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Project 3 | Interaction Design'22

Exploring Digital Wellbeing Strategies

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01 Introduction

Digital wellbeing is gaining increasing importance as it focuses on designing technology that should empower the user to help improve their lives. This project aims to explore digital wellbeing strategies to help people address problematic digital behaviours, manage distractions and improve their autonomy around how they spend their time.

Technology is ubiquitous and a large part of our lives make use of screens to support the user's productivity, connectivity and leisure. Constant distractions from primary tasks increase the user's screen-time affecting their physical and mental health. These distractions are a result of how applications are designed to engage or hook the user into losing track of time, low self-control, frustration, guilt and post-use regret. While some users are aware of their excessive usage, a few do not identify the effects of the wasted time. 'Time is the currency' when it comes to distractions on our digital devices as it is easiest to start using these applications but difficult to understand 'how much is enough?'. To combat these negative experiences and digital behaviours, digital wellbeing plays an integral role in devising solutions that help users manage how they engage with technology.

A variety of digital wellbeing interventions exist but only work for temporary periods of time or are easily bypassable. This project aimed to build upon other less-explored approaches through a robust list of ideas accounting for user contexts of device use and routines. This project designed and evaluated three design interventions that aid users in managing the time they spend on their devices by employing a combination of strategies identified from literature and primary research insights. As a result of the designs, we were able to gain insights on (1) the impact of redirecting users to diverse alternate activities of interests to reduce social media usage (2) the effects of modifying the environment on routine digital behaviors (3) the role of financial rewards/ penalties to motivate users to self-regulate screen-time We believe, insights from these explorations may be further taken forward to help with technology related addictive behaviors and support subjective wellbeing within unique user contexts.

01a. **The problem space**

Technology that supports and technology that hinders

Our smart digital devices are is a means to stay connected, productive, entertained, informed and are an essential tool for going about life. Although certain products and services such as social media platforms are designed to constantly grab user attention and promote a constantly-on way of living that impacts user's psychological health and wellbeing (Logan, 2018). It is by design that some platforms are addictive and problematic as they exploit human vulnerabilities. (Alutaybi et al., 2019). The use of these technologies give rise to problematic digital behaviours, distract from life and degrade quality of life.

Increase in screen-time

The pandemic has highlighted the need to focus on wellbeing due to the changes in how we work, interact and live. As per the 2021 Kaspersky report, 53% of people are using social media more than they were before the pandemic due to negative feelings of loneliness, boredom and FOMO (fear of missing out). More users are actively downloading more social media apps and getting onto these platforms with an average growth rate in India of 31.2%, spending an average of more than 2 hours a day on social media platforms. This number may be likely higher as a result of the pandemic and adds to an overall increase in screen-time due to remote and hybrid working formats . Increase in screen-time can effects such as reduced sleep or day-night reversal, headaches, neck pain, myopia, digital eye syndrome and cardiovascular risk factors etc (World Health Organization, 2020)

Why focus on smartphones?

In a multi-device world, smartphones have become an integral part to conduct various daily activities. Their ease of access, portability, Internet availability and engaging applications keep users hooked. Additionally, interventions to manage smartphone use can be integrated easily into people's lives due to a large portion of time spent on them. People are engaged in their smartphones with the introduction of more customized, entertaining, bite-sized content such as reels and stories, users can form unwanted habits. Appending terms such as 'Nomophobia' which means 'No Mobile Phobia' highlights that the problem is prevalent (Alexander and Ofir, 2020). Excessive smartphone use are associated with having negative impacts on social interactions as well as mental health and wellbeing. Users enter negative behavioral cycles where the smartphone acts as a 'pocket slot machine'. (Aranda et al., 2018) Constant access to the Internet and its usage may cause users to experience severe breakdowns of self regulation due to an excessive use of digital devices (Alberto and Luigi, 2021)

Are we really 'addicted' to our smartphones?

'All motivation is a desire to escape discomfort' (Eyal, 2019). In the book 'Indistracable', Eyal talks about how one must deal with these uncomfortable internal triggers, else people with continue to engage in self-defeating distractions. It is easy to build poor device usage habits that provide temporary comfort with dopamine hits as humans are hardwired to take the route with least effort therefore we continue to engage in the overuse of pleasurable technologies (Hagura et al., 2017). Not all positive experiences support wellbeing in the long run. Products tap into the attention economy and continue to employ these persuasive patterns to hook their users leaving them with a sense of low autonomy and competence to manage use. (Thomas and John, 2001) A study, Phil and Stoney in 2017 concluded that 'life satisfaction itself is inversely related with both Internet addiction and social media addiction' that is, people will indulge in using the Internet more to avoid these negative feelings. Therefore, exploring more ways to help users take control of their screen-time is a relevant and growing space for the HCI community.

Labeling the increase in device use as 'addiction' can introduce feelings of guilt, frustration and shame. 'Smartphone Addiction' is a term commonly used, although the DSM-5 does not recognize it as a listed pathology. The addiction narrative could influence wellbeing, sense of self, and sense-making around smartphone use and therefore the increased used of smartphones needs to

dig deeper into questions of 'Why do people spend a considerable amount of time on their smartphones?'. There have been a number of technology addiction measurements developed and reviewed by Harris et al., 2020; such as Smartphone Addiction Proneness Scale (SAPS) (Kim et al., 2014) and Smartphone Addiction Scale SAS (Kown et al., 2013). Some may lack the social and technological contexts needed to understand smartphone addiction. (Lanette & Mazmanian, 2018).

Problematic smartphone usage habits

Smartphone overuse may better be called a 'Habit' rather than a behavioural addiction which is defined as mental and behavioral disorders that do not include the ingestion of psychoactive substances. Additionally behavioural addictions cannot be addressed the same was as substance (smoking, drinking etc) addictions as they have different behavioral and psychological roots. (Serenko & Turel, 2020). While habits may be unhealthy, they do not possess the same core components of behavioural addictions: salience, mood modification, tolerance, withdrawal, conflict, and relapse. Following an abstinence model, similar to drug or alcohol addiction, is an unrealistic model and therefore we may consider improving self-control, break or build healthy habits and help in enabling users to reflect on usage patterns that become problematic. The way such habit build is due to the over-stimulation of dopamine cells that build learnt association with the sound of our phone vibrate or a notification light or using the app itself. (Serenko & Turel, 2020). This hyperactive reward system is reinforced by constant repetition that cause a lack of motivation to exercise self-control.

What are distractions?

In the context of this project, we look at distractions as activities that deviate the user from their intended goal or their primary task. This is not just limited to social media applications such as YouTube, Instagram, Facebook, LinkedIn and so on but to other activities that cause a lost sense of time or regret. This level of smartphone dependence is referred from the six identified patterns by Choi et al. (2017): 1) Social networking sites (SNS) during daytime, 2) web surfing, 3) SNS at night, 4) mobile shopping, 5) entertainment, and 6) gaming at night.

The definition of a distracting app is contextual and user specific such that is changes with time and needs. Therefore designs must allow users to define their distractions across their routine day.

01b. **Defining digital wellbeing**

Relevance of digital wellbeing

Digital wellbeing has been actively considered as a way to ensure the services provided by companies such as Google, Apple and others that aim to promote healthy use of digital technology. Google's focus on designing for digital wellbeing addresses problems of screen time, habits with compulsive phone usage, and designing to help regulate usage. (Lunder et al., 2021) iOS offers Screen Time to track and self-regulate use. Nowadays, people desire to voluntary disengagement through a cultural introduction of Digital detoxes, defined as 'a period of time when a person voluntarily refrains from using digital devices such as smartphones, computers, and social media platforms' (Oxford dictionary) The utilitarian nature of the smartphone can make complete disconnection tricky and therefore future interventions must balance and consider the user's context of use.

Understanding wellbeing

Recent definitions of wellbeing have moved from objective to subjective measures, self-reported by people in terms of their satisfaction with life. Subjective well-being (SWB) is defined as 'a person's cognitive and affective evaluations of his or her life' (Diener, et al., 2002). Subjective wellbeing and positive psychology are among the most recent developments that aim to improve experienced wellbeing (Seligman & Csikszentmihalyi, 2000). As some technology aims to focus on engagement, enjoyment and retention of users, this sort of approach requires interventions that mitigate the negative effects of technologies that do not actively consider the repercussions of their offerings. This is where digital wellbeing comes in and works in the form of app or device level interventions in the for of digital self-control tools. Whereas, in a broader sense, digital wellbeing should be in the foundations of our design process.

Digital wellbeing (DW)

Today, digital wellbeing moves the focus beyond 'Screen Time'. As a broad definition, 'digital well-being is how digital technology affects psychological well-being, education community health work, environment safety etc'(Google) and as a narrow definition, 'digital wellbeing is the extent to which the user feels their digital device use is well-aligned with their personal, valued, long term goals" (Lyngs, 2019). This project sticks to the narrow definition in order to develop design interventions focused on subjective wellbeing.

A study conducted by 'Think with Google' found that people more often spend time on activities they believe have a negative impact on their wellbeing that a positive impact. Although, digital activities on their own are not binarily positive or negative. People's perceptions of them are highly subjective, individual, and context dependent. Therefore, resolving addictive behaviours, low self-control, self-regulation and improving our relationships with our devices demands personalized approaches to support digital wellbeing.

Measuring wellbeing

The METUX (Motivation, engagement and thriving in user experience) model by Peteres et al., (2018) that aims to provide actionable insights to designers by focusing on user wellbeing and flourishing. The model grounded in psychological research that leveraged Ryan and Deci's self-determination theory for practitioners study the impacts of technology design on user's basic psychological needs of autonomy, competence and relatedness. Wellbeing is measured across six spheres of adoption, interface, task, behaviour, life and society. Depending on the technology, each of the spheres can have positive or negative outcomes and we could measure a 'net increase' as identified by Lukoff (2019) to make sure our designs support wellbeing.

Design implications

The project adopts the narrow definition of digital wellbeing to focus on user's subjective wellbeing to help with problematic smartphone use habits by designing interventions that help align the user's goals within their unique contexts

02 Secondary research

Digital self-control tools (DSCTs)

Users frustrated with their lack of self-control and self-efficacy to manage digital distractions, look for external solutions to help support these needs. To support this need, designers develop digital self-control tools (DSCTs), that are behavior change technologies that allow users to self-monitor their technology use through interventions like timers, lock-out mechanisms, blocking of apps and websites, goal setting, or visualizations of device usage statistics. DSCTs are designed to support user's self-monitoring by tracking their use and providing feedback (Alberto and Luigi, 2019). Such solutions rely on the user's self-accountability and motivation to break smartphone usage habits that help users improve productivity and save time.

DSCTs have been explored extensively over the past few years trying to address distractions and addictive behaviors related to smartphone usage. Lyngs et al., 2019 provides a convenient categorization after reviewing 400 DSCTs based on features that fall under the categories of: block or remove distractions, allow self-tracking device usage, promote goal advancement and provide rewards or punishments. Lyngs et al. (2019) were able to highlight interesting features and neglected areas for future work which were considered for this project:

1. Redirecting the user to an activity that meets their productivity goals
2. Increasing friction so that it is difficult for the user to override restrictions
3. Scaffolding new and desirable non conscious habits by automating implementation intention that leverages an if-then rule linking context to outcome

While a number of these tools exist on app stores, their effectiveness in actually helping users manage and improve their digital wellbeing has been debated.

To address this, a study done by Biedermann et al. (2021) reviewed around 28 DSCTs and recommended factors influencing outcomes:

- **Awareness** intervention showed effects when they are insistent and nudging the user to reduce their time on the device. Therefore, it may be useful to nudge the user towards a solution but may suffer from the novelty effects and not sustain long term
- **Goal-advancement** intervention worked when they were time based and action goals were set
- **Adding friction** to access the distracting application can help reduce frequency but increase screen time to compensate for the hurdles
- **Content modification** intervention and UI changes such as grayscale or manipulating the application interface had positive effects time spent on the distractions
- **Reward** intervention when **social support** features were introduced had positive effects on reducing distractions
- **Context** detection where the intervention accounts forr what the user is doing at a point of time should be considered. Although, context aware technologies lack accuracy and can hinder user experience therfore, self-tracking can be adopted in this case.

DSCTs as interventions are used for temporary periods as they support user's short term goals of reducing distractions. Most solutions do not integrate with the user's context causing users to abandon them after short periods of use. Alberto and Luigi (2021) suggested other approaches that could have the potential to reduce user attrition when it comes to DSCTs. While self monitoring strategies that use timers or lockout mechanisms are effective for a short amount of time, the authors identified under explored approaches which included scaffolding new desirable habits and offering learning support for their users to reflect on their negative usage. This project also builds upon the recommendation where the design helps in 'proactively assisting users in learning how to use technology through customizable and adaptable interventions'

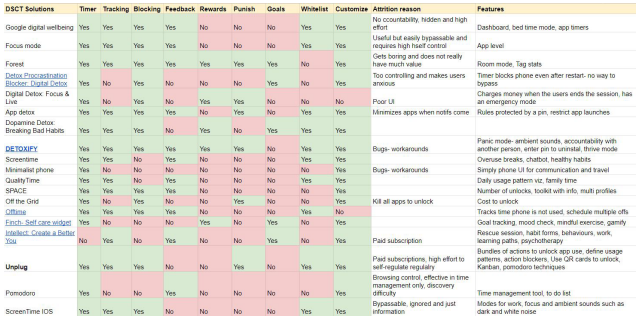
02a. **Review of existing solutions**

Review of available DSCTs

Existing applications on Playstore were reviewed to better understand features in DSCTs in addition to self-improvement and time-management apps. Timers, tracking, blocking and providing the user with feedback on usage were some of the common features in DSCTs. Factors that led users to discontinue using these tools included poor UI, poor aesthetics, bugs, privacy concerns and performance issues. These factors can cause users to fall back into loops if problematic usage patterns and habitual overuse. Additional features included setting rules, accountability partners, various user modes such as family/work time, panic modes to end timers, financial costs to unlock, increasing friction to use apps and so on.

Based on the review, the following points may be considered during the design of DSCTs:

1. Third party apps and plugins require users have awareness of these tools available
2. Interventions require the target audience to actively seeking solutions to manage their smartphone habits in order to download the apps
3. While some users wished for strict restrictive interventions to help curb overuse, others felt that blockers inhibited useful functionality that affected productivity. Therefore the solution should be flexible enough to account for routine changes
4. Timers, trackers, blockers, timely feedback, triggers and nudges are must me considered as they have been effective across most solutions
5. These applications limit users, but leave users empty handed with the question of 'now what?' For this, offering alternatives for the user and telling them possible activities to do during down-time away from the screen can be a strategy worth exploring.



DSCT Solutions	Timer	Tracking	Blocking	Feedback	Rewards	Punish	Goals	Whitelist	Customize	Attrition reason	Features
Google digital wellbeing	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No accountability, hidden and high effort	Dashboard, bed time mode, app timers
Focus mode	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Useful but easily bypassable and requires high self control	App level
Forest	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Gets boring and does not really have much value	Room mode, Tag stats
Detox Procrastination Blocker: Digital Detox	Yes	No	Yes	No	No	No	Yes	No	Yes	Too controlling and makes users anxious	Timer blocks phone even after restart- no way to bypass
Digital Detox: Focus & Live	Yes	No	Yes	No	Yes	Yes	No	No	No	Poor UI	Charges money when the users ends the session, has an emergency mode
App detox	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Minimizes apps when notifs come	Rules protected by a pin, restrict app launches
Dopamine Detox: Breaking Bad Habits	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes		
DETOXIFY	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Bugs- workarounds	Panic mode- ambient sounds, accountability with another person, enter pin to uninstal, thrive mode
Screentime	Yes	Yes	No	Yes	No	No	No	Yes	Yes		Overuse breaks, chatbot, healthy habits
Minimalist phone	Yes	No	No	No	No	No	No	No	Yes	Bugs- workarounds	Simply phone UI for communication and travel
QualityTime	Yes	Yes	No	Yes	No	No	No	Yes	Yes		Daily usage pattern viz, family time
SPACE	Yes	Yes	Yes	Yes	No	No	No	No	Yes		Number of unlocks, toolkit with info, multi profiles
Off the Grid	Yes	No	Yes	No	No	Yes	No	No	Yes	Kill all apps to unlock	Cost to unlock
Offtime	Yes	Yes	Yes	Yes	No	No	No	Yes	No		Tracks time phone is not used, schedule multiple offs
Finch: Self care widget	Yes	No	No	No	Yes	No	Yes	No	Yes		Goal tracking, mood check, mindful exercise, gamify
Intellect: Create a Better You	No	Yes	No	Yes	No	No	Yes	No	Yes	Paid subscription	Rescue session, habit forms, behaviours, work, learning paths, psychotherapy
Unplug	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Paid subscriptions, high effort to self-regulate regularly	Bundles of actions to unlock app use, define usage patterns, action blockers, Use QR cards to unlock, Kanban, pomodoro techniques
Pomodoro	Yes	No	No	Yes	No	No	No	No	Yes	Browsing control, effective in time management only, discovery difficulty	Time management tool, to do list
ScreenTime IOS	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Bypassable, ignored and just information	Modes for work, focus and ambient sounds such as dark and white noise

Figure 01: Existing apps and solutions

[See sheet here]

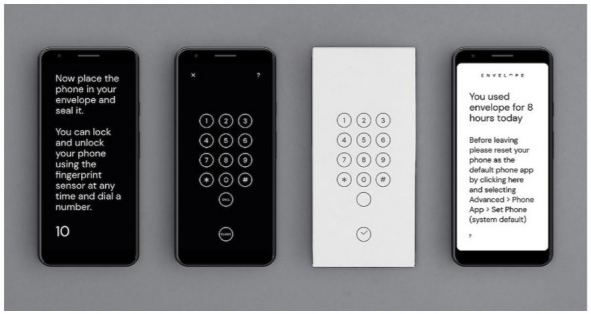
Next, based on a review of available solutions, high level buckets helped broadly understand possible areas for intervention.

Type	Examples	Pros or cons
Browser based	Pomofocus	Such solutions are easy to access if users are aware about it
Nudging	Micro break, Workrave	Constant reminders can get annoying but be helpful during the initial stages
Trackers, timers and dashboards	Activity bubbles, Anchor, Android and iOS screen time dashboard	Visualizing data is useful to become conscious but there is low awareness about available timers and dashboards
Detox products	Unpluq	Adding friction to opening distracting apps
Creative and Tangible ideas	Envelope, paper phone, Postbox	Work well for temporary detox to improve productivity but limit the user
Phone level solutions	Bedtime mode, Focus modes	Interventions may be used it there are automated defaults and easy to access
App level solutions	Instagram, YouTube timers	Better awareness of such features can improve self-regulation efforts

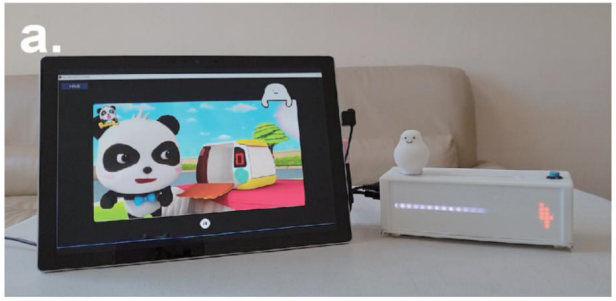
Design implications

Interventions could explore (1) means to offer users with alternative things to replace passive smartphone usage (2) scaffold new & desirable habits (3) offer learning support to manage device usage (4) leverage social support (5) let users set goals and (6) reward the user to reinforce positive behaviors

Examples

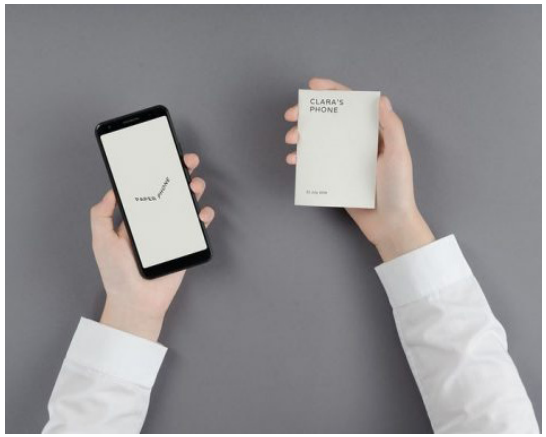


Envelope; A series of special paper envelopes which completely transform the functionality of the smartphone for the time it is sealed inside, allowing users to enjoy fewer distractions for a little while.



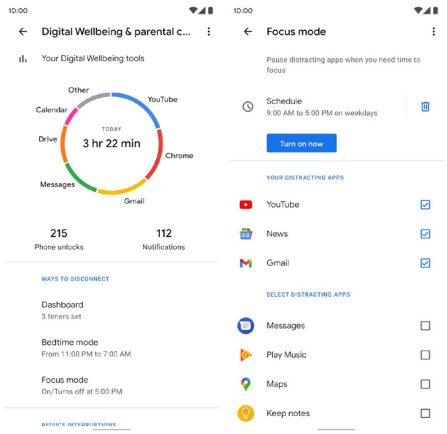
Romi is a physical screen peripheral device interface designed by Lee et al, (2020) to help children to transition from screen to out-of-screen by reducing negative experiences when ending screen time.

Google Digital Wellbeing experiments explore a variety of approaches. For eg, Desert Island helps users find focus by challenging them to go a day with only essential apps. Others include postbox that holds notifications for a set time slot.



Paper Phone is an experimental app which helps users take a break from the digital world, by printing a personal booklet of the information with contacts, calenders etc needed for the day.

Forest is a popular productivity app that helps people beat their phone addiction and manage their time by giving users credit for not using their phones.



Tracking features: Dashboards give a complete picture of phone usage: screen time, notifications, and how often users unlock their phone. Features like this are available at the phone level as well as the app level, for eg, Instagram usage stats

Review of relevant work in literature

Takeaway from relevant literature in the space helped inform the considerations for the ideation and final designs. Work done provide insights based on theoretical approaches, validated strategies and effective approaches that can be taken forward.

#	Intervention	Description	Key takeaways
1	Romadaro (Katarina et al., 2021)	A Google Chrome extension to study the effects of nudging techniques- Facilitate, confront, leverage and reinforce through the intervention	**Nudges** are an effective persuasion tool along with the Pomodoro method
2	ScreenAware (Arathi et al., 2021)	An extension to IOS Screen Time that uses a goal based approach allows the user to manage phone use or non-use goals by marking goals based on an honor code	Help users achieve **personalized goals** in relation to smartphone use and non-use
3	Romi (Jee et al, 2020)	Character based artifact to help children transition from screen to out-of-screen by reducing negative experiences when ending screen time	Potential to design **physical interfaces** that promote user self regulation
4	Nudge (Aditya et al., 2020)	Browser extension to make social media less addictive by nudges designed in the context of the Hook Model	**Automating actions** related to social media along with customization can reduce use
5	Socialize (Alberto & Luigi, 2019)	An app that includes the most common digital wellbeing features such as tracking, visualization, phone timers, blockers, app and phone time etc	Contemporary digital wellbeing apps rarely take into account **social-support** and are mainly designed to break existing habits, instead of developing new habit
6	Good vibrations (Okeke et al., 2018)	Android app nudging users to close Facebook when a usage limit has been hit, using pulsing vibrations	Explore the dynamics of other forms of **digital nudges** in future work, such as screen dimming, phone LED blinking etc
7	Time for a Break (Luo et al. 2018)	A break prompting system that enables people to set their desired work duration and prompts them to stand up or move	Designs should provide **contextual interruptions** rather than a generalized approach which can be done with customization
8	On Your Feet to Earn Your Seat (White et al., 2017)	A booklet comprising tips for reducing sitting and integrating PA habits into every-day routines, and a series of tick-sheets to self-monitor progress	**Medically endorsed information** along which improved awareness can influence people's behaviors positively and impact self-discipline
9	PomodoLock (Kim, Cho et al. (2017)	A self-interruption management tool that allows users voluntarily to set a timer for a fixed period across multiple devices	**Nudges and triggers** can have a larger impact than just self-initiation and self-necessity
10	Lets Focus (Kim et al., 2017)	A self-regulating software for students that introduces a virtual limiting space	Opportunity to develop **context and routine** based social platforms for group management
11	Lock'n'Lol (Ko et al. 2016)	A smartphone app which lets users as a group set their phones in a lock mode and adopts Location-aware techniques that provide timely recommendations	**Social support** can be critical in helping users manage their smartphone usage based on their contexts
12	Nugu (Ko et al., 2015)	An app that uses Social cognitive theory to self regulate and set limiting goals as groups in a competitive manner to promote temporary non-use of smartphones	**Group based self-regulation** can be more effective compared to individual based on competitive goals
13	Transforming your life Program (Carels et al., 2011	In-person Intervention to modify participants' personal obesogenic food and physical activity environments in a manner improves eating and lifestyle.	**Environment modification** and routine focused suggestions may help influence habits

03 Primary research

An initial round of discussion were done informally to understand device usage out of which some potential problem areas came up and helped refine the primary research. Semi structured interviews were conducted with 9 users. The research questions were (1) When do people feel like their device usage becomes problematic? (2) What factors influence their perception of loss of self-control and self-regulation? (3) What existing coping mechanisms do people use to support their limiting behaviors (4) When and why have users successfully broken a bad habit and built a good one? Additional insights were generated from another study conducted as a part of the Design Research Seminar (DRS) with 20 participant to understand current distracting app usage patterns and routines.

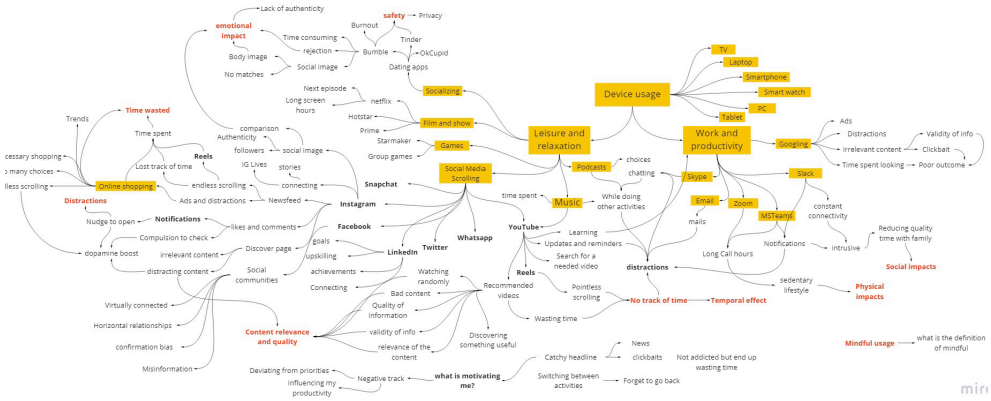


Figure: Mind mapping primary research
[See image here]

Insights and observations

Current usage patterns

- Users identified their devices as means to stay productive and also equally important in staying connected, informed and enjoying their time online using apps that they use for leisure activities. Therefore a restrictive strategy hampers the experience of using a smartphone and the solution should aim to **achieve a balance** keeping in mind the user's routine
- Most users felt notifications were the reasons for distractions and all of them had **disabled notifications** for most distracting apps such as Instagram, Facebook, Linked-in etc to avoid unnecessary interruptions. Whereas productivity focussed apps such as Whatsapp or Telegram had some notifications enabled.
- All users at some point decided to switch off their phones or they **desired a digital detox period** due to digital fatigue from online working. Laptops for working professionals were used at a minimum whereas for students, usage increased.
- Users expressed **feeling physically tired** after long periods of scrolling, neck, eye and back problems that accompanied current education and working set ups which they are aware about.
- Users **felt guilty** about the time they spent online but saw no other option but to engage with media online when alone most or bored
- **Switching to another device** was considered a 'break' thus increasing screen time
- **Loneliness** because people spent a lot of time alone cooped up at home was the primary reason device usage increased. Users would look for means to **stay constantly engaged** while eating, taking breaks etc to avoid the discomfort of sitting idle or procrastination
- **Boredom** and the need to constantly distracted were motivations for people to start using their smartphone for long periods that would lead to **post-use regret** since it was the easiest thing to do

"It is the easiest thing for me do unless there is something better that is offered that will keep me off my phone"

The temporal effects of device usage

- All users felt a **lost sense of time** when it came to using their phones for non-primary tasks or as a result of distractions
- Usage can be split into **frequent short usage** as a result of compulsive checking for notifications, replies etc as well as periods of **long usage** when it came to reading the news, browsing through social media and watching videos which was supported by the study done by Ko et al. (2015).

"I start scrolling and after one point I am not even reading, I just mindlessly scroll and suddenly 1 hour is gone"

Short term over long term user goals

- Users have certain long term and valuable goals such as building skills, reading, other projects etc that benefit their productivity or personal interests. Yet, the ease and accessibility to gain **instant gratification** using their phones **deter them from their goals** which the often feel guilty about

"I want to exercise in the morning as I am diabetic, but I end up watching videos for an hour or so after which I do not have the time to workout. I know it is bad for me but I don't know why I keep going back"

Distraction from primary tasks

- Users saw an increase in online shopping, reel and video watching etc which were caused because of boredom or desire.
- Distraction were less due to external factors since most users kept notifications off despite which compulsive checking continue due to **FOMO**
- Users own **internal motivations** to avoid overwhelming tasks led to repeated cycles of **procrastination** supported by their smartphones

Non-use patterns

- Users would often **uninstall, deactivate** accounts or log out from apps that affected them due to excessive usage which the identified as **'addictive'** and then would return to downloading or using the app again in a short period of 1 day to 1 month due the value of interactions on the app or more available time
- Users expressed **feeling out of control** when using apps such as YouTube, Instagram, Facebook, Linked-In, Snapchat, News related apps etc.. Thus, it is important to help the user develop behaviors that promote mindful usage

"My screen time statistics help me decide which apps to uninstall and I do this every few months and have been doing this for the past 4 years"

Self control

- Users were less likely to give into distractions when there were **deadlines**
- Most users who have tried a detox and picked a new hobby or activity **do not sustain** it for a long period which invokes feeling of l**ow self-efficacy**
- Many users lay the **responsibility on themselves** to reduce the time they wasted on their phones attributing to improved self-discipline rather than external factors driving them

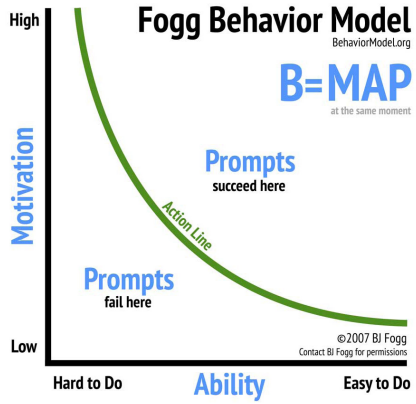
"Only I can make the change if I really want to and no matter what anyone else is going to say, if I feel it is a problem, I may make a change"

Social aspects

- Users expressed **losing interest** fast and **not paying attention** during classes and meetings due to a remote way of working which was different when there were other people around to set a social etiquette
- Users mentioned that **social setups** such as get togethers were where other people were physically present were moments where they **self-regulated** phone usage
- **Partnership** and having someone workout, follow a diet or study with the user would help them better sustain the motivation to keep going

The interviews conducted with the 20 participant provided useful design insights. Firstly, users felt that existing solutions can help users better manage distractions and work towards building routines that balance the time spent on social media. The temporal nature of social media meant that users had to be more reflective of their mood and designs could nudge users towards taking

steps for mindful usage. Secondly, the mechanism designed to manage screen time should try **not to intervene with the user's workflows and needs**. Limiting goals in DSCTs on smartphones were dismissed as they would restrict the user from completing contextually relevant tasks. Rather, mechanisms should be **flexible** and **give the users control** to restrict phone usage.
Finally, it is recommended that designs **help meet user goals** and r**edirect them to pursue habits or activities** that they have replaced with social media. Individuals will benefit from solutions that improve accountability and establish a sense of purpose when using their smartphones.



Fogg's behavioural model: Behaviour = Motivation x Ability x Trigger (Fogg, 2019)

03a. **Behavioural personas**

Personas were developed that helped narrow down the target audience for the design interventions. For this, the **Fogg Behavior Model (FBM)** was referred to. The FBM shows that three elements must converge at the same moment for a behavior to occur: **Motivation, Ability, and a Prompt.** When a behavior does not occur, at least one of those three elements is missing. Using the template from Stephen Wendel's book (2020), Design for Behavior Change and the components of the FBM, 2 categories of users were defined:

The motivated: This user is aware about their addictive behaviours and periods of overuse that impacts their wellbeing. They are motivated to change but lack right prompts that fit their context to change their behaviour. These users could be willing to invest their effort in improving their digital wellbeing.

The neutrals : These users are not motivated to change their behaviours as they are unaware about the impacts of their usage patterns. Although, if they see an option they might act on it if the change is easy to do.

Next, 3 behavioral personas were developed based on the primary research and the above categories of users based on **motivation**.

Audience	Primary Audience	Secondary Audience	Tertiary Audience
	 **Sneha Chavan** Uses: Iphone 11, HP Laptop, IPad, FitBit	 **Ajay Kumar** Uses: One Plus 7, Mac Book, Smart TV	 **Zaid Mirza** Uses: Moto Edge, Lenovo Thinkpad, Dell Desktop
Sample Bio	Sneha is a 27 year old IT professional who works at an MNC in Mumbai. She is social, organized and lazy which makes her stay in at home most days. She lives with her parents is into sport such as badminton, but does not play as often as she used to anymore Intrinsically motivated to do something about their screen time, but lack the ability to make the changes in their digital hygiene that they can sustain to avoid feeling bad	Ajay is a 36 year old Lawyer from Mumbai who works at a large firm managing a team under him. He has a 4 year old daughter whom he has to take care of when his wife goes to work at her IT company. He recently started going for walks after getting his medical reports. Not motivated enough to change their behaviours as they are not aware about the effects of their usage patterns, but if they see an easy option they might act on it	Zaid is a 44 year old Senior Manager at an MNC where he handles multiple international projects and works with his team in the US. He is highly involved in his work and preferes staying home . He is diabetic and lives at home with his wife with no children. Does not identify their usage as a problem so there is no strong enough trigger for them to change due to the lack of self-awareness about their habits
Major digital habits	Uses Instagram for work and to socialize, actively uses YouTube, Snapchat sometimes, InShorts for news and watches shows whenever she gets the time or a break	Watches a lot of news on the TV and videos on Facebook. Spends some time online shopping and reading articles on LinkedIn whenever he gets the chance	Scrolls through Facebook, watches videos related to cooking, comedy, dance and celebrities. Also watches shows while eating and at night before sleeping
Experience with actions related to reducing screen time	Switched off some notifications for a few apps and keeps her phone away when she has to really focus	Switched off some notifications for a few apps and plans to take breaks every one hour to stretch but is really absorbed into work so ends up sitting for hours	Has most notifications on for multiple apps but keeps his phone in the hall for charging to sleep better
Experience with similar products	Uses IOS Screen Time and gets a report every Sunday and has tried the Forest app once	Uses Bedtime mode on Android but dismisses it because he watches videos late at night	Has not used an DSCTs except keeping their phone away
Existing motivations	This group may be motivated by saving time to meet career/academic goals and establish a good quality of life	This group may be motivated to reduce their overall screen time if the solution was low effort and if they saw long term value	This group may be motivated by improving their routine to improve their lifestyle if they are forced to
Factors that affect the user group	This age group is young and strongly influenced by friends, colleagues and groups with similar interests	This age group is independant and need the right nudge towards a good lifestyle to avoid problems later	This group is probably affected when their family members express concern about their health
Hard barriers to action	All work, leisure and most connections requires online presence	All work, leisure and most connectiopns requires online presence	Stays mostly at home and does not see their time onlline as a problem

Figure: Three behavioral personas to target reducing problematic smartphone usage habits

[See image here]

04 Approach

How do people make decisions?

Behavioral economics combines elements of economics and psychology to understand how and why people behave the way they do in the real world and an understanding can help us intentionally design for behaviour change. People have two distinct systems of thinking, System (Type) 1 that is reactive or intuitive thinking and System (Type) 2 that is slow, focused, self-aware and intentional. (Kahneman, 2011). This is Dual Systems model that can be an effective way to understand what factors affect people's responses/decisions and help design using relevant theory supported strategies. Our decisions are influenced by the context, due to our limited attention, we are constantly looking for shortcuts to economize and make quick decisions, labeled heuristics. (Wendel, 2020) The repetition of behavioral responses to a trigger become a habit. When it comes to smartphone use behaviours, users have developed habits that are problematic and can be tackled using behavior change strategies. Various possible approaches emerged as a result of the literature, review of existing tools, existing work and primary research. To help visualize the primary research and start defining the strategies to be explored, this project refers to the HAM or Habit alteration model by Pinder et al., 2018. The goal was to understand potential areas of intervention to address problematic smartphone habits, managing distraction and reducing overuse.

HAM | Habit alteration model

Since the focus is on breaking the habit, we can consider the HAM which is a model that combines habit theory, goal setting theory, and dual process theory and suggests strategies to at various stages of breaking down habitual behaviors related to phone usage. HAM is a theory-driven graphical simplification that takes into account (1) the context (2) Type 1 associative impulses (3) Type 2 explicit intentions. This conceptual framework can be used to explore habit intervention points for digital behavior change interventions (DBCIs). Here, the three chosen theories for the model are explained:

Habit theory: Habits are learned impulses to perform a particular behavior, triggered outside of conscious awareness by a particular context. Habitual behaviors are triggered non-consciously, people are not necessarily unaware of their actual behavior.

Goal setting theory: Behavior occurs where intentions are specified with an appropriate level of difficulty and specificity, and are accepted by users. The goals must be accepted by users to be effective, that feedback on goal progress is important.

Dual process theory: Behavior is determined by two distinct types of cognitive processes: the Type 1 automatic set, formed of associative links; and the Type 2 conscious, deliberative set. People may act in line with an impulse in response to a cue or in line with non-conscious goals without the action becoming a stable, repeated behavior

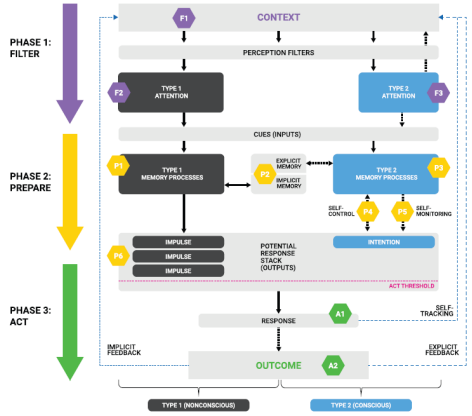
The HAM that consists of three stages: Filter, prepare and act:

Filter: Context cues are filtered by both Type 1 and Type 2 attentional processes to form a set of ***inputs*** to subsequent memory processes of Type 1 and Type 2

Prepare: Impulses and intentions populate the Potential Response stack . These may be overridden by ***self-control*** and may face competition from intentions created by ***self-monitoring***.

Act: The resulting behavioural response and (optional) outcome feed back into the model. (Pinder et al., 2018)

Figure: Stages of the HAM (Pinder et al., 2018)
[See image here]



Strategies from the HAM

The recommended strategies from each stage of the HAM were considered during the ideation phase.

Filter stage:

- *Alter the context:* Add or remove cues to alter response for behavior change
- *Social priming*- Seeing other people perform the desired behavior
- *Prime*- instinctive associations by showing users an alternative state.
- Alter cue salience: reduce the salience of contextual cues for unwanted responses and increase salience for desired behavious

Prepare stage:

- *Train Context-Response*-An approach bias exists when an individual has a default action or impulse towards an unwanted cue
- *Implementation Intentions* (if-then approach)- Aim to automate the then behavior by delegating its control to the selected contextual if
- *Provide Information*- Providing the user with data intended to alter their conscious decisional balance. Framing effects, such as presenting the same information in either positive or negative ways, impact subsequent Type 2 judgments
- *Just-in-Time Reminders*- Applicable in habit breaking (advising people to refrain from an unwanted behaviour in a given context)
- *Train Self-control*- Repeating the same self-control or impulse-resisting control in stable contexts should ease the transition of self-control into automatic processes, moving from Type 2 to Type 1 memory processes.

Act Stage

- *Self-monitoring*- Involves using information from self-tracking to form alternative intentions to act (Snyder 1974).
- *Revalue Outcome* Providing rewards for correct behaviors and punishments for incorrect behaviors

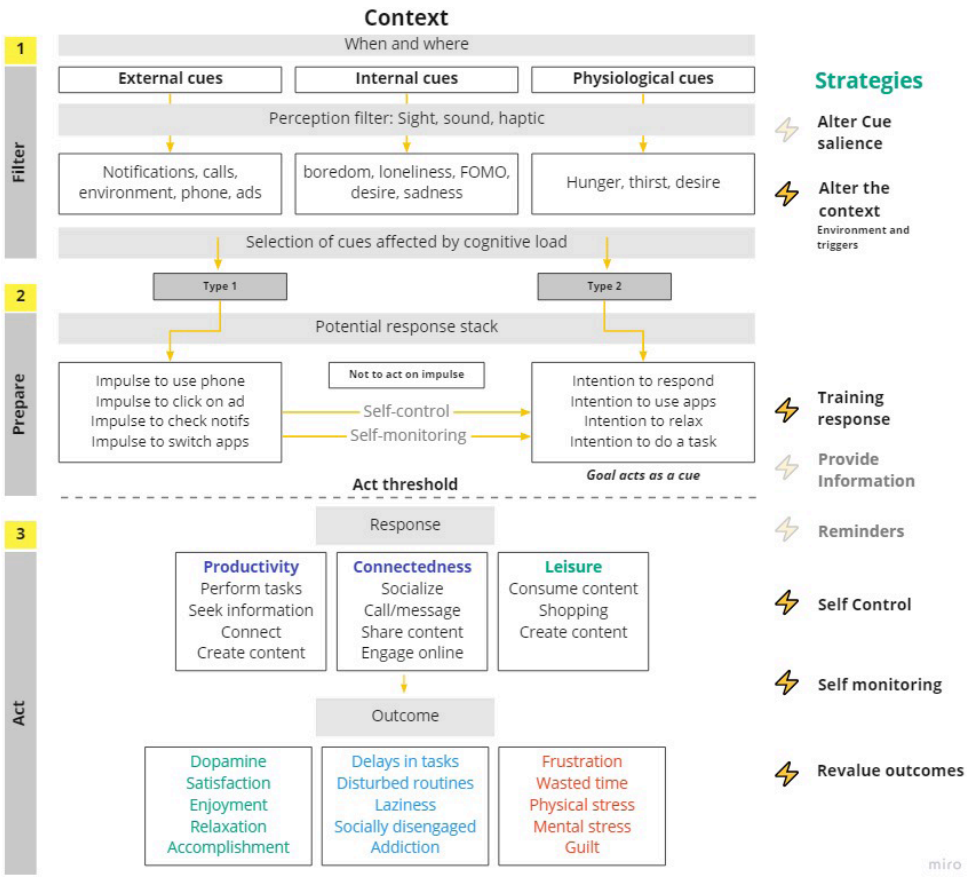


Figure: Visualizing primary research in the HAM

[See image here]

04a. **Project definition**

Aim: Reduce addictive smartphone behaviors to reduce time wasted to promote subjective wellbeing

Problem statements

1. How might we design interventions that help users reduce the time wasted on their smartphones?
2. What strategies might help users to manage their problematic smartphone usage habits and distractions?

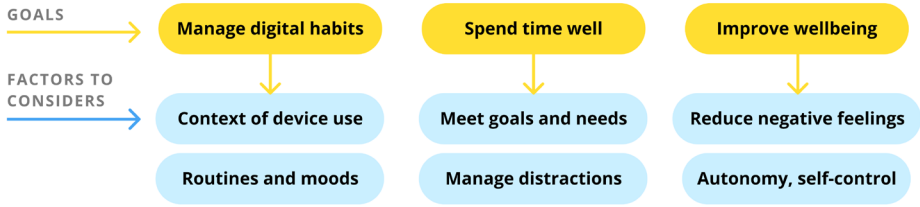
Goals of the project: To help users manage to reduce overall time wasted on digital devices by supporting self-regulation

Objective

3. Support and provide alternative activities that benefit the user's life and move away from mindless scrolling on distracting apps
4. Improve feelings around device use by managing problematic device usage
5. Scaffold desirable habits to support user goals
6. Improve awareness around problematic usage to take timely action

Approach

1. Provide users with useful alternatives
2. Improve mindfulness and reflection
3. Context specific intervention (location, activity and emotional state)
4. Employ social support to motivate users



Factors to consider while designing

Based on the primary research, the following factors were considered to meet the primary goals of the project:

1. Context of use: Smartphone use is dependent on the tasks being performed and amount of screen-time will fluctuate. Therefore, users should have the required flexibility to adapt the intervention to their context of use
2. Routines and moods: Behaviours are subject to user routines, moods and mind-frame therefore change in habits will be gradual
3. Goals and needs: Long term and personally valuable goals, interests, hobbies can play a role in improving quality of smartphone activity
4. Distractions: Changes in routines, days, contexts will affect perceptions of 'distraction' and therefore multiple solutions may be needed across time
5. Negative feelings: Post-use regret or guilt could be mitigated by promoting reflection-in-action and overall awareness to empower the user
6. Autonomy and self-control: To improve addictive behaviours, self-control may be supported by self-monitoring, tracking and regulation

Potential strategies to alter habits

Various strategies have been identified over the course of the first part of the project. Combinations of these were used to define relevant features during the ideation the process.

Audience: The target audience is students and professionals in the IT domain ages 15 years to 40 years. The primary behavioral goal is to encourage these users to reduce the time spent performing low value tasks for long period of time on their smartphones. As per the ethical checklist (Wendel, 2020); the design intervention is positioned as a digital wellbeing tool, feature or product. Users should be aware that it intends to modify usage habits and is designed for behaviour change. The condition to interact with the intervention is that the users are 'Defaulted out', that is the intervention is inactive unless the user voluntary engages with it. After choosing to participate, the user can opt out at any time.

Project outcomes:

1. Real world outcomes: Altered problematic smartphone habits (Reduced screen time)
2. Performance metric: Less physical and mental stress, improving user self-control, improved sense of subjective wellbeing
3. Definition of success: Decrease in overall problematic screen time as a result of the intervention.

Design requirement

1. Sustain use

Instead of the design intervention being a one time experience, the solution can look for ways to better integrate into the user's life to sustain use over longer periods of time and within relevant contexts

- As a user who uses their smartphones for work and leisure, I want a solution that helps balance out how I use my device so that I do not have to completely abstain but can use it in a balanced way
- As a user who spends most of my time online, I want a way to have more free time so I can unwind and do other things that interest me so that I feel less guilty about how I am leading my life today

2. Improve accountability

Users that bypass restrictive tools need a way to hold them accountable so that they continue breaking the habit and build new ones in the process

- As a user who wants to reduce the time I spend on my phone to build my skills or do other things such as read, walk, pick up a hobby, so that I feel I am spending my time in a better way
- As a user who finds it difficult to break bad habits, I want a way to be held accountable through external losses so that I do not fall back into poor device use habits easily

3. Motivate users

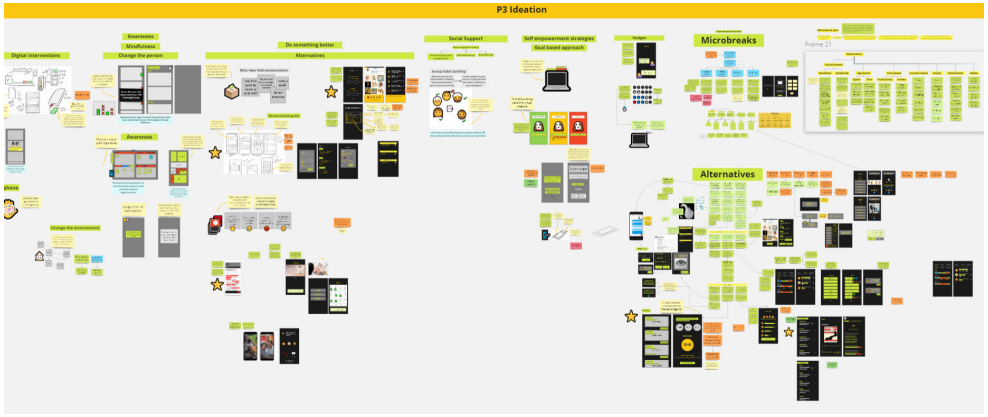
Intrinsically motivated users who are aware about their device use and want to make a change may benefit from support to continue managing their digital behaviours over time.

- As a user trying to break my smartphone overuse habits, I want to be motivated by other people, so that I can stick to my commitments
- As a user, I will be more likely to sustain the habit if I am able to see some immediate improvements so that I know that the changes I am making are improving my quality of life

05 Design ideation

Based on the strategies identified, a number of ideas were generated. Ideation was conducted in 2 phases. In Phase 01, 23 ideas explored ways to employee different strategies. These ideas were presented to N=4 users who filtered 6 ideas. In Phase 02, another set of 10 ideas were generated as blue sky ideas. Finally, all the 16 ideas were ranked based on relevant parameters to finalize 3 ideas to take forward for design detailing and evaluation.

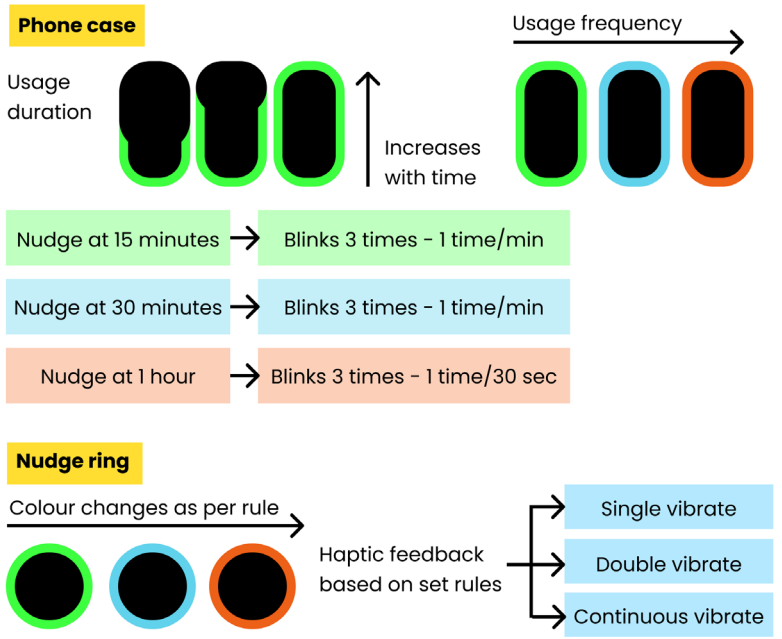
Click here to details of all the 16 ideas [See Ideation]



Idea 01: Nudge Bud

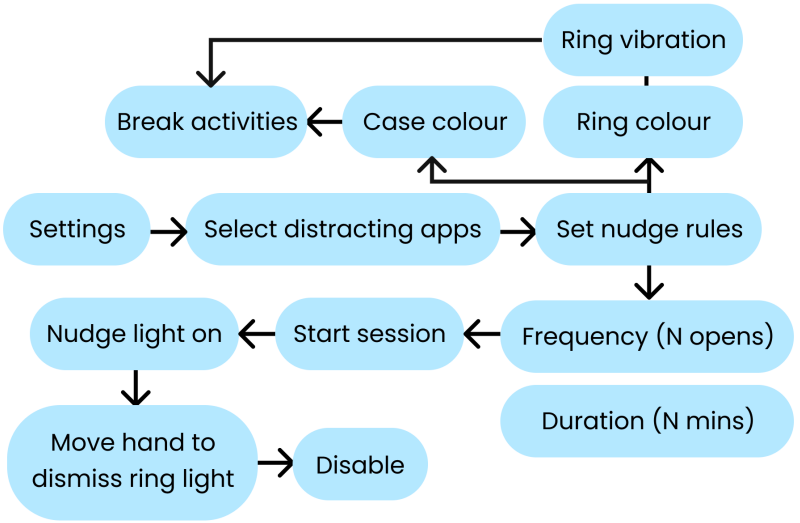
Description

Users get coloured stats for phone usage using their phone case. The colour switches from green to blue to red. Users keep the phone away and wear the ring to notify for calls and important messages only. We train the user's response to the trigger by helping them practice self-control. Users do not want to be interrupted and rather want to make their own decisions/rules that fit their routines.



Use cases

1. When working, users can keep the phone away and get notified about an important notification nudge on their ring.
2. Users get reminders to switch positions, drink water every 40 minutes or based on their defined routine. Eg. nudge for calls, blue for water break, red for meal break, green for stretch break etc. Users should be offered smart defaults during the set-up process.
3. In social settings, users may only check their phone when they get a nudge
4. Users with green phone cases may be perceived as more disciplined and this may strike conversations for social learning. People constantly checking their phones may be pacified and reduce doing so



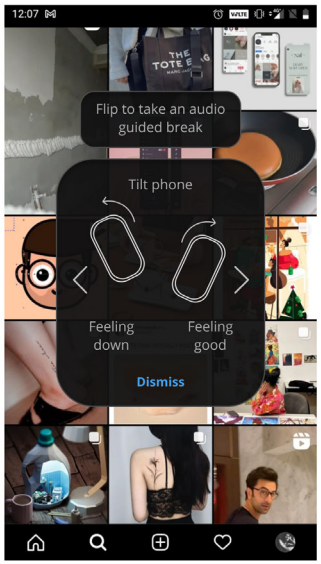
Strategies

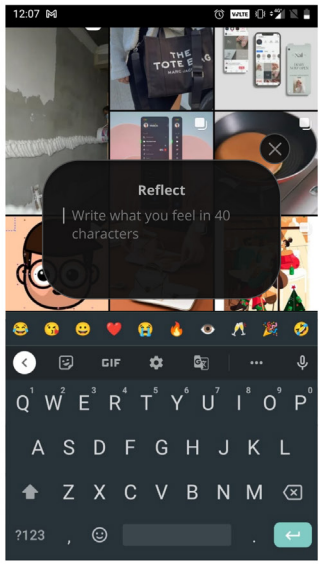
Nudging, awareness, alternate activities, train response, limiting goals

Idea 02: Mindful

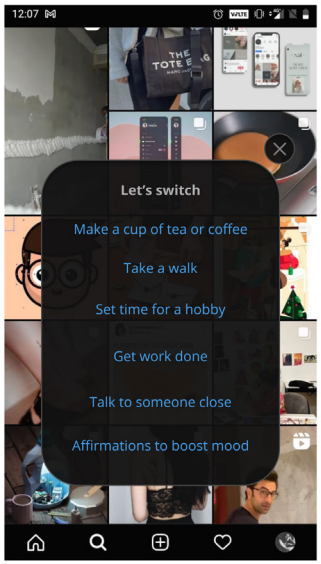
Description

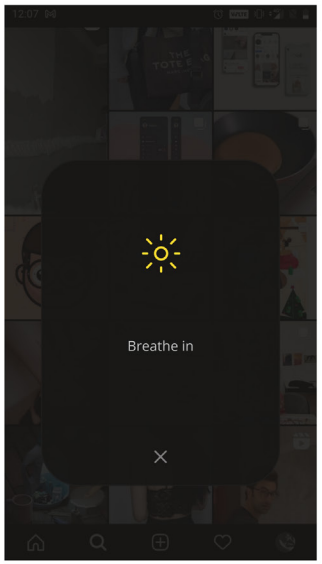
To promote mindful smartphone usage, we periodically ask users about their moods and suggest tips to overcome discomfort such as alternate activities, reflection snippets and breathing exercises. Through simple gestures, users can accept or dismiss check-ins during long periods of smartphone usage.





Reflecting on use for mood updates. Easy to take breaks with audio guides to exercises to alter user moods



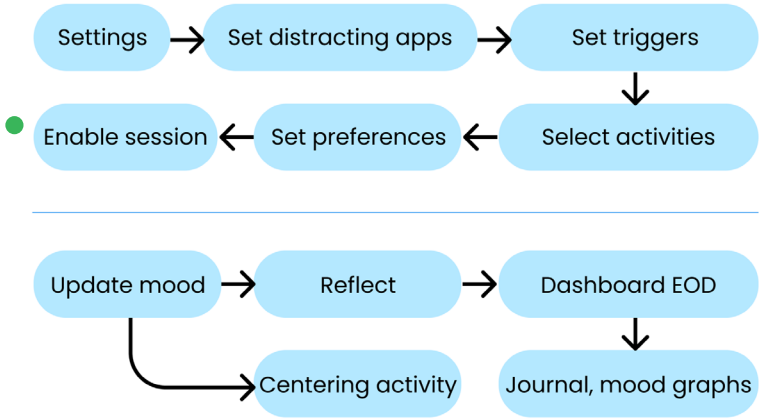


Routine and time based alternatives recommended

Use cases

1. When procrastinating important tasks, social media users may take some time off to re-centre themselves through centering activities such as breathing, mandala art, guided meditation, vizualization, simple art, task management etc
2. When looking at posts online on Instagram, LinkedIn, facebook etc, users may spiral into negative self talk if they are not mindful. Internet addiction is positively related to low self-esteem. For such individuals, reflections, affirmations etc may help cope with the impacts of social media platforms on mental health.

Strategies: Reflection, mindfulness, alternate activities, alter moods, reminders, self-monitoring



High-level workflow

Idea 04: Routine Support

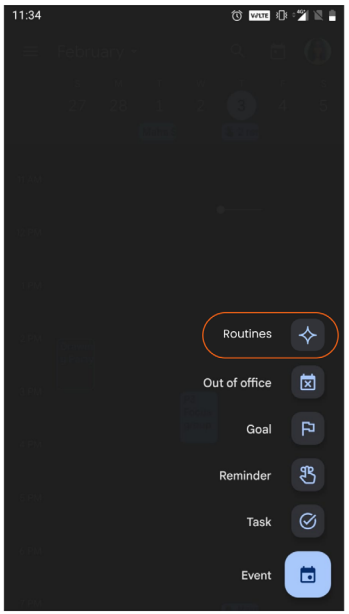
Description

Users log their routines and mark their offline time with activities they did. Friends can develop new habits through social learning and start joining friends in doing other things and reducing screen time. Users can pre-select and design routines for weekdays and weekends with activities and goals. They can mark activities with friends as ‘Interested’ and get invited to meet and do them together, physically or remotely.

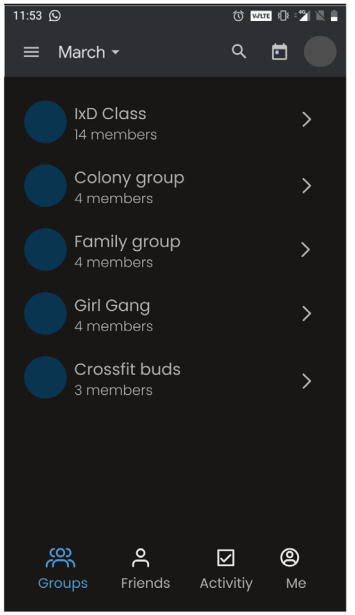
Use cases

1. Friends who have similar routines ,such as classmates, can create groups of close friends to plan to reduce wasted screen time.
2. People can plan, schedule and meet up to learn instruments, skills etc from each-other based on set time slots
3. Friends living close-by may be motivated to take up habits from others, such as reading at night, exercise in the morning, writing etc when they see consistency in others.
4. Friends working remotely can schedule activities they are ‘Interested’ in such as gardening, walks etc and keep in touch more often, add these habits into their routines.

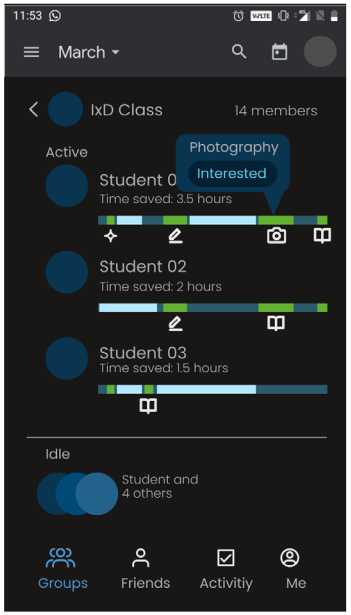
Strategies: Peer comparison, commitment contract, social support, alternate activities, scaffold new habits, self-tracking



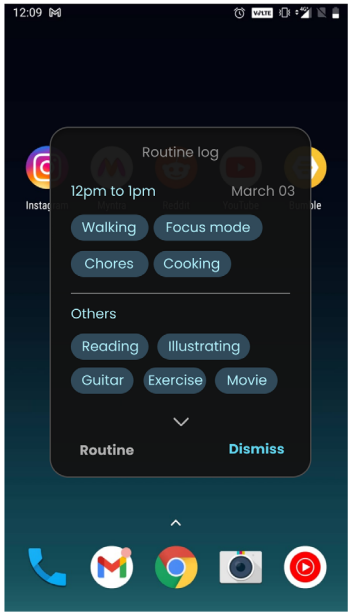
1. Synced routine



2. Routine groups (School, work, friends, family)



3. Daily activity logs

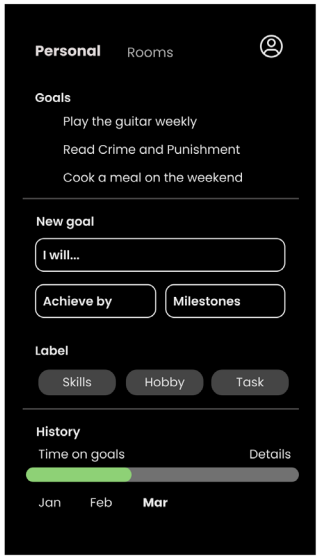


4. Hourly activity update widget

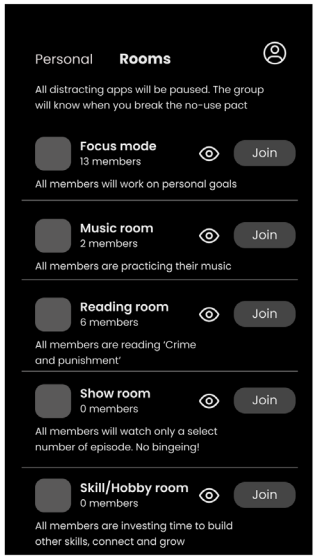
Idea 06: SyncUp

Description

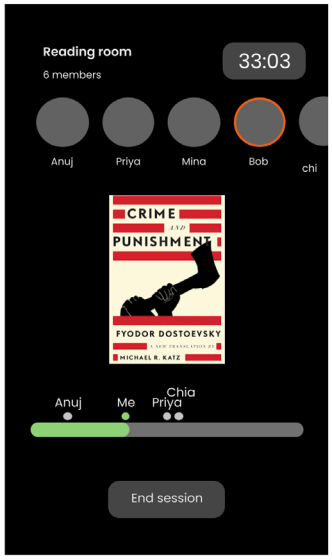
Create interest and virtual groups with friends and family to do shared activities such as reading, practicing skills etc which are often put aside. Having a group investing their time together and achieving goals may motivate users do other activities and move away from distracting apps. Rooms block distracting apps and allow members to doing different or common things virtually together.



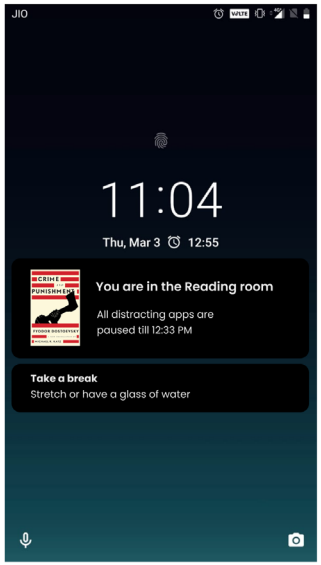
Goal setting and progress



Rooms and defined activities



Rooms with common goals + progress

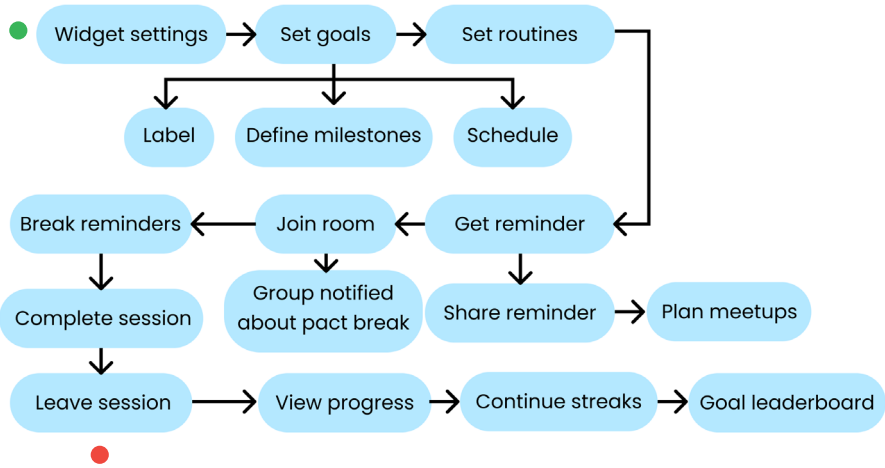


Timers and break reminders

Use cases

1. Users who resort to social media or binging on shows may benefit from having peers engage in activities such as reading, practicing skills/hobbies etc that they have reduced.
2. Colleagues and students struggling with procrastination may benefit from working together in the focus mode during 1 hour intervals with reminders for micorbreaks
3. User who are trying to build a new habit such as reading on exercising may partner with friends and join rooms to pursue these activities in a manner that experienced users do it.

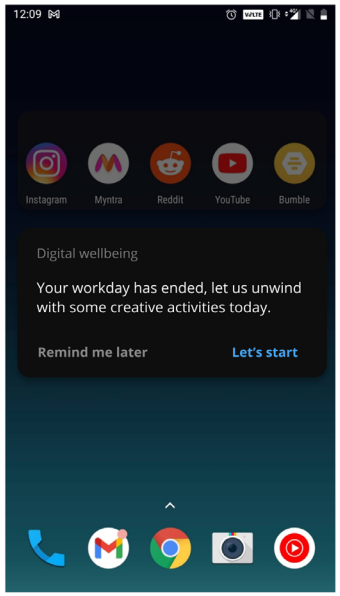
Strategies: Alternate activities, scaffolding new habits, social support, goal advancement, reminders, goal setting



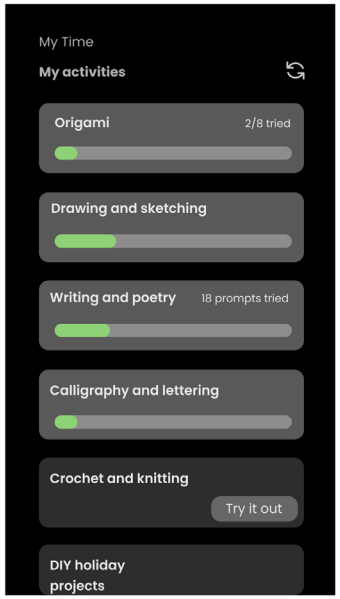
Idea 07: Creative Kits

Description

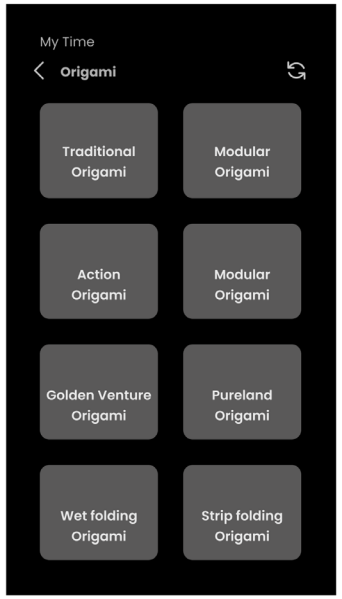
Users may benefit from engaging in off-screen activities such as origami, drawing, writing, calligraphy, paper quilling, coloring, clay molding, crochet, knitting, embroidery, macrame, DIY projects etc. Activities like origami can help with logical reasoning, attention span, spatial thinking and fine motor skills. Users may select between a variety of activities based on their time and set milestones and practice these hands-on skills with simple text or video instructions.



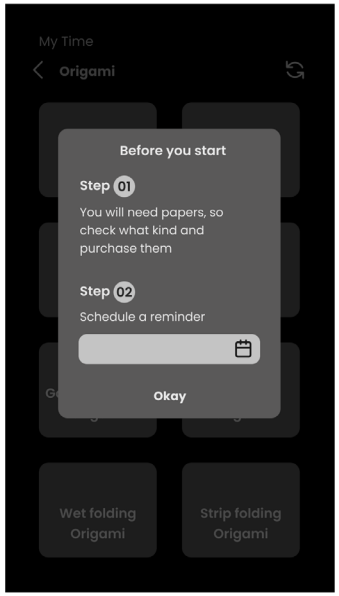
1. Nudges and routine based reminders



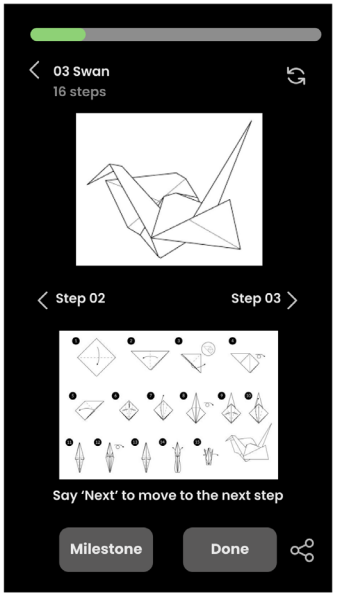
2. Activities and progress



3. Levels, prompts and choices



4. Goal setting and activity prep



5. Instructions and voice based interactions. Milestone progress

Use cases

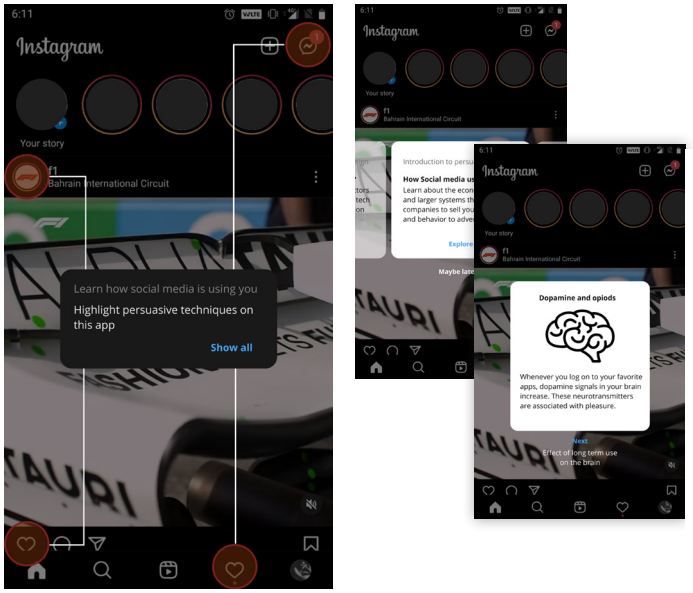
1. Over the weekend, when bored, users can look for an easy creative kit and start, instead of having to put too much effort into deciding and preparing for what to do.
2. Based on the user's routine, they can be prompted to shift to an offline activity for a short break before they get back to work or chores
3. Friends may wish to send recommendations and share progress around creative outcomes which may boost wellbeing and promote group activities away from social media

Strategies: Train response, commitment contract, alternate activities, scaffolding new habits, social support (optional)

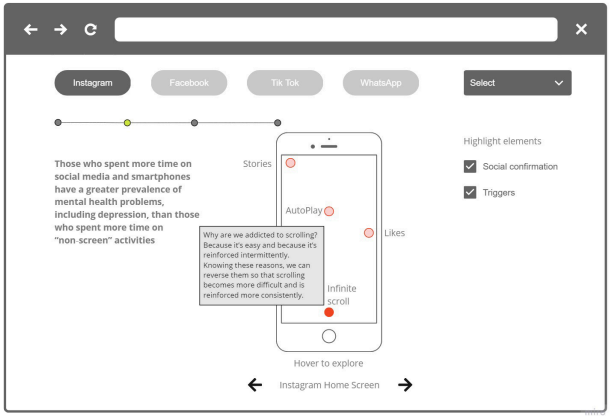
Idea 08: Awareness of Persuasion

Description

Users may become more mindful if they are made aware about the psychological and business tactics used to design such persuasive technology that can lead to addictive behaviours. The goal is to help users explore various persuasive design patterns that leverage user biases and also show the psychological, physical and emotional impact with the help of factoids. The outcome could be an interactive website with examples of social media and other common apps.



1. Interactive Social media UI walk-through for persuasive strategies and an awareness focused add-on



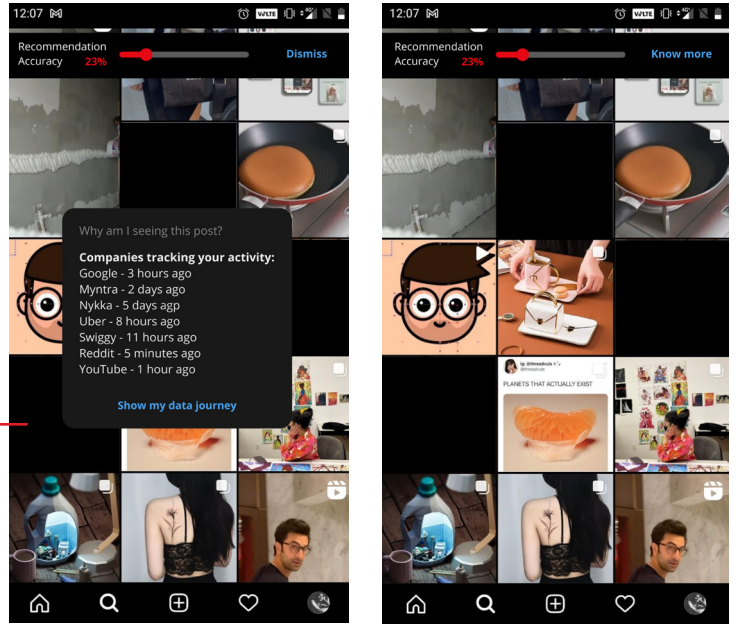
2. Website with information about persuasive techniques in major apps

Use cases

1. Users exhibiting increased frequency or duration of social media usage, online shopping etc may be nudged to take the walk through to help become more aware about the effects of their current habits
2. Users may simulate the effect their habits have on their brains and take quizzes to identify IAD (Internet addiction disorder)
3. Users may regularly get prompts to reflect the kind of content and ads they are seeing or clicking on. This awareness about the redirection could reveal how the user's data is being used for targeted adds through an interactive link

Strategies: Awareness, Learning support, reflection, self-monitoring

Hide highly engaging content based on usage pattern



3. Alter targeted content accuracy and track personal data journey

Idea 11: Move around

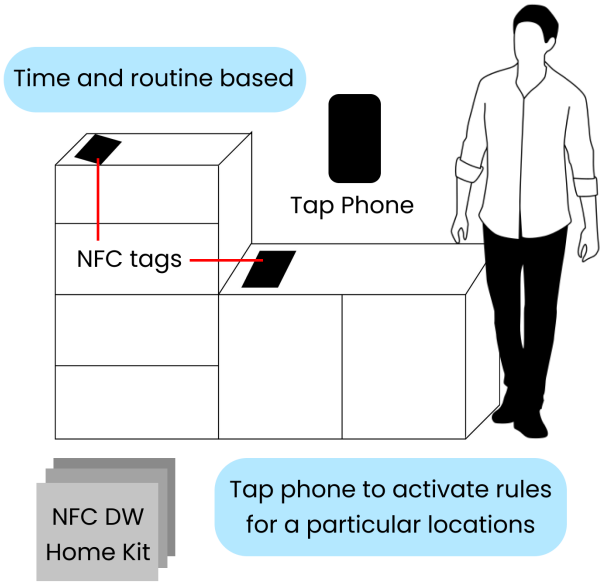
Description

Near field communication, abbreviated NFC, is a form of contact less communication between devices like smartphones or tablets. The idea leverages this interaction and allows a user to wave the smartphone over a NFC compatible device/tag to apply rules to their smartphone at a particular location. Users may develop or alter device usage habits based on locations at home and can be scaled to offices to establish healthy digital norms.

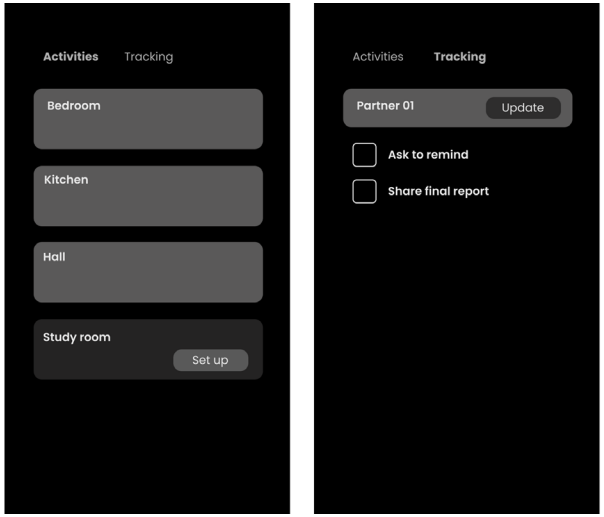
Use cases

1. A user who often wastes time watching videos on the sofa or on the bed will be nudged away from the location
2. Users may complete circuits where they need to cross multiple locations in order to receive a reward such as desert or time to watch TV or play a game. Users may take calls walking around
3. Users procrastinating chores that may be reminded when they cross a particular locations such as the kitchen or bedroom chores.

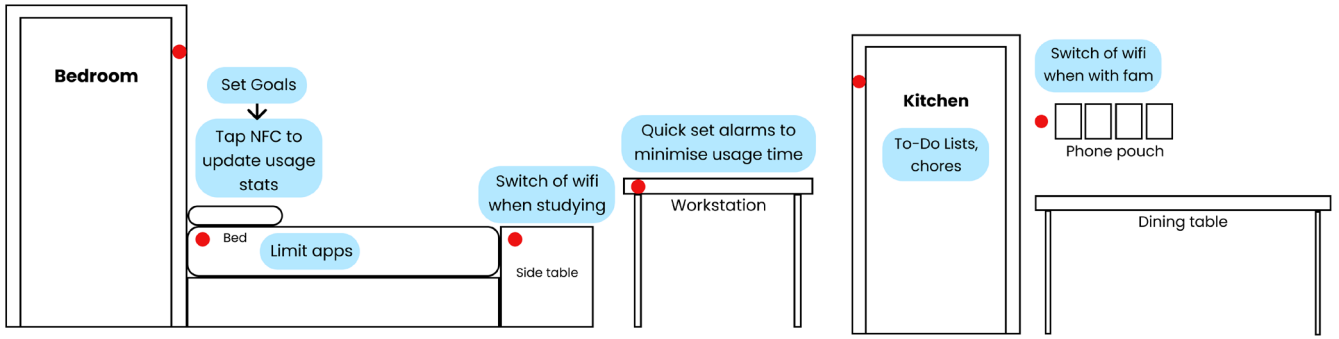
Strategies: Environment modification, alternate activities, social support (optional), train response, self-tracking, self-monitoring, implementation intention



1. NFC Card Kit with customizable rules for triggers that can be placed at home or the office. NFC cards and rules can be updated to fit contextual routines



2. NFC Card Kit Set Up application. Users can set up activities at various locations and track device usage patterns



3. Example of possible NFC triggers and customizable rules based on contextual routines

Idea 12: Pay Up

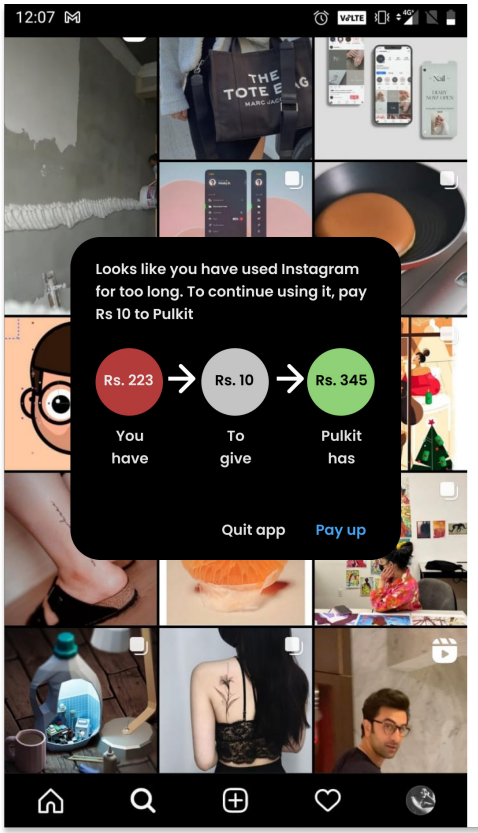
Description

Users are given a financial penalty when they use distracting apps. A specific amount is put into an App piggy bank that is used for penalty transactions with friends added in a group as partners. Friends will give a small amount to each-other based on group limiting goals. Users can tally their social media piggy bank in comparison to their group members. This can be a set up among family members, friend groups and classmates to hold each other accountable.

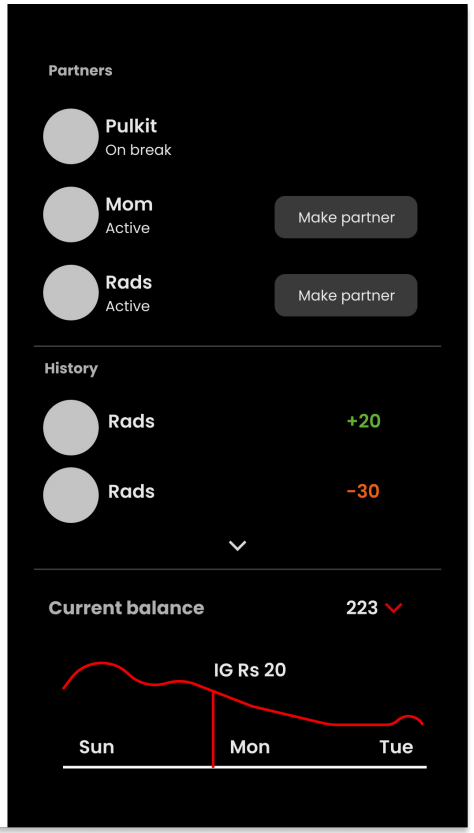
Use cases

1. Friends struggling to concentrate may be mindful to spend less time on their phone so that they do not loose money. A weekly update of money lost will induce guilt and the penalty may influence habits.
2. Users who use distracting apps lesser hold a better chance of getting penalty money from others. This sort of positive reinforcement may be helpful to sustain usage limits.
3. A group of colleagues working/studying from home may set up a goal of using distracting apps for 1-2 hours a day with <10 mins per session. Those failing to meet the goal pay penalties and those showing higher chances of success have a shot at getting the money in their App piggy bank.

Strategies: Rewards and punishments, social support, peer comparison, commitment contract



1. Overuse penalty showing whom the money goes to



2. Change partner groups based on contexts. See history of penalty transactions

Idea 15: Digi-Pet

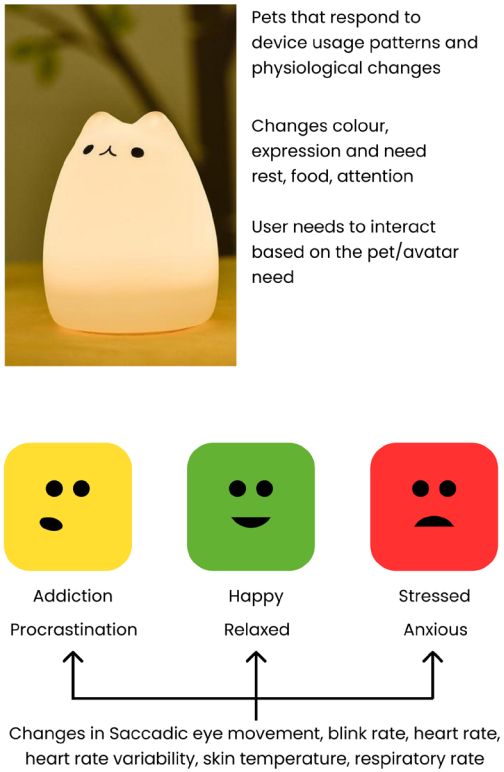
Description

The pet/avatar will responds to the user's bio-signals (Skin temperature, heart rate, eye blink rate etc) to communicate states of how the user is feeling with respective addiction. The pet provides a real time visualization of the impact of problematic smartphone usage patterns on the body and mind. Alternatively, virtual avatar can be shared with family and friends to address frequent negative impacts on users.

Use cases

1. Various states of an avatar of a student living away from home shows up on his best friend and families updates. The avatars analyze user states and may help indicate stress, anxiousness, boredom etc. Friends may share stickers around how they feel when online in real time while chatting or as an additional social media virtual avatar. [Studies suggest that expressive biosignals can support emotional expression and increase social awareness, felt presence, and empathy between people. (Fannie Liu, 2019)]
2. Users may be prompted to interact with the virual pet that responds to changes in biosignals indicating addictive symptoms. The interactions may involve taking the pet for a walk, keep the phone to give it attention, voice assisted exercises etc.

Strategies: Virtual creatures, awareness



1. States, feedback and interactions that the user has to do to deviate from addictive symptoms

2. Instruments to track biosignals

05a. **Idea decision matrix**

Parameters for the idea decision matrix

In order to decide among the generated ideas, a decision matrix considered the following factors to filter the final ideas to take forward:

1. Potential impact: The impact the intervention may have on altering the user's habit based on an understanding of the strategy used and user feedback
2. Accountable: To help users to continue supporting their digital wellbeing, it was important to add accountability.
3. Sustainable: For users to continue using the solution, it was important to assess if the concept weaves into their lives to have the potential to work within a context
4. Motivation: For users to take a step towards incorporating digital wellbeing, intrinsic and extrinsic motivations play a big role.
5. Novelty: Since a number of DSCTs have been developed, novelty was a key deciding factor to explore the possibilities of strategies proposed
6. Feasibility: In terms of the possibility to design the intervention in the real world
7. Ability: Personal skills and abilities to detail and generate the concept
8. Evaluation possibility: Degree to which evaluation of such a soncept is feasible within the given time-frame

Each of the ideas were rated across these 8 parameters on a scale of 1 to 3. , 1- Slight extent, 2-Some extent and 3- Great extent. At-least one concept from the 5 idea buckets were considered and later 3 design concepts were chosen to detail and evaluate based on the timeline.

Selecting concepts to prototype

All the ideas were put into 5 major buckets based on the nature of the solution and strategy that supported with user's digital wellbeing:

1. Environment: Concepts that utilized the environment and context
2. Alternative: Concepts that redirected users to do an alternate activity
3. Social support: Concepts that took into account other people such as friends or family
4. Tangible: Concepts that used physical artefacts where possible
5. Mindfulness: Concepts that allow for users to reflect and become aware of usage patterns

Idea Decision Matrix

1 = slight extent, 2 = some extent, 3 = great extent

Total number of Ideas= 16 **Final=3**

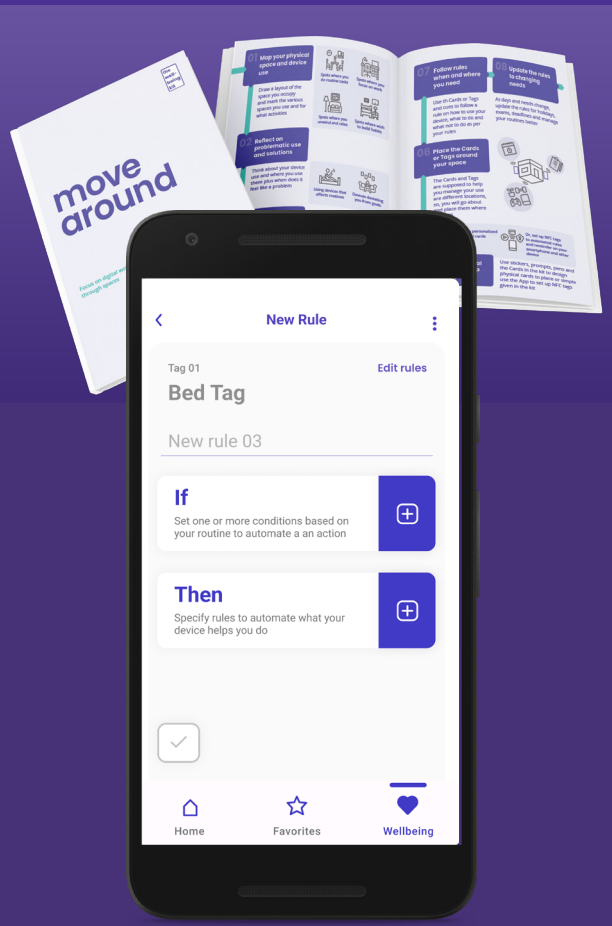
Idea #	Parameters	Potential impact	Accountable	Sustainable	Motivation	Novelty	Feasibility	Ability	Total	Eval possibility
A	Category: Environment									
Idea 11	Move around	3	1	2	2	3	2	2	15	2
Idea 13	Disconnect Artefacts	2	1	1	1	2	1	1	9	
B	Category: Alternative									
Idea 03	App Fueler	2	3	2	1	1	2	2	13	
Idea 07	Creative Kits	2	2	2	2	3	2	2	15	2
C	Category: Social Support									
Idea 06	SyncUp	3	3	2	1	2	2	2	15	2
Idea 05	Off-time team games	2	2	1	2	2	1	2	12	
Idea 04	Routine support	3	3	2	2	2	2	1	15	1
Idea 10	Disconnect Partner	2	3	2	1	2	2	2	14	
Idea 12	Pay Up	3	3	2	2	2	3	2	17	3
D	Category: Tangible									
Idea 01	Nudge Bud	2	1	2	2	2	2	2	14	2
Idea 15	Digit Pet	2	2	2	2	3	2	1	13	1
Idea 16	Phone Cover	1	1	2	2	2	3	2	13	
Idea 14	No-Phone games	2	1	1	1	2	2	1	10	
E	Category: Mindfulness									
Idea 08	Awareness of persuassion	2	2	1	1	3	3	3	15	1
Idea 09	Social media lite	2	1	2	1	2	2	2	13	
Idea 02	Mindful	2	2	2	2	3	2	2	15	2

FINAL DESIGN CONCEPTS

01. Creative Kits

IDEA 07

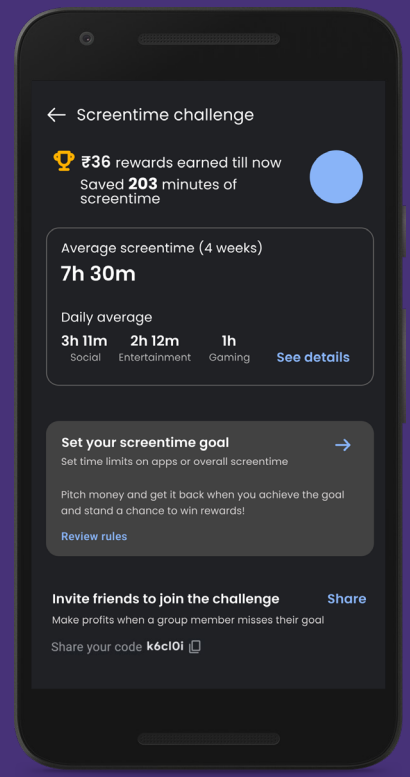
A mobile application provided with a variety of off-screen activities with instructions and a materials kit that can be customized to the user's wide range of interests



02. Move Around

IDEA 11

A kit combining a booklet and a set up application aimed to produce User designed location based visual cues and NFC tag automations added to the environment to improve routines, support goals and manage problematic usage habits



03. PayUp

IDEA 12

A finance based feature designed to motivate groups of users to self-regulate smartphone use by meeting limiting goals to receive original amounts paid against the goal and also recieve rewards from other participants

06 Creative Kits

'Creative Kits', are a set of alternative activities to help users redirect themselves away from passive smartphone use towards other **off-screen activities**. The solution aims to introduce diverse alternatives in a manner that steers away from restrictive strategies towards f**lexible and voluntary engagement with diverse activities of interest**. The solution is available on smartphones as a widget or an app that can be configured to prompt users to try off-screen activities such as origami, calligraphy, sketching etc with a variety of hobby based options. The solutions takes into account the time and routines users to provide short to long activities than can keep users engaged. With **small incremental steps**, users can pick up a new skill during the time they usually waste on social media or other distracting applications.

Key Features

The widget has three major sections: **My Kits, All Kits and Profile** (Me). The user can choose from a variety of activities based on their interest and add or remove kits over time. (See Figure 01 on the right). The users can continue activities they started or select a new activity based on the time they have.

For the solution at this stage, a few hobby based activities were shortlisted that would have tangible outcomes at the end of the activity. The categories of activity have various levels of difficulty and also sub-categories to explore making them sufficiently diverse and scoped given the available project timeline. (See Figure 02 on the right)

Watch the video for the clickable wire-frames here Watch

Try the clickable wire-frames here Go

Note: All the linked content is available in the drive folders

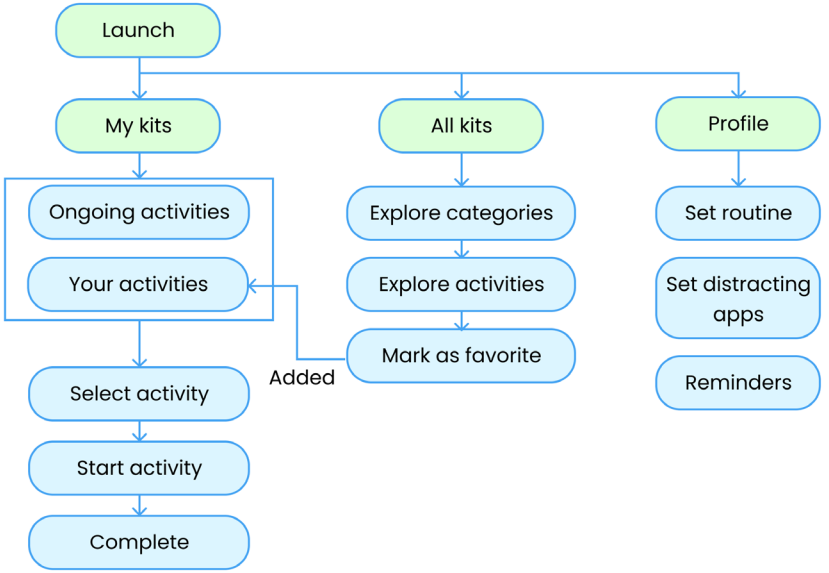


Figure 01: Creative Kit IA

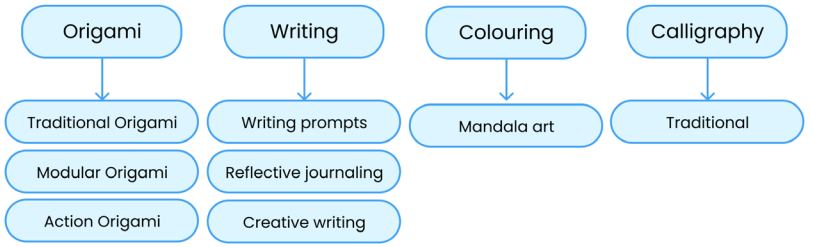
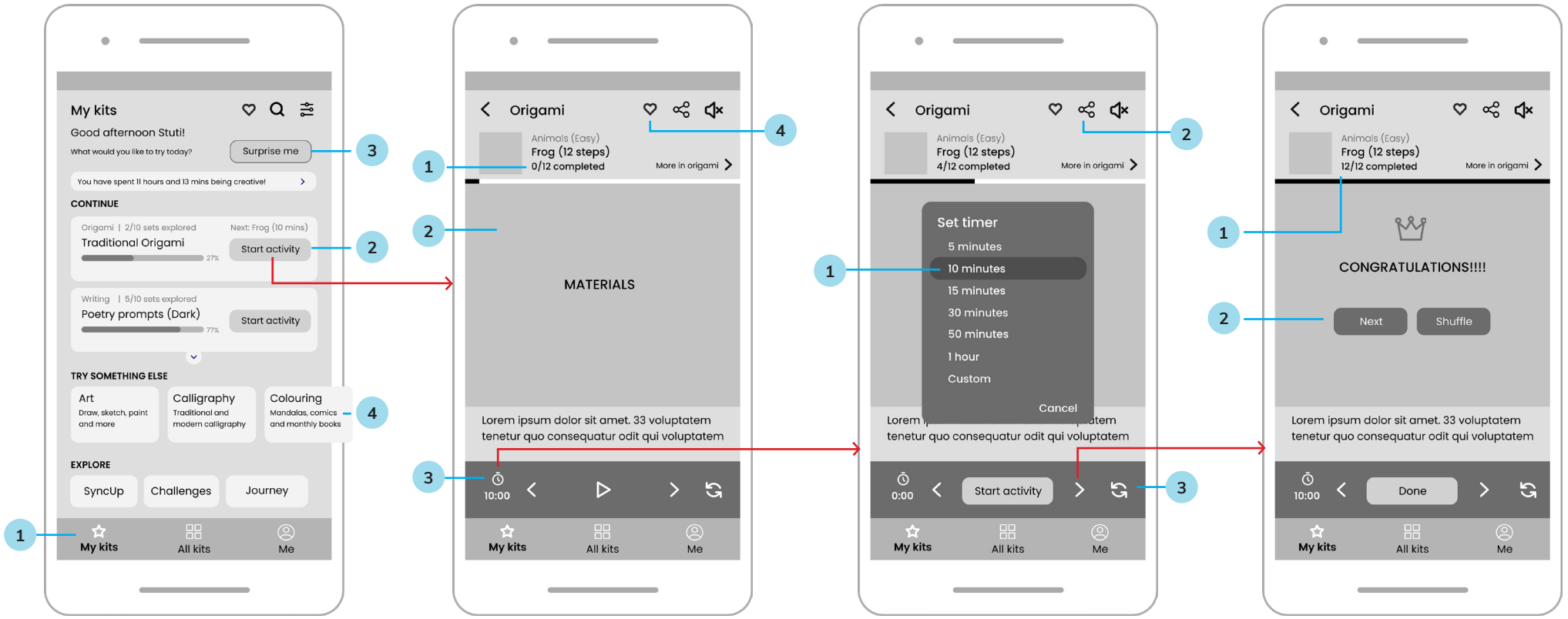


Figure 02. Category of Kits offered with sub-categories to choose activities from

06a. **Features and Wire-frames**

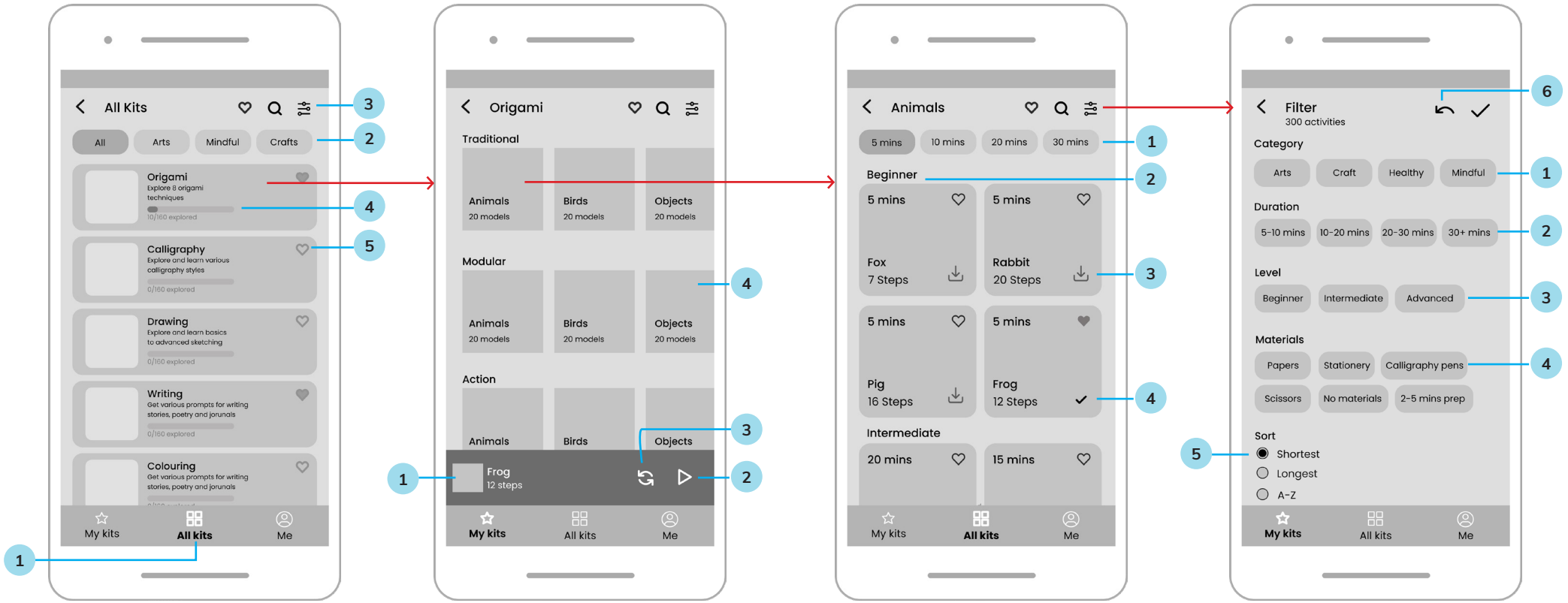


1. My Kits: Quick access ongoing activities
2. Continue an activity of interest
3. Let the widget suggest an activity based on time of the day and history
4. List of other categories to choose from

1. Progress to complete an activity based on number of steps
2. Instructions if any
3. Set a personal timer for short or long breaks before an activity
4. 'Favorites' to revisit prompts and activities

1. Time activity and pause the activity to continue later on
2. Share an activity with a friend to explore doing it together
3. 'Shuffle activity' to suggest something else from the user's selected kits/favorites

1. Complete various levels of each activity to progress to more advanced models, prompts etc
2. Go to the "Next activity' or 'Shuffle activity' to do another

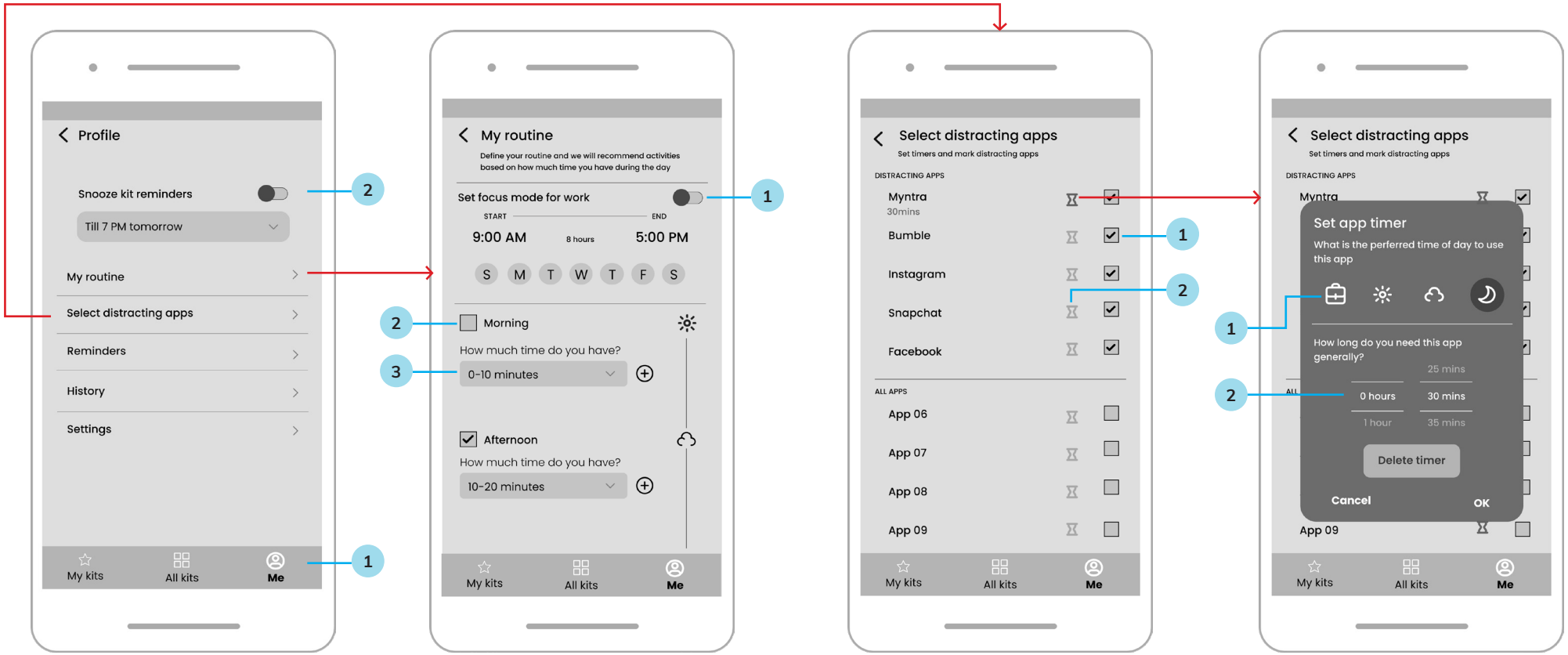


1. List of all available kits for users to choose an activity from
2. Quick filter to select a category or activity based on user mood
3. 'Filter' from all kits
4. Progress through various levels
5. Non favorites do not show up in 'My Kits'

1. Ongoing activity
2. Resume activities during breaks
3. 'Shuffle activity' to suggest from any category based on time of the day and settings
4. Bucket of activities based on themes grouped together

1. Filter activity based on the time the user wants to spend doing it. (Estimated)
2. Level of difficulty for each theme to choose from based on interest and motivation
3. Download activities for future use to avoid using up phone memory
4. Downloaded activities to be used offline as well

1. Filter based on category
2. Select a duration to do the activity. Longer to do things like write, paint etc
3. Select level of challenge based on time and motivation
4. Select based on materials required to prepare to do the activity
5. Sort based on estimated time to do the activity
6. Remove a category of filter before searching

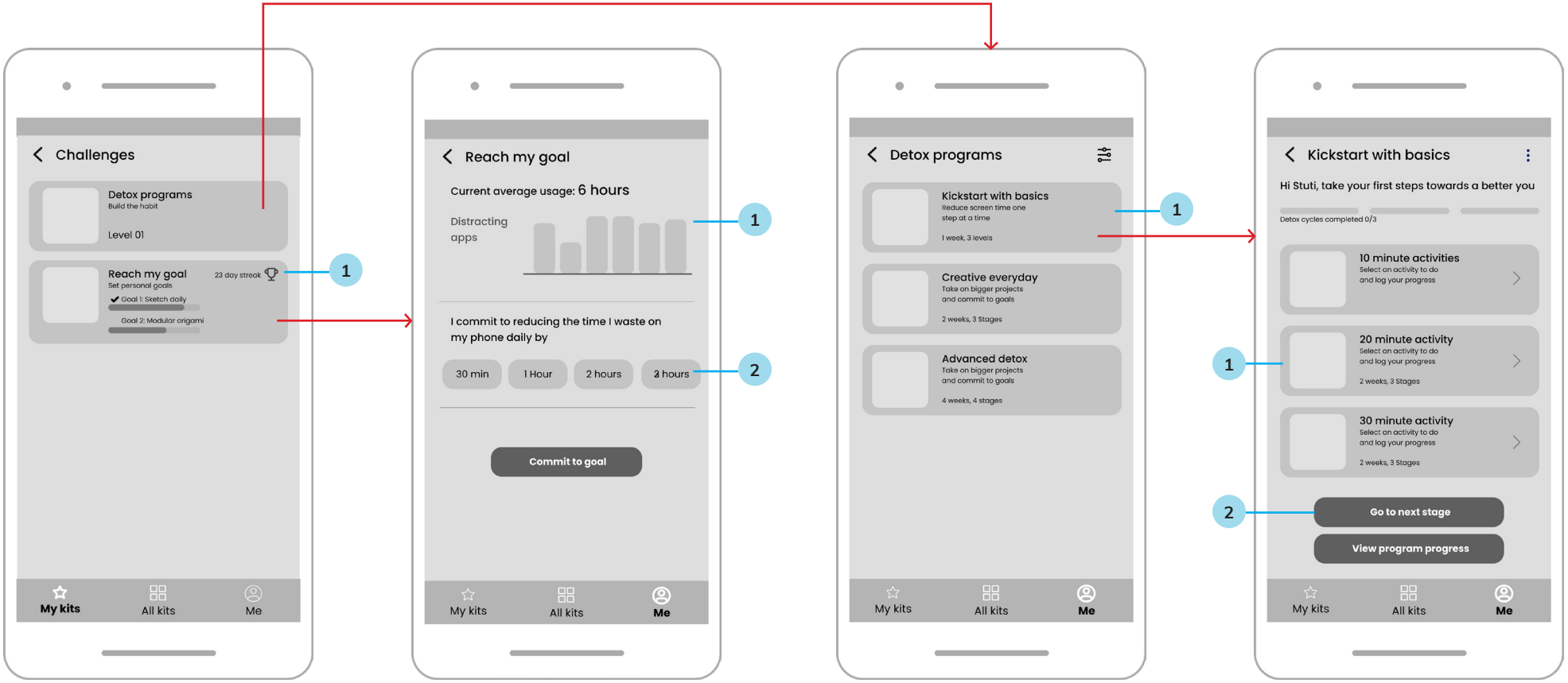


1. 'Me' is where the user can set their routines and manage how the widget prompts them to do an activity
2. Users may choose to snooze regular reminders for a period of time

1. User defines a time they are expected to focus so reminders are limited and do not interrupt
2. Users can choose to do activities based on the time of they day
3. Users may give an estimate of how much time they may wish to engage in an activity and get recommendations as per that

1. Users can specify apps that are distracting. This will prompt users at random intervals to use 'Detox Kits' instead of the app
2. Users may set a timer as well so that 'Detox Kits' is launched after time is up

1. Define a category for the app and when is it more likely to be used such as 'Work', 'Day routine', 'Afternoon routine, or 'Night routine'
2. Define the desired time to spend on the app. Based on the time, category of app and available time, an activity is recommended



Users can set goals that help build a routine of doing the activity regularly.

1. Users can review their stats and commit to reduce screen time
2. Committing to goal will prompt users to reduce session time during each phone use session and also try to reduce frequency by prompting them to do an activity instead

Within 'Detox Programs' users can opt for paced ways of reducing time wasted on distracting apps

1. Time based activities are paced over a specified number of days and can be customized to meet user goals
2. Stages gradually increase limiting goals

06b. **Prototyping**

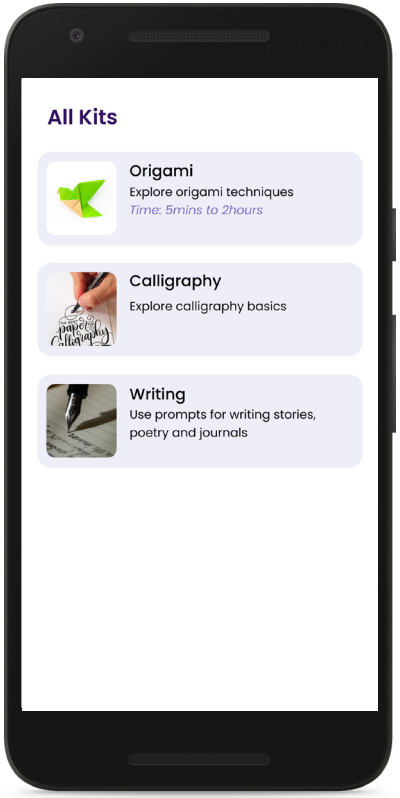
The creative kit prototype consists of two major components, an app with access to the activities and intsructions plus materials as per the chosen activities

1. ***Figma prototype:*** A Clickable figma prototype was created with a few basic options catered to the participant's interests who would take part in the evaluation of the solution. (See Figures on this page) The options available for the users were:
   a. Origami: Traditional, modular and action origami options were linked to YouTube videos. The approximate time and level of difficulty were mentioned to help users choose and manage their break times.
   b. Calligraphy: Basic strokes and alphabets were provided for users to begin and explore calligraphy and practice letters . The provided letters were adopted from the book Calligraphy 101 by Jeaneen Gauthier
   c. Writing: Reflective and creative writing prompts were provided
   d. Colouring: A few Mandala art outlines were provided

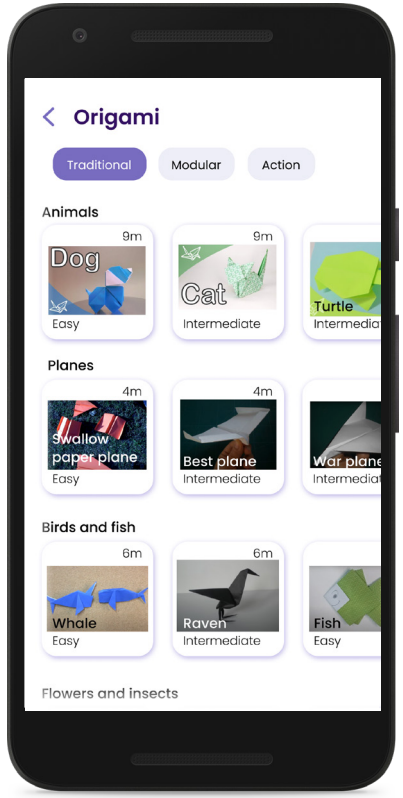
   Click here to watch the video explainer to the prototype Watch

   Click here to use the clickable prototype Go

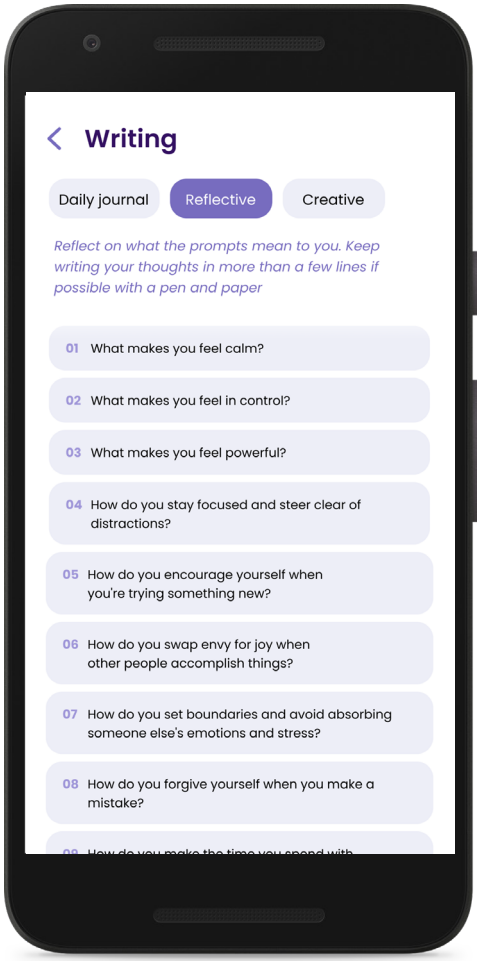
2. ***Material Kit:*** To enable the activities, materials were provided to the participants which included paper, pens, origami sheets, calligraphy pens and colour pencils/crayons. Ideally a physical sand timer could also be provided that runs for 10 minutes or is adjustable in its mechanics.



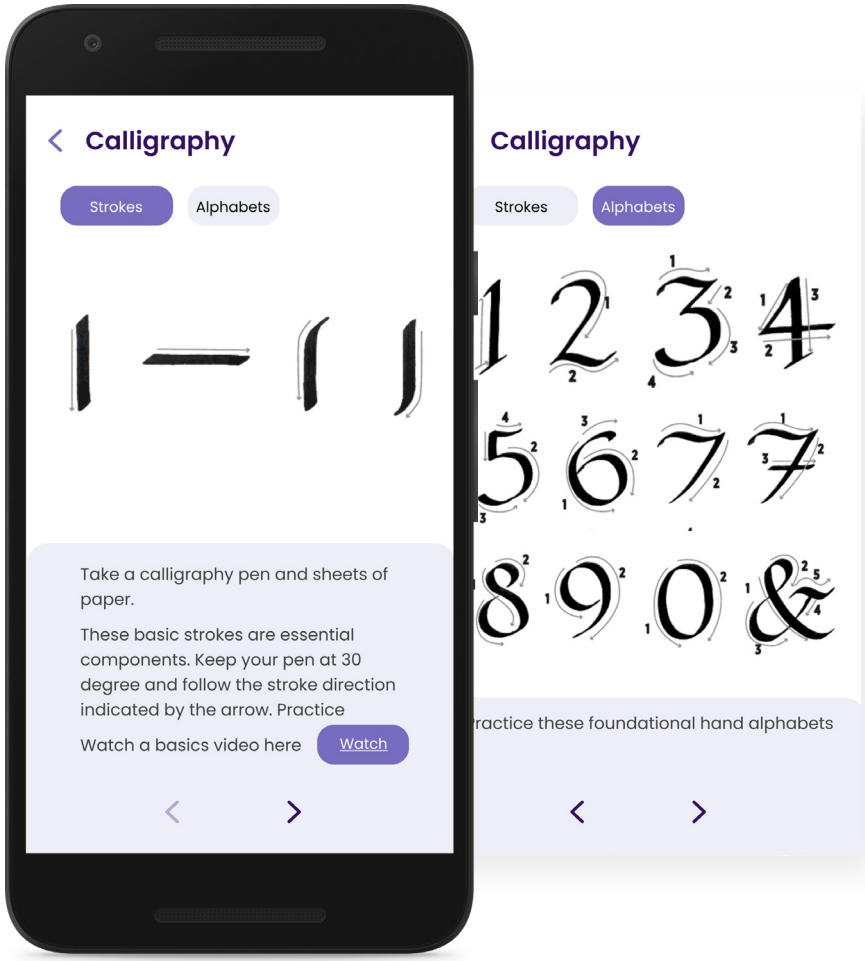
Figma application with 3 activity categories for prototyping



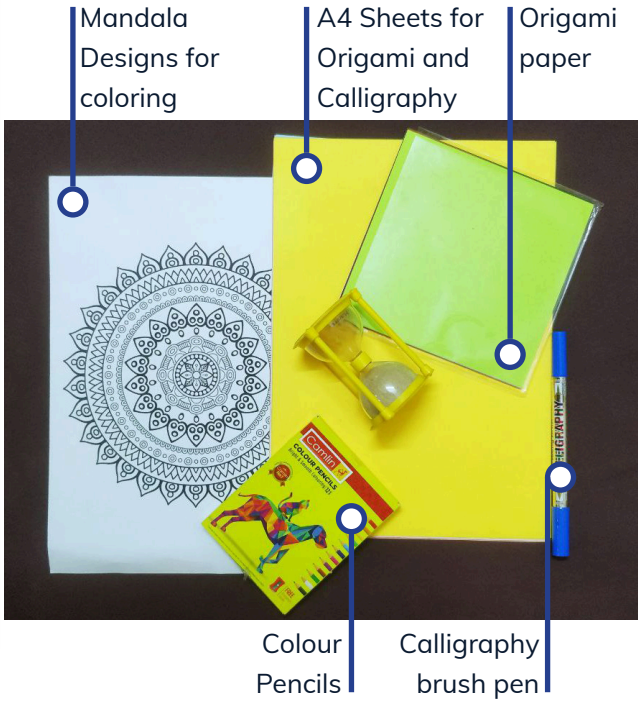
Sub-categories of Origami models redirected to YouTube videos



Writing prompts



Calligraphy



Materials Kit

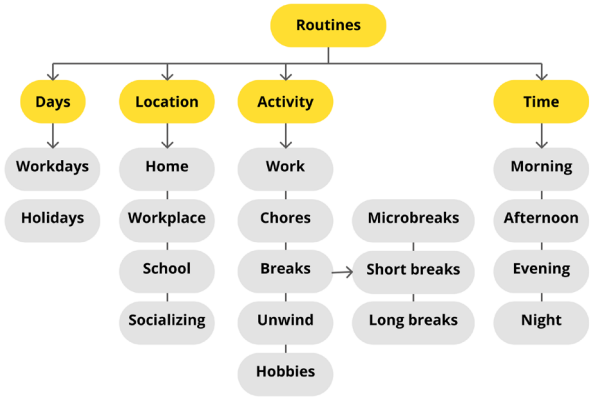
07 Move Around

This design concept is based on the user's environment and tried to first understand how spaces cued habitual smartphone overuse. Within the scope of this project, the idea was to understand if the proposed design intervention could help users manage their habitual smartphone overuse in a 'work from home' or 'hybrid-work' set-up. This can be later translated to other spaces depending on the context.

Move around aimed to help users identify smartphone/device usage patterns and habits built over time that are associated with spaces and objects. Since the lack of consideration for context of usage has been a recurring observation from the primary and secondary research, this solution aimed to provide contextual control on use and non-use patterns. The concept explored if setting location specific and user defined limiting goals, activities or reminders could influence people's usage in their spaces to improve perceived wellbeing.

To define how 'Move Around' could work, it was important to begin understanding on what basis will the rules work. Rules are basically a means to support desired actions and inhibit undesired actions that are problematic habitual smartphone behaviours at a specific location.

The process involved adding details from the primary research conducted. We analyzed the common patterns in how people used their smartphones and started defining the basis for the rules to be designed.
Step 01: Mapping routines for our user persona and their goals (See Figure 01)
Step 02: Listing potential location based goals and rules (See Figure 02, next page)



Mapping Routines

New table

User routines	Goals	Rule
Waking up	Avoid wasting time, stay motivated to start the day better	No Social media, Limit news, Nudge to exercise, hydrate, stretch
Productivity focussed	Meet productivity targets	Avoid long distracting breaks
Short breaks	Meaningful and relaxing breaks	Avoid long distracting breaks
Long breaks	Chores and spend time on self goals	Finish work on time and take time off
After-work	Spend time with friends and family, focus on goals	Avoid procrastination and sedentary behaviour
Unwinding	Spend time with friends and family, do enjoyable things	Limited social media use and increase off screen activities
Bedtime	Improve sleep hygiene	Limited social media use and increase off screen activities

Figure 01: Mapping Routines

New table

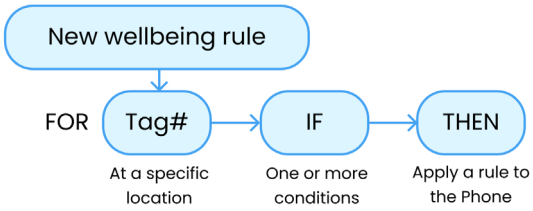
				Customizable- Only for examples	
Location	**Goal**	**Rule**	**Action**	**App rules (Limit)**	**App rule (Allow)**
Bedroom side table	Take short meaningful breaks + manage Chores	Limit distracting apps, set timers	10 minute timers and reminders	Limit IG, FB, YouTube, Reddit, Twitter, Game	Health trackers, To-Dos, other needs
Bed	Improve sleep cycle	Mindfulness exercises, power naps and reflection of night use	'Time to sleep', Centering activities, Non screen activities	Limit IG, FB, YouTube, Snap, Twitter, Game	Music, Games, podcasts, other needs
Bathroom	Do not use phone in the bathroom	Set timers and remind about remaining useful time left for the day	Achieve ideal time and routine		
Study table	Improve productivity and manage breaks	Limit distracting apps, set timers, Pomodoro breaks	Work and break timer, Suggest activities	Limit IG, FB, YouTube, Snap, Twitter, Game	
Kitchen	Manage chores and spend family time	Redirect towards chores, hobbies and breaks	Interest based suggestions, To-Do list	Distracting apps	Radio, To-Do, suggestions, other needs
Dining table	Manage chores and spend family time	Sync No-phone zone, timers, Audio books	Suggest off screen alternates	Distracting apps	
Hall seating area	Alter relaxation time and family time	Schedule off-time, check email and messages	Hold off messages till user comes to the hall		Email, WhatsApp, IG, Snap, Telegram
Other sitting area	Manage time for breaks, self and work	Track screen time duration	Nudge away		

Figure 02: Mapping standard locations

How does the NFC bit work?

Near-field communication (NFC) work like RFID (radio frequency identification). NFC tags are used for applications to exchange a few bits of digitized information quickly between an NFC enabled smartphone and the Tag. NFC tags do not have a power source and come as blank rewritable tags that can be rewritten thousands of time. NFCs have been around and used for mobile payments, boarding passes for travel, and for sending a contact, directions, or photo to someone's phone nearby.

Since users who user their phones in different ways and at various locations, using NFC seemed like an interesting approach. Users can voluntarily decide to apply self-control strategies on their phones at a particular location, at a particular time if they tap on an NFC tag. NFC enabled devices will use personalized NFC tags that can be configured and placed around any location by a user. Tapping on the Tags will apply specific rules for that location. These rules can alter smartphone functionality based on the location to meet user goals. Inspired by smart-home controls and automation features, an 'IF' - 'THEN' approach was adopted to make the rule building.



IF the user taps the tag at a particular location at a particular time within the context of a specified routine **THEN** the smartphone will automate an action that alters the smartphone functionality to limit, remind, or enable the user to meet a personal goal.

07a. **Features and Wire-frames**

The Wellbeing kit

The idea is to provide users with a kit that consists of instructions, physical cards as visual cues and NFC Tags for users to configure and place around any space The flow for that is shown below (See image 1)

1. Instruction manual- This manual is supposed to help users understand how the RULES work and how might they go about creating them to meet their wellbeing goals (Figure 01, 02)
2. NFC tags- These Tags are stickers of cards that can be configured using an application to write triggers on NFC tags. (Figure 03)
3. The move around app- The main purpose of the app is to write and rewrite rules on NFC tags. Each time the user uses the app, they can edit the rules and condition, Tap the Tag to rewrite it with an edited rule
4. Physical Cards- Since various activities around a space may not require the phone to improve routines such as doing chores, reading etc. physical cards can be placed at relevant locations and visual cues

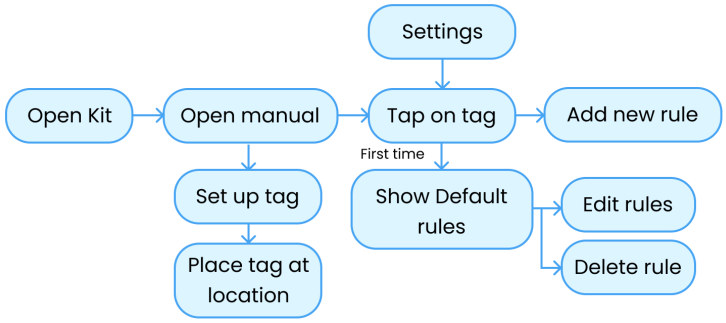


Figure 01: Kit basics

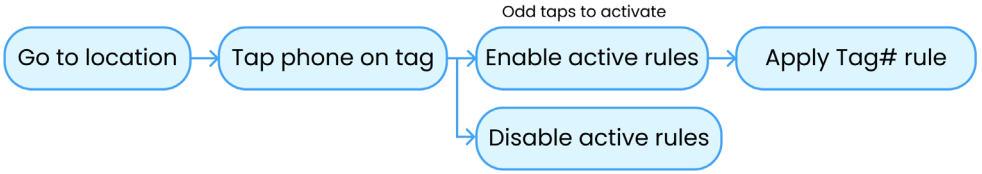


Figure 02: How do the NFC tags work

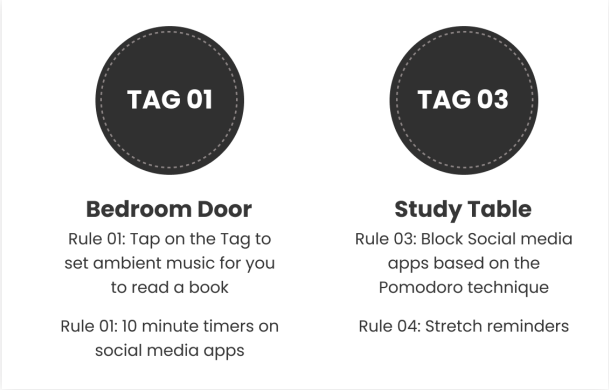


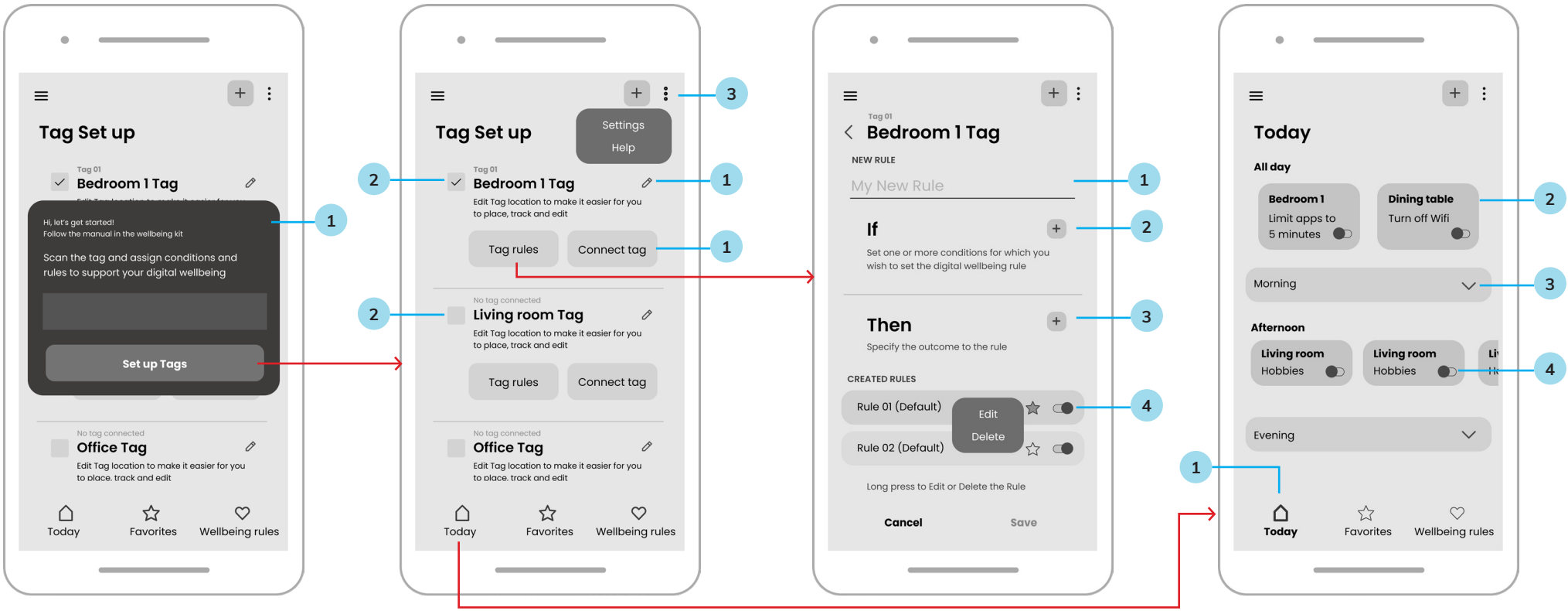
Figure 03: NFC tags with default rules that can be rewritten using the Move around App

Wire-frames were created to demonstrate the set-up process of the NFC tags for the design concept that consider location and user routines.

Click here to watch a video of the clickable prototype Watch video

Click here to access clickable wireframe Figma prototype

Tap on the Tag

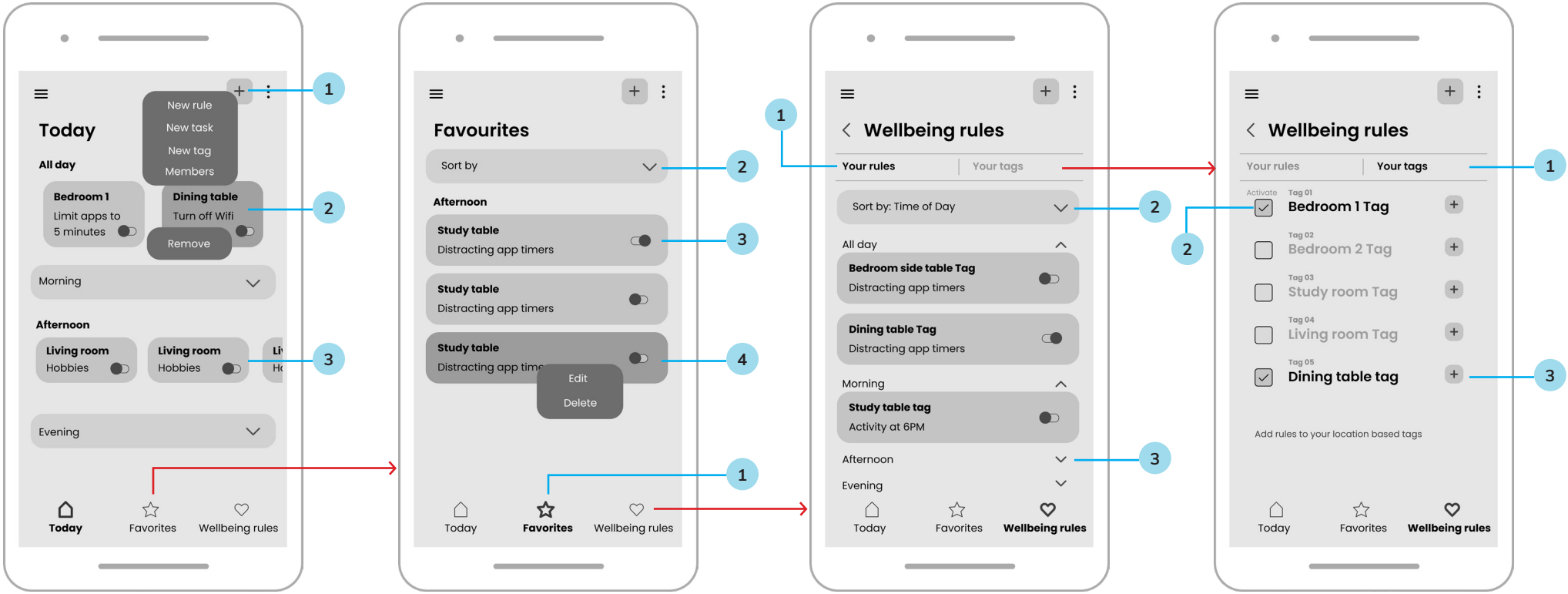


The user can edit and create rules for each numbered Tag. For that, when they 'Scan' or simply 'Tap' on the tag after activating NFC on their phones, the app will help them set up the Tags

1. Based on which numbered Tag is Tapped, the user can name the tag appropriately as per the location they are going to place the Tag at
2. Users can activate or deactivate the Tag using the Checkbox
3. This screen is accessible under the three dots menu > settings and also under the 'Add' button to add 'New Tag'

1. Assign a suitable name to a new rule to identify it later
2. Set an 'If' condition
3. Set a 'Then' outcome as a result of the previously set condition
4. Tags in the Kit come with default rules. Users may 'Enable' or 'Disable' rules for the specific tag using the toggle button. Users can also 'Favorite' created rules to access them quickly in the 'Favorites Tab' on the navigation bar

1. The 'Today' tab shows the user all the active rules for the particular day with respect to the various tags
2. Some rules may apply 'All Day' depending on how the user plans to define their device usage patterns
3. Rules specific to time of the day are grouped
4. Users can 'Enable' or 'Disable' the rule as per their needs in the app

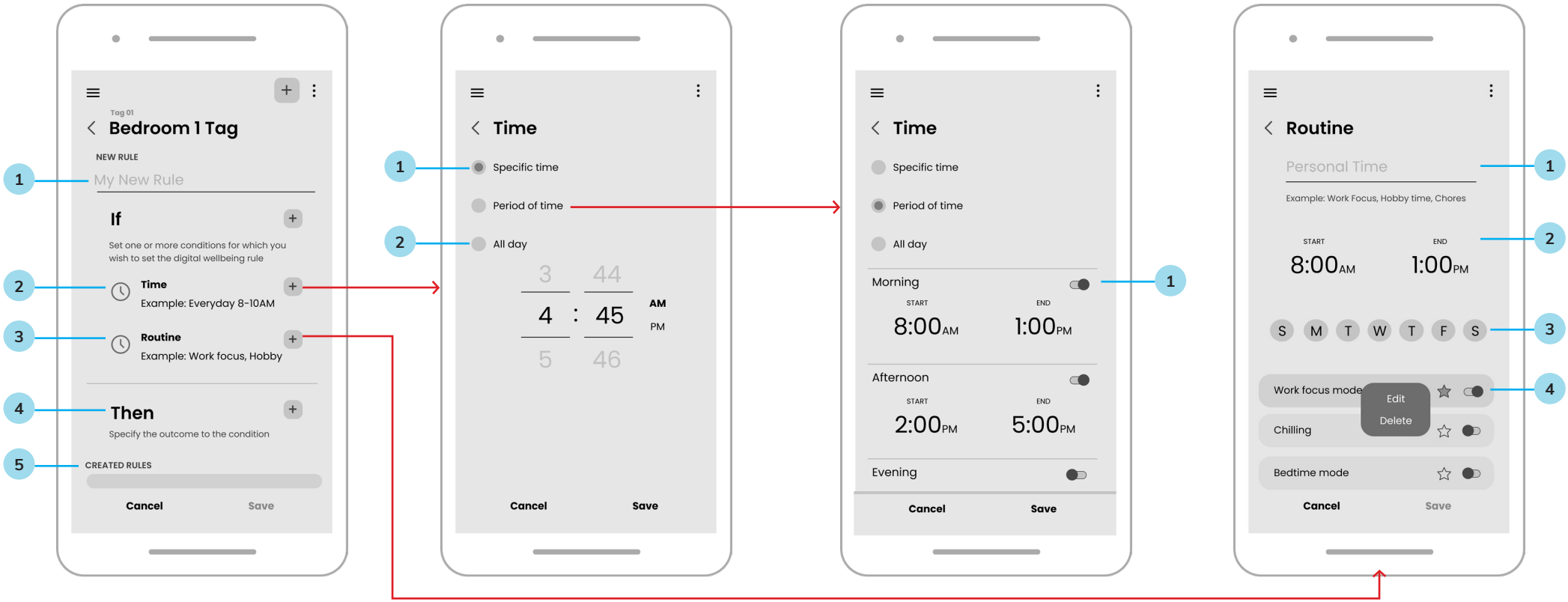


1. The 'Add' button allows users to assign new rules to a specific tag,
2. Long press to remove rules
3. See only rules applied to the time of the day or routine to avoid clutter

1. 'Favorites' provides quick access to commonly used rules for all the Tags and can be an easy way to enable or disable rules as per need
2. Users can sort rules by Tag name, time, routine, conditions or outcome
3. Toggle to Enable a rule for a Tag
4. Edit the rule or Delete it

1. 'Wellbeing rules' show all the Active rules for all the Tags in use
2. Users can sort rules
3. Expand specific groups of rules to easily enable or disable them

1. See a list of all the Tags connected
2. Use the check box to Activate the Tag so that if the user taps on the tag at the location, the set rules will be applied to the phone. Unchecked Tags are in 'Idle' states
3. 'Add' rules to Tags. Rules can be added to 'Idle' tags as well

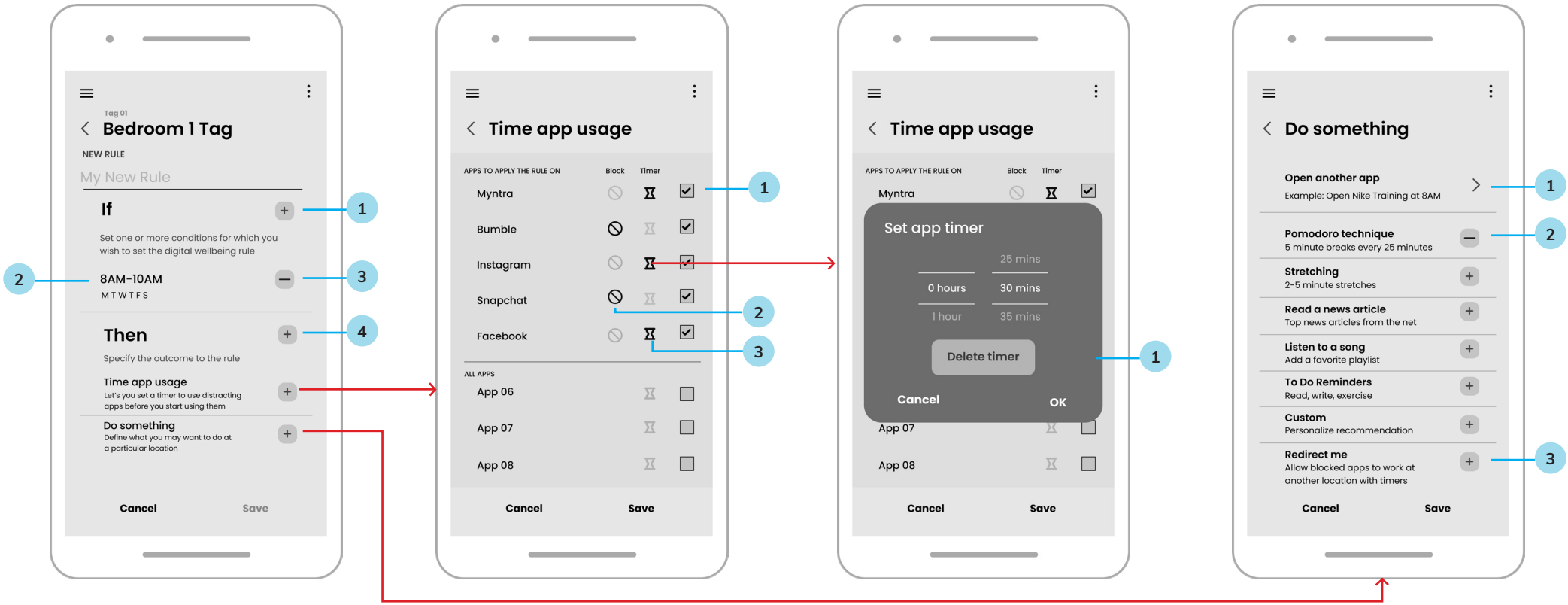


1. Users can name a new rule
2. Users can set an 'If' condition that depends on time of the day. Eg. If the user wants to workout, they may set a rule at the 'Bed' for 9AM to launch an exercise App
3. Users may also define routines such as work, weekdays, weekend etc that are also time based
4. User set a 'Then' outcome for the condition to complete the rule

1. Users can define the Tag at a specific location to activate a rule if they are present there
2. Users may choose to create general rules at various locations 'All day'

Users may define chunks of time for the rules to apply and enable/disable them as per their needs

1. Users can name a routine
2. Users can set the time slot for that particular routine. Routines are reusable across all Tags
3. Users can specify the days the routine applies
4. Users can save the routine and then enable the particular routine for the new rule being designed



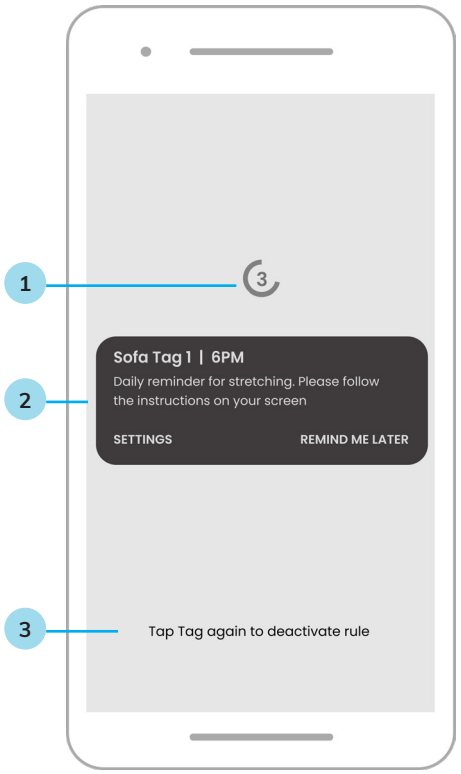
1. Users can 'Add' multiple 'If' conditions
2. Users see the condition summary when they set it
3. Users can easily remove the condition by tapping on remove (-)
4. User can specify the 'Then' outcome for the conditions set to complete the rule

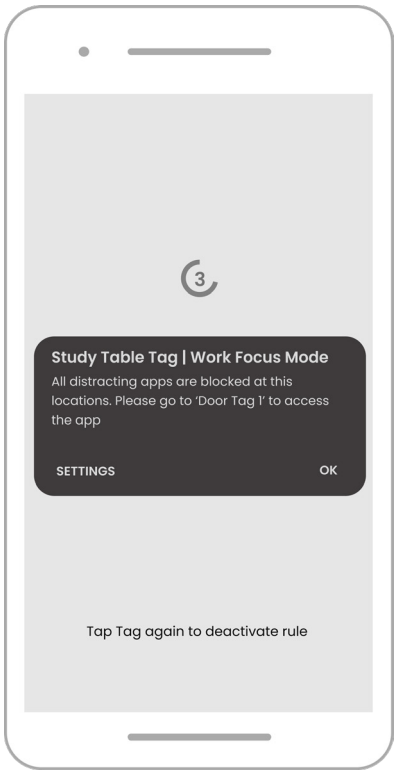
1. Users can 'Time app usage' by marking distracting apps as the ones to apply the rule on. Eg. Users may want to limit Instagram at the study table to 2 mins per session and block dating apps completely here. But they may use the dating app at the sofa, the rule is flexible
2. Block apps completely at the location tag
3. Set a timer on the app at that location

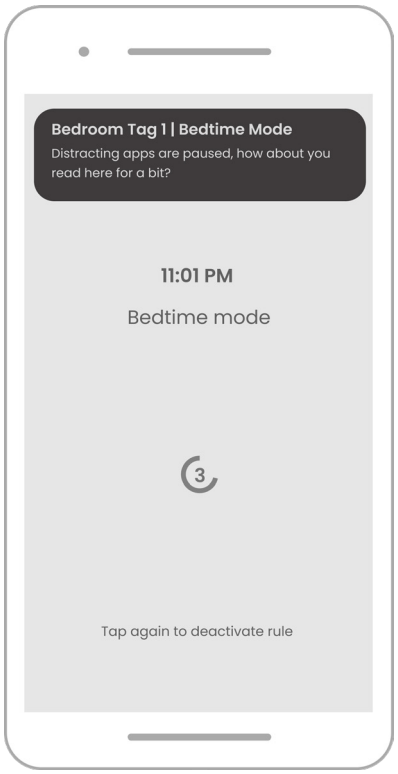
Users can set app timers for the entire day on specific apps

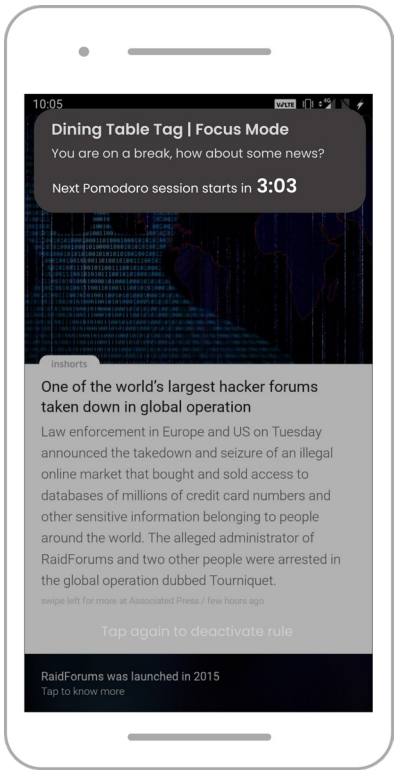
1. User may want to launch a specific app at a specific time or location and their to nudge them to exercise, read, take breaks etc
2. Users may add preset timers that activate at a location such as the Pomodoro Timer. Users can simple 'Add' or 'Remove' the outcome here
3. Users may want to add friction by telling the app to redirect them to another Tag location to access an app such as email, social media etc.

Example use-cases









1. When a user goes to a particular location and taps on the Tag, the rules are applied to the phone. There is a 5 second timer for activities before they start
2. Notifications popup nudging the user to follow the rules
3. Users who wish to deactivate the rules from a tag at a particular location can do so by tapping again. This allows the solution to support autonomy

Blocked apps at a location show the popup when they are accessed based on the set rules

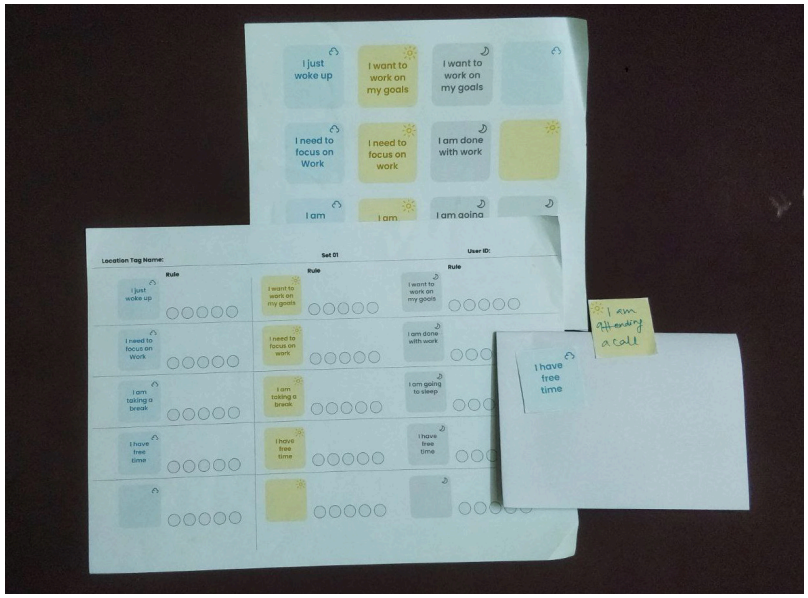
Users can get reminders for activities around the space based on the modes set

Users can get options for break activities during focus modes such as reading top news for 5 minutes or listening to music between Pomodoro sessions

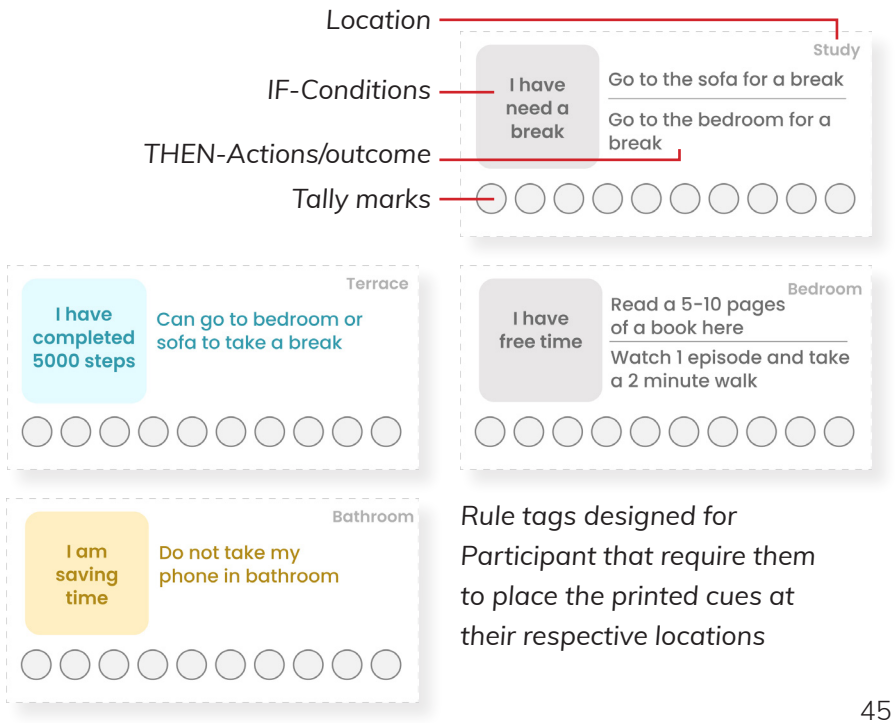
07b. **Prototyping**

The prototype consisted of artifacts that were designed after consulting the user and printed, cut and placed around their homes. The early stage of the prototype was done using post-its and designed on the stop with the user. Where as, the next iterations developed a template. Components of the prototype included

1. IF conditions: a set number of pre-defined IF conditions were set based on assumptions around work from home scenarios and the primary research. Black sections were also provides. The tags were initially designed to differentiate between morning, afternoon and evening using colours and symbols. This was later removed due to low relevance.
2. THEN Actions or outcomes: These spaces were user defined and hence kept empty or filled during the testing period after designing the rules with the user
3. Tally Marks: These help user track if the rule was applied today at the location or not



Paper tags with default and empty IF conditions



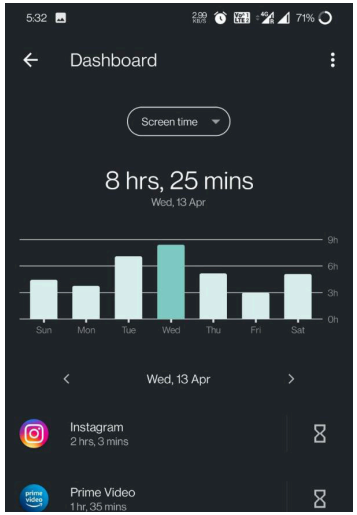
Rule tags designed for Participant that require them to place the printed cues at their respective locations

08 PayUp

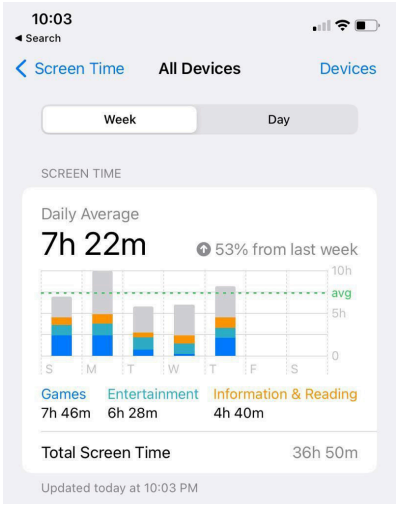
The concept aims to equate time to money by offering rewards and penalties and punishments. Users can volunteer to participate in a challenge that requires them to consciously stay within a set time limit for their smartphone use. By employing a group of friends with similar routines such as students, colleagues etc, the solution also looks at social support as a means to motivate users through **social comparison** to stay meet their limiting goals and support their self-regulation.

How it works: The solution aims to support user autonomy by making the intervention voluntary and giving users the flexibility to define their goals. Goals are **'Goal time'** set by the user which is below their daily screen time average. Within a group of PayUp participants, each one may set a unique goal and still be able to participate in a same challenge. For eg. One participant may choose to reduce their social media use whereas another may decide to cut down on their overall phone usage. Each participant pitches an amount of money equivalent to the time they decide to reduce and if they are able to stay within their 'Goal time' they receive their entire pitch money back. In case they are not able to stay within their time limit, other participants who achieved their goals **win** portions of the losers pitch money. Additionally **penalty** amounts of 50 paisa per minute of use is charged.

The aim is for users to regulate and manage their smartphone use time across the day to **ration their available time** to do things that are important to them. In case of solo challenges, the user may **hold themselves accountable** for 1 day during contexts such as deadlines or exams for a specific monetary amount that remains locked for a period of time or is lost to a friend when goal time is not met.



Android Digital wellbeing and parental Controls



iOS Screen Time Dashboard

This concept relies on screen-time tracking, therefore existing Android and iOS features were utilized. **'Digital wellbeing and Parental controls'** found within **Andorid** settings provides usage stats for screen-time on a daily and hourly. Similarly, **'Screentime'** within **iOS** provide detailed usage stats as well. During the interviews, it was found that more than half the users had not used either of these trackers. **Awareness** of their screen-time itself provided some consciousness around usage. Through this intervention, we also tried improving awareness around such available tools.

Next, the details of how the intervention works is mentioned.

08a. **Detailing**

Condition	User Action	Transaction Rule	Outcome
A person wants to regulate their screen time but timers are bypassable	User decides to launch a PayUp challenge for a single day and send invites to groups of friends		
Peers of colleagues can voluntarily participate	Solo challenges can be launched where users can pitch an amount that they will receive at the end of N number of successful screen-time challenges	Solo pitch amount of ₹A= (Goal time in minutes × 50 paisa) is set for 1 day or for N number of days	People with similar routine can support each other
Start > Each user sets a Goal Time= 20% to 50% less than Average app or phone screen-time	Users may strategically set timers on distracting apps for the entire day		Challenge starts at 12AM and records screen time on the user's smartphone
	Users may reflect on the kinds of apps they use and not limit productivity apps.	Everyone pitches ₹A= ((Goal time in minutes) × 50 paisa) for 1 day.	Pitch amount is deducted and set as the group contribution to the challenge. Higher pitch amount for more screen-time
After a 24 hour period, the screen time results are shared and compared	Users can monitor their screen time using existing inbuilt trackers and ration their remaining available screen time	Users within the stipulated goal time immediately receive their pitch money = ₹A	Successful at meeting limiting goal
	Users pay penalty amounts	Users beyond their limit loose ₹A + pay additional penalty of ₹(Extra minutes × 20 paisa)	Punishment- Money lost for not staying within the time limit
		Users who complete the challenge successfully receive thee lost pitch amounts and penalties that is equally divided	Rewards - Money received for staying within the time limit
New challenge	Users add new goal money for the day and the accounts are refreshed	Transactions settled with reminders for additional penalty amount	

09 Experiments for evaluation

The evaluation of the three design intervention aimed to gain insights into how the strategies adopted aid with user with limiting problematic smartphone usage behaviours through design probes as research artifacts and not primarily as products. For the evaluation, we conducted experiments in an iterative manner to gauge the influence on smartphone use patterns, screen-time and subjective wellbeing. **Find the detailed plans** Evaluation Plan

Designs	**Creative Kits**	**Move Around**	**PayUp**
Description	A mobile application provided with a variety of user interest based off-screen activities with instructions and a materials kit	User designed location based visual cues and automations added to the environment to improve routines, support goals and manage device usage	A finance based approach to motivate users to self-regulate smartphone use by meeting limiting goals to receive and original amount invested
Objective	To assess the impact of redirecting users to diverse alternate activities of interests to manage social media use for breaks	To identify the factors that influence user's motivations to adhere to environment cues that support their desired smartphone usage routines	To understand the factors that influence the effectiveness of financial penalties and rewards to influence smartphone usage to reduce screen time
Questions to answer	1. Is the creative a kit a feasible approach to redirect users towards alternatives, if not why? 2. How did the solution influence their attitudes towards their usage patterns? 3. Did participants feel like they could adopt the solution to use their devices for something apart from distracting apps on their smartphones?	1. What is the relationship with routines and location based cues and how might we leverage them to reduce addictive smartphone behaviours? 2. What kind of location specific cues for micro locations influence smartphone usage patterns? 3. How could altering functionality of the smartphone based on context help participants manage distractions?	1. What factors need to be considered to design for reducing addictive smartphone behaviours using financial incentive and penalties? 2. To what extent does the solution support user competence to reduce screen time? 3. What do people feel about financial penalties and how does it influence their usage habits? 4. Does the approach support autonomy
Strategies evaluated	Redirect to an alternative, Revaluing outcomes (Means to pursue other meaningful goals)	Altering the context, training cue response (location triggered habits)	Revaluing the outcome (Rewards and punishments), self-control, self-monitoring, self-tracking
Medium	Interviews, Figma prototype, Self-reporting	Interviews, paper prototypes, Self-reporting	Whatsapp Messenger, Self-reporting
Data Collection	Alternate day interview, screen time and artefacts created, exit interview	Daily voice notes or interviews, screen time, rule update meetings, exit interview, tally marks	Screen shots of inbuilt screen time dashboard, daily prompts, exit interview
Data Analysis	Qualitative insights, number of activities done, time invested in activities	Qualitative insights, rules followed, rules updated, daily routines	Screen time before and during experiment, Success or Failure rate, reduction in screen time, Transactions

09A. **Participants**

For the evaluation we aimed to look for participants exhibiting addictive smartphone use behaviours and define smartphone addiction as the excessive use of smartphones that interferes with the daily lives of the users. This overuse may interfere with their ability to self-regulate use and lead to subsequent impulsive use. This decrease in control may result in increased negative experiences and continue with undesired behaviours. (Liu et al., 2019)

Participants were recruited if they identified as smartphone use and 'problematic' which meant that (a) they felt a sense of wasted time due to their smartphone use habit (b) impacted their lifestyle in terms of physical or mental health along with social life (c) impacted their goals such as desire to pursue a hobby, learn etc. (d) were motivated, in some capacity, to make a positive change in their use time or patterns. Some questions adopted from the Mobile Phone Addiction Scale (Anxious attachment, Addiction and Continuous Use) were taken as a basis to filter participants (N=20). Participants whose answer to most questions was yes were cosnidered.

1. I feel anxious if I don't have my phone with me
2. I feel isolated without my phone
3. I feel dependent on my phone
4. Without my mobile phone, I feel out of touch with the world
5. I find myself occupied on my phone even when I'm with other people
6. I find myself occupied with my phone when I should be doing other things
7. I find myself engaged with my mobile phone for longer periods of time than I intended
8. I would get more work done if I spent less time on my phone
9. I read/send text messages from my mobile phone, when I am at work or in class, that are not related to what I am doing
10. I use my phone all day
11. I am never bored if I have my phone with me
12. I rely on my phone 24/7

Next, details of the participants for the 3 interventions are mentioned in the table below:

Design intervention	**Participant ID**	**Demographic**	**Days evaluated**
Creative Kits (Group 01)	P01, Female, 52yrs	Mumbai, Homemaker, children away	14
	P02, Female, 25yrs	Mumbai, Employed, work from home	14
	P03, Male, 26yrs	Mumbai, Student, Unemployed	14
Move Around (Group 02)	P00, Male, 23yrs	Mumbai, Student, Hostel resident	3 (Pilot)
	P04, Female 27yrs	Orissa, Employed, Work from home	14
	P05, Female, 25yrs	Mumbai, Employed, Hybrid working mode	14
	P0, Female, 26yrs	Mumbai, Employed, Hybrid working mode	3 (Drop)
PayUp (Group 03)	Group 3A: P06, P07, P08, P09 (Females, 23-25yrs)	Mumbai, Students, Hostel residents	3
	Group 3B: P10, P11, P12 (Males, 23-30yrs)	Remote, Students, Work from home	4

Overall, 14 participants were briefed and interviewed about their usage patterns and assigned an intervention based on their answers. For the final evaluation only 12 participants were considered. The criteria for assignment is mentioned in the next section.

One size does not fit all

Digital wellbeing interventions work uniquely for different kinds of users and also withing varying contexts. We felt it was important to evaluate the three strategies keeping in mind user needs, current routine and time which were observed during the introductory interviews conducted (Appendix A)

Creative Kits

Participants who showcased interest in crafts or had pursued creative hobbies but no longer practice them were chosen. We wished to understand how different age groups with differing contexts may respond. For that reason, a homemaker (52yrs) and 2 adults living at home with some free time and felt that there social media use was a problem were considered.

P-ID	P01	P02	P03
Screen Time (mins)	204 (SD=44)	227 (SD=50)	253 (SD=29)

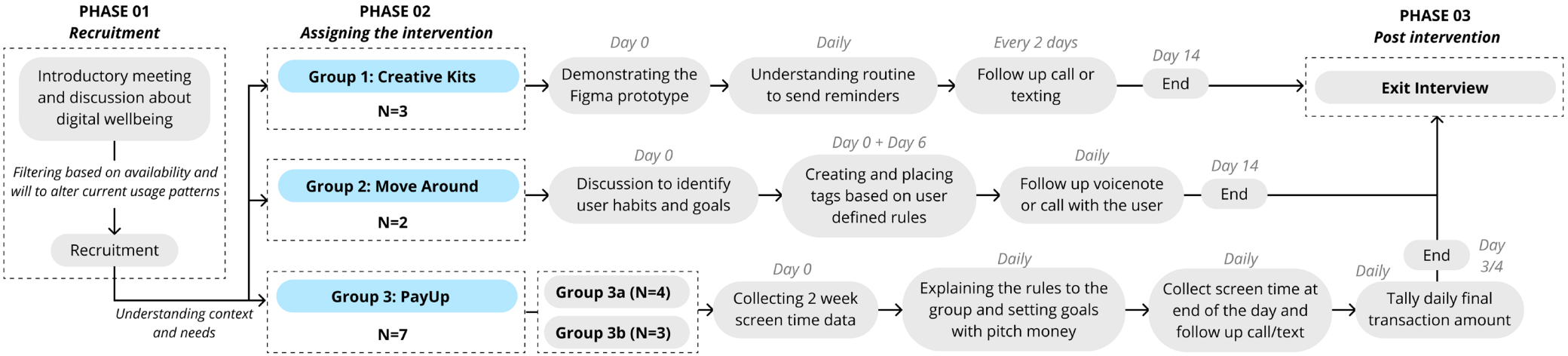
Move Around

2 participants who identified problems with their routines and were willing to incorporate the intervention in their space were considered. While for some days smartphone screen time was less than 4 hours, their multi-device screen time made the participants desire better management and improve routines to cope with the necessary screen time during working from home.

P-ID	P04	P05	P00 (Drop)
Screen Time (mins)	204 (SD=44)	227 (SD=50)	362 (SD=46)

PayUp

2 groups of participants were recruited based on their screen time and if they were motivated to reduce in problematic usage habits. Group3A (P06, P07, P08, P09) were hostel residents and saw a drop in overall usage due a change of locations from home to the hostel. Where average usage was 7+ hours at home, that number had dropped for all people and problematic habits also were fewer. Therefore, for a second iteration, Group3B (P10, P11, P12) considered classmates remotely placed at their respective homes whose use was higher and also were willing to reduce their smartphone screen time.



Experiment design schematic for evaluation of the 3 design interventions

10 Creative Kit Evaluation

By providing participants with the option of alternatives, we aimed to redirect the time they spent during long breaks on their smartphone towards off-screen activities supported by the smartphones.

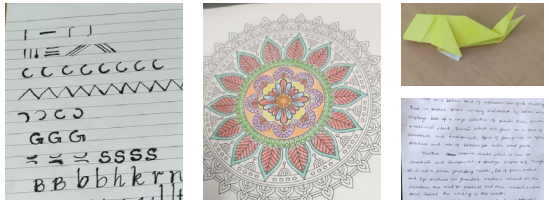
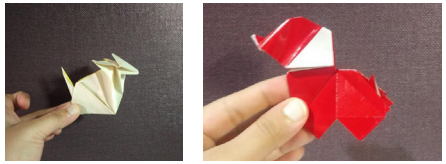
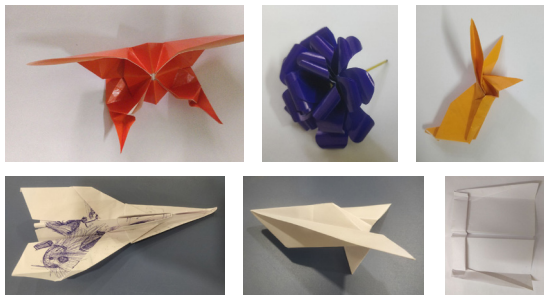
Procedure:

1. ***Introductory interview:*** The aim was to understand at what points did the participants feel that their usage was problematic during their daily routines. The focus was on short and long breaks along with free-time that was often spent watching shows or scrolling through social media.
2. ***Routine based reminders:*** Based on the interview, each participants weekday and weekend routines were understood and time slots where they would generally take long breaks were recorded. These time slots were used as points for Whatsapp reminders accompanied by the Figma prototype link which nudged the user towards the alternate activity
3. ***Follow Up interviews:*** Participants recollected there days and answered using the following prompts
    a. Take me through your day from the moment you woke up
    b. What points did you take breaks? What did you do during the breaks?
    c. When and why did you use decide to use the kit?
    d. Why did you select the particular activity?
    e. Why did you not decide to do an activity? What did you do instead?
    f. How did the reminders help you?
    g. When and why did the reminders and kit not work for you?
    h. How do you feel about your device usage over the 2 days?
    i. How did doing the activity make you feel?
4. ***Exit questionnaire:*** The questionnaire loosely adopted questions from the METUX model by Peters et al. (2018) and is mentioned in the detailed evaluation plan linked earlier. The questionnaire asks participants to rate their experience of using one of the 3 design interventions on a scale of 1 to 5. 1 being Strongly Disagree and 5 being Strongly Agree.

10a. **Results**

1. No participant used the kit on all 14 days due to other engagements, moods, time or effort
2. From the questionnaire, participants did not feel the solution influenced smartphone usage. This was intended as the solution does not reduce screen-time, but rather aims to shift post-use guilt from mindless breaks to meaningful breaks
3. Participants also did not find the solution to be fit for regular use as it was highly dependent on their mind-frame and desire to do an activity that demands time and effort compared to the easy scrolling based satisfaction
4. Participants felt happy about trying something new and about their smartphone use in general. This was due to improved awareness, conscious efforts they made to take meaningful breaks when possible
5. An overall positive response suggests that such a kit with diverse activities more catered to the user may nudge users towards spending their time well

Find the link to results from the exit questionnaire [Here]

P-ID	Days activity done	Reminders	Activity done	Other activities	Time with kit
P01	6/14	12:00 PM, 4 :00 PM, 6:00 PM		Singing, walks	120 mins
P02	2/14	4:00 PM, 9 :00 PM		Puzzles, reading, cooking	45 mins
P03	8/14	2 :00 PM, 4 :00 PM, 10 :00 PM		Reading, walking, cooking	240 mins

Artefacts created by participants using the kit

10b. **Observations and participant quotes**

1. Providing the material enabled and motivated participants to consider alternative activities since mostly they would not have the resources that nudge them to do something hands-on
2. Participants found the activities nostalgic, fun and as a means to engage in off-screen activities
3. This solution worked well for the older participant who had leisure time during the afternoon where they could invest time in pursuing hands-on hobbies that they had not done in years.
4. Since P02 was not as interested in origami or writing, they found the need to do the activities more as tasks than as breaks
5. A lost sense of time was also experienced unless timers were set. All participants were motivated to complete their models or explorations in one sitting
6. The initial enthusiasm may be as a result of the novelty effect. Yet, 2 of the 3 participants did decide to do the activities even close to end of the study.
7. Users were more aware and chose to voluntarily take up other activities such as solving puzzles, singing or sketching to manage their social media use during breaks
8. P03 started getting YouTube recommendations for origami models and they later tried making more planes even after the study was done

Participants quotes

9. I have consciously realized that SM is not satisfying me, something like this is giving satisfaction
10. Maybe experiments have not given the solution- but it has created consciousness in a way that it made me realize that this is what you could do additionally
11. The fact that you gave me the material helped me and made it easy. Small kits that you just give it a try, small crayons, coloring books- which our age group will not go and buy for ourselves- once we explore we can go and buy
12. Just seeing the option of writing I decided to write- I did not really go through the prompts
13. At the end of the activity you feel satisfied you did something different. I tried somethings after so many years
14. When reminders were sent, I was alert that I could do other things after 10 minutes
15. Reminder helped me try to make time for the activity and choose to do the activity instead
16. I guess I should have started with an easy level so that I can finish it faster during a short break
17. Also I did not feel like using my brain too much, just wanted to relax, easy 'timepass'
18. When I am in the frame of mind where I want to try something new, that is when this option is there which is convenient but this mood does not come too regularly
19. Activities seem like a bit of an investment and I am also a little lazy
20. Milestone and levels would be helpful in the form of guided path. If these are break-time activities, I don't want to figure what to do next, a path or defined activity list with time would have worked for me.
21. Atleast it triggered me to pickup something else and I chose to do puzzles
22. I liked having the levels and time mentioned so I could choose what I wanted to do
23. Feels like a commitment on busy days and I would rather do something easier

10c. **Insights and Next steps**

1. Creative kits work as a useful alternative to redirect users away from mindless breaks towards other activities for specific period of time
2. Users find having the duration of activities useful as they can time how long they are spending on these activities as well between working days
3. Users may choose these activities based on their mood and time which is non restrictive
4. Users may need more motivation to continue using such tools and can benefit from social support features or having people do these activities together
5. Guided activity paths could suggest new activities each time with a gradually increasing time duration to slowly reduce the screen-time on distracting apps
6. Users could choose to download custom kits and learn new skills- on and off-screen both. Although, the kit aims to promote off-screen activities

11 Move Around Evaluation

Experiments were conducted to understand if context specific limiting goals could be effective and moderating overuse of distracting applications. The actual solution would ideally make use of NFC tags of Bluetooth Beacons which would automate the rules for the users.

Process:

1. Creating custom rules for the user based on their usage patterns and the space on post it notes.
2. Placing them around the space with consultation from the user and refining the rules
3. Asking users to follow the 'Then' action at each location based on the 'If' condition by logging success of following any assigned rule at the location
4. Collecting qualitative feedback on the intervention and need for changes based on routine, location, rules and desired outcomes.

Designing the intervention

1. **Observing problematic usage patterns:** A brief interview and observation is conducted around how the user uses their phones at each location. The user is asked to define 'problematic' usage in terms of (a) wasted time (b) supporting procrastinating tasks (c) negative impacts of lifestyle (d) desire to achieve other goals such as building the habit of reading, taking breaks, exercising etc.

2. **Identifying achievable limiting goals:** Since positive and negative experiences with device apps and features is subjective, limiting goals should cater to the user's needs at different times of the day. For that purpose, the 'If' conditions account for time of the day and modes (working, relaxing). Location based rules were created with the user. For example, if a user tends to open Instagram on their bed for non-productive activities and find it personally wasteful, we may redirect them to access the app at another location or during a specific time frame only.

3. **Supporting healthy habits:** For most users, there were other hobbies or interests that they would wish to invest their time in, but media and entertainment is the easiest thing to do. The rules tried to provide means to introduce these alternatives and build habits by nudging them at a certain convenient location. Eg. Keep a book at the side table to read every evening. Other ways to improve routine involved identifying habits at around the spaces they occupied and breaking bad habits with some restricting rules. Additionally introducing ways to build new habits at the specific locations. For eg, a rule to stretch every time the user completes a work session or to limit social media near the bed to 2-3 mins per session and other various permutations.

Pilots

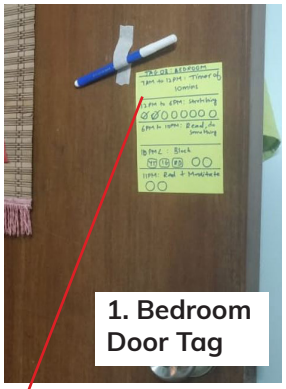
For the 2 pilot tests, the rules were written on Post-it notes and placed around 2 location: A 3Bhk flat and a student's hostel room in Mumbai.

11a. **Pilot Experiment 01**

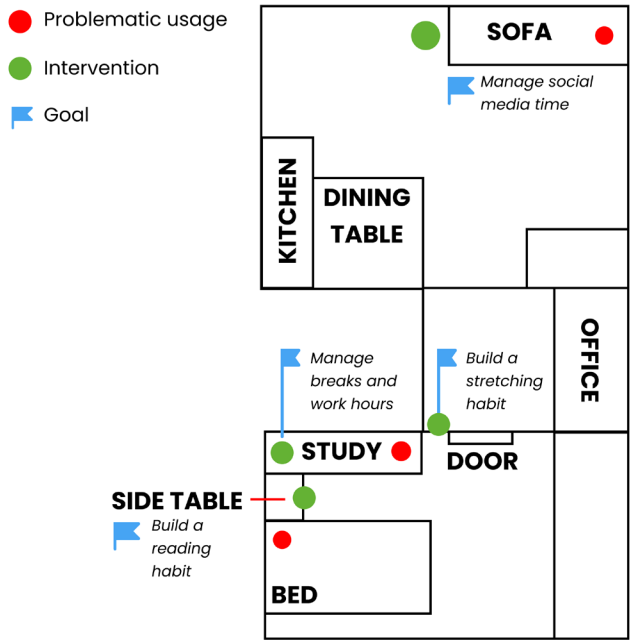
High Usage Zones were identified at the flat . These were based on the time 3 family members spent at different locations and would majorly involve activities such as social media, online shopping, watching shows and chatting. Since the Sofa was a common point, a 'No Phone Zone' was created that required timed usage of 10 minutes which required an alarm to be set when the user decides to use the location. For other locations, the user's routine timings were considered. (Refer Flat Layout- Right)

Key takeaways

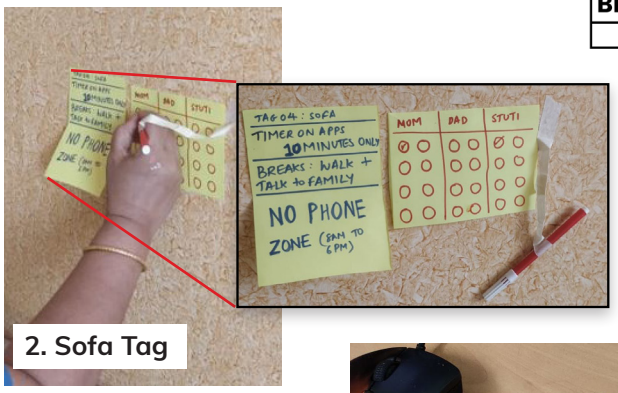
1. The Tags acted as constant reminders to follow a routine in terms of time spent working at the study table, taking breaks, limiting phone use. But they were also high effort given the participant had to manually do it and were often ignored
2. There is a strong association between the space and phone usage for all members in the family due to availability of privacy and time. Participants tried to follow the timer rule but felt 10 minutes for a break was too little. This frustration was expected as it adds friction in device use but diminishes autonomy that can lead to a negative experience
3. The 'Sofa Tag' (Image 2) acted as a prompt for family members to voluntarily keep their phone aside as someone would point at the Post-it reminding others.
4. No participant diligently followed the rules and would only decide to limit use once in a while depending on when they felt like it or when another person intervened. For eg, The 'Bedroom Tag' (Image 1) displayed the user's desired routine which made others intervene when a rule was not being followed.



Circles tally number of times the rule of 'Stretching' was followed when entering the room



Flat Layout



A tally of how many times the participant set a timer and successfully follow it when using their smart-phone at the sofa

Circles tally number of work sessions completed with breaks every 30 minutes during a time slot

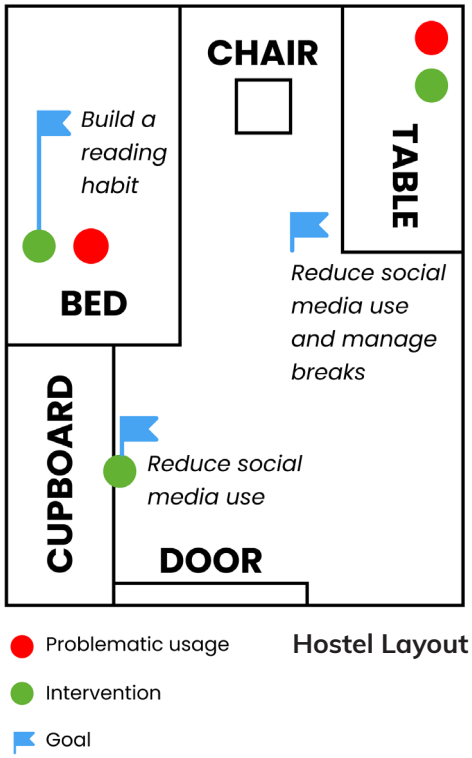
11b. **Pilot Experiment 02**

This experiment aimed to understand the effect of the location based solution on a student at the IITB hostel. They had an average screen time of more than 3 hours daily and claimed to get distracted very often by their phone, Whatsapp and Instagram taking the most time on their smartphone and Laptop.

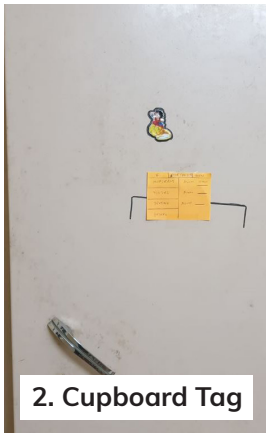
Since the space was limited, 3 main locations were identified to introduce the intervention Tags (Hostel Layout). The participant wished to better manage their routine is terms of improving productivity and also getting back to reading. Given that, the post-its and the 3 locations included rules around waking up, work mode, after work mode, short breaks, long breaks and bedtime mode. The participant was expected to follow the rules on the notes based on what they were doing at a particular location. For eg, After waking up, they could use social media apps near the cupboard for a specific amount of time and while working they followed 25 mins of work and 5 minute break cycles.

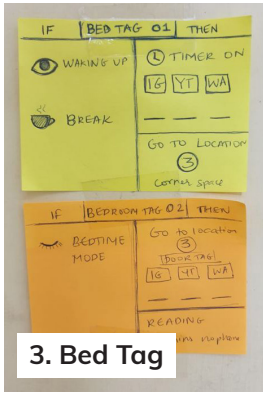
Key takeaways:

1. While Pilot experiment 01 made use of time slots, here we explored routine in a more flexible manner. Instead of specifying 8-10AM as waking hours, this was made flexible by walking it 'Waking up' since following the rules based on the context of what they are doing made more sense than time.
2. On the first day the user tried to follow the rules and claimed to reduce time wasted on their devices and invested that time in reading
3. The initial discussion and logging activities improved awareness for the period of the experiment
4. Self-regulation is high dependent on the user's will to make the change when they deem necessary




1. Table Tag


2. Cupboard Tag



3. Bed Tag

	Time	Activity	Duration	Phone used	No.of times	SM use	Remarks
2	9:00 AM	Wake up, morning routine, breakfast	45 mins	Yes	3	10 mins	
3	9:45 AM	First pomodoro work set	30 mins	No	0	0 mins	
4	10:15 AM	Break - reading	30 mins	No	0	0 mins	Not really frustrating at this point. The reporting is actually making me stick to the schedule. It is probably the lack of structure in my regular routine that leads me to spend hours on the phone
5	11:00 AM	Second pomodoro work set	45 mins	Yes	1	0 mins	Felt bored in the middle when there was a bit of a lull in work. Automatic reflex was to reach for the phone and check notifications. Remembered I wasn't supposed to use it and closed it and kept it aside though. Find myself repeatedly opening whatsapp on the laptop. Some relevant work messages have been sent and received, but I end up clicking on the icon because it's very convenient, almost every two minutes.
6	11:45 AM	Break - reading	30 mins				

4. User log using customized tags simulated with post it

11c. **Experiment refinement**

Based on the pilot runs, the following changes were incorporated:

1. Bucket rule design based on location, activities for productivity, leisure (free time), breaks and routine activities to make it easier to design rules
2. Associate rules with routines and activities instead of time slots to improve flexibility and make it easy to follow the rules
3. Ask the user to suggest limits and goals that they believe they can follow
4. Incorporate new habits to build around the space
5. Improve legibility of visual cues
6. Tally marks were provided despite irregularity so that participants are nudged to perform a rule based on their performance history
7. Adding friction by suggesting an alternate space should be feasible for the user. Rules that are too strict, deviate from their regular interaction with the space may be tough to follow.
8. Logging was tedious for the user and therefore voice-notes were requested over Whatsapp

Artefacts: For the experiment, cards were designed with tally marks which were printed and placed at their respective locations

Procedure

Pre-intervention: Similar to the pilots, introductory interviews were conducted and the rules were co-designed with the participant. Another round of changes were made for holidays as routines and needs change.

During-intervention: The participants would tally the rules that they followed over the days and check the circles at the bottom when they follow the rule. Google calender reminders were automated for certain rules such as journaling, sending their self-report voice notes and perform night time routines

Data collection:

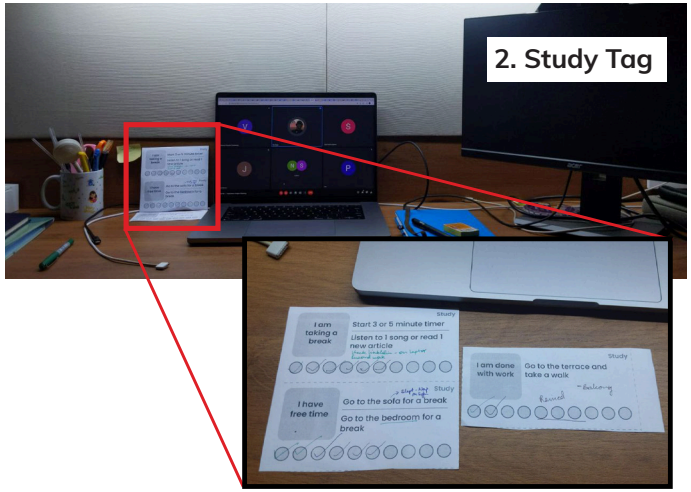
The participants were requested to share daily voice notes over Whatsapp and prompted at 9PM everyday around the following prompts

1. Describe your day using the following 4 time slots:
    a. From when you woke up to when you had breakfast
    b. From breakfast to lunch
    c. Lunch to Dinner
    d. Post dinner to before sleeping

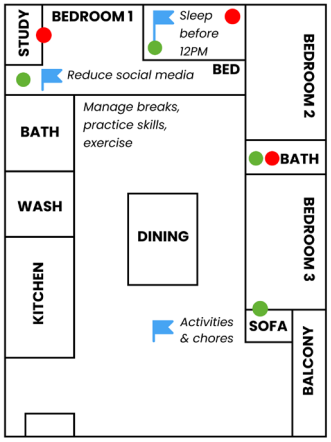
2. Answer these 5 questions for each of the above time slot:
    a. Which location were you at and what were you doing there?
    b. When did you notice the rule?
    c. What rule did you follow or not follow?
    d. Why did you decide to follow the rule or not?
    e. And how did it make you feel?

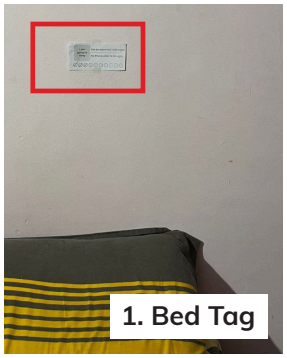
11d. **Move Around experiments 03 & 04**

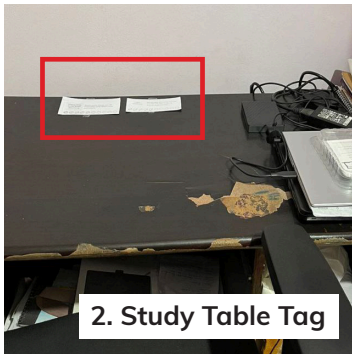
A set of 2 experiments were run parallelly with two participants after the pilots: **Experiment 03: P04** lived in a bungalow with her parents in Bhubneshwar, Orissa. She worked remotely at home at her corporate job and attended online Yoga classes as well. Due to an online routine, she desired better management of her time and identified her phone usage late in the night as a problem and as a distraction that led to a sedentary lifestyle. In order to manage the work from home environment we decided to confine her work to the office space and all breaks to be taken at alternative locations. We placed books at the break zones and promoted walking on the terrace after work to limit social media use.



Experiment 03: P05 lived in a flat with her brother and their family. She had her own room and worked in a hybrid mode for her full time job. She too struggled with setting boundaries to work and break spaces. Night time routines lacked structure and discipline leading to waking up late, delaying chores and leaving less time to work on goals such as exercising, practicing hobbies. up-skilling etc. She felt her post-work routine, 7PM to 2AM was spent on social media and entertainment which was not fulfilling everyday. To manage her evening routine, we set tags around her bedroom as primary location that did not interfere with other people in the house







P ID	Location	Goal	Rules		Follow frequency
			IF condition	THEN Action/outcome	
P04	**Study (Office)**	Reduce long breaks that waste time during work	I am taking a break	Start 3 or 5 minute timer, Listen to 1 song or read 1 news article	**High**
		Build a habit of walking	I am done with work	Go to the terrace and take a walk	**Moderate**
		Manage break times	I have free time	Go to the sofa for a break, Go to the bedroom for a break	**High**
	Bedroom *(weekday)*	Improve sleep cycle	I am going to sleep in a while	Set an alarm for 11PM, Keep phone away at 11PM	**Low**
	Weekday + Weekend	Off-screen and timed breaks when possible	I have free time	Read a 5-10 pages of a book here OR Do a 2 minute walk/ stretch OR set a 10 minute timer on apps	**Moderate**
	Weekday + Weekend	Avoid binge watching	I am watching something	Limit to 1 episode/1 movie and then go to the living room,	**High**
	Weekend	Pursue hobbies	I have some free time	Try something crafty for 30 minutes to 1 hour	**Low**
	Weekend	Build a habit of walking	I have some time	Go to the terrace for a walk	**Moderate**
	Bathroom	Break the habit	I am saving time	Do not take my phone inside	**High**
	Sofa (Hall)	Manage breaks	I am taking a break	Pick up a book and read 3 pages	**Moderate**
		Avoid binging shows	I have free time	Start your timer for 10 minutes before launching any app	**Moderate**
	Dining area	Spend off-screen time	I am having a meal	Listen to an educational podcast for your meal time	**Low**
	Terrace	Meet a goal of 5000-10000 steps everyday	I have completed 5000 steps	Could go to the bedroom or sofa to take a break	**Moderate**
P05	**Study table**	Manage distractions	I am working	Go to the balcony to use social media or for a break with family	**Low**
	Bathroom	Break the habit	I am saving time	Do not use the phone in the bathroom	**High**
	Bedroom	Improve routine	I have some free time	Exercise for 20-30 minutes	**Low**
		Build skills	I have free time after dancing	Start your timer for 15 minutes and learn the software	**Moderate**
	Bed	Improve sleep cycle	I am going to sleep	Set an alarm for 12:00 night and No phone after midnight	**High**
	Balcony	Manage break time	I am using social media for a break	Use the app for 5 minutes or listen to 1 song	**Low**

11e. **User Quotes**

Participant 04

1. I was taking official calls to take a break from the place I was in. I became more conscious about how long I spent at these spaces and the estimated time of these calls became more evident to me.
2. I was doing these things unconsciously- but not this often- I did take a break but I would sit in the study whereas now- I go to the sofa for any breaks
3. I timed my watch time on the weekend to 1 hour and it did not feel insufficient rather I felt in control
4. I started one thing at a time instead of being hard on myself- instead of making so many goals-I could make a few and achieve them. Introducing 1 activity and doing it is better than adding 4 or 5 new things to my routine and then feeling guilty about not doing them
5. I was taking this easy- things that were coming to me with intrinsic motivation is what I stuck to
6. Lack of isolated work spaces can be confusing, so this method is definitely working well for me for now
7. On days that I was very busy- I took mini breaks that did not require me to move away from that location like walking, drinking water, reading an article, checking emails, doing personal chores
8. If I felt like I needed a longer break I would put the timer for 20 minutes and follow that
9. I like designating the spaces for things I do through the day in my routine since that is set for me
10. I was struggling with the 'GUILT' factors. As I had agreed to meet these goals that were a part of my routine, it made me constantly feel like I should not be 'wasting' time but be 'productive'
11. I felt keeping this cap helped me a lot to avoid that binging thing and I ended up going to the living room and chat with the family after
12. I am trying to sleep sooner- 1hr to 30mins early
13. Not taking my phone to the bathroom is difficult but I have been following that as much as possible
14. I did not start reading at the bedroom, just the sofa for now because the bedroom is purely for chilling, netflix and stuff like that for me
15. The sofa is like a small pocket of breaks, bedroom for longer, balcony for chilling
16. If I had messages from work during my 10 minute chill at the sofa, I decided to answer them after the break only when I went back to the study

Participant 05

1. I know the rule of going to the balcony to use my phone but I did not follow it because it felt like too much effort for me. if it comes naturally, then I can go, but not without a motive
2. I can see the cards and therefore I am reminded to make the decision and now after some days I can realize the outcomes of following certain things or not
3. I really wanted to follow them but I just don't feel like doing anything
4. I got free time after office work because I felt I managed my time these few days in a better manner
5. Except for 1 day I had a call so I slept late and I could feel that sleeping early felt much better and I should have slept on time
6. When initially I felt guilty on the weekday, on the weekend I was okay not being productive or not following all the rules
7. I did not feel anything about not following the rules today and I did not want to exert myself
8. The rules are mostly around my study table and I keep them with me as the printed sheets so that I am reminded when I see them
9. I followed the rule of not using my phone before sleeping, I did not take the phone to the bathroom and I tried finishing 30 minute to 1 hour tasks without the phone. All of which were difficult but I tried
10. Some days after work I had time till 12AM to do other things but I did not, I just watched shows and scrolled through Instagram

11f. **Results and insights**

Find the link to results from the exit questionnaire Here

1. This design concept exploring the initial stages of location based interventions for digital wellbeing show some promise and can be further explored to create more robust and high-fidelity interventions
2. Users benefited from the initial digital wellbeing related discussions as it helped them reflect on their current usage patterns
3. Allowing users to define their own goals can improve accountability, flexibility and autonomy. Yet such self-identified rules may also be bypassed as a result of no real commitment contract being set and not external locus of motivation to change habits
4. Users did feel a better balance in their overall usage patterns on days they followed the rules although initially felt guilty about not following them. As a result, both users filtered out the 'Easy to do' rules and stuck to them over the course of 14 days. Therefore, we may help users start with easy habit changes and move onto larger goals with time
5. Additionally, since the experiments did not employ any sort of automation, a lot of responsibility was upon the user to be honest about timers, avoiding apps and following the rules. It could be helpful to understand the role NFC or micro-location based automations may provide.
6. More importantly, such a solution would work well for intrinsically motivated (P04) users who identify their usage as problematic and wish to change.
7. For users with low-self regulation, such a solution may induce negative emotions of guilt and demotivation without any real impact on their habits or wellbeing (P05)
8. Both users felt the solution had potential to impact their wellbeing positively and could be considered as a long-term routine improvement method
9. Scores from the questionnaire revealed above average positive scores for all questions suggesting that, for the 2 participants, usage patterns were influence to help improve subjective wellbeing.

Although this sample size is too small to make any conclusions, iterations of these experiments can provide more opportunity to move away from existing strategies towards more reflective, tangible and micro-location based interventions

11g. **Move Around- The Wellbeing Kit**

Based on the insights and observations, location based interventions could help users become more aware and conscious about the their usage. More importantly, helping users reflect on their habits and self-identify alterations could be an effective way at improving subjective wellbeing. Since the user can exercise autonomy and be flexible to improve digital habits, such a solution could be an initial step towards purely user initiated wellbeing interventions.

The final design is a Kit that takes users through the process of setting up location based cues to focus on wellbeing. The kit provides the physical cards, stickers, NFC Tags and steps to arrive at IF-THEN rules around their work location.

1. The booklet is designed to take users through the process of reflecting on their current usage, ways to alter habits and design the intervention by themselves
2. It shall contain NFC tags that can be written with their designed triggers
3. It shall contain cue cards that they can handwrite or use a sticker sheet with pre-designed conditions and prompts for their wellbeing rules

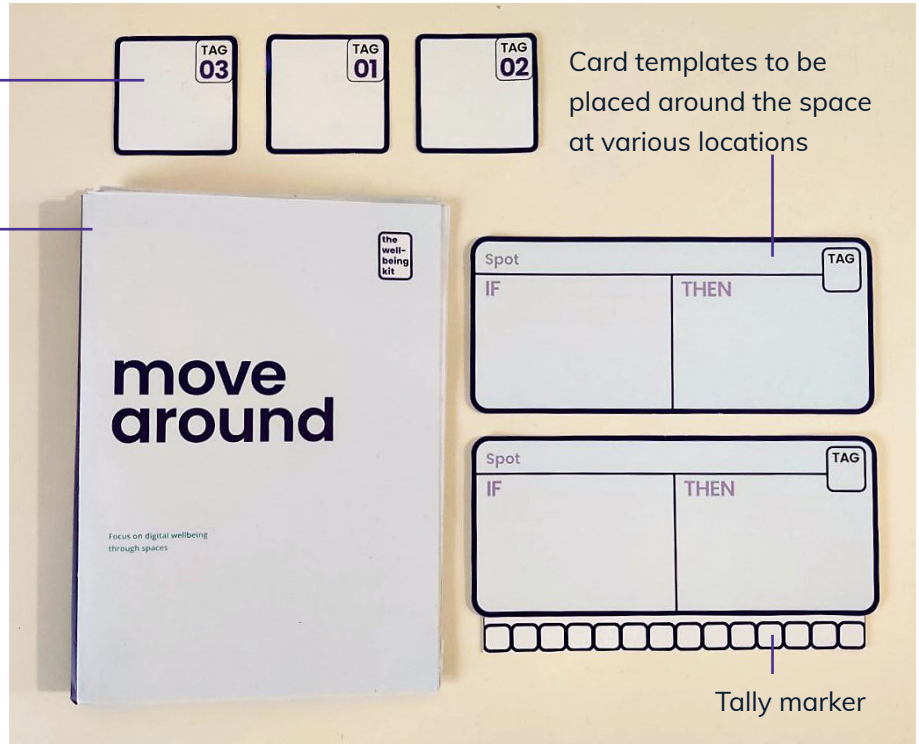
The design is proposed as a support kit for people Working at home. Users could receive the kit from their employers when they are on-boarded with new devices and company accessories with the aim to focus on employee wellbeing.

The explainer video for the Move Around Design Concept cn be found **Watch**

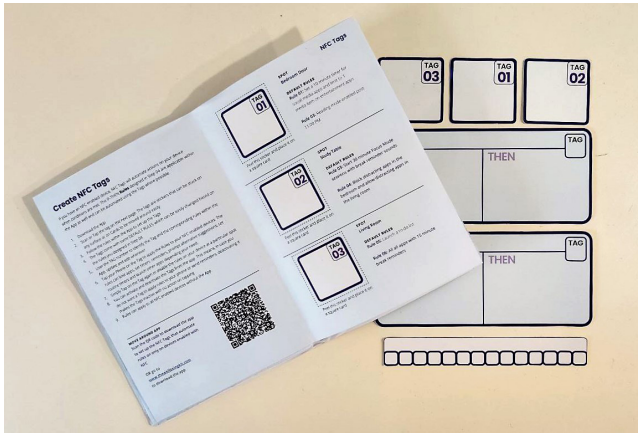
Next, to complete the kit, a set of high-fidelity screens were created as a clickable Figma prototype and can be found here **Go to prototype**

Go to Booklet

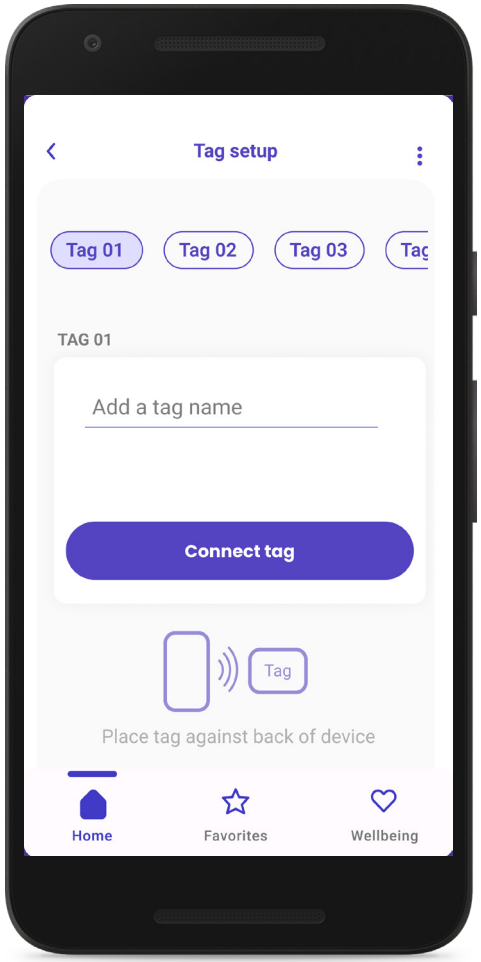
NFC tags to be placed around the space to automate smartphone features, reminders and rules to support digital wellbeing with the help of the set-up App



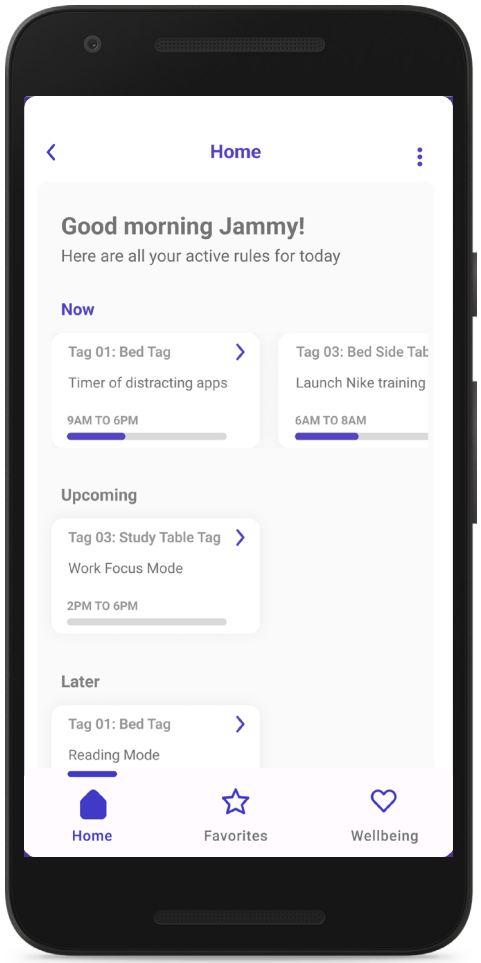
The Wellbeing Kit- Move Around Instructional booklet with Cards, Stickers, NFC Tags and App link



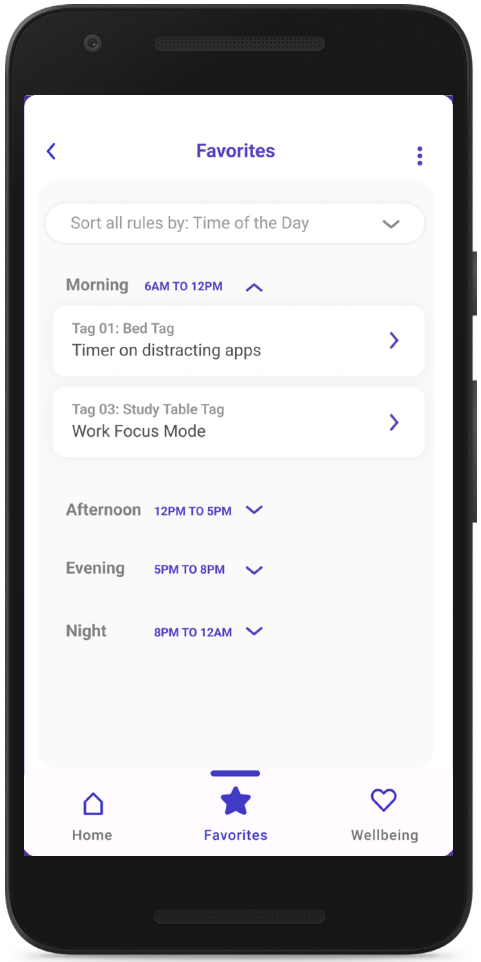
11h. **Move Around SetUp App**



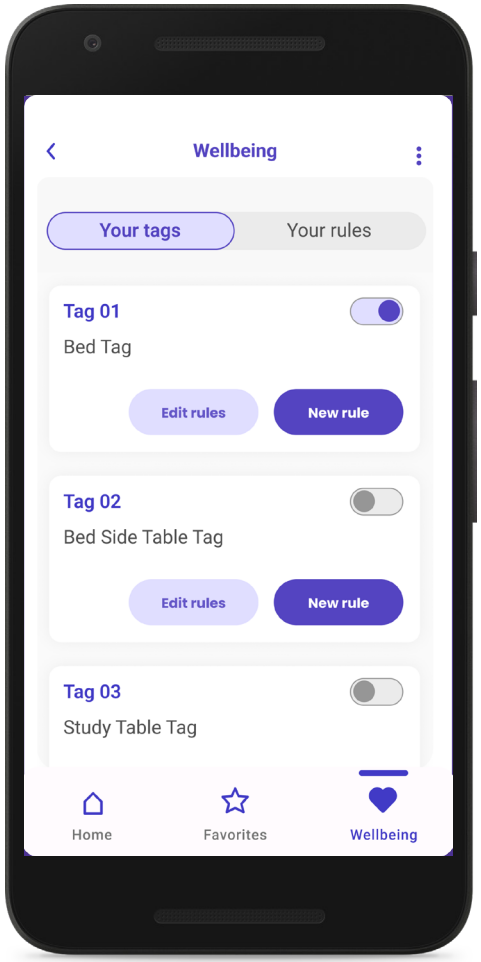
Connect NFC Tags to write rules to trigger actions



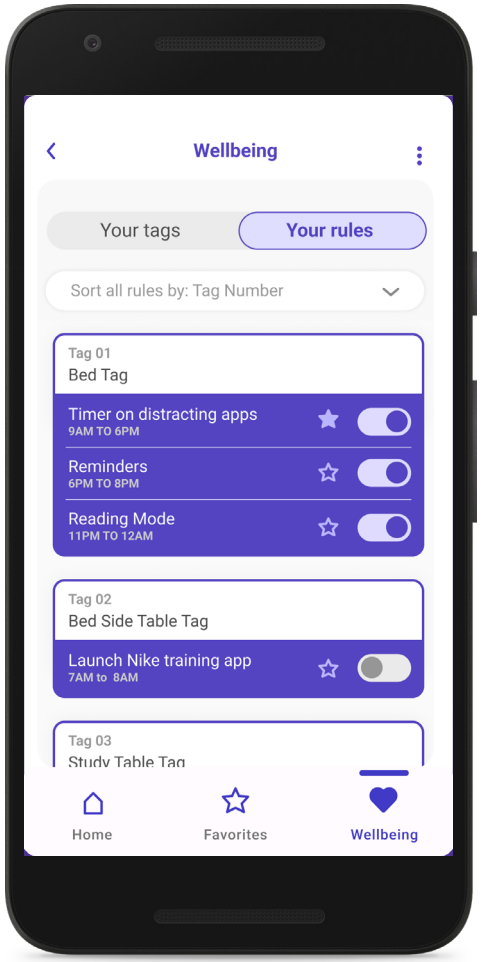
List of all connected tags and options to add or edit rules



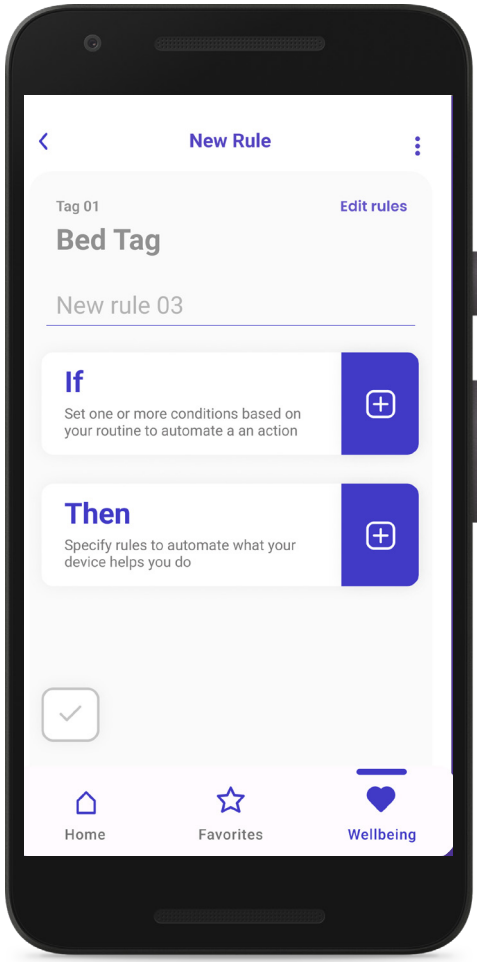
List of favorite rules based on time of the day



List of all connected tags and options to add or edit rules



User can choose to enable and disable from all the designed rules



User can design rules using the IF-THEN logic

12 PayUp Evaluation

A set of 2 experiments were conducted with 2 groups. For Group 3A, the experiment was conducted for 3 days.

Procedure:

1. Recruited participants joined a Whatsapp group where the steps for the experiment were shared every morning 10AM and Evening 8PM.
2. Goal time for group 3A was the number of minutes they would spend on distracting apps where the goal must be 20-50% lower than the average hours from the previous 2 weeks on the app which was calculated by collecting 2 week data from Android and iOS screen time dashboards for each participant
3. Participants set a target number of hours they wanted to reduce for distracting apps they identify (eg. YouTube, Instagram, InShorts, Games etc. for a particular day on the night before, since the inbuilt screen time trackers start at 12AM and record for a period of 24 hours.
4. A checkpoint reminder message is sent on the Whatsapp group at 6PM to check their screen time
5. The final screen-time on the app is shared the next day morning on the Whatsapp group when the participants wake up
6. Transaction amounts are calculated and results were shared once all screen time screenshots have been received

Observations

1. Calculating based on the entire screen-time versus app based would actually help reduce screen time since participants looked for alternate apps to continue tasks which did not have an effect on overall screen-time
2. The goal should be realistic as participants with high usage struggled to stay within the limit and felt demotivated by loses

Participant screen-time

P- ID	Average screen-time	Distracting apps avg time
P06	292 mins	Instagram and Hoststar (120+ mins)
P07	400 mins	Instagram (80+ mins)
P08	238 mins	Instagram (60+ mins)
P09	389 mins	Instagram (120+ mins)

3 Day experiment challenge results

Day	P-ID	Goal time	Pitch ₹	Time spent	Pass/ fail	Return ₹	Reduction in app use
Friday	P06	30 mins	15	0 mins	Pass	25	Yes
	P07	30 mins	15	18 mins	Pass	25	Yes
	P08	30 mins	15	13 mins	Pass	25	Yes
	P09	60 mins	30	94 mins	Fail	-17	Yes
Saturday	P06	30 mins	15	0 mins	Pass	31	Yes
	P07	30 mins	15	21 mins	Pass	31	Yes
	P08	30 mins	15	0 mins	Pass	31	Yes
	P09	60 mins	47	96 mins	Fail	-18	Yes
Sunday	P06	30 mins	15	23 mins	Pass	55	Yes
	P07	30 mins	15	21 mins	Pass	55	Yes
	P08	30 mins	15	31 mins	Fail	-1	Yes
	P09	60 mins	65	63 mins	Fail	0	Yes

12a. **Experiement Iteration 02**

The next experiment with Group 3B was conducted for 4 days. We decided to set an overall screen time reduction goal which was set by the participant and depending on that, a pitch amount was collected.

Group 3B

Procedure:

1. Recruited participants joined a Whatsapp group where the steps for the experiment were shared every morning 10AM and Evening 8PM.
2. Goal time for group 3B was the number of minutes they would spend on their smartphone. The goal must be 20-50% lower than the average hours from the previous 2 weeks which was calculated by collecting 2 week data from Android and iOS screen time dashboards for each participant
3. Participants set a target number of hours they wanted to reduce for a particular day on the night before, since the inbuilt screen time trackers start at 12AM and record for a period of 24 hours.
4. A checkpoint reminder message is sent on the Whatsapp group at 6PM to check their screen time
5. The final screen-time is shared the next day morning on the Whatsapp group when the participants wake up
6. Transaction amounts are calculated and results were shared once all screen time screenshots have been received
7. The goal for the next day is confirmed by 10PM n the night to accommodate changes to their routines

Observations

1. Participants preferred calculating overall screen-time compared to app based screen-time to really help with overuse
2. Evenings were when participants were free and when it was the most challenging since free-time would demand phone use for leisure
3. Participants rationed their usage when possible to have more time at night
4. Current Android trackers also calculated Phone calls which was unfair
5. Small deviations from the goal time let users feeling defeated

Participant screen-time

P-ID	Average screen-time	Distracting apps
P10	450+ mins	Safari, Gaming, Reddit, YouTube
P11	300+ mins	Instagram, YouTube
P12	300+ mins	Instagram, Whatsapp

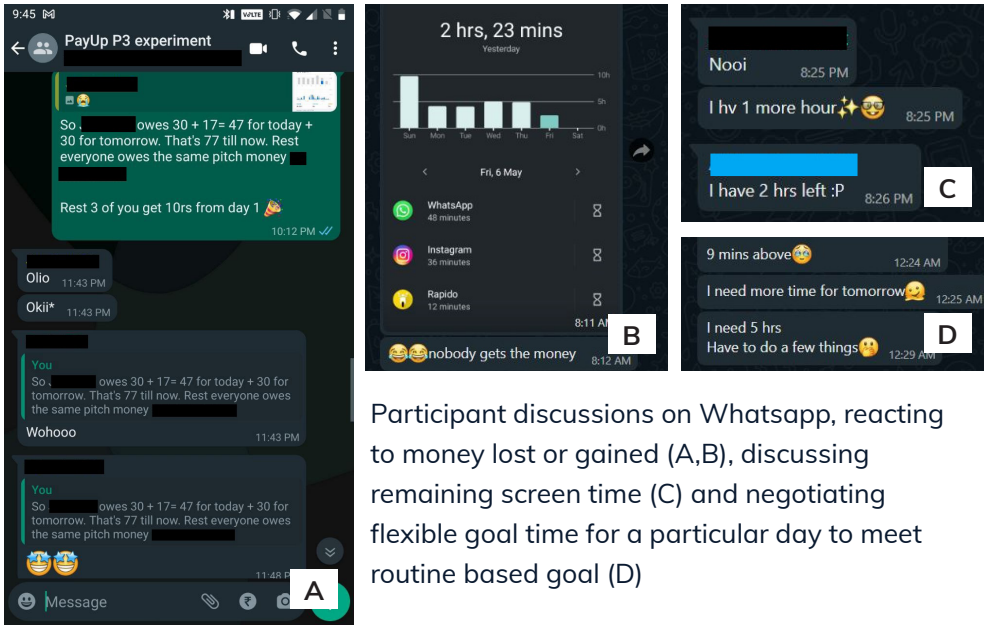
4 Day experiment challenge results

Day	P-ID	Goal time	Pitch ₹	Time spent	Pass/ fail	Return ₹	Reduction in screentime
Friday	P10	300 mins	20	248 mins	Pass	20	Yes
	P11	180 mins	20	162 mins	Pass	20	Yes
	P12	180 mins	20	143 mins	Pass	20	Yes
Saturday	P10	300 mins	20	248 mins	Pass	60	Yes
	P11	180 mins	20	253 mins	Fail	0	Yes
	P12	180 mins	20	189 mins	Fail	0	Yes
Sunday	P10	300 mins	20	347 mins	Fail	0	Yes
	P11	180 mins	56.5	294 mins	Fail	0	Yes
	P12	300 mins	24.5	251 mins	Pass	101	Yes
App wise limits							
Monday	P10	120 mins (2 apps)	20	74 mins	Fail (1 app)	-27	Yes
	P11	60 mins	20	67 mins	Fail	-23	Yes
	P12	60 mins	20	21 mins	Pass	70	Yes

12b. **User Quotes**

Participants were asked to share voice notes or texts at the end of each day with the following questions sent as prompts around routine, strategies to manage screen time and overall experience during the daily challenge. Below are a few user quotes:

1. It was not too easy to avoid Instagram, I checked my screen time 3-4 times to ration how could use it
2. Since money was involved- I felt anxious about it as I don't want to lose the money
3. I feel I have achieved my goal because it is just 2-3 minutes extra so I felt demotivated when I lost all my money that day.
4. With strangers I will probably be stricter with myself since my money would go to them, if my money goes to my friends I am okay I guess
5. I was not infinitely scrolling on social media, I was more mindful of the time I was spending on phone
6. Helped me catch up on previous work, made a conscious effort of trying out new apps. Wasted less time on trivial applications like Reddit and Random Websearch on Safari.
7. Made a conscious effort to reduce the screen time. Tried to manage it somehow that i have atleast 2hrs left at the night, usually the time when I have no productive work left to do. Hence, managed my time properly and worked during the day!
8. This experiment made me realize that I used random applications for prolonged times. It made me conscious about using my phone for lesser durations
9. This experiment has been an eye opener in terms of how much time is actually wasted on an average day which is spent just watching the screen.
10. Definitely feeling a bit guilty about my current use. I wondered why I could not sleep 30 mins earlier the previous day by simply keeping my phone away
11. This set up may feel a bit restrictive. Maybe its because I am working from home/ staying at home have nothing else to do at the time being, specially post dinner.
12. I felt this monetary thing made me more serious with the experiment. I had something to lose, if I didn't paid attention to my screen time
13. Today I know I have to spend less than 4 hours a day; but there will be a time when I'll be desperate for mobile usage that all the previous effort will go in vain.



Participant discussions on Whatsapp, reacting to money lost or gained (A,B), discussing remaining screen time (C) and negotiating flexible goal time for a particular day to meet routine based goal (D)

12c. **Results and insights**

Find the link to results from the exit questionnaire Here

The primary goal of this intervention was to help users reduce their screen-time using financial rewards and punishments among a group of friends or colleagues. Given this context, we were able to reduce overall app and smartphone screen-time for all participants for the period of the challenge

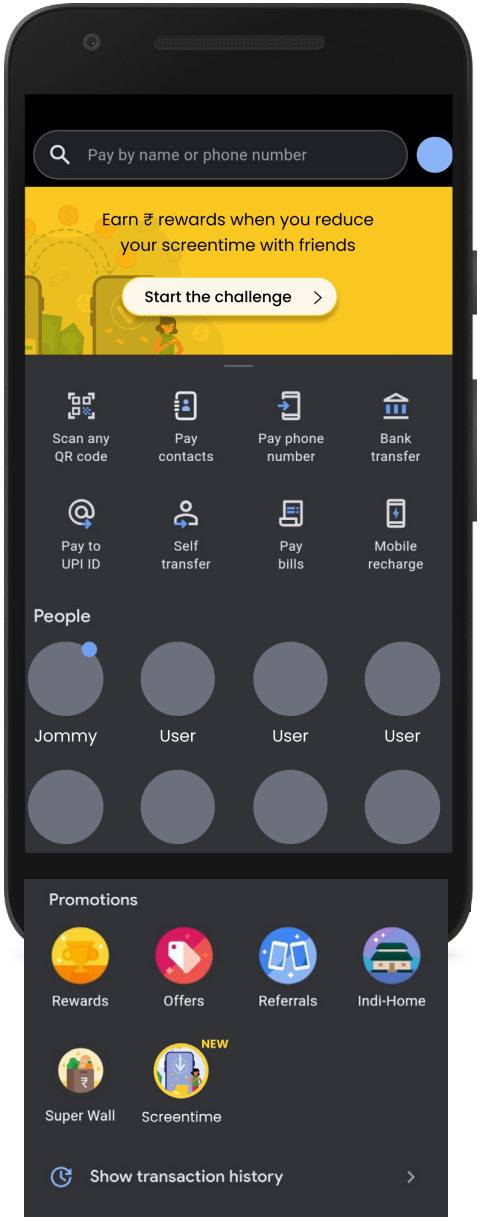
1. Users found the financial penalty of 20 to 50 paisa per minute sufficient. Too high a penalty would have deterred users from even attempting the challenge. Although further assessment may reveal different levels of accountability for the pitch amount (too low or too high)
2. Users felt that such strict restrictions on regular days may not be that necessary. Rather, groups of friends may decide to opt for such a challenge during deadlines, classes, exams or other times.
3. For group 3B, participation was voluntary for Day 4, yet all three participants saw value to continue the challenge with slightly more relaxed goals. This can be an effective means to help users gradually and regularly manage their time online.
4. As social comparison, users with high usage would think about how others were winning money. Making them reflect on their use and set realistic goals to atleast meet a gradual reduction of 20 to 50 percent time
5. Users perferred phone level screen time reduction over app level. This was because, app level limits could be bypassed by doing the same activity on an alternate app for example, moving regular Instargram chatting to Telegram of Whatsapp. There may be a reduction in app screen time but net usage stays the same.
6. Users felt that awareness of the trackers played an important role and may be an initial effect that motivated them to reduce screen time
7. Overall, the major highlight was that users do think they would participate regularly. This was an intended reaction given the challenge needs to be initiated and there has to be a specific motivating factor for people to join.
8. Users did feel a sense of accomplishment and more positive about their usage for the period of the experiment and believed that such a solution would be useful to manage distractions

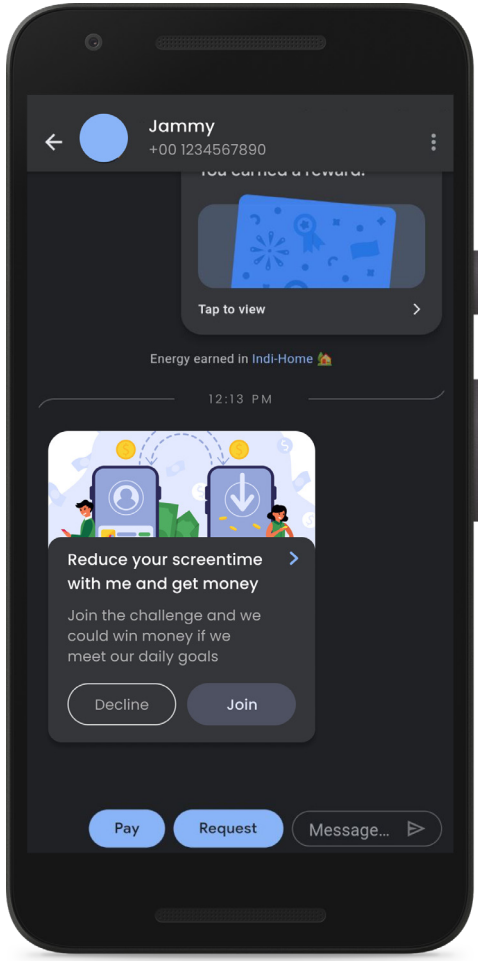
12d. **Final Design**

Based on the insights and observations from the experiment, a GooglePay feature was proposed that builds upon the strategy of financial incentives to manage screen time. The key features include:

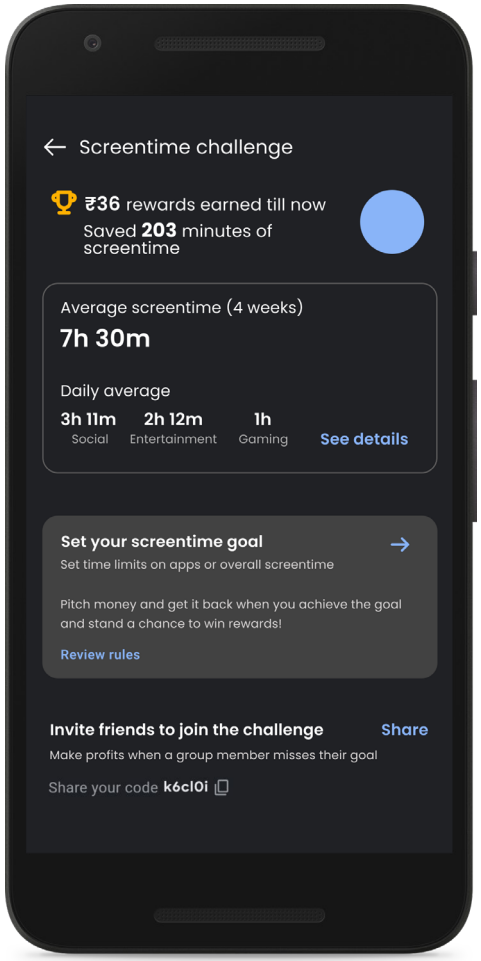
1. Group Challenges: Groups of friends could set goals and pitch their money as users were comfortable among friends when it came to money.
2. Screen time awareness: Since many users had not actively used screen time trackers, this could be a way to boost awareness and get users with screen-time reduction based on their usage history
3. Setting Goal Time: The option for setting the goal time was provided based on overall screentime or app usage time and the pitch amount would be calculated accordingly
4. Final transactions are done over Gpay itself and automated

Link to the clickable Figma prototype can be found [Go to prototype]

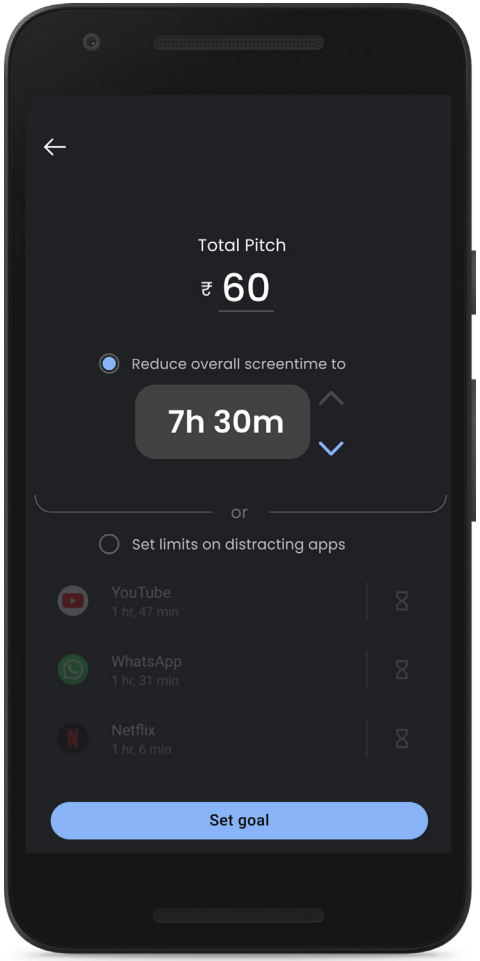




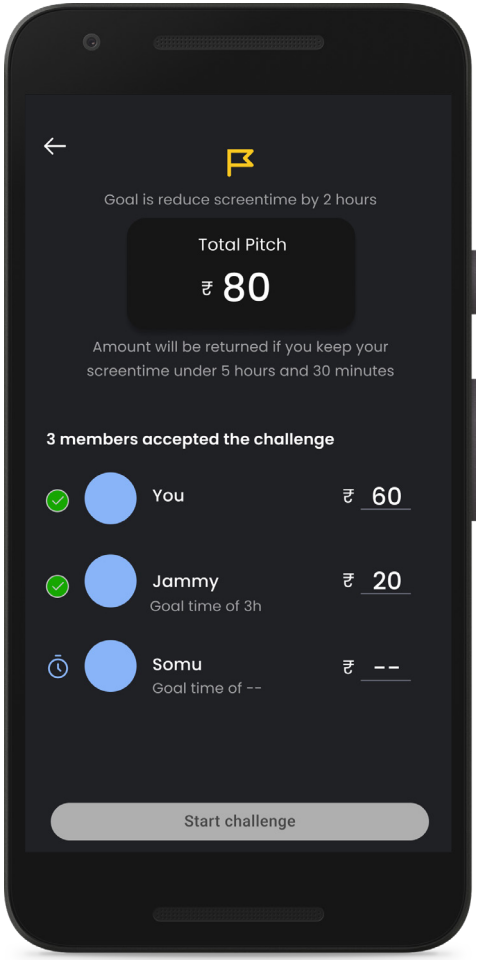
Start a challenge and invite friends to join on Google Pay during times such as exams, deadline or trips



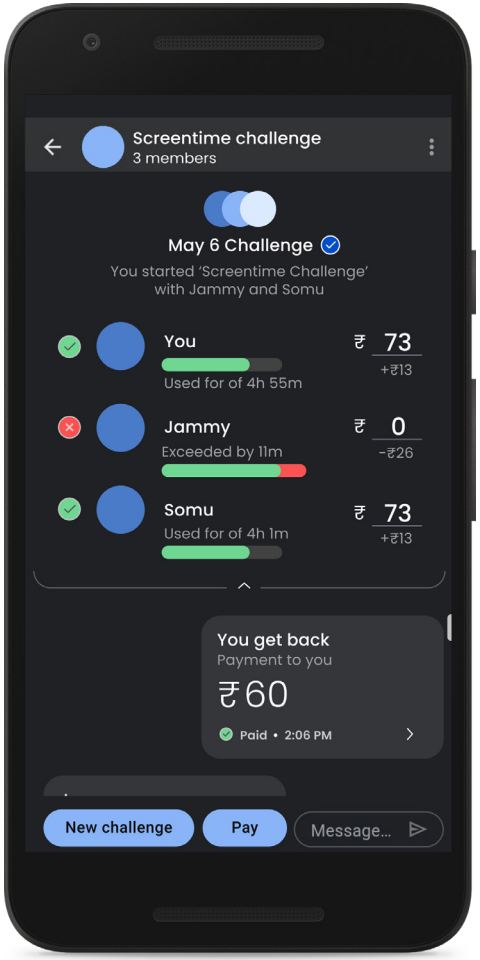
Screen-time data showcased, option to set goal and invite friends



Set an amount, overall screen time or app based limit. This was done to customize each person's goal as user's use their devices differently in varying contexts



Invited friends can set up their goal for the next day and a cumulative Pitch amount is set aside with real money



End of a 24 hour period, the final transaction occurs automatically from the Pitch amount and requests for penalties are requested from losers on behalf of the winners

13 Conclusion

As a part of this project, we aimed to explore digital wellbeing strategies to boost user's subjective wellbeing by influencing problematic smartphone usage habits. As a process, existing literature and the Habit Alteration Model revealed various strategies that may be used to help users alter their usage habits that affect their physical and mental health. Using those strategies, a number of ideas spanning across various categories of design interventions were presented out of which we aimed to focus on concepts that displayed novelty in terms of their approach.

The three design concepts presented in thsi report, namely, 'Creative Kits', 'Move Around' and 'PayUp', employ unique strategies to help users manage their smartphone usage. In order to validate these approaches, experiments were conducted that simulated the design concepts with a small number of participants. Initial understanding helped generate insights that informed further design iterations to propose possible products and features. Given the breadth of the work done, further experiments may be conducted with more participants to develop a deeper understanding of the benefits of the strategies adopted, namely, redirecting users to alternatives, scaffolding new habits, adding components to the environment, and revaluing outcomes through rewards and punishments.

While it may seem that a 'screen' was used to solve the problems related to screens, I personally believe that digital wellbeing may not always about simply abstaining for digital devices, rather, to use them more meaningfully. All the three solutions make use of screens in the form of apps, and these decisions were made to improve access to such tools and make the smartphone as a point of reflection-in -action itself.

14 Limitations

The current project has attempted to explore the breadth of digital wellbeing strategies and approaches. Given the large body of existing work done in the space, seeking novelty has been challenging. Within the given timeline, limitations of my personal skills, I believe further depth can help bolster the approaches proposed in this report.

I also acknowledge that certain under-explored approaches such as social support techniques could have been utilized to bring about more novel explorations. Given the limits of my current understanding, I believe, more interactive and social approaches may better aid behavior change. This project has not delved into behaviour change taxonomies or theories, rather, it aimed to demonstrate the use of literature suggested strategies in digital wellbeing.

The experiments are initial iterations into how such strategies may be evaluated with low-fidelity prototypes and set-ups to gain insight before developing products and features. Since the number of participants were few, it was difficult to form any specific patterns or come to any conclusions to pass off any of the three design intervention as successful enough to lead to behavior change. For this purpose, a longitudinal study would be ideal and helpful to really validate the effectiveness of the proposed concepts.

15 Future work

Future work may first make an attempt to develop a validated understanding of usage patterns within micro-locations. Second, NFC and IOT based products have been gaining attention over the years and hence developing such solutions that support technological wellbeing are relevant areas for further design interventions. Finally, an experiment based approach may help develop a deeper understanding of what could work to tackle digital addictive behaviors. We recommend utilizing other identified strategies within the project and building upon the ideas of expressive bio-signals, scaffolding new habits, altering contexts and cues, employing social support and other such explorations. Additionally, the project aims to highlight the need for more autonomy-supportive digital wellbeing initiatives that move away from the current DSCTs that feel restrictive.

16 Reflection

During the pandemic, feelings of loneliness and boredom made me seek comfort in spending my time online. It was evident that my peers felt the same loss of control and general dissatisfaction which began to resolve as restrictions lifted. The struggle with negative feelings of guilt and frustration made me always want to explore the area of digital wellbeing. My very first academic exercise at IDC was a poster on Aza Raskin and the 'Center for Humane Technology' as I have been interested in the effects and ethics of technology and design. I hoped to walk the talk and take on the project to see what opportunities for design open up. Given the work done in the field, it was throughly challenging to bring in novelty. But as I progressed, I was able to shift my focus from limiting screen-time to subjective wellbeing where we work 'with' technology and not 'against it' to make our experiences more positive and empowering.

As a designer, I aimed to also explore my personal design processes at IDC and I believe that I have tried to go beyond my original ways of working in my P2 (Practice theory and Communities of Practice in Service Design) and P3. While I may have fumbled and not yielded the desired result or worked in an optimum manner at all timed, I continue to build my understanding and practice as a designer. The experience of taking on a research project (DRS) within this domain definitely helped me take my initial steps. I have tried to overcome my fears towards evaluation processes, research methods and user interviews, all vital to the design process. At IDC I intended to learn from the diverse projects done by my peers, be it in terms of presentation styles, reports, process, nature of work or communication skills, there is always a new skill that the other reveals I could further build.