specific to printing press such as newspapers, magazines, or even the box of cereals, to understand how the traditional way of design products interact with consumers. With this, the project can use it as guidance on how these artistic practices were applied to digital products such as mobile applications.

The Used of Analog Media and Digital Media in Graphic Design

Analog media are tangible, lasting objects that was best utilized as the communication tools before to the internet and are less frequently used now. The term analog or analogue comes from the Greek terms ana, which means "up to," and logos, which means "among other things (ratio/proportion)" (Arat, 2021). In addition to this, according to Arat (2021), it was first used as a noun in the early nineteenth century but didn't gain public notoriety until around the mid-1940s, when it became synonymous with computer language as an adjective to describe a type of signal that is continuous in amplitude.

On the other hand, Digital media is defined as media that has been encoded in machine-readable forms. Software, digital photos, videos, web pages, websites, social media, digital data, digital audio, and E-books are examples of digital media that may be generated, viewed, transmitted, edited, and saved on digital electronics devices. According to Das (2020) on his article about the impact of digital media, the influence of the digital revolution may be measured by looking at the number of mobile smart device users globally. The fact that a considerable part of the world's population owns smart devices illustrates the tremendous rate of expansion seen throughout the digital revolution. In addition to this, the development of digital media also gave birth to other design industries such as UI/UX design, animation, and digital paintings.

While analog media may appear outdated in today's digital world, it still has its benefits. Print advertisements and billboards, for example, may be quite effective at reaching local audiences, particularly those who are less tech-savvy or prefer more conventional media. Analog media may also provide customers with a more memorable experience when a well-crafted print ad or television commercial may create an indelible impression on viewers, fostering an emotional connection to the product.

However, Given the recent shifts in the past years, we have all pondered the Internet's power to completely take over tasks such as advertising picture development, book publishing, and order processing administration, online tests and courses, application licensing, CV presentation and so on.

Despite the way on the how these media are often positioned – with old-aged debates portraying that one is better than the other, the analog and new media do not have to go head-to-head. These mediums can be utilized in tandem to make advertising and development strategies more effective than before. The analog and new media can complement one another, with each serving an important function, as it is the reason why computer devices and mobile software are interactive and entertaining more than before.

In my study, this literature gives me insights and understanding on how the society slowly shift from analog to digital media, most especially that this project focuses on creating a mobile design for students.

UI/UX Design Development and Techniques

The launch of the World Wide Web in the 1990s was a major moment in UI/UX design history. The web, with its hyperlinked sites and easy browsers, allowed anybody to access and exchange information online. This created a huge opportunity for designers to create user-centered websites that were both visually appealing and simple to use (Hassini, 2023). In addition to this, the development of mobile devices in the 2000s offered new challenges and opportunities for UI/UX designers. Because of their small screens and touch-based interfaces, smartphone and tablet designers had to reconsider how they approached layout and interaction design.

Furthermore, accessibility is becoming increasingly important in UI/UX design. With the increased use of technology by people with disabilities, designers are highlighting the need to create interfaces that can be used by anybody, regardless of ability. This includes designing for a variety of devices, locations, and scenarios, as well as ensuring that interfaces are not just simple to use but also understandable.

In my study, this literature gives me insights and understanding on how society slowly shift from analog to digital media, most especially that this project focuses on creating a mobile design for students.

Interface Elements and Iconography

Iconography plays a crucial role in the field of computer design, contributing to the user interface's visual language as these graphic symbols represents real life objects (Zhangfan Shen, 2020). The first iconography of Mac OS created by Susan Kare, an American graphic designer,

in 1984, when Apple releases the first personal computer called the Mac. Before Mac, computers were complex behemoths designed primarily for research and commercial purposes only, and to interact with a computer, Apple wanted to simplify the operating system so that average people can understand instinctively what they needed to accomplish (Kindy, 2019).

Figure 21

Apple Mac OS Iconography Designed by Susan Kare

Figure 21 shows Susan Kare's iconography for Mac that made computers feel more approachable and intuitive for people who had never used computers before. Since computer matrix is essentially a grid, Kare sketched her icons on a 32-by-32 square and began coloring in squares to make the icons (Kindy, 2019). Many of these icons mirrored real world objects to feel more intuitive and easier to use. For example, the trash bin icon represents all files deleted on a computer, and to make the Mac friendlier, the smiling Mac icon will appear every time users boot their computers.

The review of the literature for graphic design in the new media environment helps this project to understand interactive design for the mobile application project, specifically for the UX/UI Design as it can help this project to know the roots and practices in designing mobile software. It also serves as a reminder for the considerations that designers need to remember for the design to be inclusive and accessible for as many people as it can. Moreover, it helps this study to understand the immense development of digital technology and how it can be utilized by people, may it be an artist, mathematician, engineers, professors, and such to make interaction easier and enjoyable.

Furthermore, this also shows the study of interface elements and iconography is relevant when creating a mobile app design as simple icons can represent a certain function in just a click. In today's day and age, it serves the outmost importance when people use their smartphones as icons represent a certain meaning. This review can also help this study on how to approach

designing iconography for a specific software to make it friendly looking and easy to understand for an ordinary person.

The Effectiveness of Digital Media and Mobile Apps in Educational Engagement

The education sector in the Philippines has been affected by the same issues and difficulties. Notably, these are issues in terms of logistics, ranging from a lack of instructional materials, facilities, and even schools to underpaid yet overworked instructors. Nonetheless, education is still highly valued in Filipino society; in fact, it is often regarded as the great equalizer of opportunity (Al-Rashiff Hamjilani Mastul, 2023). However, when the COVID-19 epidemic affected the Philippines, educational leaders were again faced by another challenge. The situation forced educational authorities to reorganize the curriculum and change the instructional setup to support remote learning, which is the most viable answer to the situation (Sacramento et al., 2021).

Being able to interact with technology as an individual is a key aspect in learning for students in the twenty-first century. According to Ignacio (2021), access to technology has become increasingly important even after the Covid-19 pandemic. His investigation in the use of online classes and learning in the Philippines showed that the academic institution's way of connecting to their educators and students are through social media channels. He suggested that even after the pandemic, schools should prepare appropriate assessment tools for the students and that taking advantage of digital tools and technology can hone students in their learning, for instance, implementing a hybrid or blended learning.

Following the World Health Organization's (WHO) announcement that COVID-19 had reached pandemic status, nations enforced community quarantines and lockdowns, effectively suspending classes at all levels. Drudging the pandemic in the Philippines, President Rodrigo Duterte imposed an extended community quarantine (ECQ) on the island of Luzon, forcing schools to switch to remote learning (Commission on Higher Education [CHED], 2020). According to Statista Research Department (2021), during the implementation of online learning for most academic institutions, 30% of the 200 survey participants believed that the success rate of using digital technologies lies between 20 to 50 percent, 29% in less than 20 percent effective, 28% voted for 50 to 80 percent effective, and 14% for 80 to 100 percent effective.

By knowing the perception and engagement of students or younger generation in smartphones and how they often use it for educational access, this project can establish that target users, as well as the target function of the project will serve the best interest to improve their academic life even outside their academic institution.

Overall, these reviews of related literature serve as guidance for the researcher in the user-centered design process when creating the app. The reviews will help this project established the basic design principles that must be observed for the design creation, to understand how people perceive design and its meaning as they incorporate it in their everyday life, and how the modern graphics and interactive technology affected people's interaction and education system.

Review Of Creative Works

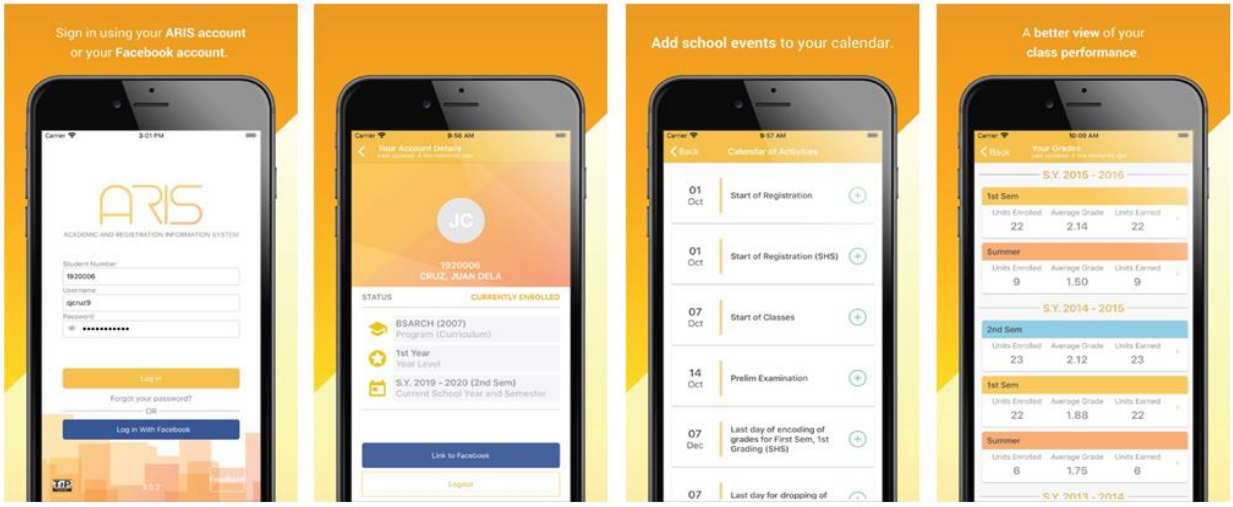
This section of the paper will cite a series of related mobile apps like the proposed project to analyze mobile applications from different academic institution in the Philippines. The related works that will be discussed will provide an in-depth examination of how these mobile applications serve their purpose in terms of design, workflow, and its overall purpose in an academic institution.

ARIS Mobile

One of the examples of student portal here in the Philippines is the Technological Institute of the Philippines (T.I.P.) ARIS Mobile. T.I.P is one of the Philippines' leading schools in Engineering and Computing education, and they introduced the mobile version of their Academic and Registration Information System called ARIS Mobile for students to download the app in their phones. The app is for T.I.P. students to conveniently access essential school-related information with the use of their smart phones (Technological Institute of the Philippines, 2022).

Figure 22

ARIS Mobile App Interface Screenshot



As shown in Figure 22, the ARIS Mobile is a mobile-based application designed to help T.I.P. students access and monitor their information through their phones and is completely integrated to the web version of their student portal, allowing administrators to get things done in less time but with a broader and easier access for their students. The app donned an analogous warm color from yellow orange to orange-red, while blue as a color breaker. There are some pages of the app that are congested in text and spacing, but overall, the information needed is given to the students and is still understandable. Also, if students find themselves having system error, they can message system maintenance to improve their mobile experience through the app.

For this project, ARIS Mobile serves as a reference and inspiration in developing mobile accessibility of student portal by creating a mobile app. It serves functions that that help the T.I.P.

students to access their information such as grades, calendar, tuition balances, enrollment, available classes, school hymn and support system, in which it is one of the main goals for this project to achieve.

iBU Student Portal

The iBU Student Portal is an app developed by Kenneth Alberto, Ian Andrew S. Mayor, and Frances Mikhaela B. Quiapos as an undergrad capstone project in 2022 for Bicol University (BU). The iBU Student Portal is a cross-platform mobile application for accessing academic data of the students at Bicol University. The development and implementation of the project was proceeded by the programmers under the BU Information and Communications Technology Office, headed by ICTO Director Dr. Aris J. Ordoñez, and led by the Project Manager Ms. Majel Belarma (Bicol University, n.d.).

Figure 23

iBU Student Portal Interface Screenshot

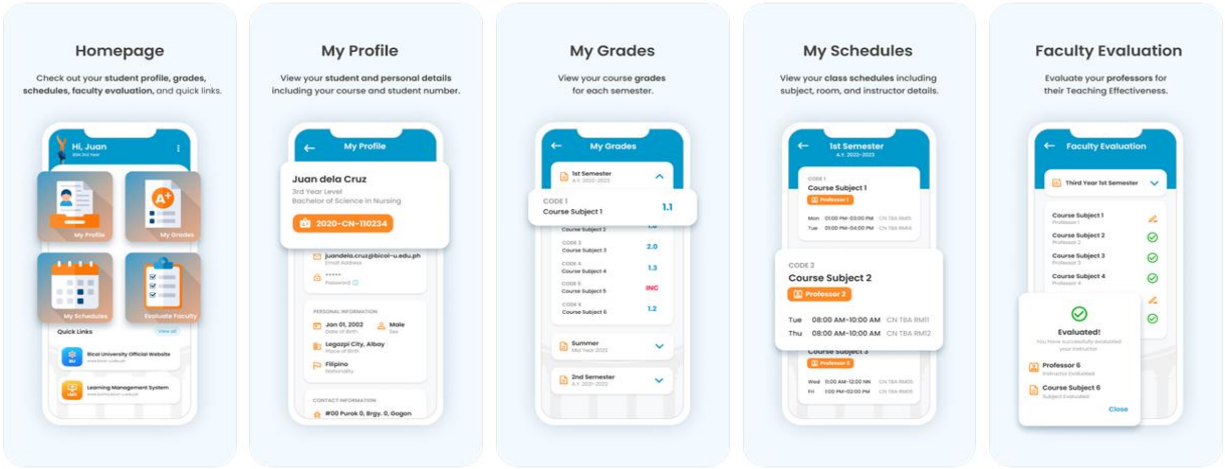


Figure 23 shows the interface of iBU Student Portal. Developers and designers had increased user usability, dependability, accessibility, and security, the program expanded its functionalities, improved its UI/UX design, and underwent quality testing. The portal provides student grades, schedules, and faculty evaluation. Students also have a profile page where they can see their student number, year level, and college department. Also, the app the app is consistent in its use of icons to visually understand its features and the color palette is aligned with the school's logo. It is also noticeable how the app uses a plain white background which makes the overall look to be clean and modern.

In this project, a systematic wireframe should be implemented to have smooth and seamless experience when using the app while also taking familiarity to APC's identity. The iBU Student Portal uses their school's main color palette and settled with dominantly white color to make text and colored icons more recognizable. With this, it serves as a reference or inspiration for the designer when considering adding sub-colors for the final output.

SJIT S3 Mobile

Another example of a student portal app in the Philippines is the Saint Joseph Institute of Technology (SJIT) S3 Mobile. SJIT is a private school in Butuan City located on Montilla Boulevard. Dr. Nicomedes Salas established it in 1971 as a technical-vocational college. They launched the S3 Mobile as a native mobile app of their web-based student portal S3 Aris Student Portal to make students record accessible easily with smartphones or tablet. (Saint Joseph Institute of Technology, n.d.).

Figure 24

SJIT S3 Mobile Interface Screenshot

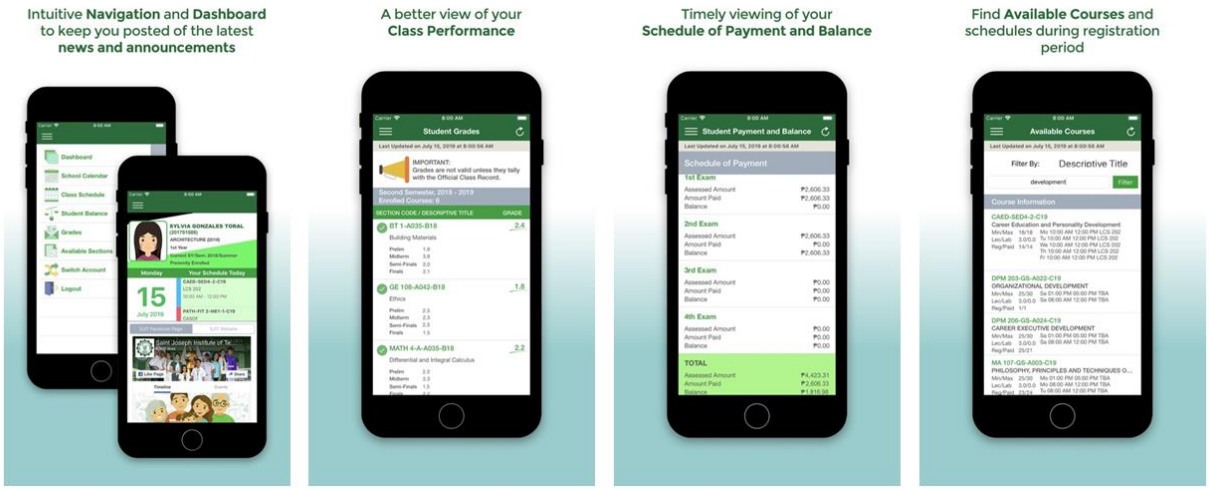


Figure 24 shows the SJIT S3 Mobile for students access and monitor their information through their phones. Students must log-in with their school email address to open their student portal in the mobile version. If students find themselves having system error or slow loading screen, they can also message system maintenance to improve their mobile experience. The app uses the green tone of institution to familiarize the user in its interface. However, the app lacks visual hierarchy and spacing, resulting in too many small texts in the screen and crowded visual elements for users to comprehend. It is also noticeable that there are some pages of the app that are overwhelming in information, making it harder to visually comprehend. Despite this, the app is still straight forward and easy to understand for many. It's easy to navigate and find key features that give necessary information to the students.

For this project, it aims to provide coherent information to students via mobile app with the use of icons or drop-down menus to make the interface easy to comprehend and to not overwhelm users with visual elements. Though the S3 Mobile falls short in visuals and aesthetics, it still provided coherent information for students. This shows the importance of utilizing mobile apps to show data and contents that is needed by their users like how the student profile, newsletters, and daily schedule is located at homepage – giving the user less work in accessing important

information. The app also provided their users with familiarity by integrating their school's color palette on the visual design.

Google Classroom

Google Classroom is a free tool that helps students and teachers communicate, collaborate, organize, and create assignments. It makes learning paperless. Google Classroom, as a digital tool, is only available to customers who have Google Apps for Education (Hussaini & Libata, 2020). Digital Tools like this emphasize learners' ongoing learning activities using digital tools such as desktop computers, and smart phones.

Figure 25

Google Classroom Mobile Interface Screenshot

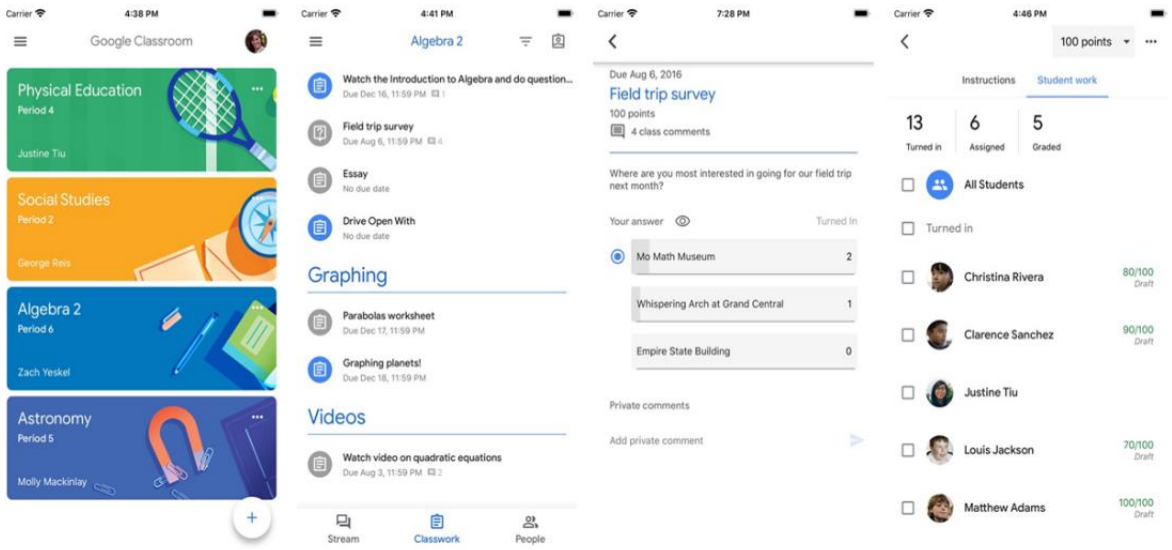


Figure 25 shows that with the mobile app Google Classroom, teachers can collaborate with their pupils without ever meeting in person by just using their smartphones. Teachers use this medium to publish resources for their students, make announcements, and set projects and quizzes for students to complete, submit, and save online, either in a web browser or on the Google Classroom App. Students can also see their grades, missing assignments, or even comment about activities to directly ask inquiries about it.

For this project, the accessibility and navigation will have an important role for the student's experience when using the app. Digital tools like Google Classroom can help designer define a coherent layout and wireframe for the final design, making sure that the app is usable, easy to understand, and function as intended.

Microsoft Teams

Virtual learning platforms, among other digital technologies, have experienced a major surge in use for distant education because of the Covid-19 pandemic. The increasing adoption of virtual learning systems that emphasize collaboration, real-time interactions and conversations

between instructors and students, mobile-accessible online lectures, and prompt feedback has emerged from the rapid transition to remote education. In response, Microsoft launched MS Teams, a software tool that facilitates communication and cooperation inside the Office 365 environment (Mahmud & Wong, 2023). It has garnered extensive acceptance in a variety of companies. It has user-friendly features, especially now that Office 365 environment has its own mobile app for smartphone accessibility.

Figure 26

Microsoft Teams Mobile Interface Screenshot

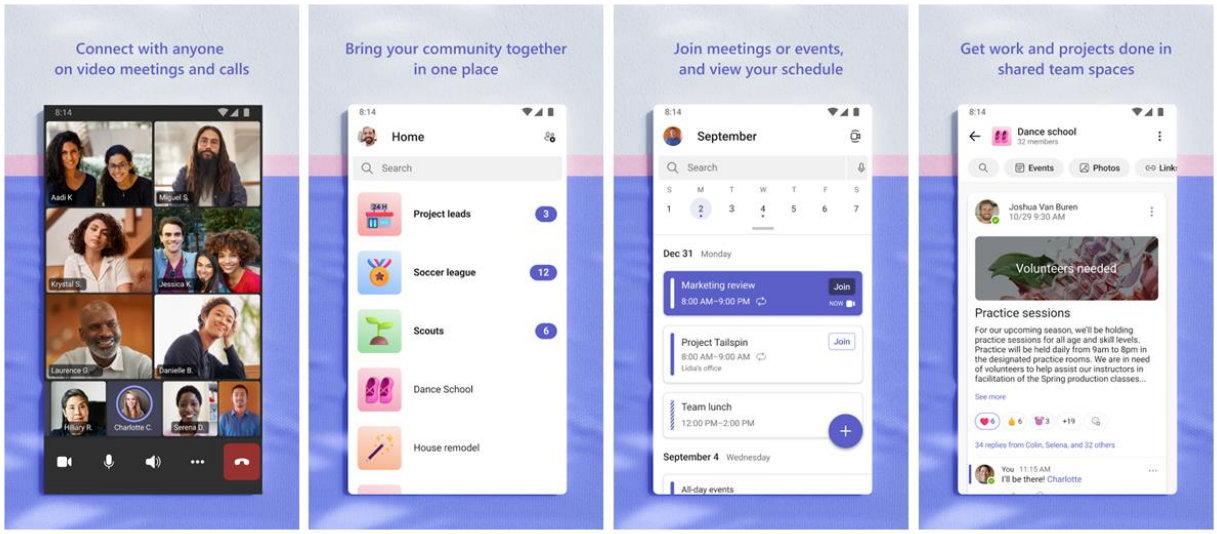


Figure 26 shows the interface of Microsoft Teams mobile app. Its user-friendly features, such as the ability to build general or customized channels with tabs such as "post," "file," "class notebook," "assignment," and "grade," add to its usefulness as a tool for fostering student interaction in academic contexts. Furthermore, the automated consolidation of SharePoint file storage and the "share screen" functionality for online video chats and screen sharing promote synchronous meetings and discussions. The integrated "chat" feature improves communication among team members as well.

This project aims to empathize with the pain and needs of APC students towards their experiences in student portal website. By integrating visual elements that is easy to understand, like the Microsoft Teams' use of Ghantt Chart for calendar, use of color contrast to highlight active elements, and the use of animation or motion graphics to bring the app to life, it manifests that, based on studies, that graphic visuals have a big impact to mobile app engagement.

Results and Discussion

For this study, I conducted an online preliminary survey that focuses on APC students' overall experiences – mainly based on the interface design and functionality, on the current format of the APC Identity Service. In addition to this, I also conducted a Personal Interview that focuses on gathering qualitative data for non-verbal behaviors of the target users. It was revealed both in the preliminary survey and interview that students have strong opinions for improvements for the

APC Identity Services, most specifically about its mobile responsiveness and its interface design. The results support other studies that were reviewed in this paper. Studies have shown that mobile apps are effective tool to improve student learning and iterative development is crucial in making educational applications.

After creating the design prototype for RAMS Mobile, it goes through a user testing phase from 16 college students. The testing of prototype aims to evaluate and validate the success of the redesigned prototype based on its interface and its usability. By going through this process, it increases the chance of creating a successful and usable design for the student portal app that meets the needs of the target user and provides a positive user experience. It also provides further suggestions from the target user for the final design presentation of the prototype. The testers were asked to rate the interface and their experience with a numerical scale, 1 being the lowest and 5 being the highest, the feature that they find the most useful, and their comments and suggestions based on their overall experience.

Preliminary Survey Result

The following data was gathered from December 17 – 23, 2023, with 30 respondents to gather input from the target user about the current format of the APC student web portal. By utilizing MS Forms, a part of Microsoft's 365 Office where users can create questionnaires and surveys, the respondents were able to answer the survey online with easy access and real time update.

The respondents were asked 11 questions regarding their personal information, experience while using the student portal website, and suggestions regarding the project. Below are the summary and analysis of the survey with charts and graphs to easily understand the respondents.

Figure 27

Device Use to Access Student Portal

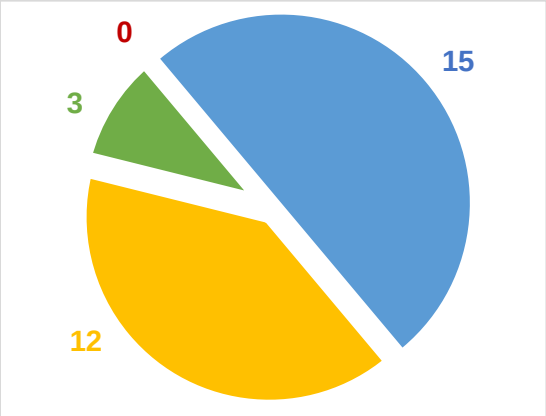


Figure 27 illustrates the device employed by students to access their student portal. Predominantly, students utilize their mobile devices, with 15 out of 30 respondents indicating this preference. Following closely, 12 out of 30 respondents opt for laptops, while three (3)

respondents favor desktop computers for portal access. This result shows that the scalability issue of the student web portal is a major problem for APC students as most of them use their mobile devices to access their student porta. With this, prospect of creating a design solution for a mobile design for APC student web portal became more relevant.

Figure 28

Usage of Target Users

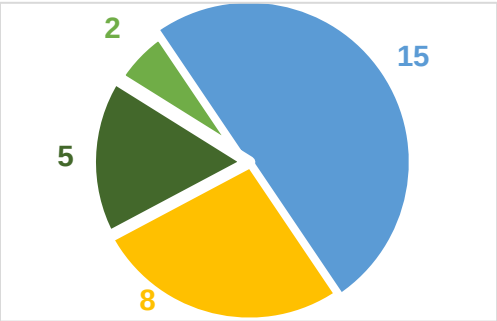
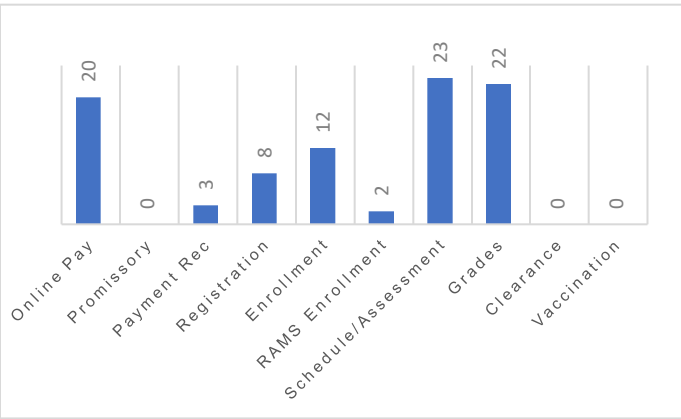


Figure 28 displays the frequency of student access to their student portal. According to the data presented, 15 out of 30 respondents access the portal on a weekly basis. Additionally, eight (8) respondents report monthly usage, while five (5) respondents indicate rare usage. Only two (2) respondents access the portal daily. Gathering data on how students frequent their student portal is important, for this project, as it emphasize the importance of student portal to the APC students and in connection with the result of user behavior in Figure 1, the RAMS Mobile shows relevance and design solution to alleviate the accessibility problem of the student web portal in terms of the design and its features.

Figure 29

Most Used Features

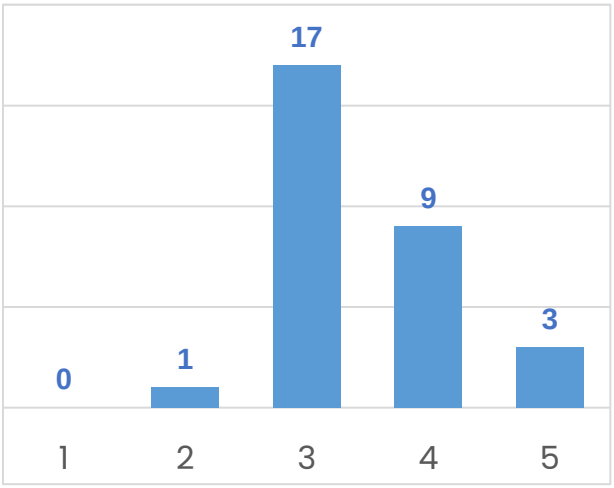


According to Figure 29, students consider the Schedule/Assessment feature on the student web portal as the most relevant, garnering 23 out of 30 responses. Following closely, the Grade Viewer feature receives 22 responses, while Online Payment have 20 responses. Enrollment is deemed relevant by 12 respondents, Registration by eight (8), Payment Records by three (3), and RAMS Enrollment Lane by two (2) respondents. Gathering data about the top

relevant feature of student web portal for students show what students use the most in which, this data will help the to the decision making in the design process.

Figure 30

Average User Rating for Web Portal



4. Average rating for student web portal

$$Average = \frac{(a_1 + a_2 + a_3 \ldots + a_n)}{n}$$

$$Average = \frac{[0 + 2 + 3(17) + 4(9) + 5(3)]}{30}$$

$$Average = \frac{(2 + 51 + 36 + 15)}{30}$$

$$Average = \frac{104}{30}$$

$$\boldsymbol{Average = 3.47}$$

Figure 30 shows the average user rating experience while using the APC Identity Service. Using a numerical scale rating from 1 (lowest) to 5 (highest), the overall average user rating equates to 3.47. Most respondents, 17 out of 30, rated their experience at level 3. Additionally, nine (9) respondents rated it at Level 4, three (3) respondents at Level 5, and one (1) respondent gave a rating of 1. Gathering the data about user's rating of APC student web portal serves as reference and guide to know if the project successfully attained a higher rating and positive feedback from its target users.

Personal Interview Results

A series of personal interviews were conducted with six APC students to collect their experiences with the APC Identity Service, while using both mobile devices and desktops. The following are the respondents' answers to the questions:

1. How often you use your Portal, and what for?
    - *"I use it for viewing my schedule."*
    - *"Ginagamit ko siya pag mabgagayad lang ng tuition"*
    - *"Ginagamit ko yung portal para sa grades, tuition…"*
    - *"For checking ng grade pati ng subjects."*
    - *"Pag nag babayad and pag registration."*
2. What device do you use to access it?
    - *"Usually, mobile device yung gamit ko"*
    - *"Laptop yung ginagamit ko kasi mas accessible doon. May lag kasi siya pag sa phone."*
    - *"Sa phone ko lang siya ina-access"*
    - *"Phone kadalasan yung gamit ko. Pero laptop talaga pag payment or enrollment kasi mas maayos siya [student portal] doon."*

- *“Sa phone lang ako nagbubukas kasi mas madali”*

3. What are your experiences while using it? Does the portal help you provide the features and information’s that you need?
    - *“Pag sa mobile, pag ni-landscape mo hindi siya [Interface] nag-aadjust, so hindi mo makikita, kunwari, yung full schedule. Kailangan mo i-view talaga through a computer.”*
    - *“So far, ang purpose lang ng portal sa akin is yung magbayad talaga ng tuition… May isa akong problem which is pag meron ka kasing balance, hindi ka nila agad ia-approve. Kailangan pa pa pumunta muna sa registrar to clear yung issue. Mas okay kung merong feature na mapakita yung balance ko para di na rin ako laging pumupunta sa finance.”*
    - *“Luma na kasi yung phone ko, yung website minsan ‘di gumagana sa browser ko… Dati nangyari sa akin na ang lag talaga sa phone tapos nagka-problema sa online payment ko.”*
    - *“Madami akong frustrations pag ginagamit yung portal. Unang-una pag yung error pag nagla log-in. Tapos pag nag refresh yung page nala log-out. Hindi nagsi stay yung pag open nung account. Tapos bago ka mapunta sa ibang feature, nago-open siya ng another tab kaya nakaka-frustrate kasi bumabagal yung phone.”*
    - *“Syempre natutulungan ako nung website pero minsan yung error ayaw ko talaga, which is hindi naman talaga mawawala yun. Also yung pag phone… kilangan mo siya i-“desktop site view” para makita ng buo yung information. Pag di mo kasi ginawa yun kahit i-landscape mo kailangan mo pa rin i-scroll horizontally para makita yung nasa sides.”*
4. What are your comments on the mobile version of the student portal?
    - *“I feel like mas Maganda kung merong mobile app… Gusto ko is minimalist lang kasi ang purpose lang naman talaga, for me, is magbayad ng tuition and mag view ng grade.”*
    - *“Mas okay yun kasi di na ako magba-browser and accessible na siya sa phone.”*
    - *“Siguro, kung mag w-work siya sa lahat ng OS or kung Maganda yung magiging accessibility niya sa lahat ng phone and kung magno-notif din talaga sa mga updates or pending clearances.”*
    - *“For me, very relevant siya pati madali gamitin. Gusto ko kasi na naka log-in lang talaga yung account ko, no need to log in again para hindi saying oras.”*
    - *“Depende siguro kung anong meron sa app. Kasi kung same lang naman ng website, parang okay na rin na mag webstite na lang muna para di bawas sa storage kung sakaling ida-download pa since di naman ko siya [student porta] ginagamit daily.”*

Prototype Testing Results

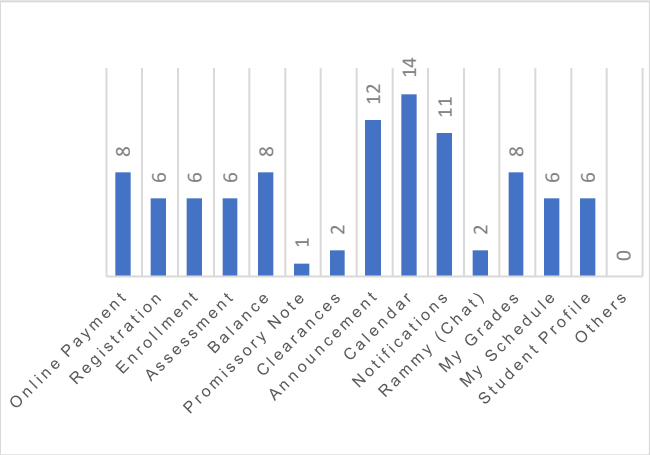
Prototype testing is a simple yet effective way to gauge the perspectives of the target users by allowing them to interact with the prototype and identify where the project may fall short

for the intended audience. This process not only provides valuable insights into potential shortcomings but also evaluates the overall success of the project in terms of its design and usability. During this prototype testing phase, testers were asked to identify their favorite features, rate the design and overall user experience, and provide detailed feedback aimed at enhancing the outcome of the project.

The testing process involved a group of APC students representing the target audience, ensuring that the feedback collected was comprehensive and representative of potential end-users. Testers were encouraged to explore all aspects of the prototype, from the main functionalities to the finer details of the user interface. The following are the detailed results of the prototype testing:

Figure 31

Most Liked Features

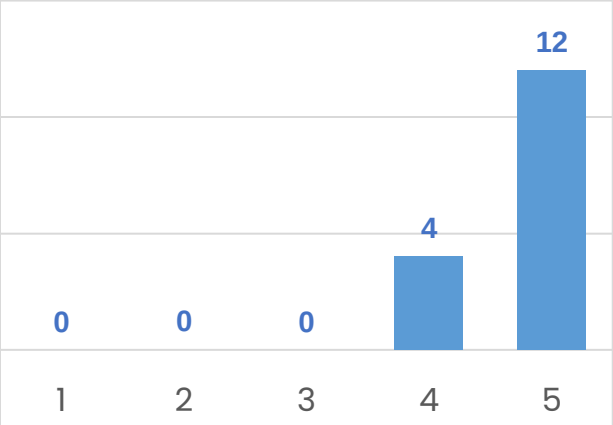


1. Feature(s) that you like the most?
   - (14) Calendar
   - (12) Announcement
   - (11) Notifications
   - (8) Online Payment
   - (8) Balance
   - (8) My Grades
   - (6) Registration
   - (6) Enrollment
   - (6) Assessment
   - (6) My Schedule
   - (6) Student Profile
   - (2) Clearances
   - (2) Rammy (Chat)

Testers were asked to select what features appeal to them the most in consideration with the design, information, and layout. Figure 31 shows that the feature that testers like the most was the Calendar, and new feature for the RAMS Mobile with 14 testers mentioning it to their favorites. Next is the Announcement feature with 12 votes, and Notification with 11 votes, where in both features are new features for the RAMS Mobile. The other features that testers like the most are: Online Payment (8), Balances (8), My Grades (8), Registration (6), Enrollment (6), Assessment (6), My Schedule (6), Student Profile (6), Clearances (2), Rammy (2), and Promissory Note (1). This data shows that the additional features added in the RAMS Mobile such as Calendar, Announcement, and Notification, and Balance received positive feedback for the target users while the older features such as Online Payment, My Grades, Registrations, and such remained relevant for the students.

Figure 32

Average Rating for User Interface (UI)



2. Average rating for User Interface (UI)

$$Average = \frac{(a_1 + a_2 + a_3 \ldots + a_n)}{n}$$

$$Average = \frac{[0 + 0 + 0 + 4(4) + 5(12)]}{30}$$

$$Average = \frac{(16 + 60)}{16}$$

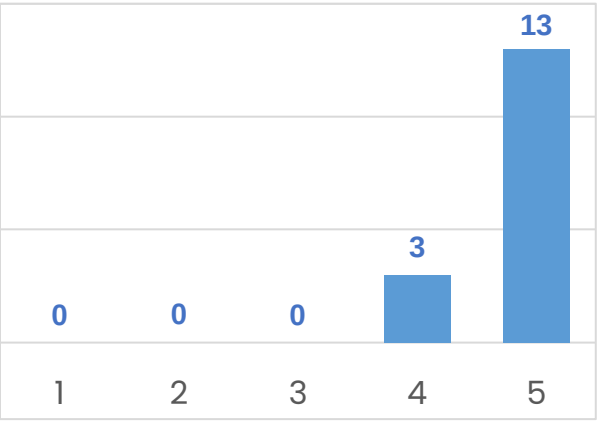
$$Average = \frac{76}{16}$$

$$\boldsymbol{Average = 4.75}$$

Figure 32 shows the average of rating of testers to the design interface of RAMS Mobile. Testers were asked to consider the layout of the design, how information are presented, visibility of text and icons, color palette, and if the design is intuitive and user-friendly while navigating. By using a numerical scale rating, with one (1) being the lowest and five (5) being the highest rating, the equated overall average user rating was 4.75. The majority rated the design 5 gathered from 12 out of 16 user testers while the remaining four (4) testers rated the design on Scale 4.

Figure 33

Average Rating for User Experience (UX)



3. Average rating for User Experience (UX)

$$Average = \frac{(a_1 + a_2 + a_3 \ldots + a_n)}{n}$$

$$Average = \frac{[0 + 0 + 0 + 4(3) + 5(13)]}{30}$$

$$Average = \frac{(12 + 65)}{16}$$

$$Average = \frac{77}{16}$$

$$\boldsymbol{Average = 4.8125}$$

Figure 33 shows the average of rating of testers from their experience while using the prototype. Prototype testers were asked by how fast they navigate the app to achieve their goal, if it was easy to navigate, were the features relevant for them, and their overall feeling while using the app. By using a numerical scale rating, with one (1) being the lowest and five (5) being the highest rating, the equated overall average user rating was 4.8125. The majority rated their experience with 5 gathered from 13 out of 16 user testers while the remaining three (3) testers rated their experience on Scale 4.

Figure 34

Overall Average of UI and UX

User Interface (UI) Average	4.75
User Experience UX) Average	4.8125

$$Average = \frac{[4.75 + 4.8125 =)]}{30}$$

$$Average = \frac{9.5625}{2}$$

$$\boldsymbol{Average = 4.78}$$

Figure 34 shows the overall point average of the UI and UX for the mobile version of the student web portal. By finding the sum of average of UI and UX, then dividing it by two (2), as there are two items, the result for the overall average is 4.78. This shows an increase in average compared to the 3.75 average gathered from the preliminary survey.

Table 1

Feedback from Prototype Tester

No. of Respondent	Feedback
1	The app is easier to use than the current website
2	Good interface. It matches the APC brand
3	As long as it doesn't need to be rotated in order to see the entire UI, it's all good.
4	this is very good, the icons are kind of small especially the one in homes page.
5	I like it and this is something I wish we have right now because checking the Rams portal via a mobile browser is difficult.
6	None
7	I like the overall design. The color and logo match APC brand. Though there are some elements that are not properly aligned sa homepage.
8	None
9	None, it would be better is APC adapt this mobile version to be more efficient in checking student related updates

10	Compare to what we are currently using, this is much more easy to use especially that it's already a mobile version. I also like the additional features that will really help student
11	Siguro just change some icons lang. For me I don't like na star yung sa grades. And I notice na misaligned yung icons sa homepage and meron din na icons na inconsistent yung styles if you compare it to other icons. Goodluck!
12	Overall, the only suggestion that I have is to make the icons bigger. And to revise Rammy's icon to a much more cartoonish look.
13	- Some of the icons are not aligned. - The grades viewer is okay but the icon is a 'star'? - The ui is good, it gives the school's vibe - My suggestion is in the account info pwede naka-lagay don kung ilan subs yung enrolled ka, pwede rin yung status mo as a student kung irregular ka ba or what, etc. e.g. Currenty enrolled 5 subjects, Regular
14	The design really feels like APC brand. Though, for the calendar at homepage, there should be color indication about what kind of day it is (Regular classes/holidays/grades consolation/midterms/finals week)
15	None
16	the notification can be clickable so the viewers can read the announcements or the notification clearly.

According to the statements given by testers in Table 1, the prototype for RAMS Mobile in connection to the overall user rating (see Figures 6 & 7) received a positive reaction to the target users. Some respondent stated that the prototype was on brand and easier to use compared to the web version, primarily since the prototype is for a mobile use, which is the device mostly used by APC students, and to additional features such Announcement and Calendar as advantage to improve their student and academic life. Although, the prototype still received feedback for improvement such as making the icons bigger, changing some icons to make features more intuitive, and to add more student information such as the total subjects enrolled and their status as a student.

Based on the given statements by the testers, their insights and comments showed that the RAMS Mobile was able to deliver a design solution to the problem about the scalability and design issues of the APC student web portal by using the User-Centered Design theory and following the Design Thinking Process. Moreover, the usage of intuitive symbols such as icons, interactive elements, and color palette helped the user's experience to be familiar in navigating the design prototype. This resulted in an increased experience rating to the testers.

Conclusion

Smartphones have made life easier due to its convenience and portability and overtime, the use of smart device technologies and mobile apps evolved in education system to engage students with class materials and help them improve their educational experience. According to the preliminary survey, 15 out of 30 respondents open their student portal weekly to facilitate their schedule, to view their grades, and to pay tuition online. In addition to this, 15 out of 30 students primarily use their mobile device to access the student portal while the remaining respondents use either a laptop (12) or desktop (3) computer. The experience of the respondents while using the student web portal resulted in the overall average of 3.47 satisfactory level. Personal interviews also show that most of the respondents felt frustrated to the scalability and design issue of student web portal whether they're using mobile phone or a desktop computer and felt that the student portal lacks features that help them as a student.

With that, I created a mobile design solution through RAMS Mobile, a student portal that allows APC students to have an enhance mobile experience and comprehensive student portal as part of a broader initiative to improve their academic life. Based on the result of prototype testing wherein I was able to assess 16 testers' feedback and suggestions regarding the design and usability of RAMS Mobile. Results showed an increase of the average rating of the interface design and mobile experience with the result of 4.75 and 4.8125 average rating respectively, and with the overall point average of the UI/UX with 4.78. During prototype testing, testers were asked on what features they like the most, and the result showed that the new added features such as Announcement, Calendar, Notification, and Balances received high scores primarily due to its relevance and advantage to make their student and academic life easier. Moreover, the insights from testers were gathered for the iteration of the prototype for the preparation of the project exhibit. These results showed a positive outcome for this project which proves the success of the design intervention in addressing the occurring scalability and design issues of the student web portal. Furthermore, it also showed that the use of User-Centered Design theory and Design Thinking Process where proven effective to further understand and empathize the consumer and user of our products, and that the usage of intuitive symbols such as icons, interactive elements, and color palette results in an increased experience rating to the target users.

Recommendations

Research Topic

When I was consulting with other people about this project, I was given many suggestions that I was not able to incorporate app because the project targets only APC students, thus, the RAMS Mobile were only exclusive for them. With that, I suggest further expand the demographic of this project such as making a jam within the log-in page where users can choose between students or administrators or create a similar app for professors and instructors where they can encode or update their student's information. By creating a topic like this, it is important to be mindful of the timeline, responsibilities, target users, and budget to make the research and the project feasible for the proponent(s). Future proponent could also expound the designs studies and theorems in interface design such as accessibility design and color theory to make the project accessible and inclusive to those who are visually impaired and accommodate all potential users in many contexts of use, which can result in better design for all.

Iteration to the Project

This project highlights the use of User-Centered Design theory and design thinking process when developing a product. In a way, it is an iterative process – a technique to optimize products, services, or processes by repeated cycles of trial and error. The RAMS Mobile can further improve in terms of respondents as I only gathered 30 respondents for the preliminary survey, 5 people from a personal interview, and 16 college students for prototype testing. Thus, by reaching more respondents within the APC student demographic, they can result in an enhanced and improved experience of RAMS Mobile in the next iteration. The prototype testing can also be improved by actively participating in the test as proponent by conducting a moderated testing where in the proponent(s) will be a moderator to the testers to facilitate them in achieving a certain goal within the app.

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