



9-15: Uptimise

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Introduction

Uptimise is a mobile app that enables students to take charge of their learning by helping them to build effective study habits through gamification, and seamlessly integrating their online assignments with offline homework.

Rationale

Recently, the utilisation of technology to maximise learning outcomes has become increasingly common. The COVID-19 pandemic has catalysed the shift towards technologically enabled learning in schools, so many learning resources and assignments are now uploaded online (Li & Lalani, 2020). This has created new challenges, adding on to a growing list of issues that students face:

- Lower productivity due to distractions from games, social media, etc.
- Poorer organisation of lesson materials and assignments due to the multitude of online learning platforms
- Inability to keep track of short-term and long-term homework, and examination dates

Project Scope

While some of this app's features were tailored to meet Singaporean students' needs, its core functionalities would be useful to any student with an Android or iOS phone and an Internet connection.

Literature Review

Background Information

Technology has revolutionised the way students learn. The wealth of information on the Internet, and the online portals that facilitate learning by engaging students with multimedia lesson packages are just the tip of the iceberg. However, technology can also be a distraction: students are more likely to multi-task while learning online, leading to poorer academic performance (Lepp, Barkley, Karpinski, & Singh, 2019). Moreover, with blended learning in countries such as Singapore, homework and assignments are being distributed both online and offline, making it difficult to keep track of deadlines.


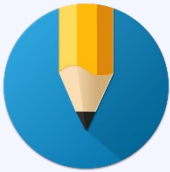


To boost one's productivity, researchers have proposed various strategies to increase concentration. One such method is the Pomodoro Technique (Cirillo, n.d.), which uses a work-reward system to motivate individuals towards achieving their goals, where distractions are intentionally removed from students' learning environments (Schmidt, 2020). Work is broken down into three cycles of 25-minute sessions, separated by 5-minute breaks. After three cycles, individuals can take a longer 15-minute break.

Another strategy is gamification, defined as the addition of game mechanics into non-game environments. Gamification can be integrated into services through providing motivational affordances (e.g. points, achievements, storylines and rewards) to increase user activity, social interaction, or quality and productivity of actions. In particular, gamification is frequently utilised in educational contexts, and this has resulted in positive learning attitudes and more enjoyment in learning tasks for students (Hamari, Koivisto, & Sarsa, 2014).

Therefore, our app strives to blend these two strategies together and incorporate users' tasks into the game, creating a highly personalised user experience. This encourages the building of effective study habits such as reducing procrastination, and minimising multi-tasking and distractions when working.

Similar Products

A vast majority of apps either help to boost productivity or organise lesson materials and assignments – our app does both.






 <p>Forest</p>	<p>Features</p> <ul style="list-style-type: none"> • A user initiates a work session by planting a tree • When the user focuses on his work, the tree grows • Leaving the app halfway causes the tree to die <p>Gaps</p> <ul style="list-style-type: none"> • Limited features – users cannot collate their assignments • Overly restrictive – limits usage of all apps • Users are not notified when sessions end
 <p>myHomework Student Planner</p>	<p>Features</p> <ul style="list-style-type: none"> • To-do list • Track assignments, projects, tests <p>Gaps</p> <ul style="list-style-type: none"> • Limited features – Does not increase productivity • Unreliable – some updates cause crashes • Unattractive user interface
 <p>Todait</p>	<p>Features</p> <ul style="list-style-type: none"> • To-do list • Calendar to keep track of schedule • Memo to write notes <p>Gaps</p> <ul style="list-style-type: none"> • Plain functionality – Does not use a gamified approach to productivity • Poor user interface
 <p>Calendar</p>	<p>Features</p> <ul style="list-style-type: none"> • Note down important deadlines <p>Gaps</p> <ul style="list-style-type: none"> • Limited features – Does not help to increase productivity

The Study & Methodology

Needs Analysis

We conducted a survey with 40 students. 97.5% of respondents reported experiencing lower productivity due to distractions from technology while 70.0% said there were excessive online learning platforms. Furthermore, 72.5% agreed that our app would be helpful to their learning. This shows a clear consensus that our app would be useful to students. Detailed results can be found in **Annex A**.

Development Tools

 Flutter	Cross-platform UI toolkit <ul style="list-style-type: none">• Fast and simple development• Plethora of ready-made widgets• High performance
 Dart Dart	Programming language <ul style="list-style-type: none">• Works with Flutter• Compiles into native code
 Firebase  Hosting  Cloud Firestore Firestore	Hosting <ul style="list-style-type: none">• Production-grade web content hosting Cloud Firestore <ul style="list-style-type: none">• Cloud-hosted database that apps access directly via native SDKs

Alpha testing

The table below shows the areas for improvement that three students whom we interviewed mentioned and our corresponding actions:

Problem	Action
Too many unnecessary features – this agrees with our proposal evaluators’ comments <ul style="list-style-type: none"> • In-app tools were cumbersome • Interviewees preferred to use their phone calendar 	<ul style="list-style-type: none"> • Removed in-app tools • Replaced calendar with option for calendar integration
Text overflow when task name is too long	<ul style="list-style-type: none"> • Added an Expanded widget to the TextFormField widgets
The game had some bugs <ul style="list-style-type: none"> • The balloon occasionally disappears • Work sessions continue infinitely 	<ul style="list-style-type: none"> • Resolved • Used Crashlytics to collect analytics about crashes and errors

Beta testing

The table below shows the areas for improvement that seven students whom we interviewed mentioned and our corresponding actions:

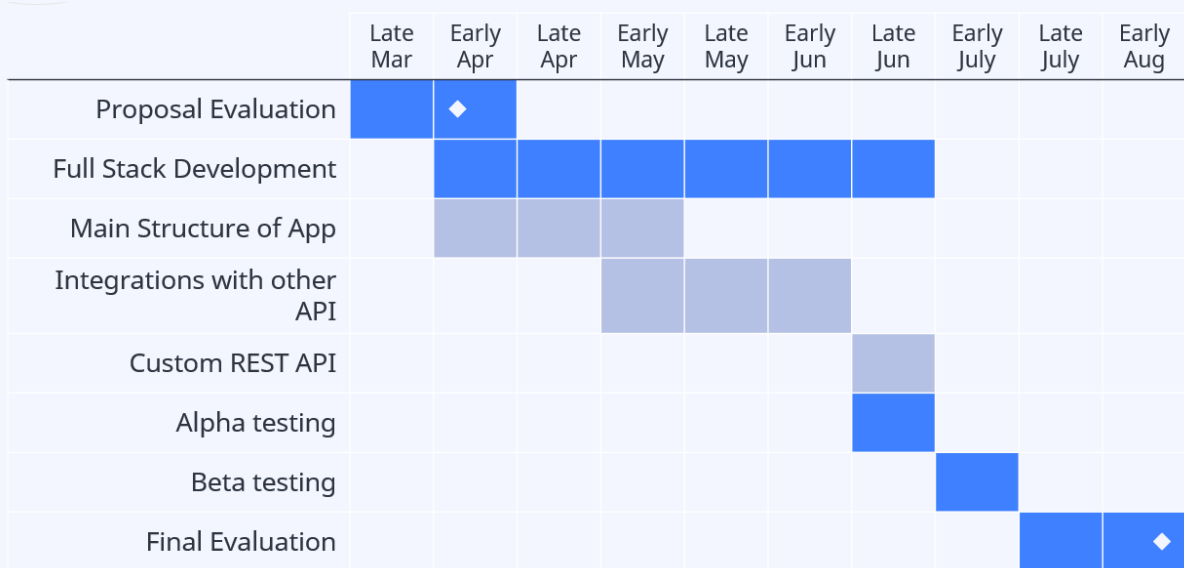
Problem	Action
<ul style="list-style-type: none"> • Game provided little incentive to initiate work sessions 	<ul style="list-style-type: none"> • Increased the rate of ascent during sessions
<ul style="list-style-type: none"> • App design is not visually appealing 	<ul style="list-style-type: none"> • Used Inkwell widget on buttons for a splash animation • Used AppTheme widget for greater thematic consistency

The students were asked to rank the app in terms of design, ease of use, and functionality on a scale of 1 to 5, with 5 being excellent. On average, they rated 3.8, 4.3, and 4.3 respectively.

Job Distribution

Kavan	Report Writer, Presentation Designer, Content Designer
Reyes	Report Writer, Needs Analysis Researcher, Product Analyst
Jiexu	Software Engineer, UI Designer
Ivan	Lead Software Engineer, UI Designer


Timeline

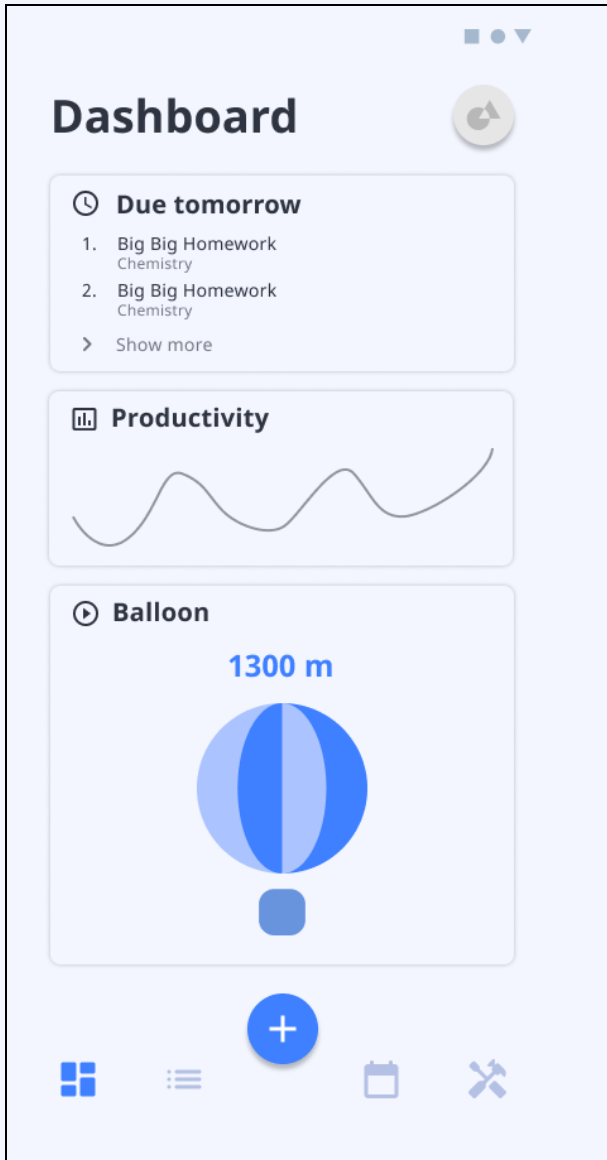


Project Timeline

Outcomes, Analysis & Discussions

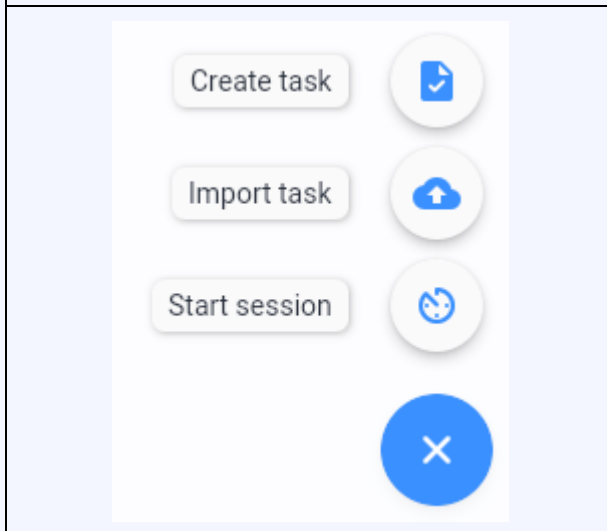
Features

 <p>Start Optimising</p> <p>Sign in with Google</p>	<p>Authentication screen</p> <ul style="list-style-type: none">• Button to sign in with Google• Authentication via Firebase Authentication SDK
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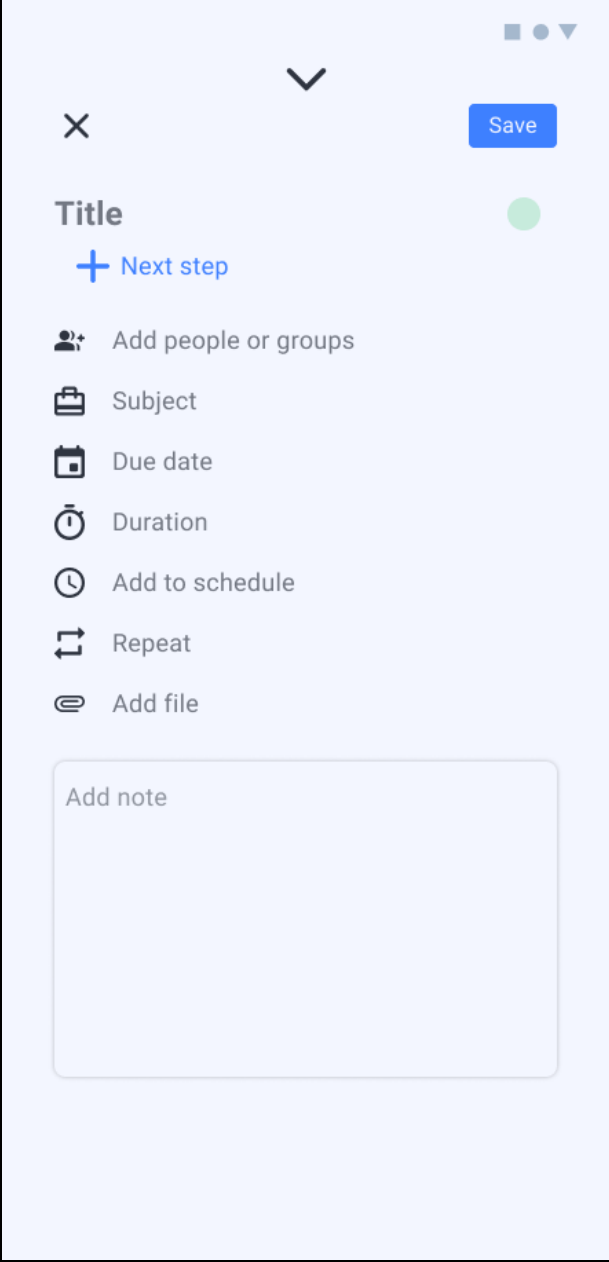
Dashboard

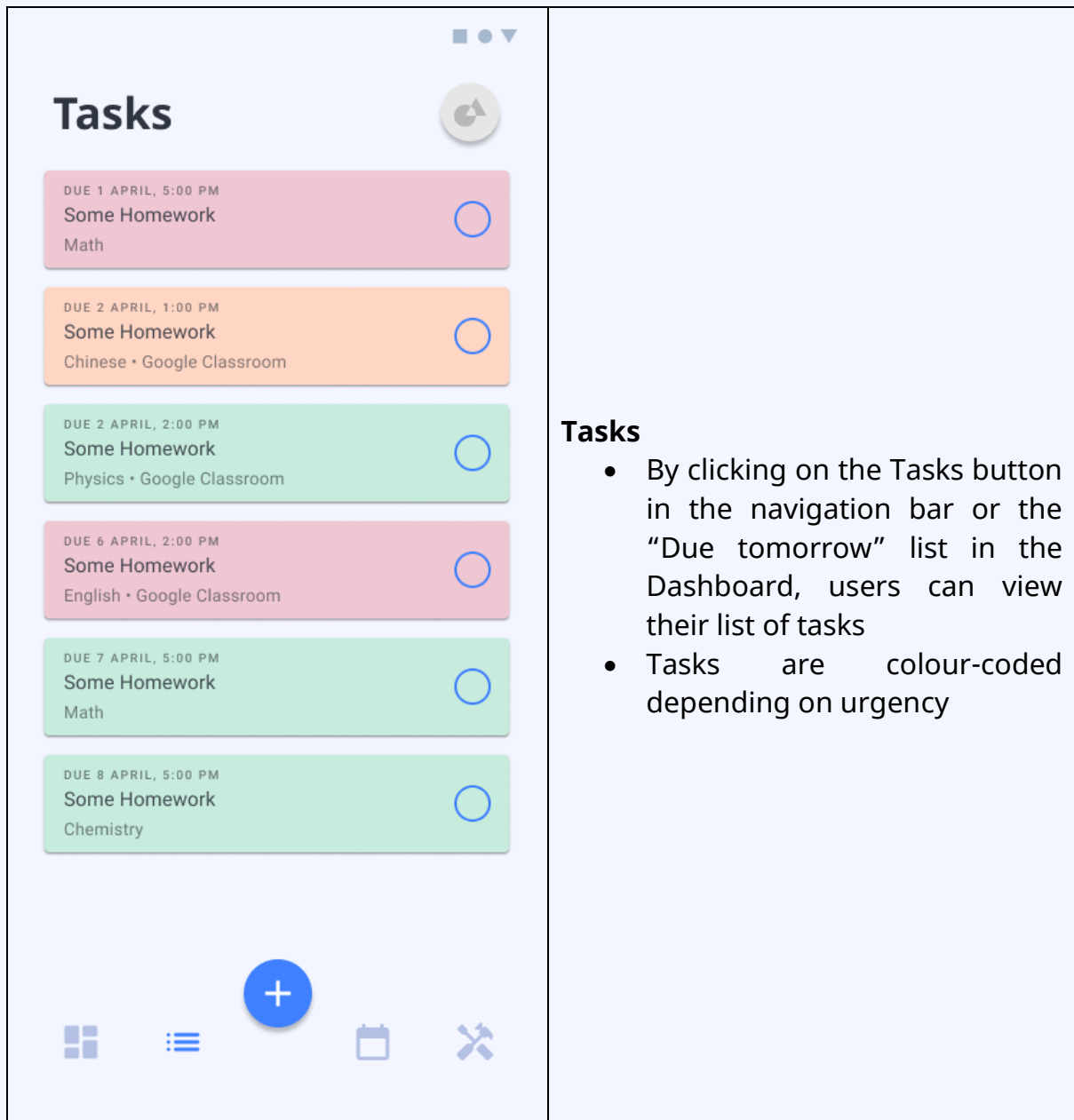
- After authentication, users can view:
 - Due tomorrow
 - Their upcoming deadlines (overview of the most urgent tasks)
 - Productivity
 - Productivity analytics to track their progress in cultivating effective study habits
 - Balloon
 - Provide hot air balloon game data at one glance
- Bottom navigation bar eases toggling between screens
- Floating action button for one-click access to adding new tasks



Floating action button menu

- Options that lead to the *Create task*, *Import task* and *Start session* screens

	<p>Create task</p> <ul style="list-style-type: none"> • Users can create tasks with the following details: <ul style="list-style-type: none"> ○ Colour-code (red, orange, green) ○ Step-by-step instructions ○ Collaborators ○ Subject ○ Deadline ○ Time for completion ○ Option to add to calendar ○ Frequency interval ○ Attachments ○ Description
	<p>Import task</p> <ul style="list-style-type: none"> • Users can import tasks from Google Classroom



<■ ● ▼

hyper difficult chem ws ●

do question 1 ×

do question 2 ×

+ Next step

👤 Add people or groups

📁 Chemistry ×

📅 Due date

🕒 1 hour ×

🕒 Add to schedule

🔄 Repeat

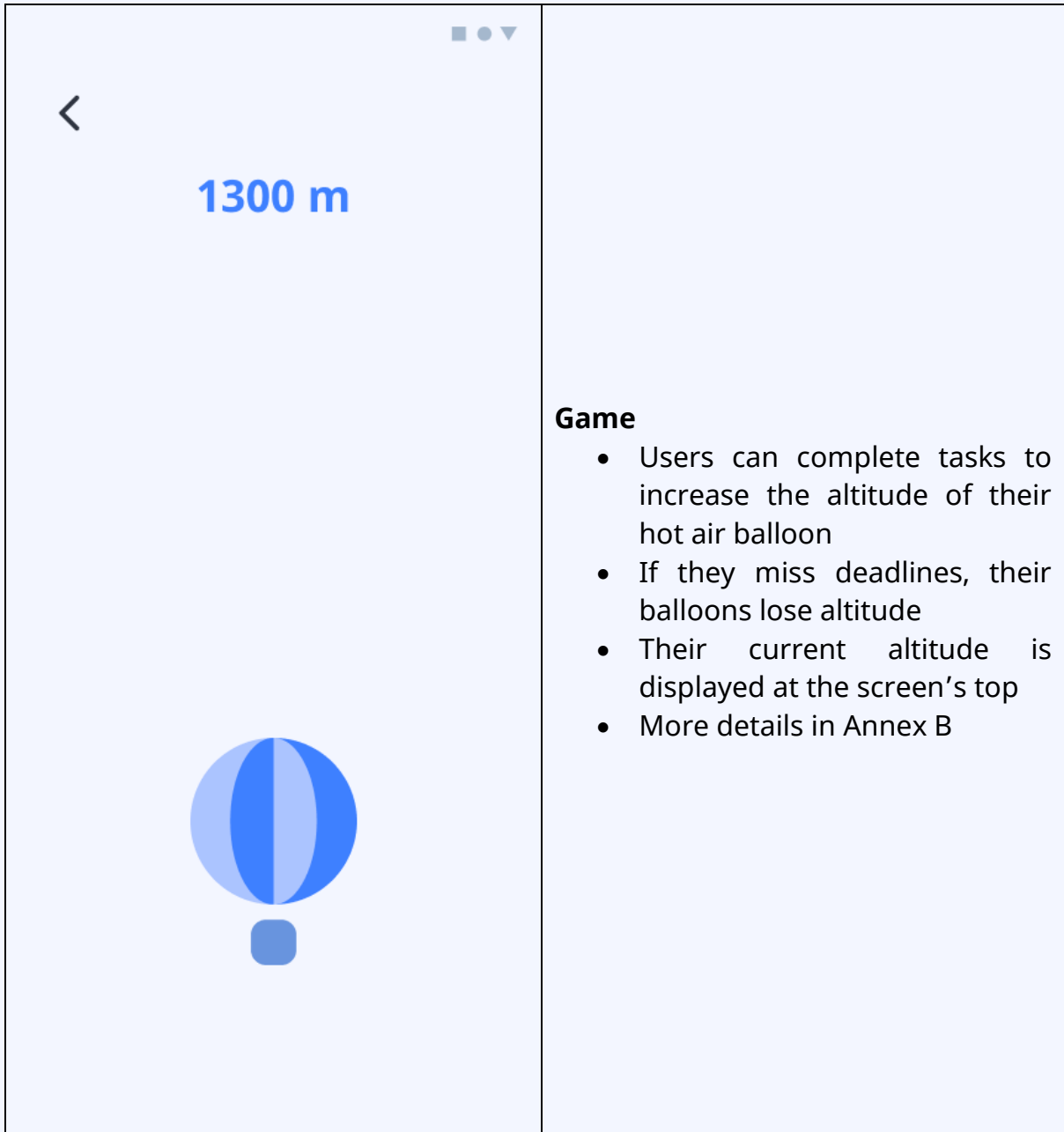
📎 Add file

This worksheet is hard... start early!

Imported from Google Classroom (some chem classroom)

Task Detail

- Users can click on each task card to reveal and swiftly edit details



Game

- Users can complete tasks to increase the altitude of their hot air balloon
- If they miss deadlines, their balloons lose altitude
- Their current altitude is displayed at the screen's top
- More details in Annex B

< Create Session

Tasks

Make friends with Donkey

learn assembly

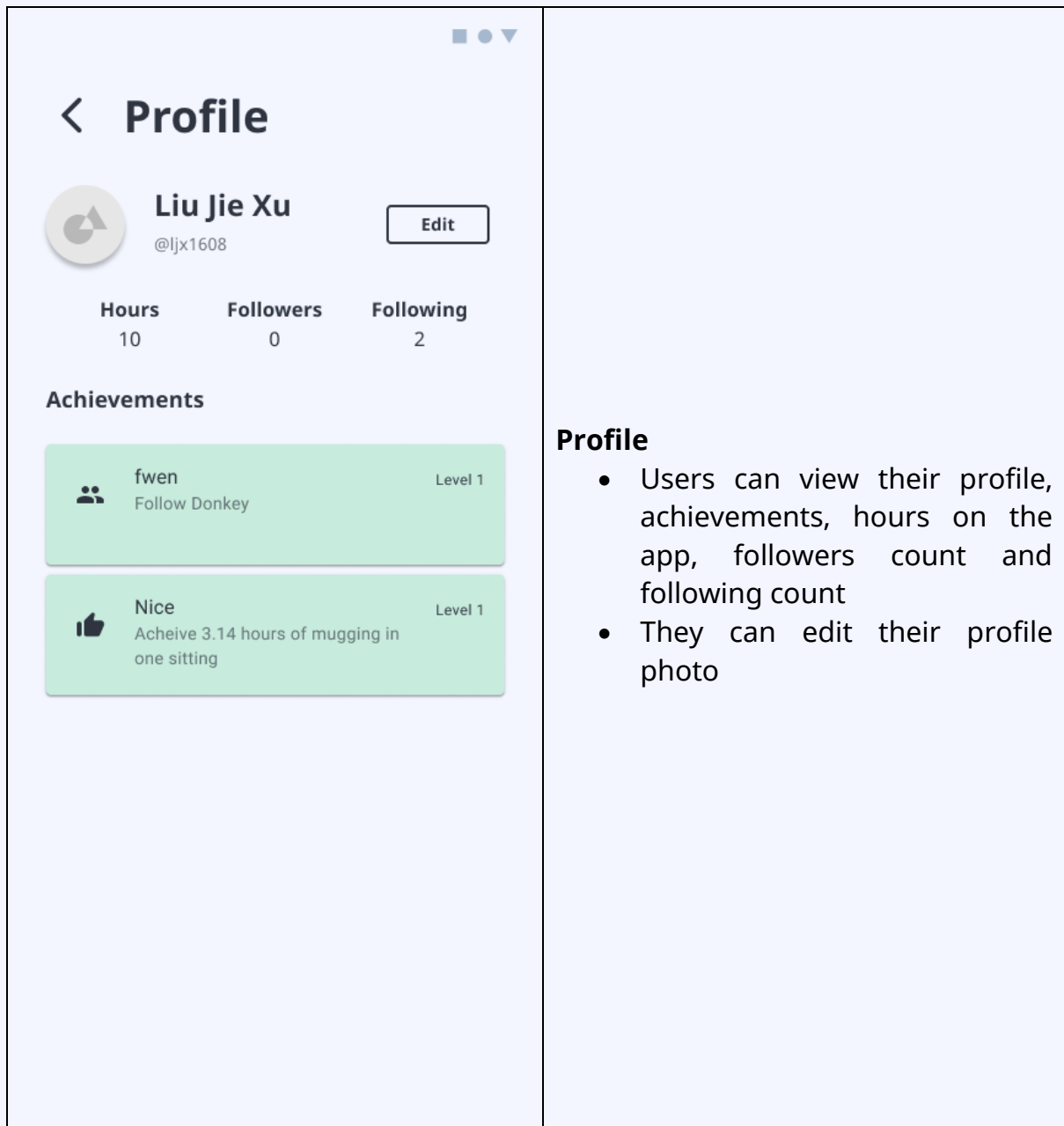
Social engineer Donkey

hyper difficult chem ws

Blackmail Donkey

Create session


- Within the balloon game, users can initiate a work session to increase productivity via the Pomodoro Technique
- The bottom drawer provides a scrollable list of tasks that users can select to focus on during the session
- Altitude of balloon increases faster for tasks completed during this duration



Profile





- Users can view their profile, achievements, hours on the app, followers count and following count
- They can edit their profile photo

Profile

 **Donkey** Following
@donkey

Hours	Followers	Following
69	420	0

Achievements

-  **Productivity God** Level 1
Complete 3 tasks in half the estimated time
-  **Nice** Level 1
Acheive 3.14 hours of mugging in one sitting
-  **Productivity God** Level 2
Complete 5 tasks 3 days before the deadline
-  **Productivity God** Level 3
Complete 24 hours of work in one day

Profile - Others

- Users can view the profiles of other people and follow them

Implications and Recommendations

Areas for Improvement

Other than Google Classroom, more learning platforms can be integrated into the app to cater to the growing pool of educational portals.

More insights can be provided regarding the users' productivity, and personalised tips can be generated to guide users towards optimising their time management.

Further Extensions

Aerodynamic principles should be incorporated into the productivity game to improve the applicability of the game to reality, which enhances the thematic cohesiveness of our student-centric app, increasing user interest and engagement.

Our app could also ensure that users are not overworking themselves which could lead to immense stress and burnout. By encouraging them to take regular breaks, we can leverage our app to help students cultivate healthy study habits.

Reflections & Learning Points

We realised that resilience is a fundamental value required in project work – we had to pour through hundreds of posts on StackOverflow and conduct several rounds of trial-and-error to minimise the bugs that plagued our app.

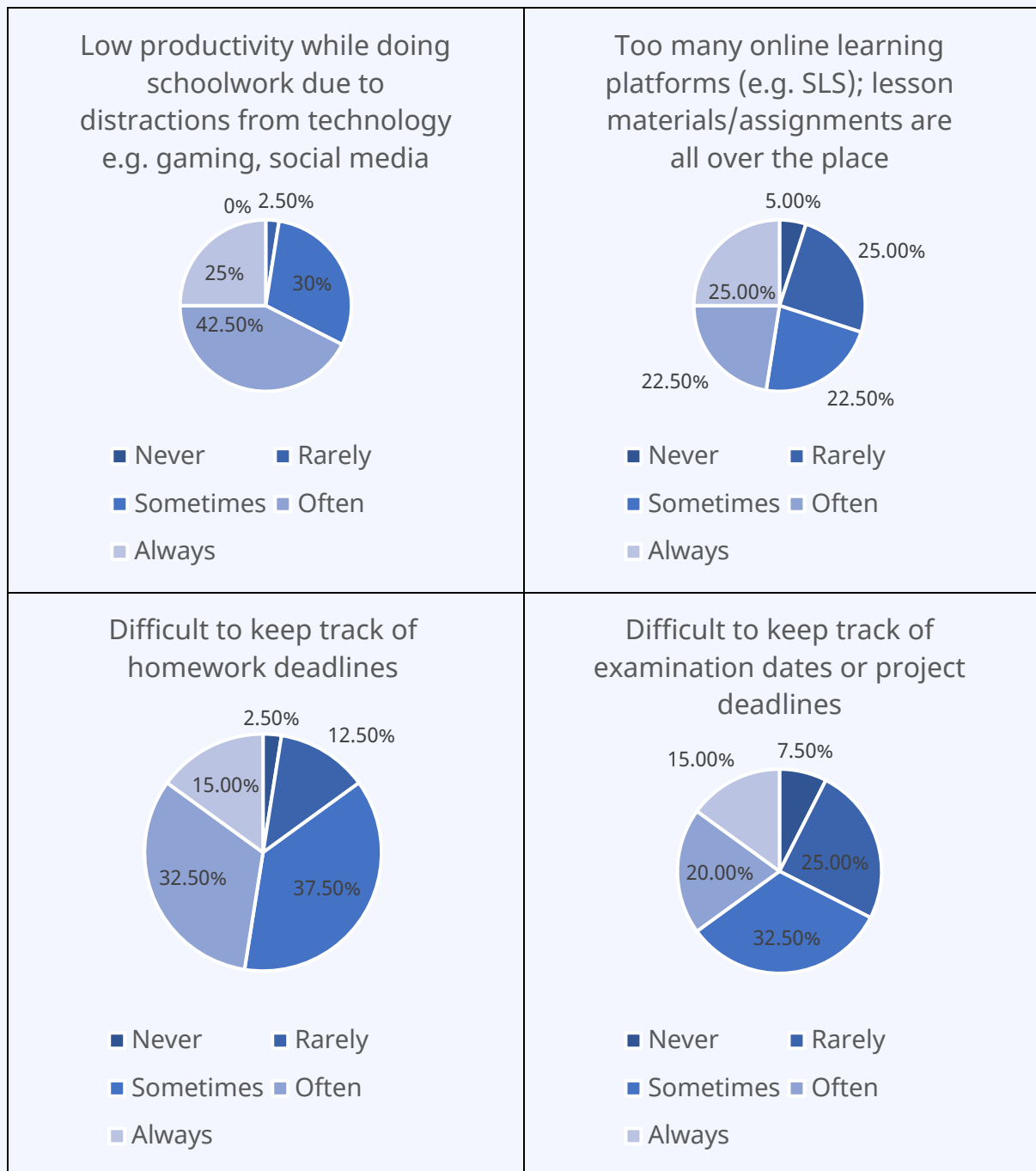
Moreover, creativity was crucial – during our brainstorming sessions, every single idea was considered seriously, no matter how ridiculous. We had to envision a game that would be engaging enough to incentivise students to work efficiently yet not overly addictive. We steadily established a good rapport that would serve us well when we started coding the game which was harder than we had imagined, requiring the use of custom widgets.

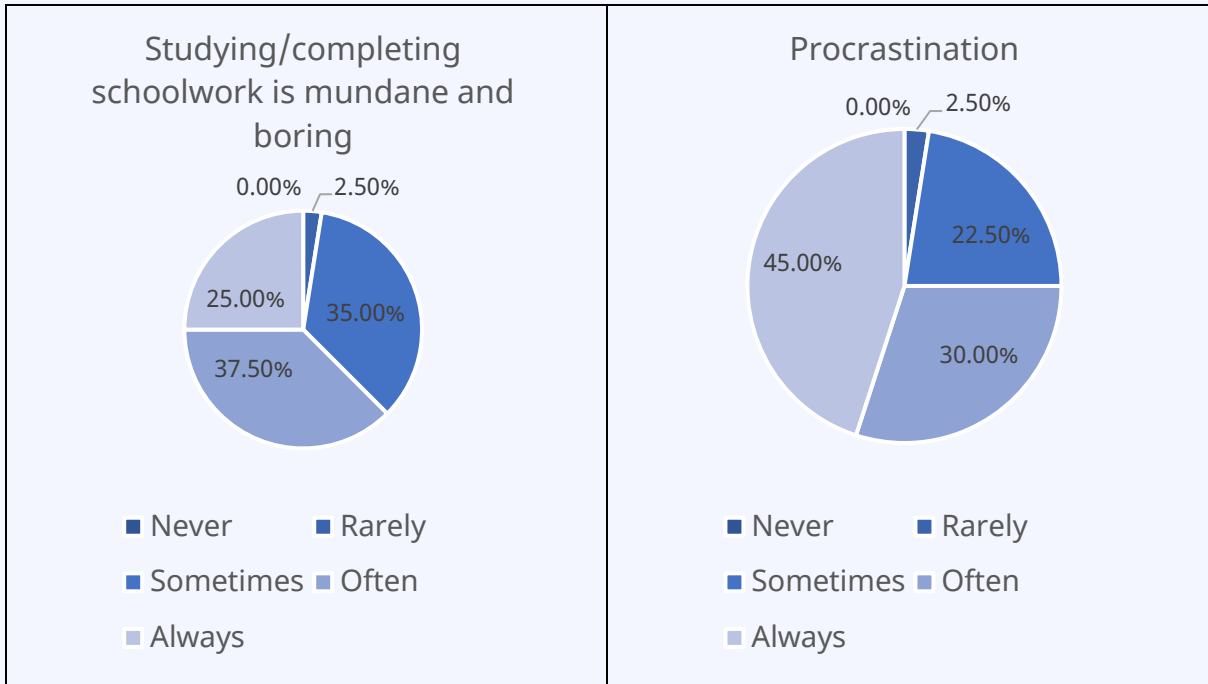
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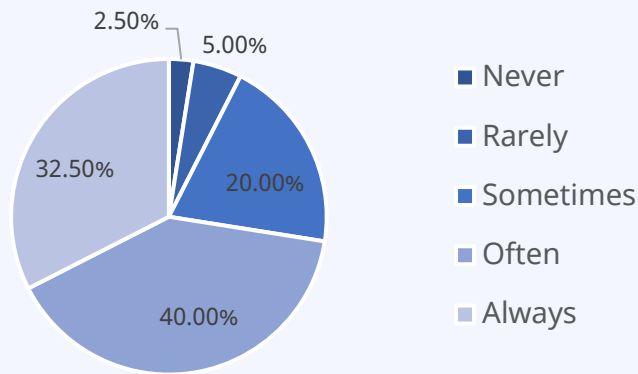
Annex A: Needs Analysis

1. How often do you face the following problems?

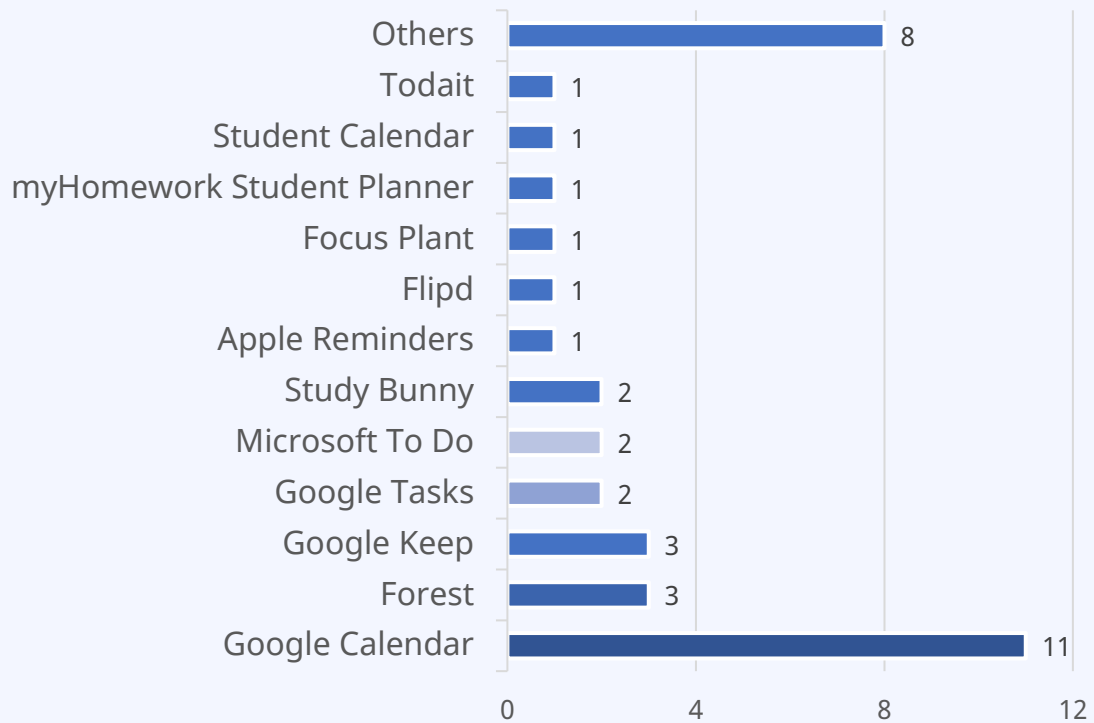




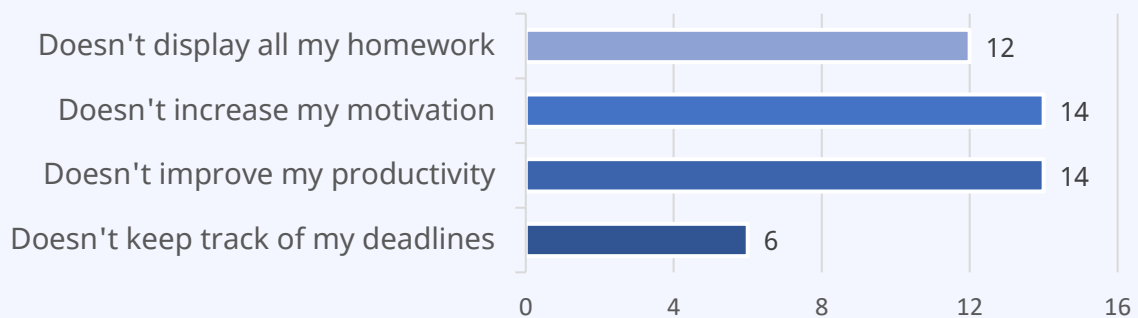
2. Would an app to help you manage your tasks and deadlines, and at the same time boost your productivity in an engaging manner be helpful to your learning?



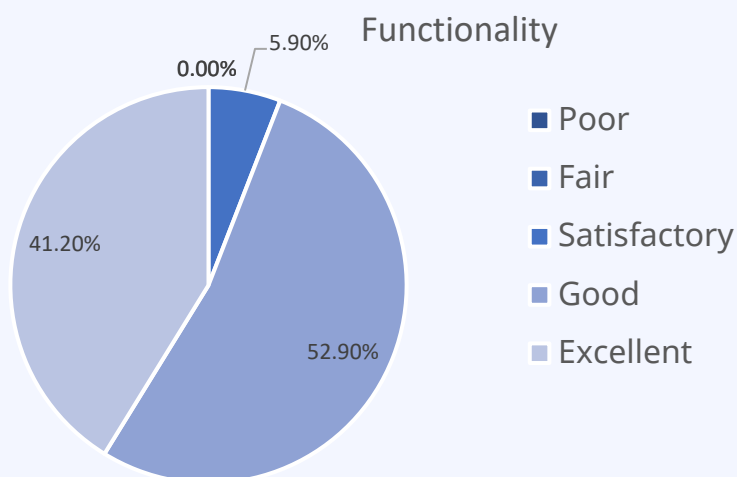
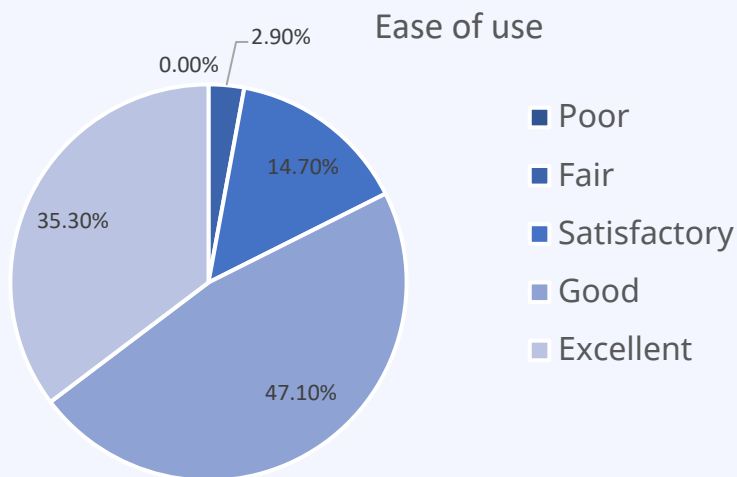
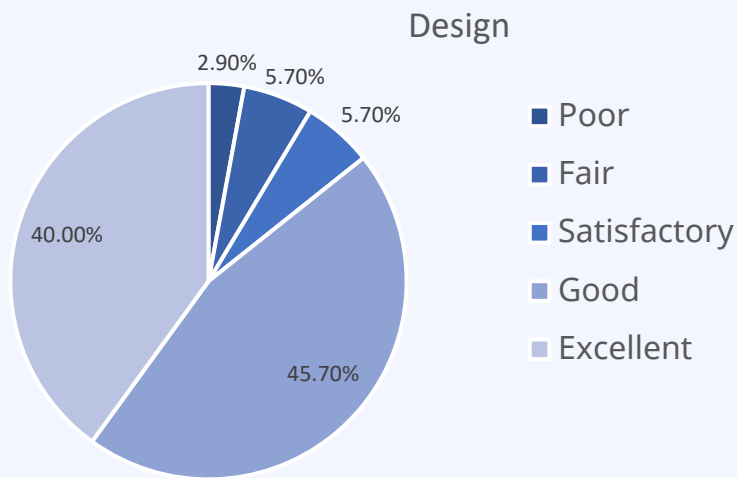
3. What apps are you currently using to manage your schoolwork / improve your productivity?



4. What problems/limitations do you face with the apps above?



5. Rate the design, ease of use, and functionality of our app.



Annex B: Gamification

Every user starts with a hot air balloon on the ground, with an altitude of 0 m.

To take flight, the user creates a task, which adds fuel stored in fuel tanks to the hot air balloon. The importance of the task (red, yellow, or green) determines the capacity of the fuel tanks (76, 57 or 38 litres). The starting altitude is 50 m.

The hot air balloon starts to rise and gain altitude at a constant rate of 1 m per total capacity of the fuel tanks expressed in minutes. For example, if User X has created 3 green tasks, the hot air balloon will rise at 1 m per 114 minutes = $1/114$ m/min. This means that the more tasks are added, the slower the User X's ascent, because the user is weighed down. The maximum speed is 1 m/hr.

However, when a user completes a task, it gives him an immediate boost in altitude that is equivalent to the volume of fuel in the fuel tank that corresponds to the task in metres, as well as an increase in rate of ascent because the fuel has been used up. If User X completes one green task, his altitude immediately increases by 38 m, and rate of ascent increases to $1/76$ m/min.

Users can also initiate a work session, during which the rate of ascent increases tenfold. They first have to set a work duration which must not be shorter than 30 mins. The session is split into "work" and "break" periods. During the work period, their device usage will be monitored to ensure they do not use any other application on their phone. If they do, their hot air balloon will be subjected to extreme turbulence, and its rate of ascent will be the negative of its original value. They are allowed to take breaks as per the Pomodoro technique of at most 5 minutes after at least 25 minutes of constant work. Tasks completed during the work session will also reap triple the usual rewards. During the breaks, the rate of ascent returns back to normal. If the total work duration has exceeded 2 hours (about 4 cycles), they will be prompted to take a longer break between 10 and 30 minutes inclusive, after which the 2 hours is retimed. It is not possible to cancel this longer break to avoid experiencing burnout. At the end of the longer break, the user has to click a button to verify that he is ready to start the next cycle. If he fails to, the work session will end automatically.

If the user fails to complete a task by the specified deadline, the fuel tank for that task will start leaking at 20%, 15% and 10% a day for red, yellow and green tasks respectively. If User X completes a green task 3 days after the due date, his immediate altitude increase will be limited to 27 m. If the fuel tank is fully

depleted, a bird will land inside the fuel tank. The next day, the bird will start pecking at the hot air balloon, which punctures and damages it. This causes the balloon to start descending at a rate of total lost capacity of fuel tanks expressed in metres per day. If User X does not complete a green task even after 10 days, the balloon's rate of ascent will be -38 m/day.

Once the user has a positive altitude, his altitude should not fall below 50 metres. However, there is no upper limit to his altitude. Depending on the time of day, the colour of the sky will change. If the balloon manages to enter other layers of the atmosphere (stratosphere at 10,000 m, mesosphere at 50,000 m, thermosphere at 85,000 m), the colour of the sky will also darken during the day from light blue to purple to black. At certain significant milestones (e.g. world record for highest altitude of hot air balloon - 21,000 m), the user will be given a badge which will be displayed in the achievement page.

Annex C: Ideation

During full home-based learning (HBL), the top complaint we heard was that students felt less productive. When school restarted, and teachers conducted file checks, students had to scramble to print the assignments that were submitted online during HBL. These experiences gave us the impetus to work on this project.