Supporting Class Infrastructure through *Task Management* Mobile Application during Pandemic

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Abstract

During the pandemic, most university students have difficulties interacting with lecturers to follow and update their project progress periodically. Procrastination is a problem that often occurs in this kind of circumstance. Developing the sustainable infrastructure that may be implemented for this situation needs further consideration, and several factors contribute. Digital technology scientifically can optimize or improve performance also interaction between lecturers and students. Utilizing mobile apps as tools to support the infrastructure of class activities can help break down their projects, and it also ensures the sequence stays in the proper order. Constructing tools for students using the app *Task Management* may improve their productivity in running tasks assigned by their lecturers. The methodology used is in-depth interviews (qualitative) with students and lecturers, supported by a literature review based on Design Thinking for educators by IDEO design by Tim Brown. The authors also analyze and visualize based on the data obtained from the research methodology. The results show that there is potential for both students and lecturers to use this app in their classrooms as they are likely to use it to manage their tasks and for lecturers to keep track of their student's progress and give feedback.

Keywords
Procrastination, Class infrastructure, Digital method, Productivity, Mobile app.

1. Introduction
Many students struggle with managing their projects. These students face problems that include procrastination, not knowing where to start, bad time management, lack of information and understanding of the design process that the project requires, and lastly, feeling overwhelmed when these tasks pile up. There is no denying that deadlines for work can be overwhelming. Impending deadlines have a history of fostering last-minute dashes toward the finish line, such as when students pull all-nighters to complete weeks' worth of projects. Research has shed light on the psychology of deadlines and how we can learn ways to improve concentration and enhance perseverance through deadlines.

According to Liberman's psychologists, "As less of the task remains to be done, each unit of effort is perceived as more effective in closing a larger proportion of the gap to the goal" (Frster et al., 2007). Part of a deadline's motivational effect is that it provides you with continuous feedback on how much further you must go before the completion of the mission, allowing goal gradients to have an impact (Jarrett, 2020). Most notably, during remote working sessions during the coronavirus pandemic, there is a new challenge of a lack of structure to our days and weeks. This can cause a feeling of irregularity in our objectives and ambitions, generating a sense that they are delayed while we wait for things to return to normal. To combat this, we can place deadlines on ourselves. Liberman says, "Deadlines and progress monitoring help keep us in focus and advance our work" (Frster et al., 2007). These findings indicate that the strategic use of deadlines may be a solution that allows us to remain cantered as one-week blends into the next, paying particular attention to tracking our progress towards set goals (Jarrett, 2020).

There are many reasons why we may tend to feel overwhelmed by big projects and procrastinate instead. Research conducted by Polivy found that our brain fears big projects and often struggles to commit to long-term goals because we are vulnerable to giving up at the first sign of distress (Polivy et al., 2010). In addition, researcher McGraw shows that "we are prone to procrastinating on large projects because we visualize the worst parts and thus delay in getting

started (McGraw & Fiala, 1982). These results show that students who gave themselves too generous of a deadline frequently experienced the same problems as students who set zero for themselves. This suggests that when you give yourself too much time to complete a task, you can magnify your problems over something trivial (Ciotti, 2014). Another challenge we face is multitasking. Research shows that multitaskers are less likely to be productive, but it creates an illusion of productivity where they feel more emotionally satisfied with their work (Wang & Tchernev, 2012). Tracking our work progress has been proven to be the most effective method of staying diligent because we are exposed to the work we have accomplished (Ciotti, 2014).

Task Management which correlates to time management skills, is becoming increasingly important for students in today's busy world, especially during this pandemic. Some tips to boost productivity include creating a task list, breaking them down into subtasks, and filtering them in order of priority (Team, 2022). Some tips to boost productivity include creating a task list, breaking them down into subtasks and groups, and filtering them in order of priority. This will help students to consider the whole scope of the work and start planning their time better. In addition, students can keep track of their progress with a list of tasks, which helps increase productivity by remembering the necessary details and estimating all their tasks (Allabarton, 2020). It is important to organize the notes and workspace. The constant change in project requirements is very common, where lecturers could unexpectedly update the assignment's criteria or shift deadlines. It is possible to lose the notes students have taken regarding the assignment or forget what that note applies to. This is where a *Task Management* tool can come in handy to improve a student's workplace and keep it systematized.

2. Methodology

The research was conducted through literature reviews and a qualitative method of in-depth interviews. Most of the research information collected was from online resources ranging from websites, articles, journals, and reports for the literature review. The fundamental theory discussed the basic structure of *Task Management* tools, the interaction design process, learning management systems, and app design guidelines. The journals in the literature review section covered topics on deadlines, progress monitoring, and productivity. Based on IDEO design and Riverdale Country School in New York developed a toolkit for design thinking called the Design Thinking for Educators, which divides the process of finding a solution, or innovation into five steps: research and discovery, analysis and interpretation, idea generation, experimentation and refinement, action plan and implementation (Brown, 2009). Researchers use the Design Thinking Process, which is then adjusted to the needs of Digital Design Methods of the mobile app creation process, which are: (1) Research; (2) Analysis from the ideation; (3) Design Concept; (4) Experimentation; (5) Design Implementation.

3. Research

This phase was carried out by observing the Task Management and interaction design solution literature studies.

3.1 Task Management

Task Management is managing a task's life cycle, from planning to tracking to execution. It is how you break down complex projects into more straightforward, smaller tasks to be managed more easily. It can help you finish projects successfully and in the most productive manner possible. Having a task priority helps users decide which tasks they should work on first (Babich, 2018). Setting an assignment due date or deadline is essential to specify the date and time of when a study must be done. While the task is in progress, the due date can highlight almost due and overdue tasks, accompanied by notifications and reminders to avoid procrastination and delays. Breaking an enormous, complicated task into subtasks helps users be more efficient when managing a study by breaking it into smaller, more straightforward steps to achieve the desired outcome (Cardello, 2021).

Successful task completion relies on accurate task duration estimation. It is the process of estimating the time required for task completion. Scheduling tasks helps to convert your work strategy from a vision to a time-based plan. Functions without a clear start and finish plan are more likely to be delayed. It is an essential part of the task planning phase, which helps users start and finish tasks within the scheduled time frame (Cardello, 2021). Lecturers can track task progress and spot troubles with their students' task execution. Furthermore, once a task reaches a deadline or is overdue, the system can send out notifications as a reminder before or after the assignment's due date.

3.2 Interaction Design Process

The interaction design process designers use to design solutions based on users' goals, aims, and behavior when interacting with products. The user experience (UX) design process follows a similar design thinking approach, consisting of a five-stage process of empathizing with users, defining the problem, ideation, prototyping, and user testing (Brown, 2009). The picture can be seen below in Figure 1.

Figure 1. Design Thinking: A Five Stage Process
Source: interaction-design.org

The user research phase is an essential starting point of UX design. Designers can conduct user research through interviews, online surveys, and focus group discussions. The study results teach designers about the users, their behavior, goals, and needs. It is necessary to have empathy while listening to and observing users. Compiling the results into a user persona (Kouprie & Visser, 2009). Next is analyzing the research results and compiling them into a user persona and a user journey map. A user persona is a fictional character representing the target audience and their behavior. A user journey map is a diagram that illustrates the steps taken by a user to accomplish a goal (Dam & Siang, 2022).

User flows provide a guide illustrating the sequence of interactions users should take to complete a specific task. User flow is the foundation of a design's structure to build wireframes and prototypes. A wireframe is a visual guide with the framework for each product page. It can be low fidelity with a minimal layout and fewer details, or high fidelity, which is more complex and fuller. The wireframe conveys the layout and organization of each page within the overall design (Downs, 2020).

The prototype functions as a simulation of an almost fully realized product design. It includes navigation, interactions, and all the content and visual elements that users will experience and interact with (Sutcliffe, 2016). Once the prototype is ready, usability testing is conducted to validate the design flow and user experience. It can be very effective in identifying potential usability or design issues to explore areas of improvement in functionality (Downs, 2020).

4. Analysis

This phase was carried out by analyzing information and facts gathered. According to the psychologist, many students procrastinate because they put off their tasks until the last minute, and they feel overwhelmed when the tasks pile up near their due dates. Instead, students should manage their workload by progressively working on their tasks daily leading up to the deadline. This is achievable by breaking down more significant tasks into smaller tasks, which we can work on daily, and gives us a sense of achievement and motivation when we finish these smaller subtasks. It is important to prioritize which tasks require more effort and time and which are more urgent to determine the order of the tasks to work on. Finally, productivity tools can help keep track of our tasks and organize them, if we diligently use and update them daily (Figure 2 and Figure 3).

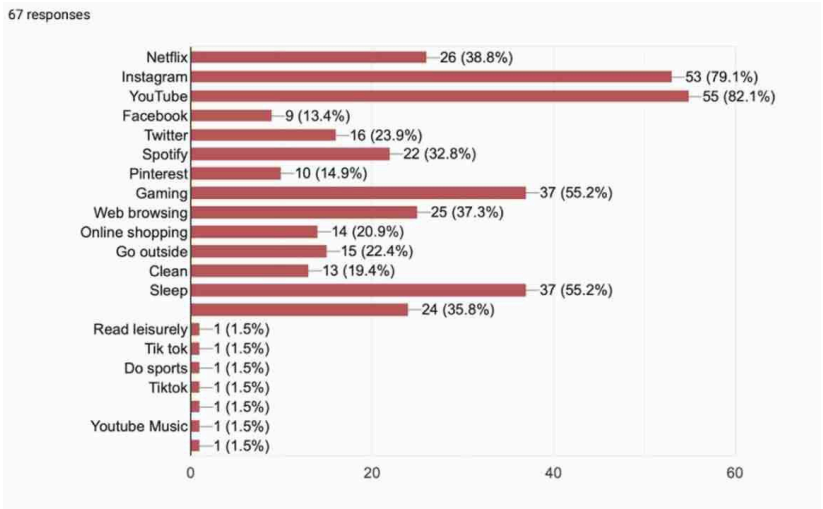

Figure 2. Data compiles from 67 responses about the student's activities while procrastinating

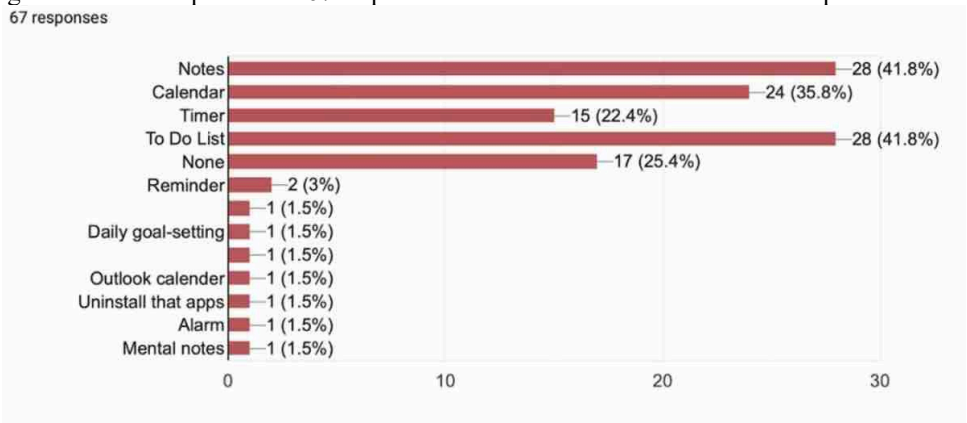

Figure 3. Data compiles from 67 responses about the tools students use to help with procrastinating.

The researchers analyzed the concept of designing a *Task Management* app that would be very helpful for both lecturers and students to keep track of each class and their deadlines. Based on researcher experiences, not many people use the website unless necessary, it is difficult to navigate through the site because there are too many features. She comments on how the website has no reminders for deadlines. Researchers suggest that the *Task Management* app should be simple to use where lecturers will input tasks for students to see, and the students can see the overview of the tasks visually with a calendar view. The design should be simple and user-friendly.

Furthermore, a reminder feature would be helpful if it is constantly visible and not easily dismissible by the user. Finally, she recommends that the app be implemented in the teaching ecosystem for mandatory use by the lecturers and students to manage assignments. Researchers agree that designing a *Task Management* app for lecturers and students to keep track of course materials and assignments would be especially helpful during this pandemic, where we are currently working from home. Some lecturers assume that keeping track of every student's progress is very important to help students in the parts they do not understand. The app design should be user-friendly by eliminating users' frustrations in the user flow. The task list should be defined with subtasks for detail and clarity.

5. Design Concept

The main media used is an iOS mobile application for *Task Management*. The name of the *Task Management* app is EZPZ, which is an abbreviation for easy-peasy. The app's mission is to break down challenging projects that seem overwhelming into smaller and more manageable tasks that students can work on regularly. Furthermore, the lecturers will input the projects and task list, which the students can see an overview of, removing the hassle of students manually inputting the to-do list themselves. The visual design is a simple, clean, and modern interface with a pop of

bright colors to appeal to a younger audience who are design students. The primary color is periwinkle blue which symbolizes calmness and productivity. The accent colors are used to color coordinate different projects and represent the urgency of upcoming deadlines and progress bars.

The app's logo is a wordmark of the app's name EZPZ. The app's colors are mainly light, with a pop of blue and colorful accent colors used to organize and differentiate the different projects, their status, and deadlines. Blue was chosen as a primary color to promote calmness, productivity, and efficiency. The accent colors are a pop of color to organize the different projects and priorities of upcoming deadlines. The red color represents urgency, and the green represents the fullness of the progress bar.

The fonts used are Proxima Nova and Graphik, sans serif fonts for a simple and easy-to-read interface (Figure 4). The main functions and features of the app include Simple and straightforward navigation, user-friendly and easy to add, edit, and check off tasks, an overview of tasks with subtasks and deadlines, calendar view, task progress bar, sharing task progress with friends, uploading files to receive feedback from lecturers. User Experience The app's goal is to deliver a user-friendly experience with ease of use and interactivity (Support, 2022). One of the critical methods used is by decluttering the design by keeping the content and interface elements to a minimum to improve comprehension. The pages are kept to a minimum with a clear visual hierarchy and legible text sizes (Kaber et al., 2002). In addition, the navigation is simplified with easy-to-learn navigation and clear labeling with tabs, icons, and graphic elements. The designer wants the users to have a painless, comfortable experience by minimizing user input. Students will have no need to input the tasks themselves, and while it is the lecturer's job to create a class, input the projects and tasks, and invite their students, the forms are kept short and broken down into smaller chunks 36 to prevent complexity for the user at one time. Chunking helps connect two different activities, and when the flow is logically connected to each other, users can navigate it more easily (Iqram & Student's Id, 2015). Lastly, the design is kept consistent to maintain an overall visual and functional consistency to eliminate confusion. Since the app will be designed for the iOS platform, the designer has designed the app based on Apple's Human Interface Guidelines for iOS users to become more familiar with the interaction patterns of the iOS app (Developer, 2022).

Figure 4. Visual Identity, including the logo, colors, and font used

6. Experimentation

During this work process, the researchers have created a mind map, mood board, and app user flow for *Task Management*. The pictures can be seen below. *Task Management* is a tool to organize, prioritize, and complete projects more efficiently. It can help manage and organize workload to improve the quality of work.

Figure 5. Mind map

The app user flow is the user's path to complete a specific action (Figure 5). For the Task Management app, there will be two different user flows. The lecturer will create a class, invite students, and add the projects and tasks with their deadlines. The students can see an overview of their tasks, tick off the tasks they have completed, and upload files to receive feedback from the lecturers. Furthermore, lecturers can monitor students' input and comment on each task. The notifications will serve as alerts, updates on any changes a lecturer has made to a task, and reminders for tasks with approaching deadlines. The following mood board consists of pre-existing task manager apps available on the market. Everyday visual consistency is a simple, light interface with colorful accents to label the different icons and statuses based on the current trend. It will become a consideration to inspire in designing the *Task Management* app (Figure 6).

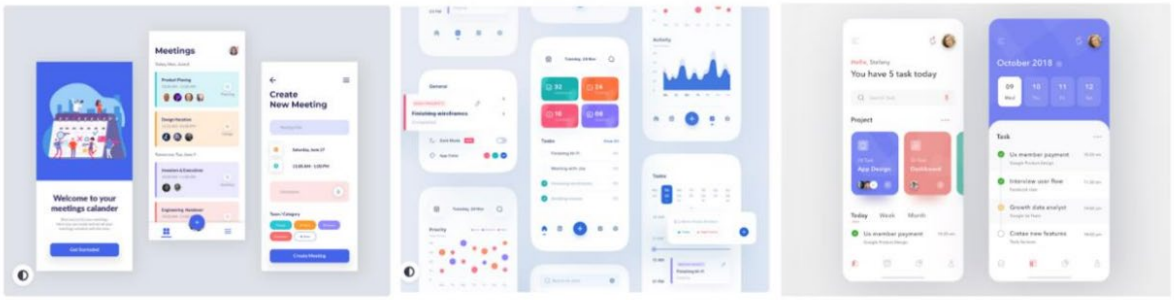

Figure 6. Mood board

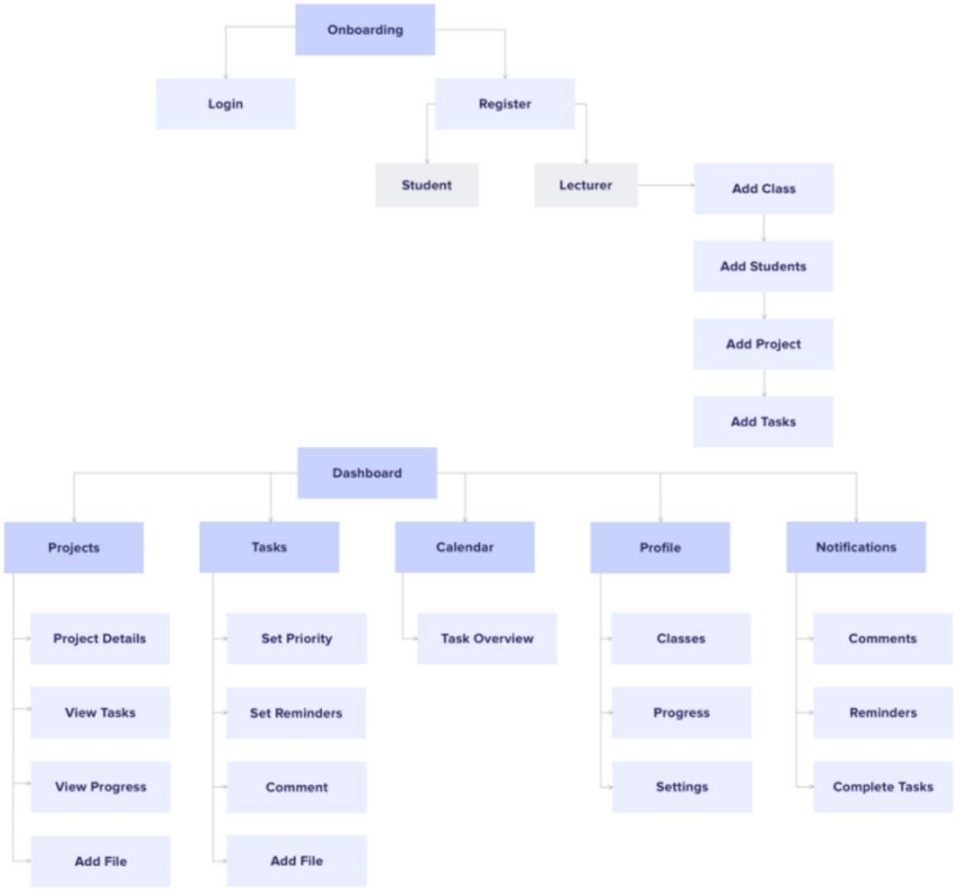

Figure 7. App User Flow

The wireframe outlines the basic structure and navigation of the *Task Management* app. On the home page (Figure 7) students can see an overview of their tasks on that given day. There is a calendar view with a list of daily tasks for students to estimate and distribute their workload. The projects section is split into three main categories, ongoing, upcoming, and done. In the project detail, students can check off the tasks they have done, see their progress bar, and upload files under each task to receive feedback from their lecturers. On the onboarding page, illustrations were on Procreate made to illustrate the app's features. The style of the onboarding illustration is friendly and minimal to communicate the critical features of the app engagingly personally. The app wireframe can be seen in Figure 8 below.

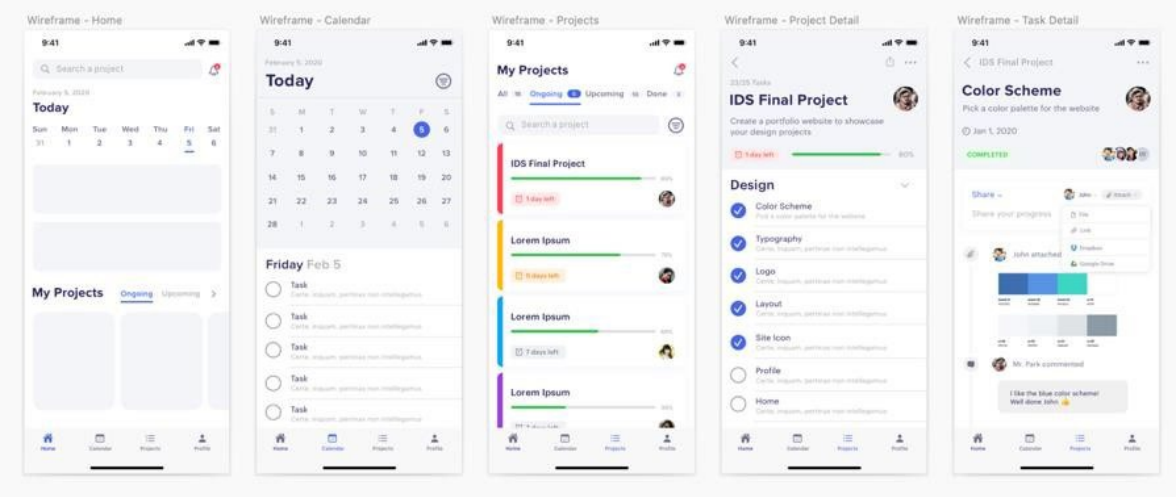

Figure 8. App Wireframe

7. Design Implementation

After going through research, analysis, design concept, and experimentation, the researchers finally perfected the chosen ideas into a set of high-fidelity prototypes created on Sketch, then imported to Figma for prototyping. The primary purpose of the *Task Management* app EZPZ is to help students organize their workload in their design classes. Hence, the tagline is easy peasy, abbreviating to EZPZ. Students can manage their projects all in one place, improve productivity and quality of work, and finally keep track of their progress and deadlines. There are two ecosystems on the app for students and lecturers. Below are the design for student HiFI (Figure 9), the lecturer HiFi (Figure 10), and the on-boarding illustration (Figure 11).

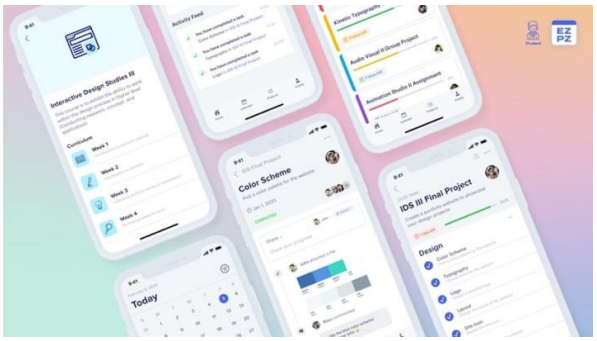

Figure 9. Student HiFi

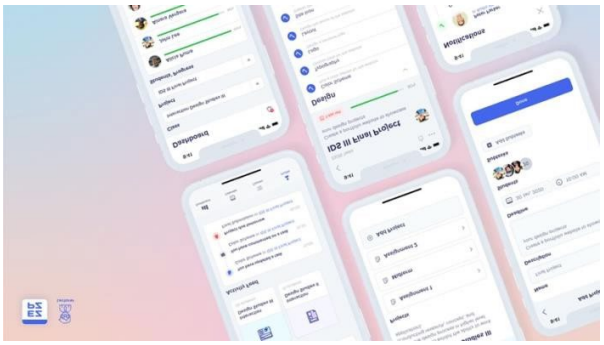

Figure 10. Lecturer HiFi

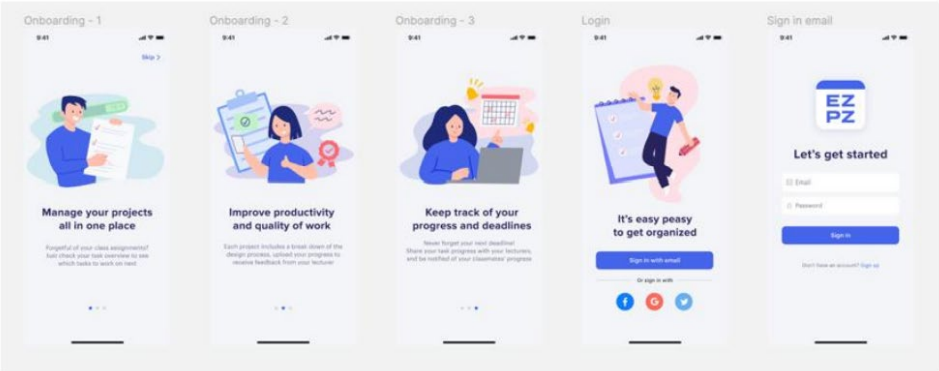

Figure 11. Onboarding Illustrations

The prototype below (figure 12) was created on Maze. Since there are two ecosystems in this *Task Management* app, consisting of the student and lecturer sides, there will be two different prototype paths. This prototype aims to showcase the interactivity of the app user flow and allow for usability testing. The prototype includes simple animations for a smooth, friendly user experience.

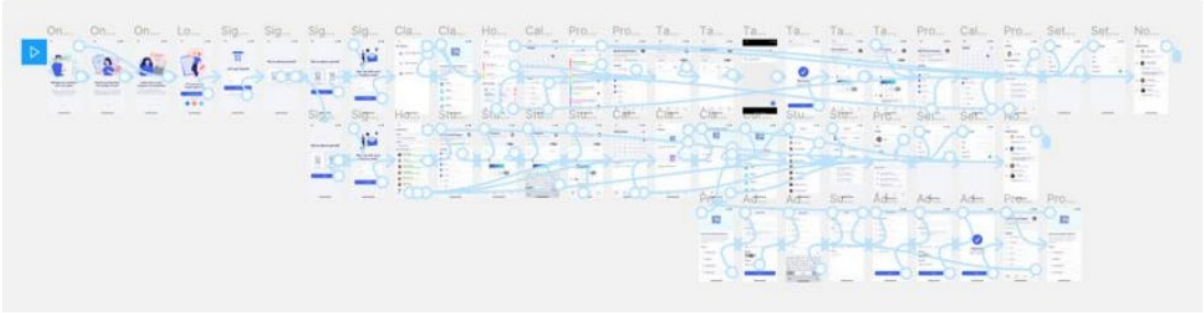

Figure 12. Prototype

Usability Testing The usability testing was conducted remotely through Maze, a usability testing tool for prototypes to generate user feedback. The benefit of Maze is that it includes a visually dynamic report that analyzes the test results. There were four participants, two students, and two lecturers. Overall, the process was straightforward for the testers. The usability score was 80 overall, which is a high score that indicates the design will be easy to use and intuitive. When asked if they would use this app for their classes, both agreed they would highly likely use this *Task Management* app. Their feedback states that this app is excellent and helpful and would use it in real life. One suggestion would be to add a chat feature with lecturers.

8. Conclusion and Recommendation

After going through research, analysis, design concept, and experimentation, the researchers, have emerged with a more effective way to maintain interaction between lecturers and students through digital design methods. They are constructing tools to improve student project monitoring that can be implemented based on mobile apps to avoid procrastination problems. For students, it can be challenging to start on more significant tasks as the amount of work can seem overwhelming. Therefore, the tasks can be broken down into smaller, more achievable goals in subtasks to make them more manageable. Utilizing this *Task Management* mobile app would help students visually keep track of their projects in class with a pre-determined list of tasks from their lecturers. This project has the potential to be implemented in classrooms to help visually inform student progress of their projects and remind them of their deadlines and for lecturers to give feedback and track their student's progress in every project they assign. It can be a sustainable solution.

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Biographies

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