

CS3216 Group 9 Final Report



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App URL: <https://www.ontheway.social>

(Note: The project was originally BuddyNUS at <https://buddynus.com> as of progress report 2, and is now rebranded as OnTheWay.social)

What is BuddyNUS

1. What is the problem being solved?

Studying in NUS is stressful. Although some students prefer to study alone, there are students who prefer studying in groups. Common reasons for doing so is because they can:

- feel more motivated and reduce mental stress
- Get distracted less easily
- help each other and discuss assignments or tutorials

23 Looking for a study buddy?

So I have always been the type of person to highly prefer studying in groups/ with friends and struggle to do so alone (get distracted easily/ no motivation). This has gotten even harder due to the recent events that made school mostly online, reducing social interactions. Hoping to find a person in the same boat that wishes to study regularly in school together maybe? Im staying in hall so it would be more convenient for me. Not sure if this is the right way to go about this.. Do PM me if you are looking to study together! Edit: Feel free use this post to comment below if you are also looking for study buddies.

32 Study buddies

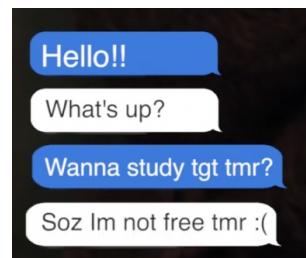
Discussion

Hello! It's week 13, followed by reading week and then exam week. Anyone keen to be a study buddy to keep each other in check and motivate each other during this period :)

Some screenshots taken from Reddit r\nus community that shows existing need for study buddies

The problem is that there are a lot of students in NUS who have difficulty **meeting up** with study buddies **in a timely manner when they need it**. There are mainly two groups of such people. The smaller group are NUS students who do not join CCAs and do not stay on campus, thus having less chance of making close friends to study together. The other bigger group consists of NUS students who have lots of friends, but just somehow still cannot find study buddies in a timely manner.

The **root cause** of why friends do not translate to study buddies is simply because **schedules of different students do not match**. It is hard to find a friend who has the same free time slots/days as you for most of the days. The diagram on the right illustrates a generic scenario of trying to ask a friend to study together. Suppose you are asking this on Monday, and your friend is only free on Saturday (due to mismatch between both of your schedules, internships, exchange programme etc). However, you have a lot of deadlines this Tuesday and Wednesday, and need motivation to study or do school work right now. This is when BuddyNUS comes to play.



2. What are some existing related solutions and why they are not appropriate to solve the described problem?

There is an existing telegram bot NUS Match Bot that helps students for the purpose of finding dates, friends and study buddies. There is also an existing telegram bot modwithfriends that allows students to indicate their modules. The main reasons why these existing apps do not solve the problem suitably is:

- The apps are not focused on getting people to meet up to study together

- They do not solve the root cause that causes meetups to be hard, which is schedule mismatch between students and that personal schedules may not be fixed.
- As a result, they do not effectively help students meetup for study sessions in a timely manner

For the first point, apps like modwithfriends are mainly used only for discussion of assignments via chat, likewise NUS Match Bot. As for the second point, even if a minority of users from modwithfriends and NUS Match Bot meetup to study in real life, they may do so once. But for subsequent times, the scenario shown in the chat screenshot above may happen again, because other people may be free for the first time, but not always. The apps are also more designed for one-time or few-time matching because matching takes several days. In this sense, you cannot keep trying to match new people to meetup in a timely manner.

3. Description of BuddyNUS/OnTheWay

BuddyNUS solves the problem by asking users to explicitly create study sessions spontaneously as they need. This addresses the root cause because:

- You are no longer trying to match your schedule regularly with a fixed, small group of friends
- You know for sure that the creators of a study session will be free at a certain time, so the scenario depicted in the chat screenshot above will not happen
- It is designed specifically with meeting up in mind

As an example, suppose the time now is 12pm. In the screenshot on the right, you know for sure that users YT and lionheart will be studying at Central Library if you need a study buddy now. Upon successful application, you can spontaneously meet them at the specified location.

Review of milestones and timeline for the project

APPLY

In this report we split our timeline into a development timeline and marketing timeline. We describe each of them in separate sections so that the execution and rationale behind certain executions can be described in a more concise manner. However, do note that both timelines are concurrent.

Development timeline

	Planned	Actual Executed
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	** note that only latest one taken, for example if we wrote different plans for Sprint 3 in our post-Sprint 1 and post-Sprint 2 report, then only the post-Sprint 2 one is shown here	
Previous weeks	Refer to Appendix	Refer to Appendix
Week 11,12 & 13 (24 Oct to 13 Nov)	<ul style="list-style-type: none"> - History and Fun Stats Feature - Reach out to more users and find out their pain points and requests to brainstorm improvements - Iterate and improve on gamification system 	<ul style="list-style-type: none"> - All completed on-time - The main user feedback that “desktop feels like a stretched mobile”. We have since redesigned new UI for our desktop version - Added day and time filtering option as requested by user
Reading Week (14 Nov and beyond)	<ul style="list-style-type: none"> - No development planned initially 	<ul style="list-style-type: none"> - Moved domain and website to ontheway.social - Redesigned logos and made UI changes for pivot.

All features planned in week 7 and 8 were executed on time. Some features planned for Sprint 2 (weeks 9 and 10) were cancelled upon consideration and user feedback, while being replaced with AI-generated art and push notifications with in-app notifications. Details of rationale behind such change in plan can be found in Progress Report 2.

Desktop Site UI Revamp

The screenshot shows the OnTheWay desktop application interface. At the top, there's a navigation bar with 'OnTheWay' on the left and 'Browse', 'My Sessions', 'Create Session', and user icons on the right. Below the navigation, there are two main sections: 'CREATED' and 'APPLIED'. Under 'CREATED', there are two sessions listed: 'Engineering' and 'UTown'. Each session card includes a thumbnail image, the session name, a 'Details' section with date and time (Today 9:15 PM - 11:15 PM), and a 'Confirmed Attendees' section which is currently empty. Under 'APPLIED', there is also a 'UTown' session card with similar details. At the bottom, there are links for 'OnTheWay', 'FAQ', 'Instagram', and 'Feedback', along with some decorative icons.

Most UI pages (e.g. Browsing page, Creation Page, Applied Page etc.) have been revamped to remove the mobile feeling on desktop. Some notable changes are:

1. Bottom bars for navigation on the mobile version are now replaced by top bars
2. Previously, details of study sessions were shown in a Modal popup component after clicking on the individual list items. The contents are now showed side-by-side
3. New bottom bar added for customer contact and outreach purposes, like what most professional business desktop sites do. Bottom bar contains links to landing page, FAQs, Instagram page, and Google Forms for feedback.
4. Animation added to bottom bar of desktop UI
5. Home page is now the landing page for non-logged in users, but Browse page for logged in users. Certain UI changes were also made to make this look more natural.

History Feature and Fun Statistics

We included some useful and “fun” statistics such as “study sessions created/applied”, “number of new people met”, “number of hours spent studying”. These data help users keep track of their study accomplishments and make them feel proud of themselves. Many modern apps use such “number strategies” to retain users as they feel the sense of accomplishment when seeing the numbers grow. Common apps like Spotify also show stats like “number of hours listened”, “number of different songs listened” as a site feature and fun statistics.

We also included features showing recent study buddies met and recent study locations. This is similar to Spotify’s “recently played” list so that users can play the songs they recently heard again. In the context of our app, if a user feels comfortable studying with a particular person, but forgets that person’s details, he or she can check it out again in the History page. In the future, when we introduce report/rate/review functionalities, this page can also serve as an entry point interface for users to report/rate/review study buddies he met recently.

Additional Filters by Day and Time

As the user base increases, some study sessions created are no longer on the day itself, and can be one or two days later. Users have requested to be able to filter study sessions by Day of the Week (e.g. Monday) and time of the day (e.g. morning), and hence we have implemented it

← Your History

Since joining OnTheWay, you have...

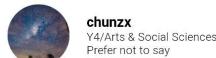
Created **40** study sessions

Applied for **7** study sessions

Met **3** different people

Spent **123** hours studying

Study Buddies you met recently



Recent Study Sessions

Here are the last 5 study sessions you had.



The image shows a mobile application interface for a study location search. At the top left is a grey sidebar with the word "Study" and a red "LOGIN" button. The main area has a white header with "Filter Posts". Below this are three sections: "Locations" with buttons for Central Library, UTown, Science, FASS, Engineering, Biz, SDE, SOC, and Law; "Days" with buttons for Monday through Sunday; and "Start Time" with buttons for Morning, Afternoon, Evening, and Night. At the bottom are two buttons: "RESET" and "APPLY".

Marketing timeline

Rationale and effectiveness of certain marketing strategies will be explained below

	Planned note that only latest one taken, for example if we wrote different plans for Sprint 3 in our post-Sprint 1 and post-Sprint 2 report, then only the post-Sprint 2 one is shown here	Actual Executed
Previous weeks	Refer to Appendix	Refer to Appendix
Part 5: Week 11 (24 Oct to 30 Oct)	<ul style="list-style-type: none"> - Find new ways to ramp up marketing efforts (for actual execution we chose poster) 	<ul style="list-style-type: none"> - Paste simple plain posters to test effectiveness (26 Oct) - Paste beautiful posters (28 Oct)
Part 7: Week 13 (7 Nov to 13 Nov)	<ul style="list-style-type: none"> - Post social media content according to Content Calendar - STEPS preparation, poster, video and presentation 	<ul style="list-style-type: none"> - Paste beautiful posters with wider coverage x2
Part 8: Reading Week (14 Nov and after)	<ul style="list-style-type: none"> - Post social media content according to Content Calendar 	<ul style="list-style-type: none"> - All planned tasks were achieved - BONUS: we reached out to NUS photography to pitch our idea as an attempt to pivot

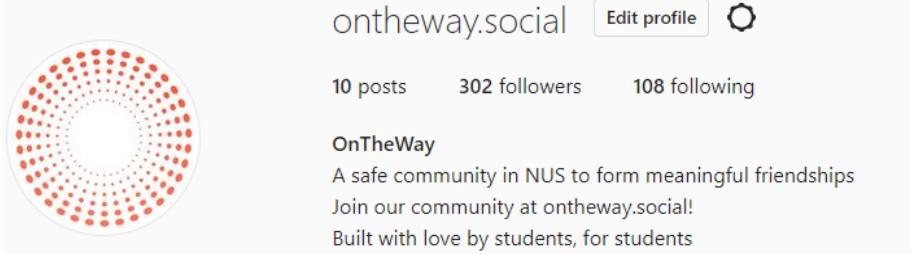
Content Calendar for Instagram

	Planned **note that only latest one taken, for example if we wrote different plans for Sprint 3 in our post-Sprint 1 and post-Sprint 2 report, then only the post-Sprint 2 one is shown here	Actual Execution
Previous posts	Refer to Appendix	Refer to Appendix
6th, 7th, 8th Post (Week 11)	Post to explain how BuddyNUS works + 1x viral reel to increase reach	<u>On time (Oct 25, 26, 27)</u> - Post to explain how BuddyNUS works (25 Oct) - Post to explain difference with chatbots (26 Oct) - Reel about hidden study spots near CLB (27 Oct)
9th Post (Week 11)	Mental Wellness	<u>Moved to Reading Week (15 Nov)</u> because students tend to be more stressed during that period and will appreciate this content more
7th Post (Week 12)	Post to address privacy concerns	<u>Earlier than timeline</u> - Combined in a previous post to explain difference between BuddyNUS and chatbots
10th Post (Week 13)	Meme about exam season in NUS, and encourage people to use our app to find study buddies	<u>On time (8 Nov)</u> - Changed content to a aesthetic/mental wellness/discover the beauty of NUS reel
11th Post (Exam Week)	Unplanned Post	Post about Pivot to OnTheWay (18 Nov)

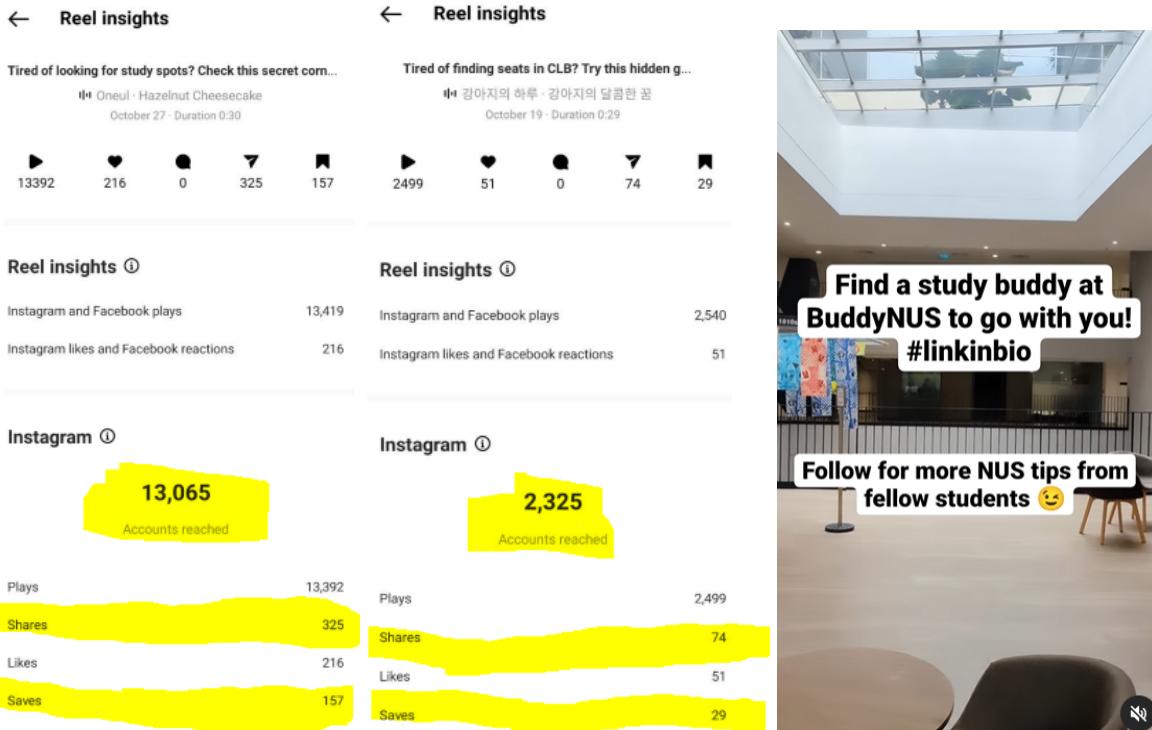
Our first point of contact with the public is our survey of potentials market on Reddit r/nus community. There were 268 positive responses within 2 days, and we decided to proceed with our app creation. We then promoted our app's pre-registration on Reddit and Instagram.

Initially, our instagram had no followers, so people could not see our content. We used a "follow back" strategy by following relevant people, because [experiments show that at least 30% of people will follow you back if you follow them](#). We also referred to [guides on how to find users who follow back](#). In particular, we took careful precaution to balance our following/follower ratio so that Instagram algorithm does not rank our posts low in our

followers feed. We also get friends with >1500 followers to promote our page on their stories. Our strategy was to search for public Instagram accounts that NUS students are likely to follow (e.g. Engineering Student Club, Business School IFG accounts, SoC student meme pages). The accounts should not be too large or created too long ago, otherwise the probability of selecting an alumni from the account's followers is higher. We then follow active accounts that belong to followers of those public pages.



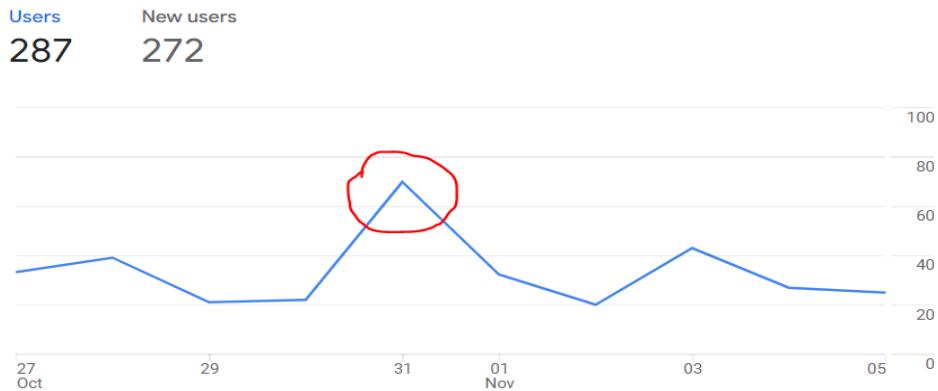
As of today we have more than 300 followers, which is sufficient for our reels to be noticed by strangers on the internet by Instagram algorithm. We do not need thousands of followers because our main strategy is to use reels to show content to non-followers. We initially plan to showcase our app through reels, but before the actual execution we changed our plans to showcase more practical information that students would like to see instead. This is because our initial plan would make Instagram users feel like seeing another advertisement and skip through it quickly. Our new plan follows the strategy of "[rewarding your user](#)" so that users feel benefited (e.g. learning about hidden study spots) from watching our reels. We also choose the most popular audio carefully to accompany our reel as [experiments showed that audio choice has significant impact on audience reach](#).



Among our Instagram reel content, there were 2 that were extremely popular. As shown in the screenshot above our reel posted on October 19 (right) has reached 2325 accounts, 74 shares and almost 30 saved. The other reel posted on 27 October that features a hidden study spot near CLB had **more than 13k watches and accounts reached, with 325**

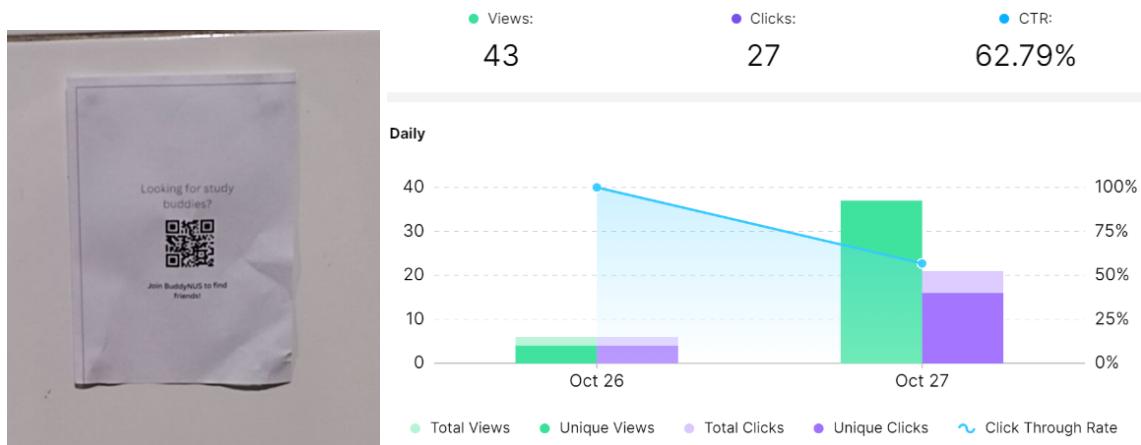
shares and 157 saves. This can only be achieved because viewers do not view our reel as an attempt to hard sell BuddyNUS to them. The same effect of promoting our app is achieved because we included a prompt for viewers to check out our app in the end.

We also noticed that viral reels actually convert to real user acquisition, as evidenced by the 2-time spike in new users a few days after the viral reel.

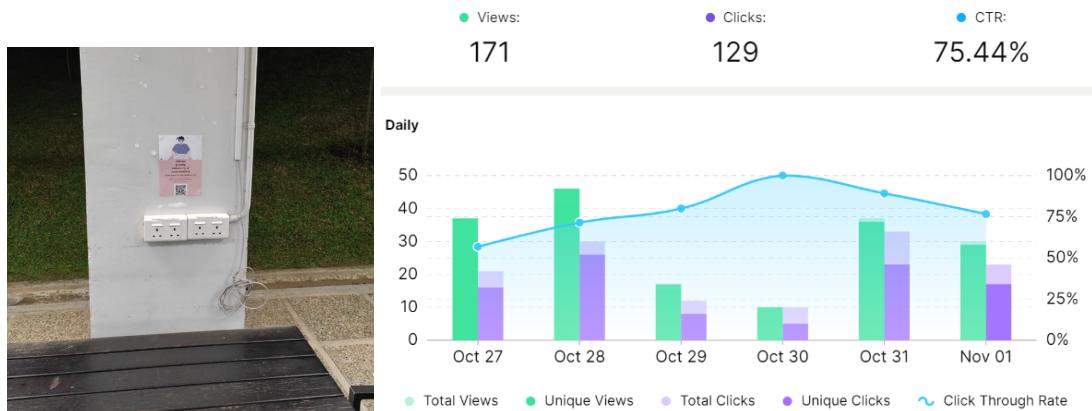


Following the success of our first reel, we realised the effectiveness of reels, and decided to change the content of our 10th post (initial plan was to share exam memes) to reels showcasing various spots in NUS instead. The reel reached around 1000 accounts, which is much higher than our typical posts which reach around 200-300 accounts.

To further our reach, we experimented with posters pasting since our target users congregate in NUS. We were skeptical about the effectiveness of posters at first, therefore we quickly printed around 10-20 “ugly” small posters consisting of only taglines and QR codes, and pasted them near the SoC and FASS area. We mainly pasted in areas near study tables or above water coolers.



We started our experiment on 26 October after midnight, and were surprised to see 43 scans of the QR code by the end of October 27. We immediately designed a “beautiful” poster and started pasting 50 of them around Engineering, SoC, UTown and FASS. We mainly pasted on study tables and popular places like bus stops.

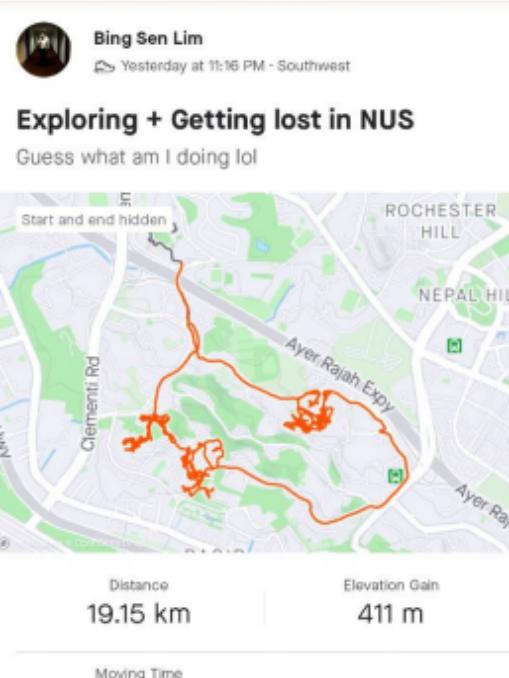


We immediately saw an increase in poster clicks the next day (note that Oct 29 and Oct 30 are weekends, hence the low scan rates). There was also a correlation with increasing new user acquisition rate during this period. In the next few days, a downward trend followed as some of our posters were taken down. At that point, our demographic of active users are (FASS:12, BIZ: 7, SOC: 21, CDE:13, MED: 2, SCIENCE: 8). Notice that the faculties with larger number of users are those that posters were pasted in the 2nd round.

We then printed another 140 posters to increase poster coverage around all NUS faculties, with priority to faculties with lesser users. We learnt from previous experiences to not paste on places that are too obvious such as on table tops, and bus stops, to prevent our new posters from being taken down by officials easily. Instead, we often paste posters slightly above charging pots next to study tables more discreetly, and survey popular crowded locations from friends of those faculties. Examples of these popular locations are:

1. Science S16 level 3 (popular among students because there is free candy)
2. Central Library and Science Library, outside different levels of lift
3. AS8 (popular because there is a breezy area facing outdoors)
4. FASS LT9 and LT10 (for LTs in general we use NUSMods to check the popularity based on number and frequency of lessons scheduled there)
5. COM3, and various Biz2 water coolers

Aside from popular locations, we also pasted larger posters on general notice boards across different faculties.



In total, our posters had around 850 QR code scans, as shown below.

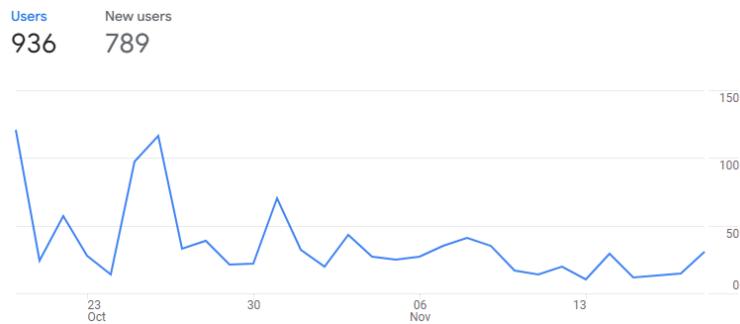
Lifetime Analytics

Views:	Clicks:	CTR:	Revenue:
846	608	71.87%	-

Summary of Google Analytics

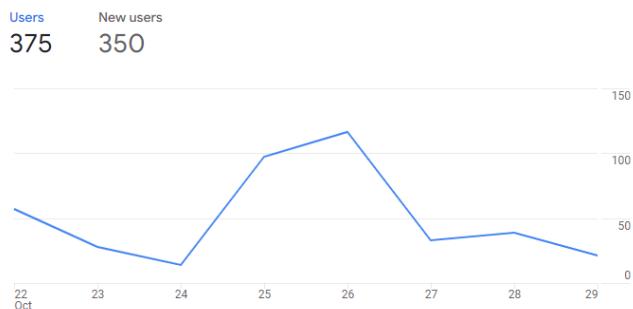
We have already used some analytics data to justify our marketing efforts and deviation from our planned development timeline, in other sections and in previous reports. Hence, this section will only show some raw statistics that have not been included in previous sections.

Monthly Active Users: 20 Oct - Nov 18

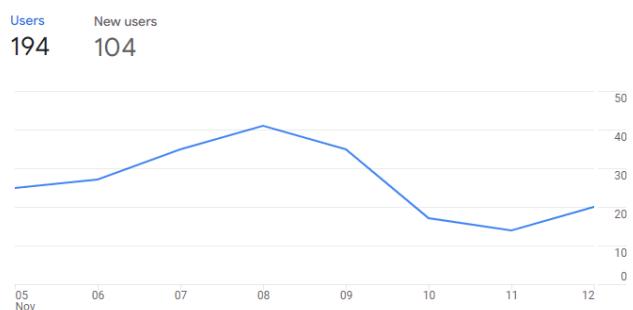


Unfortunately, there has been a decline as the semester came to an end. We hypothesise that this is because gradually fewer people are in school as the semester ends. The analytics below will focus on activity ending on the last day of week 13.

Weekly Active Users: Oct 22 - 29

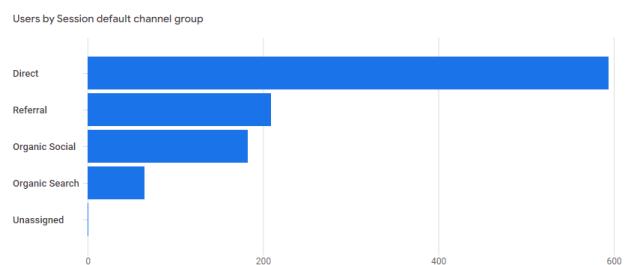


Weekly Active Users: Nov 5 - 12



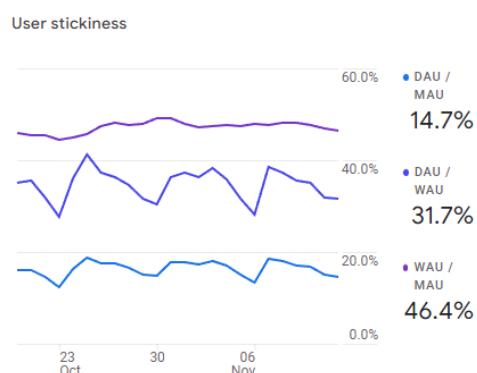
Once again, the declining trend as the semester came to an end.

Traffic Sources (All time)

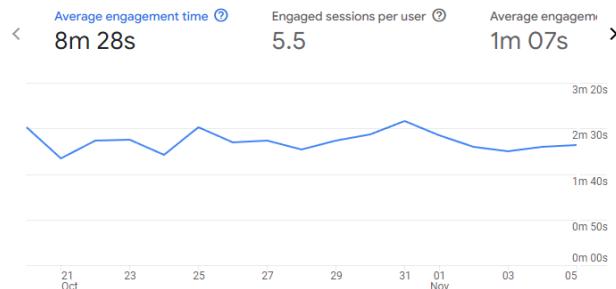


The large portion of referral is due to our Linktree links which redirect to BuddyNUS, and is from the results of our poster marketing.

User Stickiness: 20 Oct - Nov 12

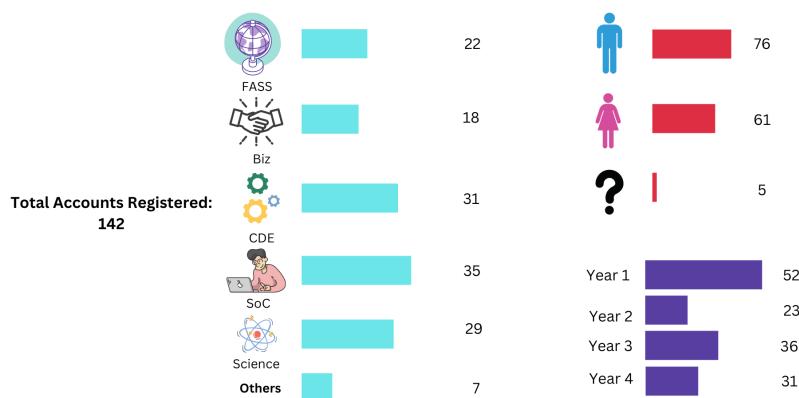


Average Engagement Time: Oct 20 - Nov 5



Monthly Active Users	900
Weekly Active Users	100-300
Number of accounts	142
Sessions Created	48
Sessions with >=1 applicant	31

User Demographics



Frontend Application Design

We decided to build a progressive web application (PWA) for OnTheWay. The main reasons were:

1. Simplification of the development process

We knew that we wanted OnTheWay to work well for both desktop and mobile, so the decision to build a PWA instead of writing separate applications for the different platforms was primarily motivated by the desire to simplify the development process - write one set of code that works for all platforms.

2. Mobile First Experience

A PWA appealed to us much more than simply building a regular³ website, as we predicted and confirmed from user surveys (and later in testing), that most users would use OnTheWay on mobile. A PWA thus allows users to continue to get the “mobile application experience” as they can install OnTheWay as a shortcut on their mobile homescreen.

3. Practical cost-related reasons

Another contributing factor that led to us deciding on a PWA, given we wanted to focus primarily on mobile, was the fact that if we did decide on making mobile apps on both Android and IOS, there would be a substantial cost that we were not ready to make with the project in its infancy - that is, the requirement for an Apple developer account to publish an application on the App Store, which costs 135 SGD. We had not even begun our application, and could not predict its success at that point of time, hence an investment like this would not have been prudent.

Given our choice of a Mobile-First PWA for OnTheWay, and after considering many other frameworks to use for our application, we decided on Ionic Framework as the frontend framework we would use for OnTheWay. The main reasons for this choice were:

1. One Codebase

The biggest benefit of using Ionic Framework is the fact that it allowed us to build the frontend for OnTheWay for multiple platforms - IOS, Android and desktop browsers, all using 1 codebase. Prior to development, we considered other frameworks like using React Native for a mobile application and some other framework for a desktop browser application, like NextJS. However this had some obvious drawbacks such as having to develop two separate codebases, which would have dramatically increased development time. We also considered other singular codebase alternatives like Flutter, but ultimately decided on Ionic Framework given our familiarity with React and Typescript (Ionic Framework has first-class support for React and Typescript), and unfamiliarity with using Flutter (and its language, Dart). Thus our choice of Ionic Framework largely came down to simplifying development and reducing development time, to be able to focus on developing all the crucial features that are key to the success of our application, within a short time frame.

2. Native mobile look and feel

This was something we learnt and applied from Assignment 3. Having a native look and feel is quite important for a mobile-centric application, as it makes the application feel more familiar to users, allowing them to more quickly grasp the features and functionality of the application, and have a more consistent and straightforward user experience overall. This is an area Ionic Framework especially excels at compared to any other web framework, as each component provided by the framework has a style that is automatically applied based on the user’s platform - Android, IOS or desktop browser, that mimics the native style of the platform. This was exactly what we wanted for our application.

3. Default optimizations

Ionic Framework performs optimizations like code-splitting by default, which meant that we did not have to manually implement these optimizations. Code-splitting helps

to reduce the bundle size required to display each page of the application by splitting applications into different bundles, and “lazy loading” them only when needed. This helps to speed up page load. Ionic Framework also provides other optimizations like tree shaking by default as well, to remove unused code from the bundles. Again, simply by using Ionic Framework, we eliminated the need to perform these optimizations manually, thereby reducing development time.

Backend Application Design

Technologies used

OnTheWay uses Firebase for the majority of our backend with a few ancillary services provided by AWS and Replicate. The technologies we use in Firebase includes

- Firebase Functions for our serverless backend, which runs on Node.JS
- Firebase Authentication for authentication
- Firebase Firestore for our database
- Firebase Storage for storing and retrieving user-generated images
- Firebase Messaging for push notifications

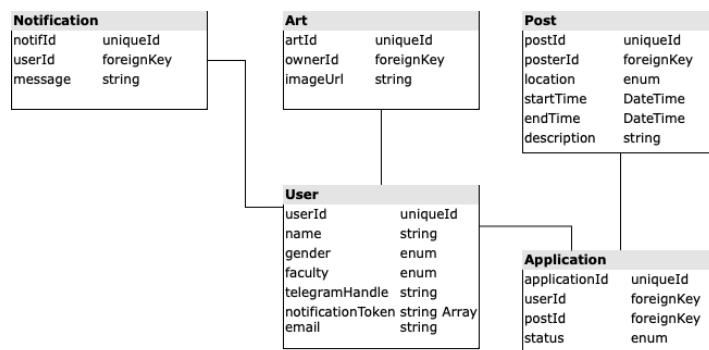
We opted for Firebase as it helps us simplify many aspects of our development such as deployment and server management, as we do not have to manage and scale our own server. It includes (almost) all the services needed for us to develop our product, and its serverless nature benefits us since we do not have to pay upfront for unused capacity if we were to use some other IAAS technology such as AWS EC2.

Beside the native Firebase services, we also make use of other third party services

- AWS SES to send confirmation emails
- Replicate, which provides an API endpoint for us to generate AI images

Database Design

Firestore is a NoSQL database, and as such no explicit schema is used when creating the database. However, on the function site we created data objects, and converted to/from those objects everytime we query from the database.



API Endpoints

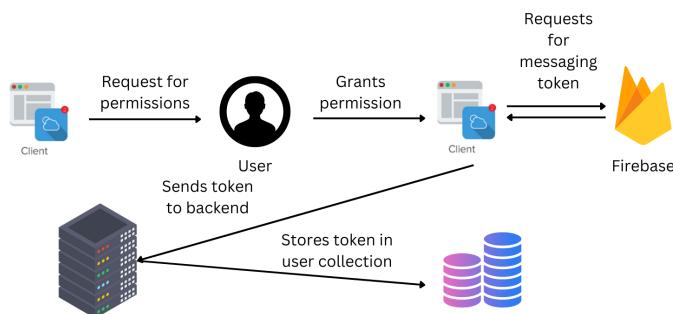
Unlike the normal RESTful or gRPC structure, Firebase offers an alternative way for writing endpoints, which is to use the built-in Https call. This has a few differences compare to normal REST API:

- Each endpoint is independent to the rest, and as such no need to provide action in the request. For example, the /api/posts endpoint with GET/POST/DELETE action is separated into getPost, createPost and deletePost endpoints.
- Each endpoint is wrapped inside Firebase Authentication, which provides an authentication context with the token for each HTTPS call. We use this to handle authentication checks for every endpoint.

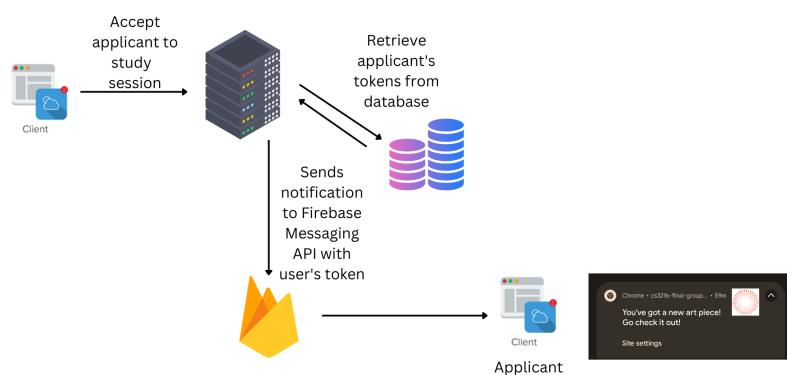
Adopting firebase's approach of writing functions instead of regular RESTful architecture allows us to benefit from the built-in authentication checks to ensure that all calls to our endpoints are by authenticated users.

Push Notifications

We use Firebase Messaging for push notifications.

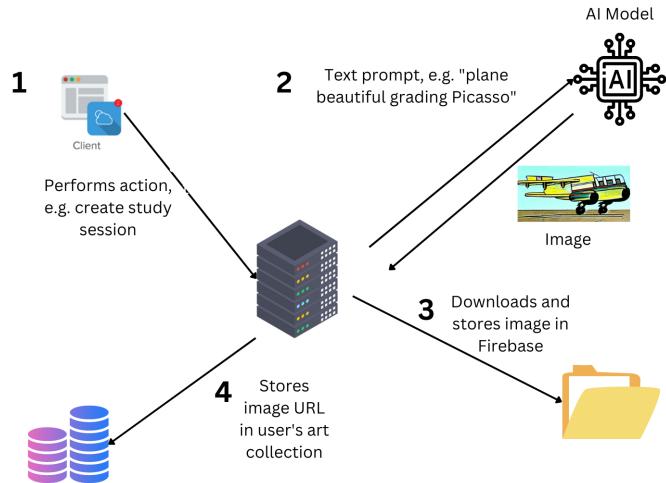


First, we provided an interface on the frontend to request for permissions to send push notifications. Once granted, a token is retrieved from Firebase Messaging, this token is then sent to the backend and appended to the token array in the database under the user's record.



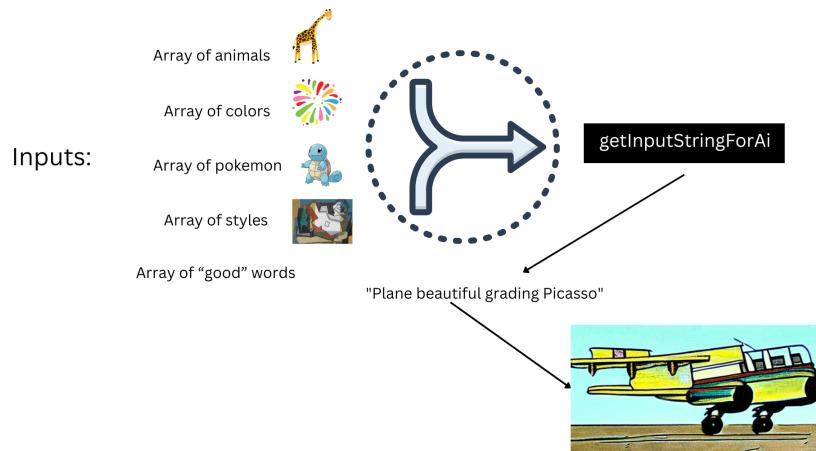
When a push notification needs to be sent, we retrieve the array of tokens from the user's records and send a notification to all of them. This ensures that a single user logged in on multiple devices can receive the notification on all devices.

Art generation: AI Text to Image



We use [Replicate's](#) endpoint to generate an image from a stable diffusion model with a prompt that we provide to the model. Whenever a user performs an action that will reward them with an art piece, we generate a text prompt from our algorithm and then pass it to the endpoint. We also expose a HTTP endpoint on our server for the model to invoke when the image generation is done, after which we make a clone of the image, upload it to Firebase storage and store the image URL in our database.

Text Prompt Generation



To generate the prompts for the AI model, we maintain a few arrays:

- 1) An array of animals
- 2) An array of colours
- 3) An array of pokemon
- 4) An array of styles, which are the name of prominent artists the model is trained from
- 5) An array of about 1000 good words, which we curated that tends to produce the results we are looking for

When the algorithm `getInputStringForAi` is invoked, we concatenate arrays #1 to #3 and invoke `chooseGoodWordOrOther` with the concatenated array. `chooseGoodWordOrOther` will

generate a random number between 0 to 1 to determine whether we randomly choose a word from the ‘good’ array or from the concatenated array, and return the word.

Afterwards, a random number between 0 to 1 is generated. This number will determine whether or not we make use of the styles array, with a 20% chance that we will use the array. If we do use the array, we will randomly include the name of an artist inside the array. Doing so will produce an artwork that resembles that produced by the artist, as the AI is trained on the works of those artists.

Drawbacks of technologies used

No technology is perfect, and here are some disadvantages of the tech stack we have chosen:

- Serverless functions “cold boot” if they have not been in use for the past 10 minutes or so. At the current number of users we have, this means that our load times could be up to 10 seconds if the functions need to boot up. To mitigate this, we employ pre-emptive loading of data on the frontend in parallel so that the data seems to load instantly after the initial loading period. We foresee this problem to go away as the number of users increases.
- Going serverless means we have less control over customising how our backend runs, load balancing, etcetera. In our use case, we do not require such fine-grain controls.
- Using Firebase function’s proprietary way of writing endpoints restricts us to frontend technologies that provide a package to invoke Firebase functions. This is not a major hurdle to us as we built a PWA with Ionic framework, which is easily extensible to Android and iOS as well, so we do not have any plans for switching to a new frontend technology.

Pivot to OnTheWay (in progress), Future Plan and Strategies

The exam period will be ending soon. After the exam period, BuddyNUS users are expected to drop significantly as nobody studies. We will need ways to acquire new users during this period, and retain existing users so that they do not forget about us after semester break.

OnTheWay is a rebrand of BuddyNUS that tries to include not only study sessions, but more categories of spontaneous activities, such as badminton sessions, cycling sessions and photography shooting sessions. The name OnTheWay highlights how users can use it to invite people to join spontaneous activities with them.



As part of our pivot, we collaborated with NUS Photography Society (NUSPS) for them to feature our app. In exchange, we will make changes to our app to allow NUS students to create invitations for photography sessions.

Our collaboration infographic we sent to NUSPS is shown above. NUSPS is picked as a first target because Chun Yong was a former EXCO member and has connections to the current EXCO. We will use their agreement as leverage to talk to other interest groups.

As part of our pivot plan, we also designed a new logo and are making new UI changes in our app.

As a solution, we decided to partner with CCAs and interest groups. These interest groups will help us promote our app to their community. In exchange, we will pivot our app to create sessions for the interest groups, so that members of those interest groups can create and manage spontaneous activities. **Currently, we have already gotten verbal agreement from NUS Photographic Society and have already pitched to NUS Cycling interest group. We are planning to reach out to NUS Recreational Badminton Group next.** We will roll out the initial changes for our pivot in December.

Benefits of the pivot for BuddyNUS/OnTheWay:

1. Gain more public exposure to acquire more users through the resources of the interest groups
2. Prevent BuddyNUS from becoming obsolete during semester break periods and remind users of our presence so that existing users do not forget about us
3. Sharing of user pools across activities - Some users may initially join OnTheWay for one activity, but subsequently use it for other activities (e.g. join for cycling, but realise that it can be used for study sessions as well). This sharing of the user pool will result in more users for a particular activity overall as well.

Proposed benefits for interest groups during our pitch:

1. Spontaneous “jios” can be seen and filtered easily. Currently, invitations for spontaneous “jios” are easily buried in hundreds of messages, and harder to be noticed by interested participants. Some session creators have to repeatedly send new messages to get people’s attention.
2. Members can “jio” a wider range of people. Currently, interest groups and chats have hundreds (e.g. cycling group) to thousands (e.g. badminton group) of members. However, not everyone who is interested in cycling is in the cycling interest group. Due to the “sharing of user pools” nature of our app, an app user who comes from the badminton interest group can also see the cycling jio, and apply for it if he is interested. As the number of interest groups that collaborate with us grow, existing interest group members will also have an easier time to “jio” other people out as the user pool increases and because humans tend to have multiple interests.

Telegram Integration and Code/UI Restructure

The following will only be done after the initial launch of the pivot, as mentioned in the previous point.

As a lot of spontaneous “jios” for different interest groups are currently done in Telegram, we do not want session creators to feel troubled for needing to go to our website to create “jios” and keep track of applicants every time. We will integrate our website with Telegram so that session creators can create and view applicants for their “jios” with their familiar Telegram app. Applicants will still need to go to our website to view all sessions and use functionalities like filters etc. (because it is not ideal to show a Telegram message with a long list of sessions). Upon successful notification, the creator will be notified on Telegram.

1. Features for maintaining a healthy community

As the community grows, more problems might arise. For example, people who sign up but do not turn up, rude people etc. We plan to introduce review, rating, credit rating (e.g. students below certain credits are temporarily banned from creating and applying for sessions) and report systems, and continuously monitor and improve on these systems to ensure that OnTheWay has a healthy community.

2. Expansion beyond NUS (not-so-near future)

If our app succeeds in NUS, we can consider offshoots in other local universities.

Insights gained from project and what we learned

1. **The best way to understand human preferences is to track behaviour of real people, not ask for opinions.** One example is that users always feedback that our app is intuitive to use and that email notification is sufficient to remind them when someone applies to or accepts their post. However, after push notifications and in-app notifications feature was introduced, we realised that there is an increase in the number of study sessions that gets accepted, and decrease in those study sessions without any attendees. This made us realise the importance of our new notifications feature.
2. **When in doubt, think about the cheapest, fastest experiment we can run to validate our hypothesis.** We were skeptical of the effectiveness of postal marketing at first. Our quick actions of printing and pasting “ugly” posters within one day of having the thought made us realise that postal marketings are effective. If we were to slowly consider all options and design beautiful posters from the start, we might not have achieved 3 rounds of poster pasting with 3 rounds of boost to our user acquisition.
3. **For startups, having a larger user base and pleasant UI can be more important than introducing non-MVP features.** Like what Eries Ries wrote in his well-known bible for startups “The Lean Startup”, The goal of a startup is to learn what their customers want and will pay for, as quickly as possible. Our goal within the 1.5 months is not to build a fully featured app but to carefully prioritise our development and stretch our limit on how much we can convince users to use our app. We pushed hard in marketing so that we know that if we fail, it’s likely because the idea itself does not appeal to users, not because users are not aware of our app. We were lucky to have many active users to prove our app’s usefulness, and subsequently we can focus on introducing more non-essential features. If we were to focus on feature implementation from the start, we would have ended up putting too much effort, then only realise it’s not about the feature but rather the idea itself that does not appeal to users.
4. **It is not about picking the latest and greatest tools, but picking what is familiar with the team, so as to speed up development.** This idea complements point 2, because we need to build apps and roll out changes fast to validate our hypothesis. In this case, we chose Ionic for frontend because our frontend lead used that for Assignment 3, while we chose firebase for backend because one of our teammates is experienced in firebase for startups as he uses it for his own startup. This familiarity allows us to make continuous feature changes and debug at a much quicker pace than Assignment 3.

Individual roles and acknowledgements

- 1. Lim Chun Yong - UI design, Marketing, Frontend, STEPS Video and Presentation**
- 2. Hoang Tran Tan - Backend implementation**
- 3. Ben Joseph Murphy - Frontend lead**
- 4. Lim Bing Sen - Marketing, STEPS Poster and presentation, Frontend, QA**

These are our “roles”, but of course, in such a lean team, everyone wears multiple hats :)

Appendix

STEPs video

<https://www.youtube.com/watch?v=EYdJOINIfUo>

Marketing timeline for previous sprints (already mentioned in Progress Reports 1&2)

	Planned ** note that only latest one taken, for example if we wrote different plans for Sprint 3 in our post-Sprint 1 and post-Sprint 2 report, then only the post-Sprint 2 one is shown here	Actual Executed
Part 1: Week 7 (26 Sep to 2 Oct)	<ul style="list-style-type: none"> - Survey and gauge of market - Landing page 	<ul style="list-style-type: none"> - Reddit post via personal account to gauge market, 268 positive responses - Landing page created
Part 2: Week 8 (3 Oct to 9 Oct)	<ul style="list-style-type: none"> - Creation of Instagram and Reddit accounts - Google forms for interest indication - Market interest indication on Reddit and Instagram 	<ul style="list-style-type: none"> - All executed as of 4 October
Part 3: Week 9 (10 Oct to 16 Oct)	<ul style="list-style-type: none"> - Post social media content according to Content Calendar 	<ul style="list-style-type: none"> - Achieved as per content calendar
Part 4: Week 10 (17 Oct to 23 Oct)	<ul style="list-style-type: none"> - Announce product launch on Instagram, Reddit and email pre-registered users. - Post social media content according to Content Calendar 	<ul style="list-style-type: none"> - Product launch marketing done on-time - Social media marketing achieved as stated on content calendar

Instagram Content timeline for previous sprints (already mentioned in Progress Reports 1&2)

	Planned **only latest plan before the sprint of execution is shown (e.g. if Sprint 1 and Sprint 2 report both plans for Sprint 3, then the plan in Sprint 2 is taken)	Actual Execution
1st post (Week 8)	Interest Indication Link + Coming Soon poster	<u>On time</u>
2nd post (Week 9)	Maximising productivity in studying + Interest Indication Link	<u>On time</u>

3rd post (End of week 9 or start of week 10)	Post to announce launch of app	<u>On time (October 18)</u>
4th post (Week 10)	Short video/reel to showcase app	<u>On time (October 19)</u> - Change in reel content to showcase hidden study spot in I4 building instead
5th Post (Week 10)	Unplanned Post	Post about Cash Giveaway event (23 Oct)

Development timeline for previous sprints (already mentioned in Progress Reports 1&2)

	Planned ** note that only latest one taken, for example if we wrote different plans for Sprint 3 in our post-Sprint 1 and post-Sprint 2 report, then only the post-Sprint 2 one is shown here	Actual Executed
Part 1: Week 7 (26 Sep to 2 Oct)	<ul style="list-style-type: none"> - Wireframing - API Design - Authentication and basic navigation flow - User interview for wireframe 	<ul style="list-style-type: none"> - All completed on time
Part 2: Week 8 (3 Oct to 9 Oct)	<p>Complete the first MVP, which includes:</p> <ul style="list-style-type: none"> - Authentication - Post and accept study requests - Notification feature (either email or notification) - Analytics 	<ul style="list-style-type: none"> - All completed on time before 1st Progress Report - But deployment to public was delayed by 3 days due to bug fixes for post and accept flows
Part 3: Week 9 & 10 (10 Oct to 23 Oct)	<ul style="list-style-type: none"> - Refine existing features - Bug fixes - Aesthetic improvements - Additional filtering options for posts - Leave reviews for each other - Chat Feature 	<ul style="list-style-type: none"> - Non-essential filtering options, reviews and chat features not implemented, see Progress Report 2 for justification - Unplanned: Push notifications and in-app notifications - Unplanned: Added gamification system to generate collectable,

		<ul style="list-style-type: none">- unique AI art for users- Other tasks completed on-time, including UI revamp and thorough QA with bug fixing.
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