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CS-GY 6543 Human-Computer Interaction

Assignment 3: A paper-prototype for a mindfulness intervention app

Following a persona-design process in Assignment 2 and a literature review in Assignment 1 of mental-health support companions (Ooms, 2023), apps designed to reduce social media addiction (One Sec, 2023), virtual reality research to treat severe mental illnesses (Bell, 2020), and conversational agents to support group therapy (Yuksel, 2023), we decided to create an intervention app designed to interrupt users whenever they are mindlessly using an app they are addicted to. This app is supported by an intelligent, Large-Language-Model powered recommendation system that facilitates the creation of case-specific interventions for the user to manage their time on these applications better.

Section 1: Recap - Our five personas

To explain the app we have designed in our paper prototype, we first need to briefly recap the personas we had in mind for this application. With this context in mind, we will explain how each major task supports each persona.

1. [P1] Isolated remote-work knowledge workers: As a byproduct of the COVID-19 pandemic, these individuals still have a working setup where they work from home most days of the week. This experience blurs the lines between work and home, with one usually creeping into the other. These individuals tend to use social media more often due to the lack of social interactions that once came from colleagues in the work environment.
2. [P2] Younger kids addicted to digital media: This persona represents children and pre-teens who are increasingly becoming more dependent on social media for social connections and entertainment. They are at risk of excessive screen time, which might impact their development.

3. [P3] People isolated due to severe mental illnesses or trauma: These personas represent people affected by severe mental illnesses like PTSD and depression, which are often exacerbated by isolation. These people turn to social media in order to lessen the symptoms of their pre-existing conditions, which might inversely amplify them due to the amount of harmful content plaguing social media platforms.
4. [P4] Busy Parents Seeking Balance: This persona represents parents who are juggling work, parenting, and personal life. They often find themselves checking social media during brief moments of downtime, which can add up to significant usage throughout the day. They want to cut down on social media to be more present with their children and manage their time better.
5. [P5] University Students Preparing for Exams: This persona represents students who are preparing for their exams. This endeavour often involves days to weeks of concentrated, distraction-less effort from the students, and any distractions might be costly for their study routine.

Section 2: Paper-Protype Supported Tasks

We envisioned an ever-growing app that supports a variety of interventions. As a starting point, we decided to start with five interventions, each supporting one of the personas mentioned above. Furthermore, the ability to create and modify an intervention is a task that every user must do and acts as the central point of our recommendation system, so we included that too and planned to ask every user to go through the creation and modification process to refine as much as possible.

Below are the major tasks we currently support. Next to each task name, you will find which personas it supports based on the code provided to each persona in Section 1.

1. Create an intervention (All Personas P1-P5): This occurs on the app's main screen and is where a user can design an intervention. Users are supported through the intervention-creation process thanks to recommendations powered by LLMs.
2. Modify an Intervention (All Personas P1-P5): After an intervention is created and deployed, a user can modify it.

3. Alternative app (All Personas P1-P5) : While using the target social media app, a user is taken to another alternative app that is proven to be more beneficial for their mental health as measured by their usage data. This targets all personas as it is very specific to what the user needs and the intervention is motivated by the specific data collected from the user.
4. Math Puzzle (Persona P5): While using the target social media app, a user is taken to a screen where they are asked to do a math puzzle to return to the social media application. If they don't solve the puzzle after a specific amount of time, a timer runs out, and they are taken back to the app. This intervention targets P5 since users might want a productive break from their studies, which keeps them on their feet to eventually return to studying.
5. Obscuring specific negative features (Persona P1): The app can embed itself within a problematic social media app and disable entire features responsible for most of the time spent in the social media app (ie, reels in the Instagram app). This intervention targets P1 because isolated remote knowledge workers tend to be chronically online, which justifies a millimetrically accurate intervention to specific features of an app as we can't prevent these users from being online.
6. Journaling Exercise (Persona P3): While using the target social media app, the app intervenes with a screen with a journal prompt and a journaling exercise. After the journaling exercise, the user can return to the main app. This intervention targets P3 because journaling has been proven to be an excellent way to treat mental health disorders (Sohal et al., 2022).
7. Breathing Exercise (Persona P4): While using the target social media app, the app intervenes with an interactive screen that prompts the user to engage in a guided, 20-second breathing exercise. This breathing exercise is augmented with haptic vibrating feedback and a visualization on the screen to keep the user engaged. Users can engage in a meditation exercise after 20 seconds or return to the social media app. This intervention targets P4 because busy parents may be overwhelmed with their responsibilities. However, they are very well versed in handling all of them, and we posit that a simple breathing and/or meditation exercise is enough to get them back to a more levelled headspace.
8. Lock App and Exit App (Persona P2): Minor interventions designed to be

included after the first prototyping session. With the lock app intervention, the user is prevented from using the app entirely for a determined amount of time. The Exit app intervention directly redirects the user to the phone's home page. This intervention targets P2 because younger users need a more controlled, straightforward form of intervention akin to that of a parental control system.

Section 3: Prototyping Process

Preliminary Interview

To acquaint ourselves with our testers, we asked them the following three questions regarding their social media use. We found that all users use social media, all of them spend more than an hour on social media on average, and all of them would like to control their social media intake better. Some even expressed a detrimental addiction towards social media and highlighted it as a big problem in their lives.

Interview Questions

1. Do you have social media?
2. How many hours do you use social media everyday?
3. Is there anything you would like about social media usage?

After the individuals interviewed were asked a few questions about their usage of social media, including frequency of use as well as if they would like to change their usage, they were given a short explanation of how the application was supposed to reduce social media usage by its users. After giving the user a persona to follow, the home screen was presented, and an instruction was given to the individual to create any amount of interrupts they desired using the application, but at least the intervention that corresponds to their persona was required for them to do. Users navigated from the home screen to the interrupt creation screen for an application. Here, they would read about the interrupts and modify them to their liking, and save the changes. They could later navigate back to this screen to modify the interrupts they created. Finally, they would use the social media application and experience the effect of the interruption.

List of revisions

After running the 1st Prototyping presentation, the following is a list of the requested changes we had, followed by how we addressed each in our final prototype.

1. Confusion with intervention apps add and modify button: We modified the buttons with different labels to clearly show which one is which.
2. Users asked for more clarity to set the times for the timer: We added colours to the timer slot. When they select the timer, it will open an independent pop-up where they can then set the time more clearly.
3. Users said that the setup of the interventions one by one was too tiresome for them. We solved this by adding 2 or 3 default recommended interventions on the screen that they can choose from. It will also have a kind of show more button below, which they can click on to see a scrollable list of the different interventions that they can set.
4. Users were a bit worried about the opt-in data collection from our app: We solved this by creating a user agreement at the start explaining to the users that the data we collect will only be used specifically for enhancing their user experience. If they choose not then that's ok too but it will result in more generalized interventions instead of personalized ones.
5. Users were also curious if they could have random interventions: We decided not to go with this because we thought that this feature is a solution to a problem that does not exist. We want our interventions to be meaningful and specific to the user, and if they are not useful, then further iteration and refinement of our system is needed.
6. Users wanted to know if there could be a notification toggle to turn the interventions and the app on and off:- We decided that we won't build this feature because it defeats the purpose of the app. We feel once an intervention has been decided, it should provide a bit more nudge to the users to continue using them. Of course, if they want them to end, they can go back to the app to do so to toggle them off.
7. For the journaling intervention, users were a bit confused as to what they were supposed to journal about: We solved this by providing a journaling prompt that helps the user understand what to journal about, like "Reflect on a moment of profound beauty that you recently experienced. What about it surprised you and drew you in?"

We plan to have a repository of journaling prompts for the users to randomly display whenever the user opens the journal intervention.

Implications of Feedback and Implemented Changes

Based on the observations and user feedback, several important design implications for the future development of the intervention app were made. Firstly, users asked us to enhance user interface clarity. This included modifying the add and modify buttons for better distinction and incorporating color coding in the timer for easier time-setting. Secondly, users asked us to simplify the setup process. We now offer pre-set intervention options and a more intuitive selection process with a scrollable list of interventions. Thirdly, users asked us to address privacy concerns. So, we have implemented an explicit user agreement about data usage, reassuring users about their privacy, with an option for more generalized interventions if they opt out of data sharing.

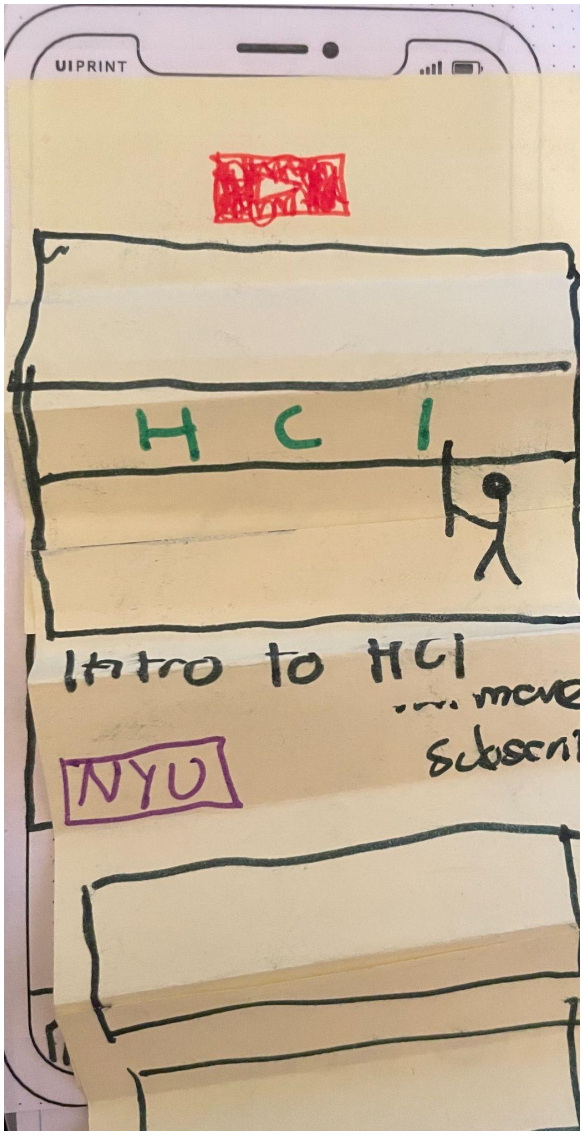
Additionally, while exploring new features after feedback, we felt it necessary to align them with the app's core purpose. Decisions, like not incorporating random interventions and avoiding a notification toggle to turn interventions on and off, were made in this light, ensuring that the app remains focused on nudging users towards consistent use. For the journaling intervention, users were a bit confused about what they were supposed to do. So, we now guide users with placeholder text, such as prompts for reflection.

Furthermore, we resolved user interface issues like adding an answer box for the math puzzle, replacing the infinity symbol with a simpler 'X' for clarity, and adding a back button for easy navigation, directly responding to users' feedback. We made these crucial refinements for an intuitive and user-friendly app experience.

Section 4: Relevant Digital Photos

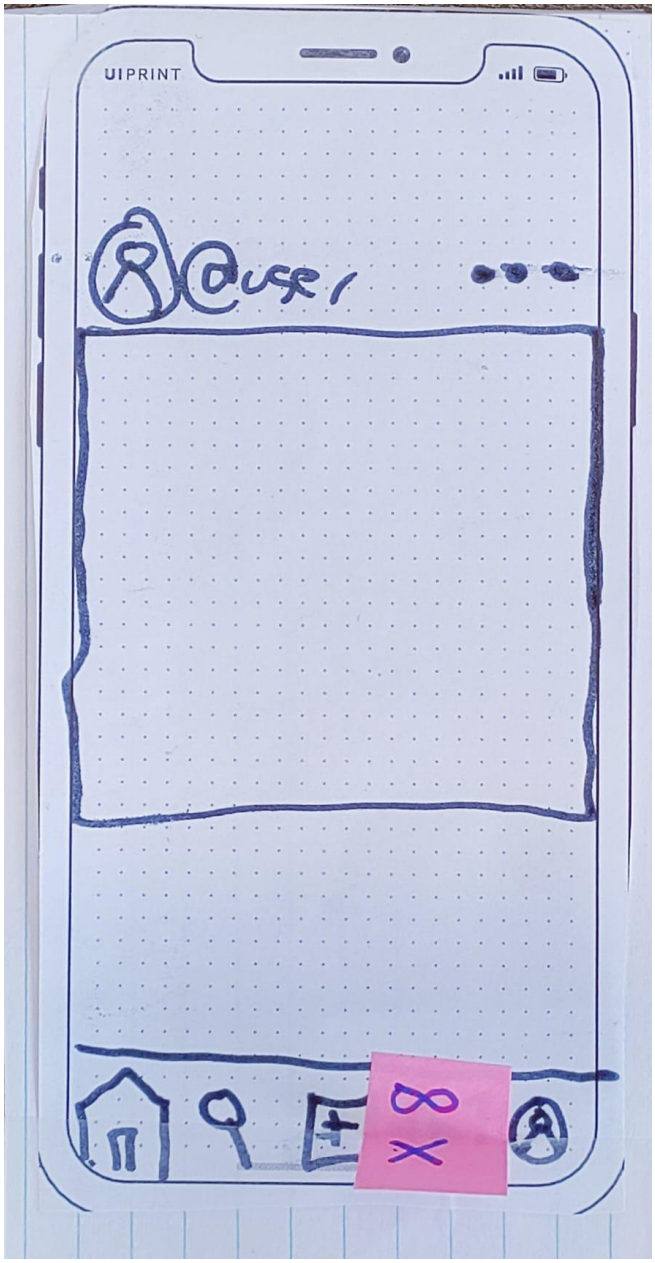
Alternative app (All Personas P1-P5)

This intervention redirects the user to an alternative app that is more healthy while still entertaining. In the example below, the user is redirected from Instagram to the Youtube app. Thanks to our personalized recommendation engine, the user is taken directly to an HCI YouTube video as the algorithm knows that the user is currently learning about the subject.



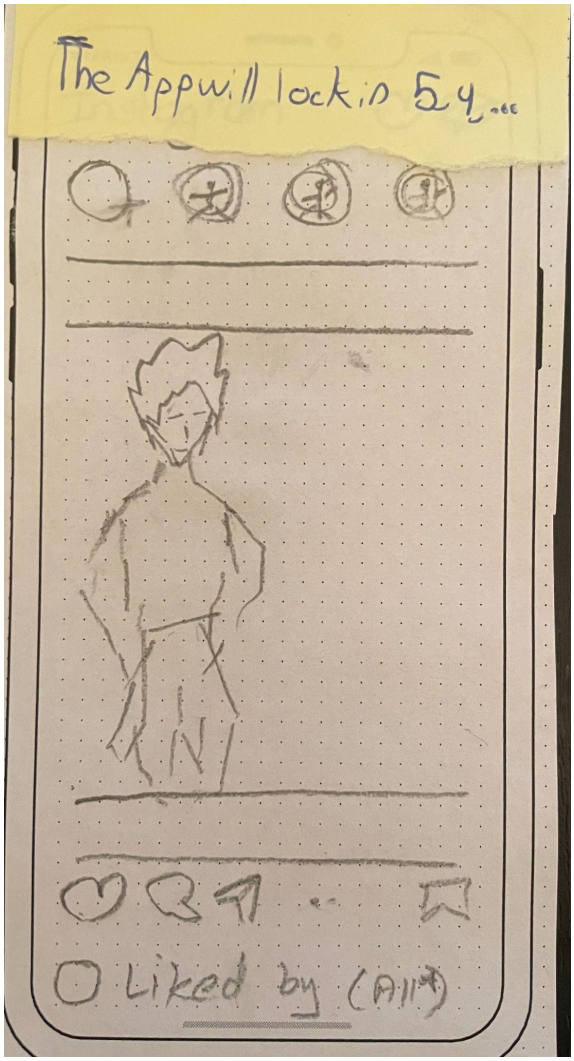
Obscuring specific negative features (Persona P1)

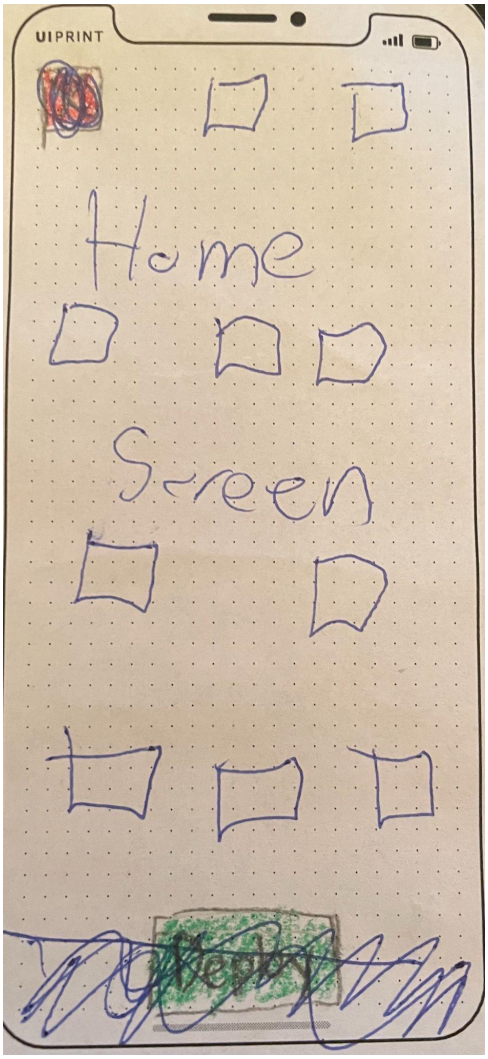
This intervention blocks out specific negative features within an app. In the example below, the reels feature of the Instagram app is blocked out.



Lock App and Exit App (Persona P2)

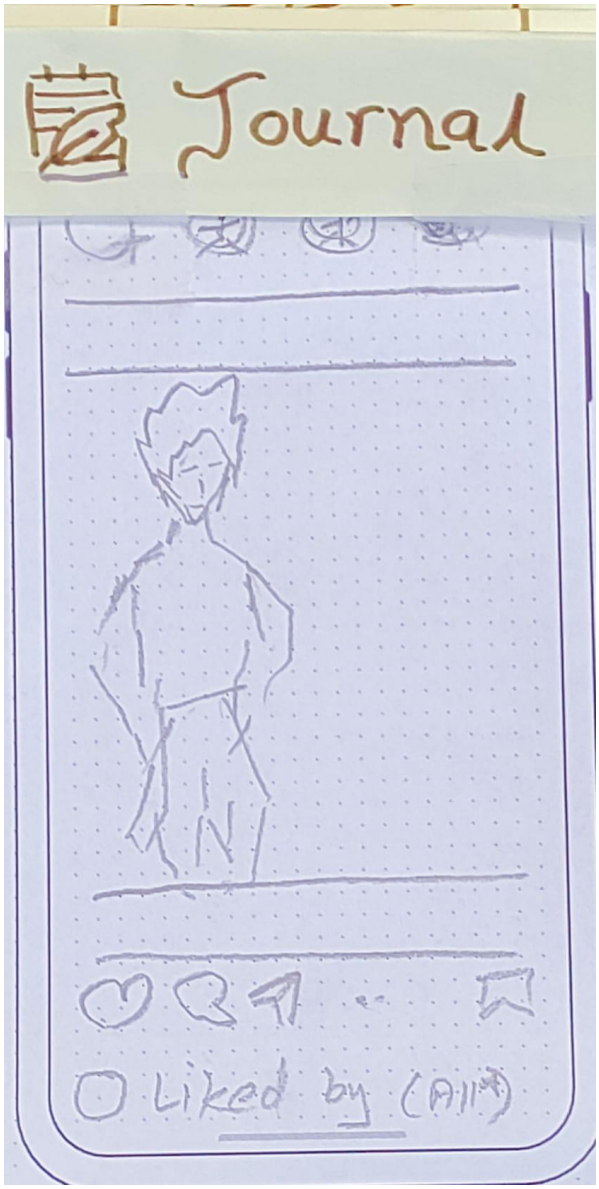
This intervention redirects the user to the home screen after trying to enter an app that is deemed dangerous for the user's mental health. This feature is mostly geared towards extreme cases of users who need it, like children who are developing mental health issues due to an addiction to social media.

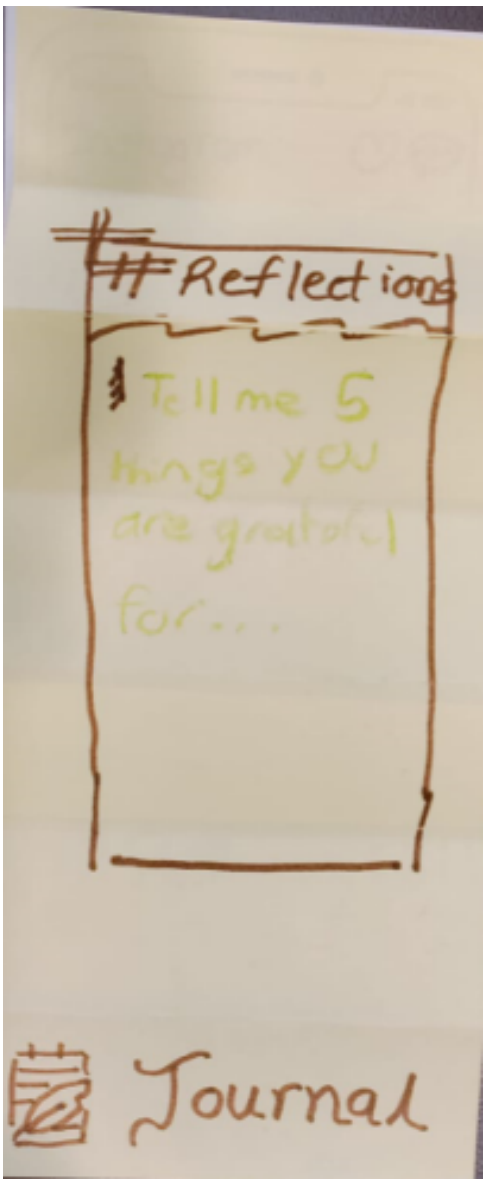




Journaling Exercise (Persona P3)

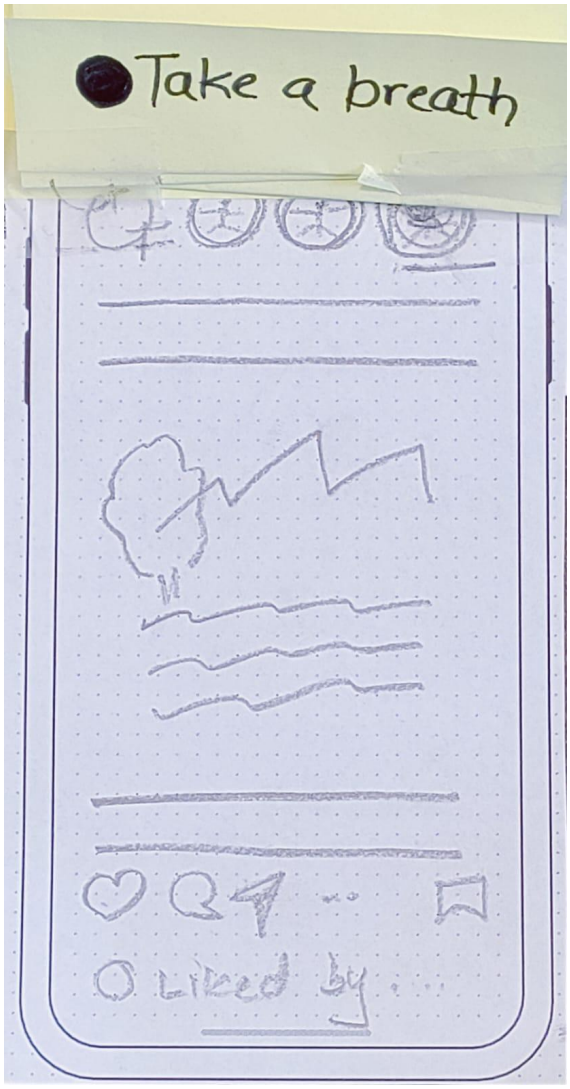
This shows the journal intervention popping up on the instagram app.

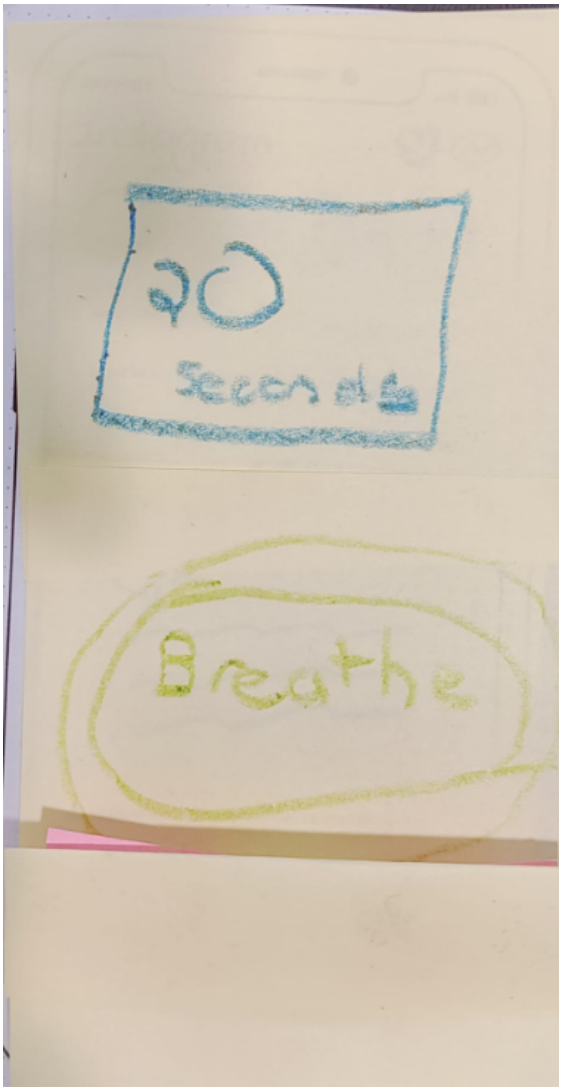




Breathing Exercise (Persona P4)

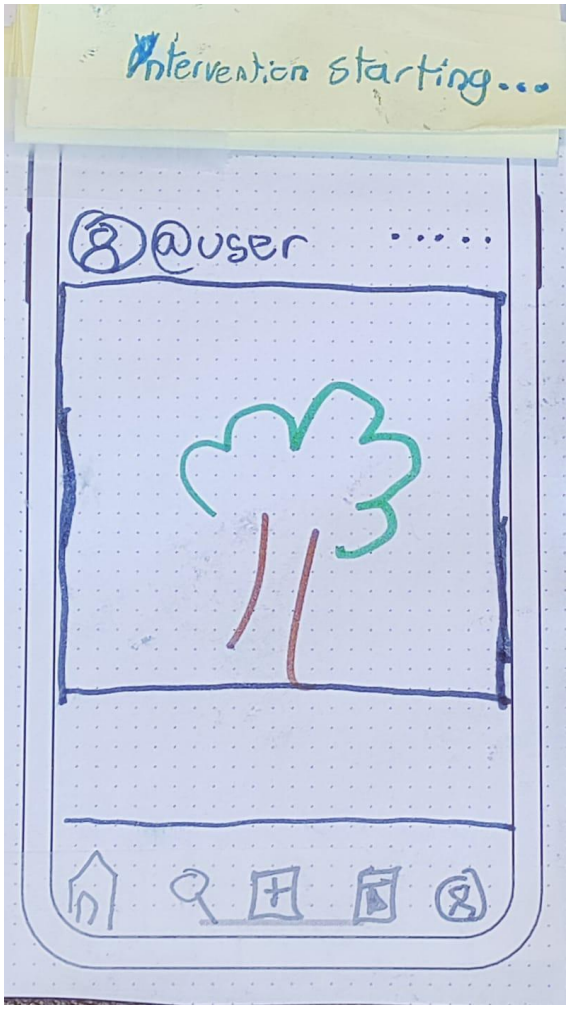
The picture below shows the take a breath intervention on instagram app. When the user clicks on the notification, the screen on the right appears.

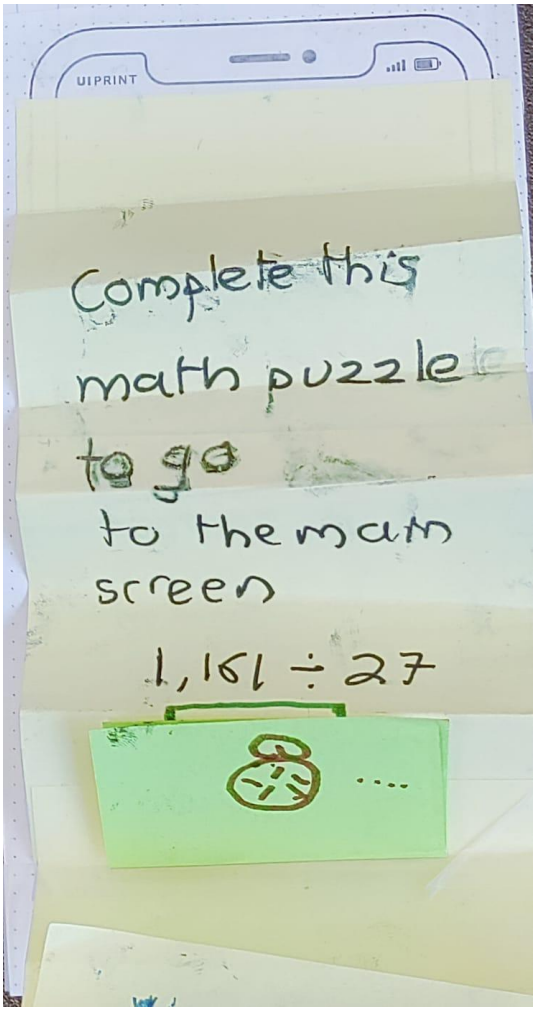




Math Puzzle (Persona P5)

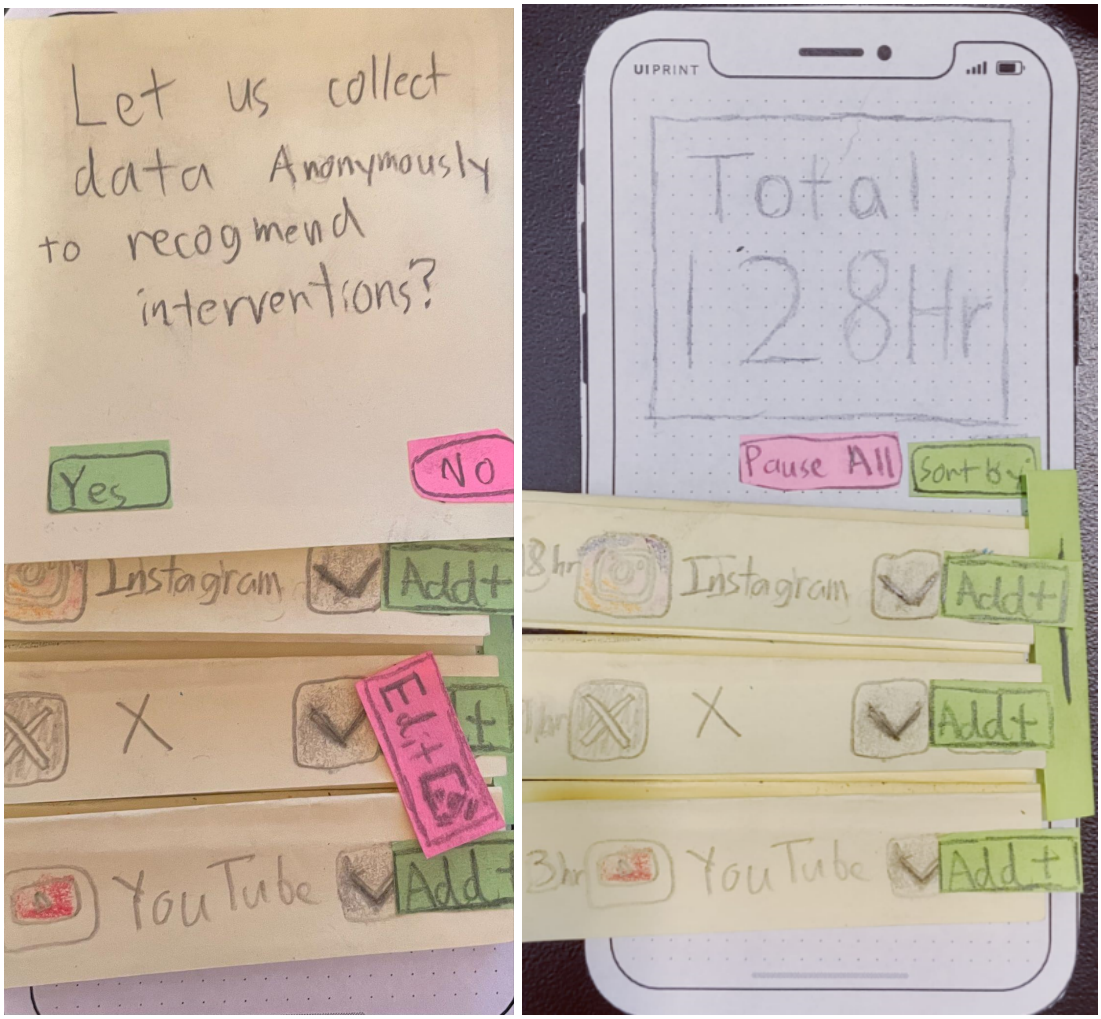
This international requires the user to complete a math puzzle while they are using the target troublesome app. If they struggle with the math puzzle, the timer eventually runs out and they return to the app.





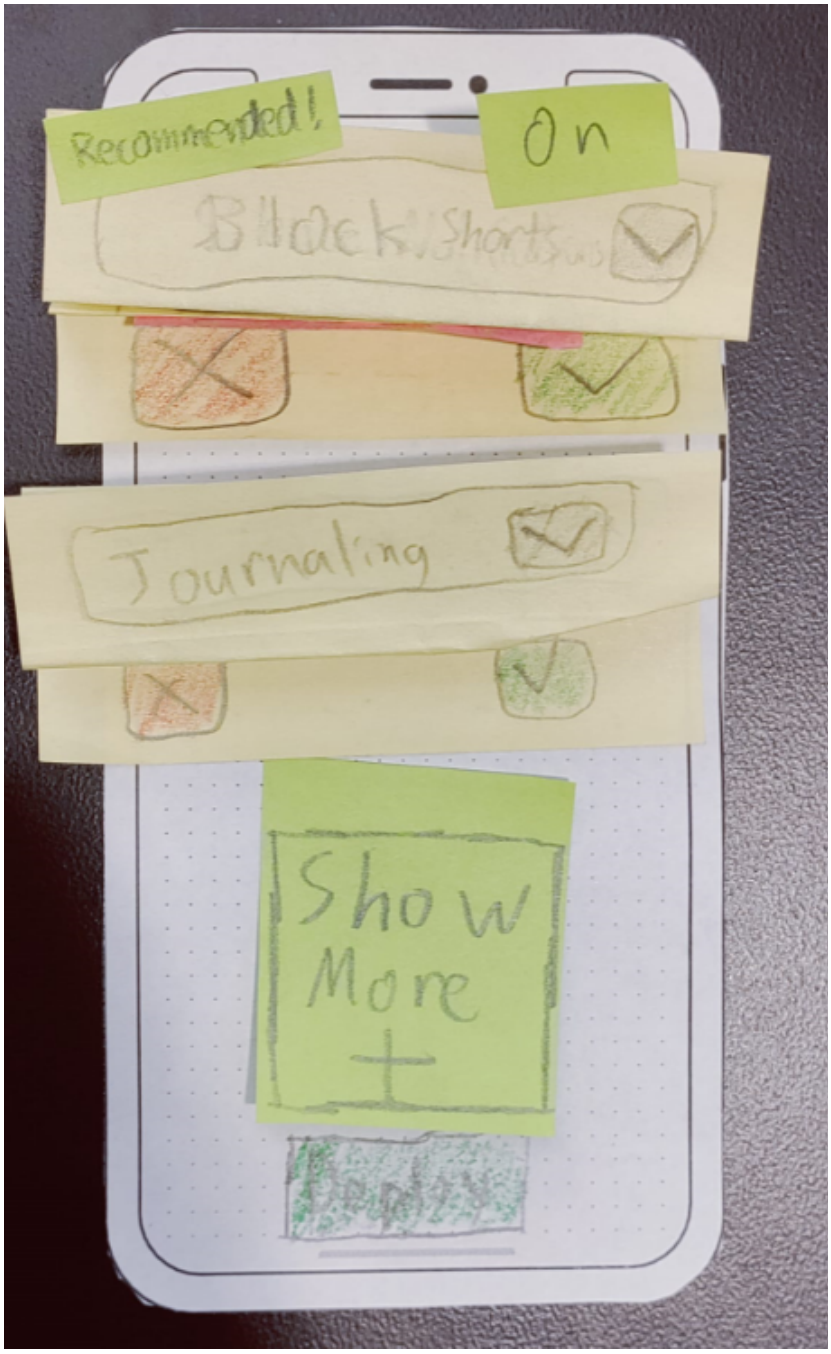
Create an intervention (All Personas P1-P5)

This is the main screen of the app. Thanks to feedback from our testers, the user is first introduced to a pop-up screen that asks for data collection consent. After they agree to this, they are given possible placeholder recommendation interventions based on their app usage. If they don't agree to data collection, these recommendations become more generic.



Modify an Intervention Screen (All Personas P1-P5)

In this screen, a user can modify the interventions they have by clicking on them. This is represented by a post-it note that folds down, showing users the modification parameters.



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