



whisper

sort through the noise,
focus on what matters.

Final Report

CS147 Autumn 2022

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Introduction

Adults with Attention Deficit Hyperactivity Disorder (ADHD) are under-equipped with the tools they need to reach their potential in their work and personal relationships.¹ Many adults with ADHD face difficulty accurately assessing the time required to perform tasks.² Improper time estimation can make it particularly difficult for adults with ADHD to organize tasks, meet deadlines, and avoid stress.

We built **Whisper, a task management tool designed for ADHD**. Whisper is a mobile application that helps users track their tasks, organize them into manageable chunks, and more accurately assess the time they need to complete their goals in a gentle and encouraging atmosphere.

Value Proposition

Whisper is a task management assistant designed for ADHD.

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¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4195639/>

² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6556068/>



Problem and Solution Overview

Through research and need-finding interviews, our team found that adults with ADHD often struggle with estimating the time needed for completing tasks. Whisper is an app designed for people with ADHD to manage tasks and improve time estimation through mindful goal-setting and personalized insights.

To arrive at this solution, we underwent need-finding and testing processes to identify user needs and develop a solution to appropriately address them. We invite you to learn more about our process to Whisper below!

Needfinding

Interviews

In our initial interviews, we hoped to understand **the unmet needs of adults with ADHD**. For participants, we sought adults who had been previously diagnosed with ADHD and felt that ADHD impacted their day-to-day lives.

We were initially interested in exploring the effects of ADHD in a variety of contexts, including relationships, work, and family. We targeted users with a broad range of experiences, prioritizing demographic diversity (age, gender, race) and diversity in life experience. We also aimed to speak with participants with an eagerness to learn and adopt new ways of managing the condition.

To recruit participants, we tapped into our own social networks, using referrals to find individuals comfortable with in-depth details, and traveled to multiple college campuses to attract large, diverse groups of young adults interested in speaking about their experience with ADHD.

Ultimately, **we spoke with 6 individuals about their experiences with ADHD**. Our initial set of interview questions focused on four primary areas of interest: discovery



and diagnosis of ADHD, management of ADHD, the impact of ADHD on their lives, and the communities around ADHD. A sample of our guiding questions is below:

- Can you walk me through how you discovered you had ADHD?
- Can you describe the process of getting diagnosed or medicated?
- Can you describe the tactics you use to manage your ADHD?
- Describe a time when ADHD has affected your personal life.
- Describe a time when ADHD has affected your work.
- Describe the community or support that you have around ADHD.

Synthesis

We synthesized these interviews with empathy-focused design techniques, including empathy maps, personas, and extreme user analysis. For each interview, we transcribed the interview and produced an empathy map. During transcription and analysis, we learned that ADHD affects individuals' sense of community and belonging, self-esteem, achievement, and productivity. We also saw the following key themes emerge from our interviews:

- For many of our interviewees, **the disorganization and hectic nature of life with ADHD made it more difficult for them to maintain consistent communication with friends and loved ones.** From our interview with Arushi, we also learned that the stigma around mental health and conditions could further alienate individuals from their support systems, especially family members.
- We also learned that **many participants struggled with completing important tasks.** This inability to follow through on their obligations led to feelings of self-doubt and diminished self-worth and trust. This also made it difficult for individuals to stay motivated or set goals for the future.
- We gathered that even when individuals are “high-functioning” and have a sufficient sense of community and self-worth, they often struggle to engage productively with their work due to manifestations of their ADHD, such as



impaired executive function or time blindness. **Their difficulty with managing tasks impacted their personal life, making it difficult to maintain a work-life balance and engage meaningfully in personal relationships.**

POVs & Experience Prototypes

In the next stage of the design process, we continued to uncover deeper insights and brainstorm future solutions using Point-of-View (POV) and How-Might-We (HMW) statements. We synthesized the results from three of our interviews into POV statements. For each POV statement, we brainstormed 10-15 How-Might-We (HMW) statements.

Point-of-View (POV) Statements

The three POV statements and a sample of their respective HMW statements are below.

POV 1: Kaitlyn, the Organization Addict

We met: Kaitlyn, a 22-year-old college student majoring in American Studies, who was diagnosed with ADHD during her freshman year of high school.

We were amazed to realize that: Despite struggling with executive function in the past, especially pre-diagnosis, she now considers herself “addicted to being organized”.

We wonder: If, in addition to helping her complete her tasks, being well-organized gives her a sense of accomplishment.

It would be game-changing to: Maximize the sense of accomplishment derived from working towards one’s goals.

From this POV, we generated the following How Might We statements:

- **HMW** create a positive cycle of task accomplishment and emotional satisfaction?



- **HMW** create communities that encourage each other based on task accomplishments?
- **HMW** customize rewards based on different motivations?

POV 2: Logan, the Frustrated Student

We met: Logan, a 23-year-old college student studying CS and Education who currently uses and has previously tried many apps to manage his ADHD.

We were surprised to realize that: He felt frustrated when rigid, app-set alarms forced him to stop rest periods earlier than necessary for a given task.

We wonder: If he craves structure that still allows him to maintain his sense of control.

It would be game-changing to: Help Logan maximize his own sense of agency while providing structure to accomplish his tasks reliably.

From this POV, we generated the following How Might We statements:

- **HMW** help interacting with reminders feel personal, friendly, and non-intimidating?
- **HMW** help individuals organize their tasks without set time constraints?
- **HMW** help people with ADHD transition between work and break periods swiftly?

POV 3: Arushi, the Overlooked Patient

We met: Arushi, a 22-year-old transfer student, who was diagnosed with ADHD at age 11 and values personal relationships, her mental health, and understanding her family.

We were surprised to realize that: Arushi was raised in a family that equated ADHD symptoms to an allergic reaction and, as such, it took Arushi a long time to move past the stigmatization of ADHD and Adderall introduced by her parents.

We wonder: Arushi yearns for more community support to manage and learn about her ADHD.



It would be game-changing to: Help Arushi find ways to address ADHD-related shame and connect with others with ADHD.

From this POV, we generated the following How Might We statements:

- **HMW** help individuals with ADHD educate and uncover harmful beliefs about the disorder?
- **HMW** leverage the network effects of ADHD to help individuals better understand the condition?
- **HMW** de-stigmatize ADHD diagnosis in families where mental health is not prioritized?

Solutions

Based on our POVs and HMW statements, we brainstormed a variety of solutions. We tested the core assumptions of each solution with experience prototypes. Ultimately, our team was the most excited about the following three solutions:

- 1) **Spontaneous nudges to connect and check in on friends:** Allow users to customize a list of their close contacts, including how regularly the user would like to check in with them. Provide automatic, randomized reminders to buzz the contact with a message or call.
- 2) **Facilitated co-working spaces:** Users can organize co-working sessions with friends, with time for shared breaks, intention-setting, and progress updates.
- 3) **Discussion forum for individuals with and curious about ADHD:** Online social forum and community for individuals with ADHD, in which users are regularly incentivized to invite their friends who are interested in learning about ADHD and may not have been already diagnosed.



Experience Prototypes

We wanted to ensure that the core assumptions of our proposed solutions were viable before selecting a final solution. We designed the following experience prototypes.

Experience Prototype 1: Text a Friend

Assumption: Users will respond positively to a spontaneous reminder to check in with their friends.

Setup: Select a time during which an individual has 5 minutes of idle time (e.g. waiting to pick up a package, waiting for co-op dinner to be served). Ask them to text or call someone on the spot that they haven't had a chance to reach out to. Observe their reaction and willingness to engage.

Analysis: From this experience prototype, we found that individuals have friends they have not reached out to in while that they thought of immediately when prompted by a member of our team. These individuals were open to the reminder to reconnect and viewed it as a necessary push. When they finally reached out, they expressed joy and relief. This confirmed our assumption that people would respond positively to a spontaneous reminder to check in with a friend.

Experience Prototype 2: Cowork Buddies

Assumption: Users are receptive to periodic accountability check-ins while co-working with other people.

Setup: Organize a co-working session between two people. Before they co-work, ask them to communicate goals for the session that they'd like to be held accountable for. Ask the friends to check in with each other every 15-20 minutes on the declared goals. Observe them while working and ask for their reflections after the hour has concluded.

Analysis: From this experience prototype, we saw that coworkers did not stay in the same place for the entire hour due to external distractions. This made it difficult for them to check in at their pre-established intervals. In the post-interview reflections,

individuals shared that setting goals and external accountability were still useful and encouraged their productivity. While this invalidated our assumption about the feasibility of check-ins during coworking, we still learned that setting time-based goals was useful for participants.

Experience Prototype 3: Got ADHD?

Assumption: Users are eager to talk with others about their ADHD diagnosis and experience. Those unsure about whether they have ADHD are receptive to engaging in ADHD communities and conversations.

Setup: Two members of our team went to UC Berkeley and held a sign with the question, “Got ADHD?”, in a public place. We observed the reactions of the surrounding public, which was primarily students, including whether they approached us and were willing to talk about their experiences. When people approached, we asked whether they would be willing to speak with us briefly (10 minutes) or for a longer period of time (30 minutes) over Zoom.

Analysis: Within the hour that our team members were holding the sign, 21 people approached us. Most individuals were willing to speak with us briefly, and 14 people left us their email or phone number to speak with us at a later time over Zoom. We were also approached by several groups of friends which were often led by at least one member of the group who had ADHD. Many individuals asked if we had knowledge of psychiatrists in the area who could provide a diagnosis.

From this experience prototype, we saw that people with ADHD are hungry for community. Many individuals with ADHD were excited to see our sign and others were encouraged to speak with us when they observed their friends interacting with the sign. Moreover, we learned that individuals need more local resources surrounding ADHD diagnosis and evaluation.

Design Evolution

Final solution

We synthesized our insights from need-finding and the results of our experience prototypes to arrive at our final solution.

In experience prototypes #1 and #3, we tested the core assumptions of solutions that facilitated relationships and community for those with ADHD. From the former, we learned that users were receptive to spontaneous prompts for relationship management and upkeep. From the latter, we learned that people with ADHD are eager to share their experiences with the disorder.

In experience prototype #2, we tested the core assumptions of a solution that targeted ADHD's impact on work and productivity. Although the assumption about coworking was not confirmed through the experience prototype, we learned that an effective way to engage adults with ADHD in their work was through mindful goal setting.

Based on these results, findings from need-finding interviews that difficulty completing tasks was the root of disorganization in other areas of one's life (e.g. personal relationships), and our reticence to develop "social media" for people with ADHD, we decided to focus on improving task management for adults with ADHD. Ultimately, **our final solution allows individuals to manage and track progress on tasks and gradually improve their time estimation through mindful goal setting.**

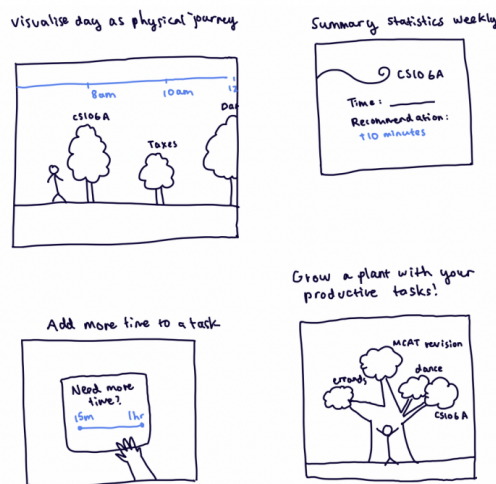
Tasks

We brainstormed tasks to include in the app and decided on the following tasks.

- **Simple task:** Flexibly add and view upcoming tasks.
 - We selected this task because a user must be able to add and view any kind of upcoming task on the app to gain awareness and manage their tasks.
- **Medium task:** Track and update progress on tasks.
 - We selected this task so that a user can monitor their progress on a task in-app, reducing the need for additional external time or task management tools.
- **Complex task:** Learn about previous time estimation patterns and task completion habits.
 - While some users may not reflect on their task progress and time estimation patterns, we provide them the ability to do so to encourage active reflection and intentionality through the app. We hope that this will facilitate their understanding of their own habits.

Design Evolution Stages

After determining these tasks, we brainstormed potential realizations of our solutions across various applications chat, VR/AR, wearables, mobile, and visual notification.



Concept sketches of VR/AR realization.

We then created more in-depth task storyboards for the Mobile and VR realizations. The key screens for the mobile realization are below.

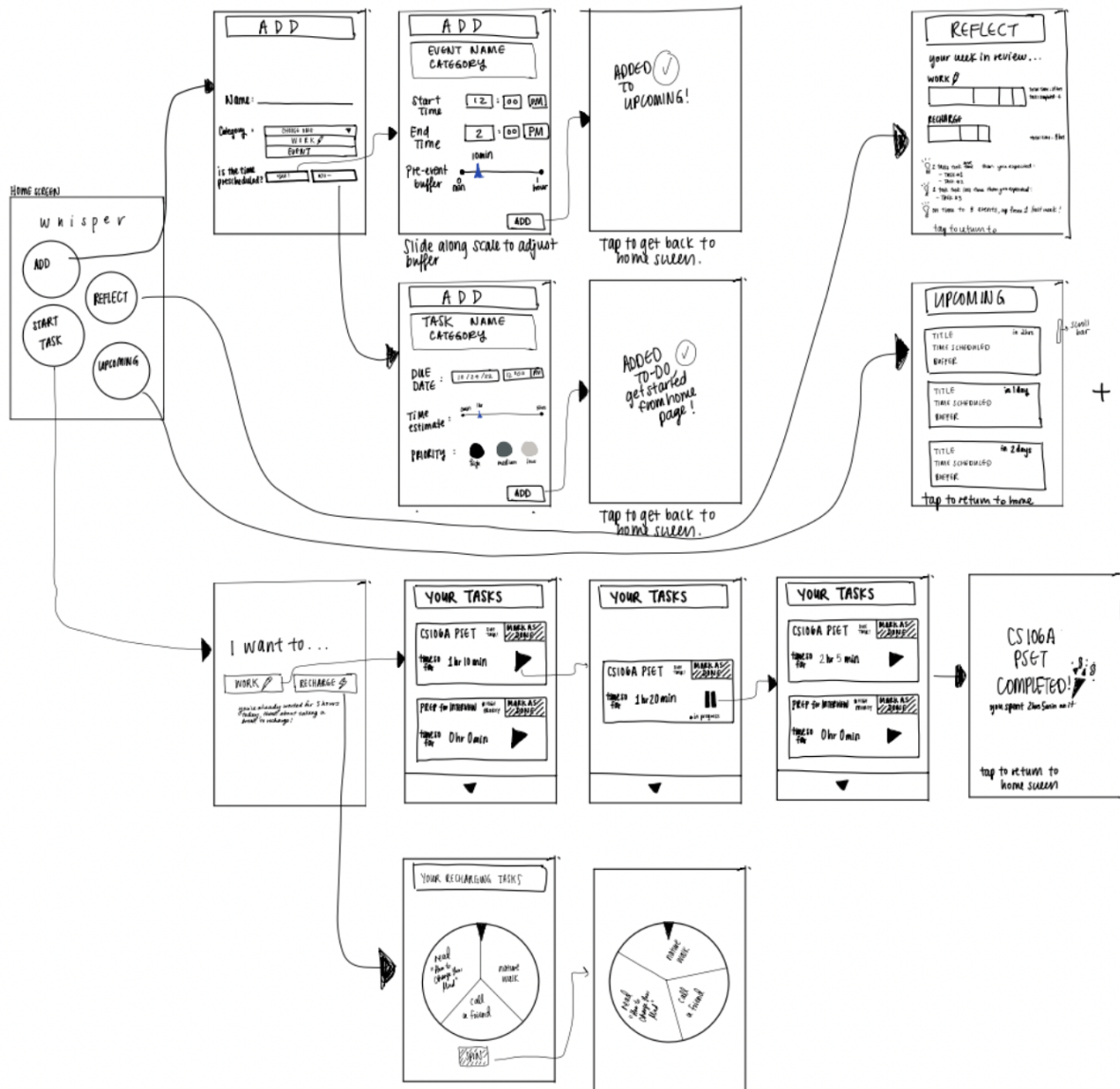


Key screens for mobile realization.

Ultimately, we determined that the mobile realization would be more accessible for people with ADHD because **the ease of integration would make it easier for users to form or maintain a usage habit**. Moreover, we found that a mobile realization could incorporate more diverse functionalities and would be more accessible than a VR realization.

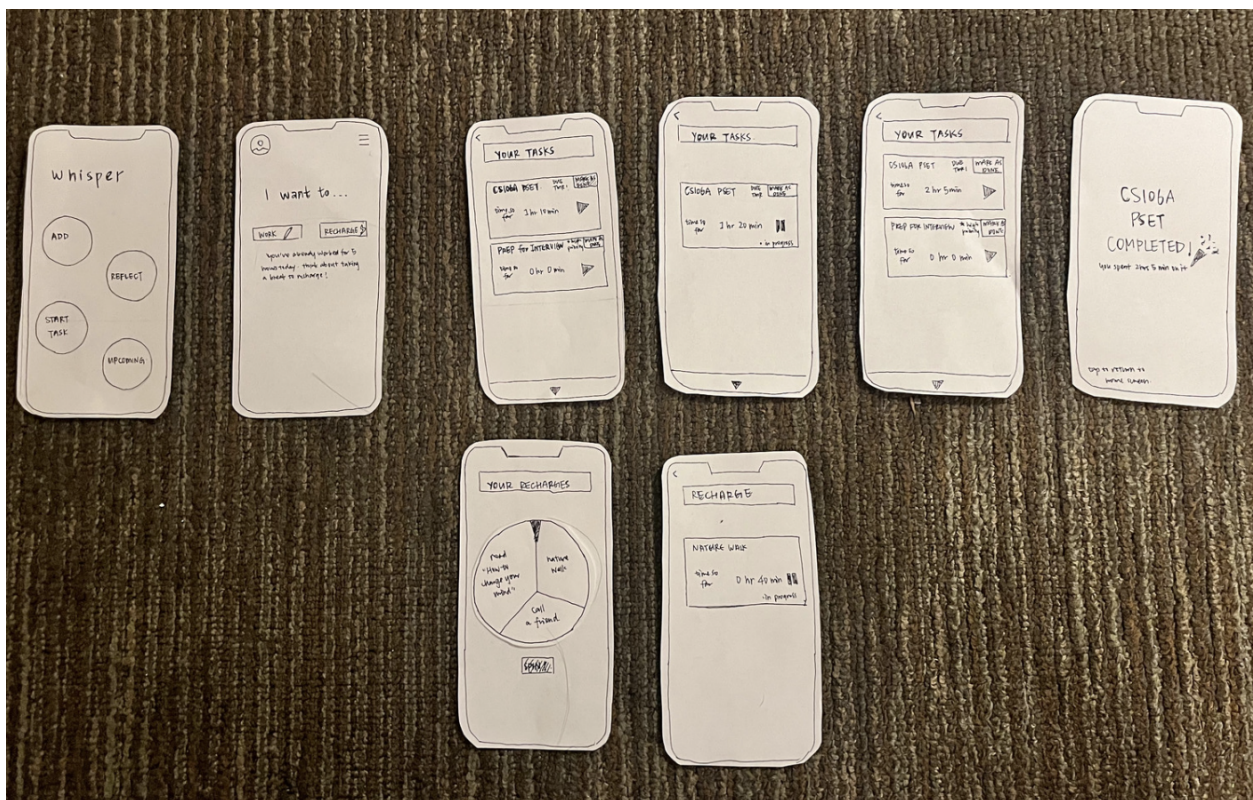
Low-Fi Prototype

We brainstormed for our Low-Fi prototype by drawing an in-depth task storyboard, which contained key screens and interaction flows. Here is a sample of the task storyboard that we created:



Part of the task storyboard.

We then built our Low-Fi prototype based on this task storyboard using pen and mobile screen-sized paper cutouts. The prototype supported our three key tasks as well as the additional task of viewing upcoming events. We used little to no color and excluded extraneous interface elements, intentionally designing our Low-Fi prototype screens to be basic to encourage feedback appropriate for Low-Fi testing. A sample of one of our Low-Fi prototype flows is below.



Low-fi prototype screens for the “Add” task flow.

Testing process: We tested our Low-Fi prototype with 4 adults with ADHD. During prototype tests, each member of our team assumed a role. Ting, the greeter, made initial contact and retrieved additional data from the tester. Michelle, the facilitator, provided testing guidelines and prompted the tester to speak aloud during the test. Cole, the computer, simulated the application response based on tester actions, replacing screens. Justin, the notetaker, kept a tidy log of notes and critical incidents that occurred during testing. We evaluated the results of Low-Fi testing using

bottom-line metrics (participants' speed and accuracy with task completion) and process metrics (their behavior and emotional reactions).

Testing results: Based on user testing, **we learned that various aspects of our design were either not intuitive or overly simplistic, leading to confusion, reduced accuracy, and slower speed in completing tasks.** Many testers were confused by the minimalistic home page, which they claimed lacked hierarchy and had nondescript names for elements. We also found that there were a couple of instances in the flow where the consequences of user decisions or responses weren't communicated to the user appropriately.

Still, we received extremely positive feedback from testers on the "reflection" screen. One interviewee noted that the section of feedback that referred to tasks for which the time was over or under-estimated demonstrated "a deep understanding of [my] ADHD".

From this feedback, we made a few key changes to our UI before creating the Medium-Fi prototype. These include:

- Improving the visual hierarchy of the home page
- Completely redesigning the process of scheduling a task or event
- Updating the language to be more descriptive and intuitive for the user (including terms like 'add', 'reflect', 'category', and 'buffer')

Low-Fi to Medium-Fi Design Changes

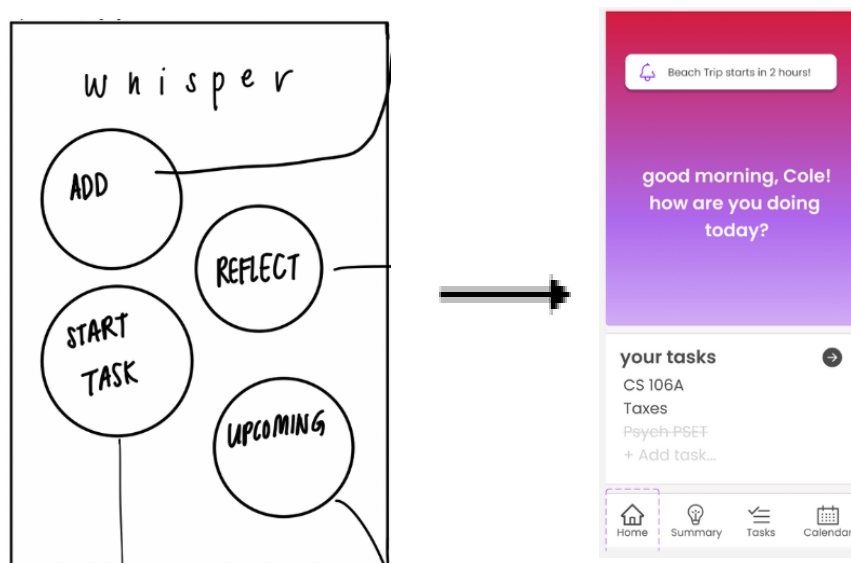
We made a few key design changes for our medium-fi prototype based on valuable feedback from our user tests and studio, which follow.

Key Change #1: Improve visual hierarchy of the Home page

In our low-fi prototype, the home page for the application placed all tasks – 'add', 'reflect', 'start task', and 'upcoming' – at the same level of visual importance. During

usability testing, we heard that the original home screen didn't fully reflect the disjoint task flows of accessing or adding a 'task' or an 'event'. Studio feedback also revealed that completely separating tasks and events would be overwhelming.

In our new home page design for the medium-fi prototype, the home screen shows key task information and places a particular emphasis on the user's upcoming tasks. We also place a call to action, the add task button, directly on the home page. Moreover, our new home page has a bottom navigation bar that facilitates users' flexibility.



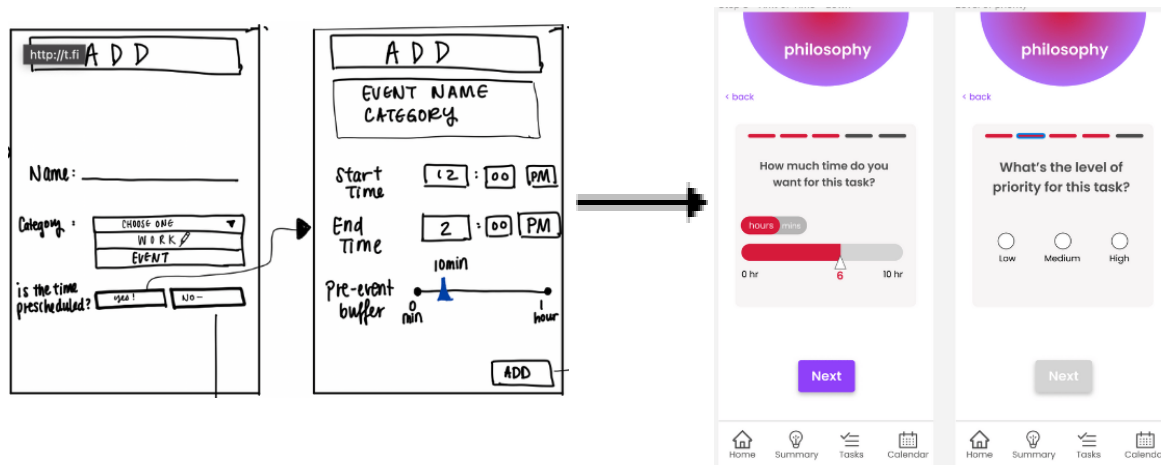
Home page screen in the lo-fi (left) and medium-fi (right) prototypes.

Key Change #2: Improve clarity of Add Task flow

In our low-fi prototype, users added tasks and events through the same flow. We attempted to separate the task and event-scheduling flow through a question: "Is this prescheduled?", which routed users to entirely different task flows. However, we found during usability testing that the question did not convey the consequence of their decision. We also learned during usability testing that the add task flow was difficult to navigate, particularly because there was confusion over language, like

'add buffer'. Ultimately, we decided to emphasize the ability to add a *task or to-do* to ensure that users could complete the simple, medium, and complex tasks, and we decided to include events as integration with an external calendar as a nice-to-have.

In the redesigned "add task" flow for the medium-fi prototype, the 'add task' flow focuses solely on a task. Moreover, each step of the task flow is one screen to minimize user confusion and increase accuracy in completing the step. We included a progress bar for the task flow, consolidated any frivolous text, and increased the visibility of navigation and action items throughout the flow. A sample of these changes can be seen below.

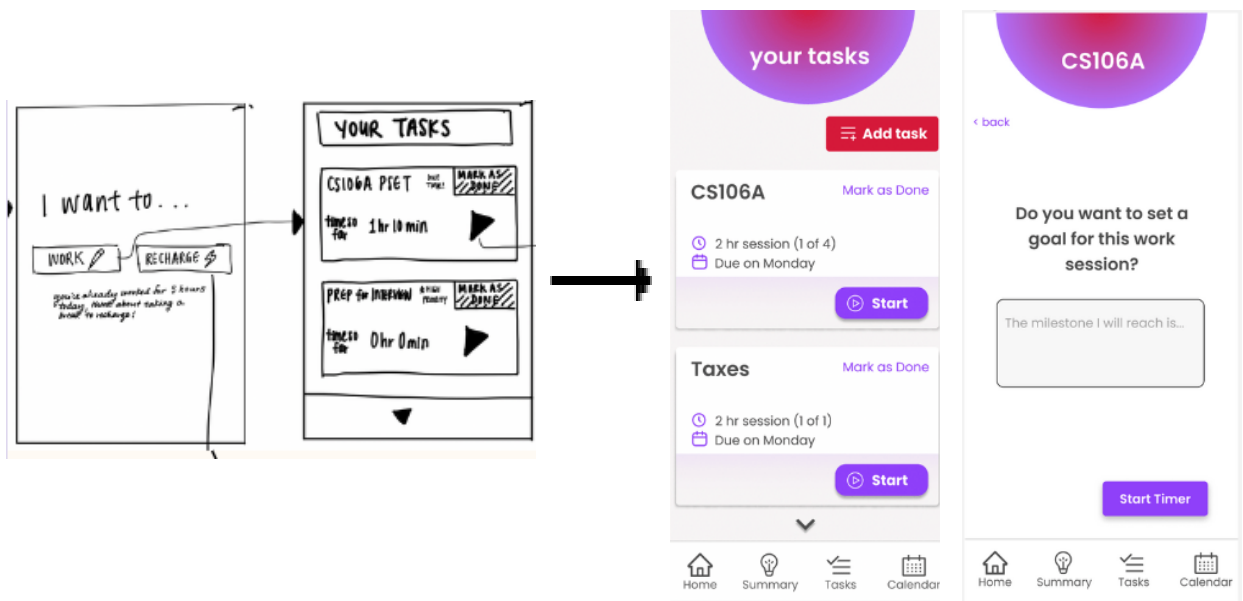


Add task screen in the lo-fi (left) and medium-fi (right) prototypes.

Key Change #3: Incorporate goal-setting and visually prominent action items for tracking a work session

In our low-fi prototype, the actions for a user to track and manage their tasks were indicated by two icons for "Start" and "Stop". During user testing, we found that these icons were not intuitive for users to click. We received in-studio feedback about the low-fi prototype's option to track "recharge" time, as our peers noted that they would be highly unlikely to track "recharge" time and considered "recharge" time as separate from time allocated for completing work.

In the updated “work session” flow for the medium-fi prototype, the calls to action appear as clickable buttons with text annotation for action items. There is no longer an option to track “recharge” time; instead, users are solely prompted to track upcoming tasks. Based on feedback from interviews that individuals have a particularly difficult time with task breakdown, we also added the ability for users to incorporate goals and checkpoints for each of their work sessions.



Sample of tracking task screens in the lo-fi (left) and medium-fi (right) prototypes.

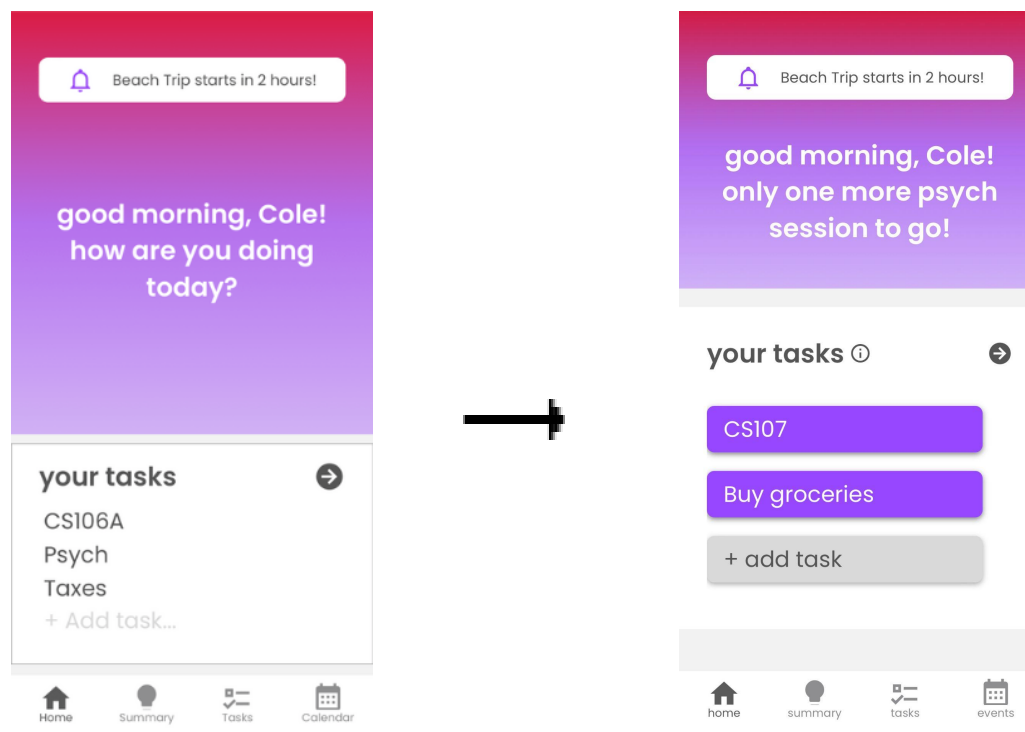
Medium-Fi to Hi-Fi Prototype

Our medium-fi prototype was evaluated through heuristic evaluation by 4 “expert” evaluators. Collectively, they found 96 violations, including 37 violations of high severity (3 or 4). We prioritized the high severity violations that were identified, which were largely concentrated among 1) H3: User Control, 2) H4: Consistency and Standards, 3) H7: Efficiency of Use, and 4) H12: Value Alignment and Inclusion. These violations and their respective fixes are below.

Addressing major violations: Home Page

On the home page of our medium-fi prototype, our evaluators thought that the question was distracting and occupied too much of the screen. They also advocated for direct access to tasks. The violations addressed in our hi-fi prototype are:

- H1: Visibility of system standards (Severity 4)
 - Issue: It's unclear why the home page asks question with no input area.
 - Fix: We updated the text to welcome the user without asking a question.
- H12: Value Alignment and Inclusion (Severity 4)
 - Issue: The home screen prompt may distract from the goals of the app.
 - Fix: We added encouraging language to the welcome message that acknowledges progress or nudges them towards productive action.
- H7: Flexibility and Efficiency of Use (Severity 2)
 - Issue: There is no way to get to specific tasks from the home page
 - Fix: We made the tasks listed on the homepage clickable and expanded the tasks section relative to the welcome message to emphasize tasks.

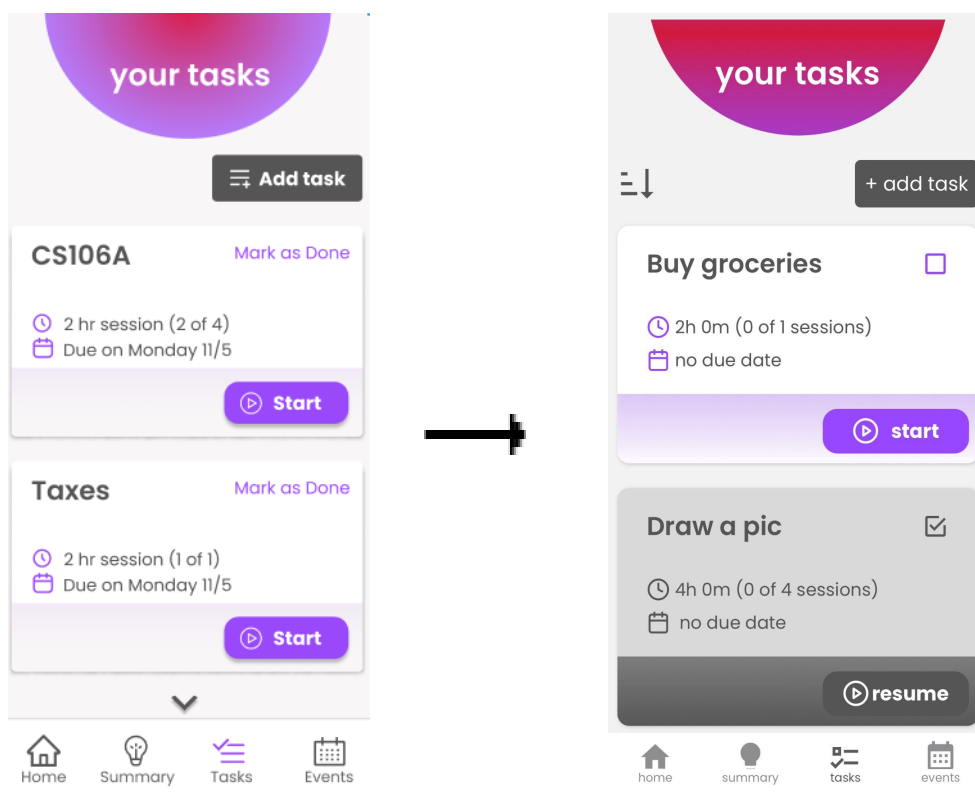


Home page screen in the medium-fi (left) and hi-fi (right) prototypes.

Addressing major violations: Your Tasks

Next, on the “Your Tasks” page of our medium-fi prototype, our evaluators found that user flexibility was diminished when they could only view tasks in a fixed order. They also requested the ability to view completed tasks. The violations that were addressed are:

- H10: Help and Documentation (Severity 3)
 - Issue: No way to view completed tasks after they’re marked as complete.
 - Fix: We updated this to allow users to view completed tasks and resume tasks they previously marked as complete.
- H7: Flexibility and Efficiency of Use (Severity 2)
 - Issue: There is no way to view the most urgent tasks first.
 - Fix: We added a filter to allow the user to sort tasks based on priority, due date, and date added.



Your tasks screen in the medium-fi (left) and hi-fi (right) prototypes.

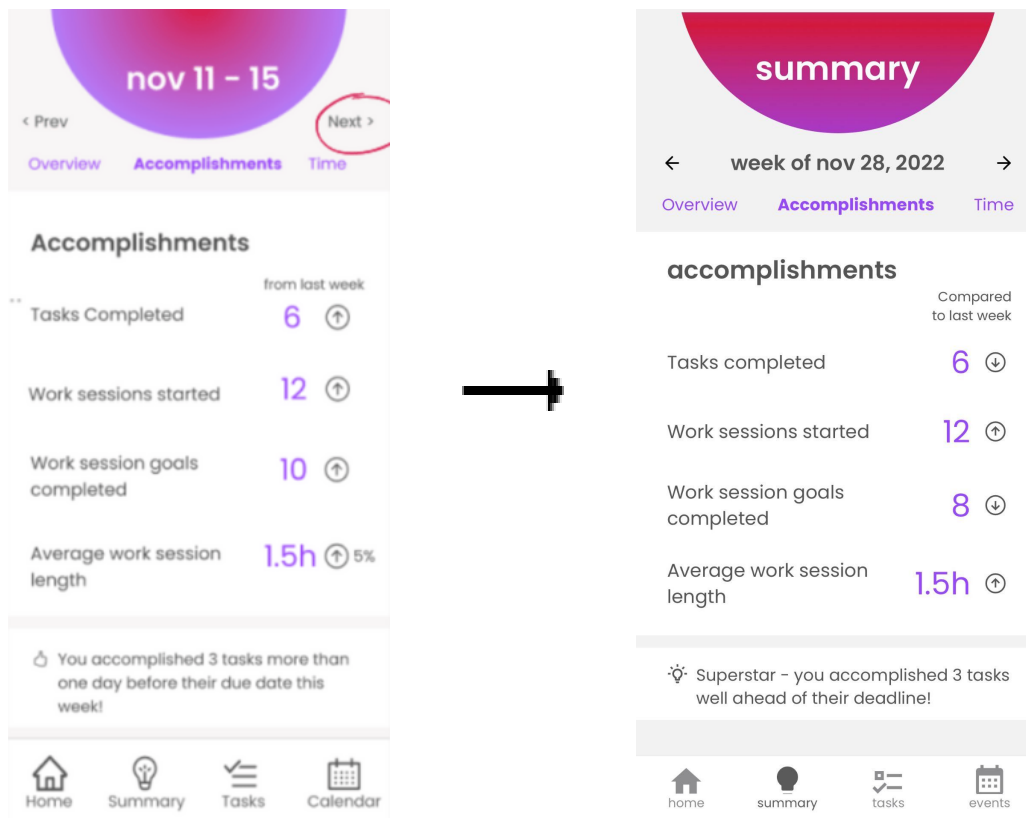
By allowing users to sort tasks based on categories, we hoped to improve user control and speed. Moreover, by allowing users to view and re-open closed tasks, our application supplies a constant and encouraging reminder of their progress.

Addressing major violations: Insights Page

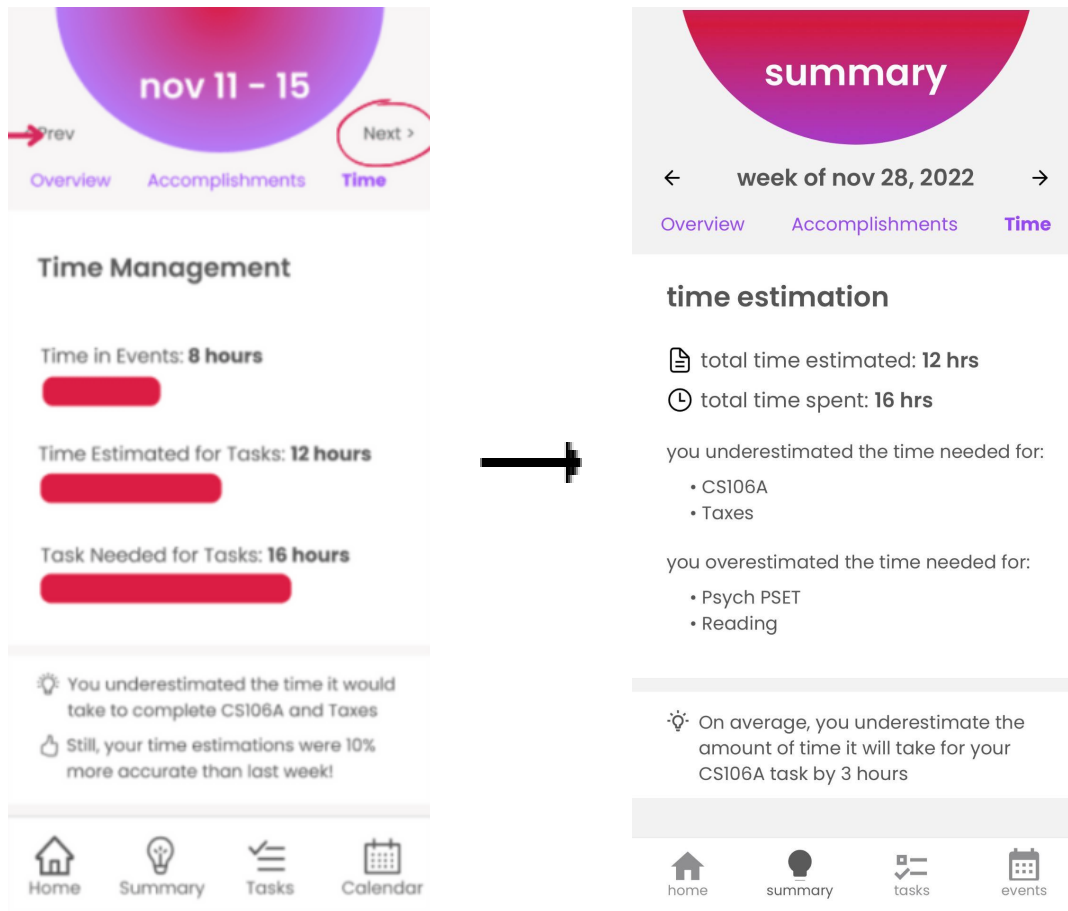
On the “Insights” page of the medium-fi prototype, our evaluators noted a couple of areas where the language was inconsistent or not entirely clear. They also found that the volume of metrics could be overwhelming and lacked clear prioritization. They requested a clearer link between the insights and users’ ADHD. The violations that were addressed are:

- H12: Value Alignment and Inclusion (Severity 3)
 - Issue: Under accomplishments, many metrics are measured, and it’s unclear which ones a user should focus on when a user goes through task creation or work sessions.
 - Fix: Metrics were reconfigured to emphasize things that are particularly difficult for people with ADHD: time estimation and finishing their tasks before deadlines. To accomplish this, we reordered metrics in the “accomplishments” tab to emphasize tasks and work session goals completed. We also renamed the title of the ‘Time’ tab from ‘time management’ to ‘time estimation’ and used the screen to highlight the tasks that the user under and over-estimated the time needed to complete.
- H12: Value alignment and Inclusion (Severity 2)
 - Issue: ADHD insights are hidden within the app and feel random and not directly aligned with the app.
 - Fix: Because our app is designed to be used both by people with ADHD and those without, we decided to remove any explicit mentions of ADHD throughout the app. Instead, we emphasized the needs of people with ADHD by placing particular focus on time estimation and task completion.
- H4 Consistency and Standards (Severity 3)

- Issue: There is a miscellaneous 5% for the average work session but not for other metrics.
- Fix: We made all analyses uniform by removing the 5%.
- H4: Consistency and Standards (Severity 1)
 - Issue: It is unclear what the next and previous buttons refer to and the dates are nebulous.
 - Fix: We moved the week label outside of the header to be in-line with the next and previous buttons to indicate these three elements are a group. The week label was also renamed to 'week of' followed by the first day of the week to emphasize those insights are weekly.



Accomplishments screen in the medium-fi (left) and hi-fi (right) prototypes.



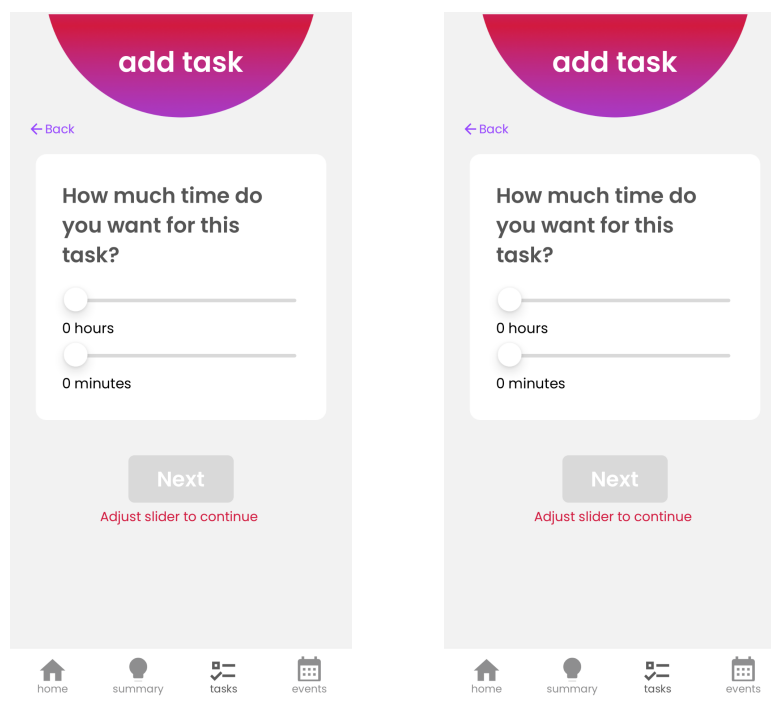
Time screen in the medium-fi (left) and hi-fi (right) prototypes.

Through these changes, we placed additional emphasis on time estimation to help the user quickly gather relevant, applicable information about their habits. Moreover, we reformatted the “week of” header and arrows to resolve user confusion about this navigation.

Addressing major violations: Task Creation Flow

On the task creation flow in our medium-fi prototype, our evaluators found that there was no way for users to consistently exit the task creation flow. There were also no guidelines or instructions on the required action to move forward if buttons on a given screen were disabled.

- H5: Error Prevention (Severity 3)
 - Issue: The disabled next and submission buttons don't have guidelines on what needs to be completed in order to move on.
 - Fix: We added instructional context below any disabled button to guide users to the next step.
- H3: User Control and Freedom (Severity 3)
 - Issue: When a user starts to create a new task type, there is no way to exit the task flow without pressing "Tasks" on the navigation bar.
 - Fix: We added a "Back" button to all steps of the task creation task flow.
- H3: User Control and Freedom (Severity 3)
 - Issue: Users can't add more specific times (to the minute) during task creation.
 - Fix: We added a minute selector so that users can add tasks by specifying minutes and hours needed.



Sample of the 'add task' screens in the hi-fi prototype.

Through these changes, we improved user understanding of their expected action, saving them from second-guessing the required next step. We also improved user control by allowing more granular time selectors and allowing users to exit or go back at any time in the task creation flow.

Additional violations addressed

We also addressed the following additional violations:

- H3: User Control and Freedom (Severity 4)
 - Issue: There's no option to not save a milestone for the next session.
 - Fix: Added an option to not save the milestone for the next session.
- H3: User Control and Freedom (Severity 4)
 - Issue: Users can still proceed forward even without selecting a task type.
 - Fix: Disabled buttons on the task selection page until they select the task type.
- H10: Help and Documentation (Severity 4)
 - Issue: Calendar doesn't prompt for any action.
 - Fix: Renamed the tab to "events" to make it more clear that users can't engage with the events in all the ways a calendar would allow (e.g. adding and editing events manually).
- H11: Accessibility (Severity 3)
 - Issue: There's a lack of alternative screen modes, which can make the app less accessible for all users.
 - Fix: We designed a dark mode implementation of the app including an easily accessible "light/dark mode" button from the home page. Given time constraints, we weren't able to fully implement the light/dark mode but would like to in the future.
- H4: Consistency and Standards (Severity 3)
 - Issue: Navigation tab doesn't show which tab you're on, other than the home tab, making it difficult for the user to accomplish tasks or understand exactly where they are on the app.
 - Fix: Highlighted the icon for the tab the user is on.

- H3 User Control and Freedom (Severity 3)
 - Issue: After clicking “mark as done”, the user has to manually redirect themselves to the next pages.
 - Fix: Upon tap, the user is redirected to the home page.
- H7: Flexibility and efficiency of use (Severity 3)
 - Issue: Different coloring for event title boxes on the calendar tab suggest that they are clickable when they aren't.
 - Fix: Changed the colors of the titles to a dark gray to mirror the visual design of the rest of the app.
- H6: Recognition rather than recall (Severity 3)
 - Issue: On the task tab, the due date is a day of the week, which requires additional recall on the part of the user.
 - Fix: Added full dates for all deadlines.

Violations not addressed

There were some violations identified by our evaluators that we chose to either not address or address in a different way than proposed. These violations are:

- H11: Accessibility (Severity 3)
 - Issue: There is no option for alternative text entry.
 - Reason we didn't address the issue: Most mobile phone keyboards already include text-to-speech options.
- H11: Accessibility (Severity 3)
 - Issue: There is a lack of different text size options, including the option to make text larger.
 - Reason we didn't address the issue: Most mobile phone keyboards already include the option to make the text size smaller/larger in their accessibility features.
- H4: Consistency and standards (Severity 3)
 - Issue: Calendar doesn't allow users to view tasks by week, month, and more.

- Reason we didn't address the issue: The in-app calendar is meant to be a simple, non-overwhelming place to keep the user updated on their most proximate upcoming events. In order to avoid overwhelming or distracting our user base, adults with ADHD, we intend to focus the 'events' tab on the upcoming days.
- H12: Value Alignment and Inclusion (Severity 3)
 - Issue: Insights may be discouraging for those who do not show progress.
 - Reason we didn't address the issue: We wanted to limit the insights page to useful, applicable information, so we improved the welcome message to actively acknowledge user progress instead.

Values in design

Throughout all points in the design evolution, our team has been guided by our core design values. These design values include:

Value #1: Simple and intuitive

We value a simple and intuitive design that keeps our users' key tasks at the forefront. This was particularly important for us as we designed for users with ADHD, who may have particular difficulty with maintaining focus on a cluttered or otherwise 'busy' interface.

We encoded this value in our design by prioritizing a straightforward UI that avoided extraneous visual details. A few ways that we accomplished this are:

- The home page is single-focus by emphasizing a user's upcoming tasks.
- Users can only view a couple of their tasks at one time on the "Your Tasks" page.
- When creating a task, users complete each part of the task flow separately before moving on to the next flow.
- Information is communicated to the user without interrupting or distracting them from their task flow.

- Calls to action are visible, prominent, consistently located, and accessible throughout each task flow.

Value #2: Friendly and encouraging

Many adults with ADHD reported feelings of shame, disappointment, and a lack of self-trust after they missed tasks they scheduled or couldn't effectively schedule their tasks. In our design, we sought to make the process of planning and managing one's tasks encouraging and welcoming.

A few ways that we accomplished this are:

- We defined a brand voice that is friendly and encouraging and mirrored this with all lower typecase throughout the app.
- We used a consistent color palette of red and purple accent colors that were slightly energizing yet maintained a warm tone.
- To avoid the panic that could be induced by countdown timers, task timers serve more like stopwatches and only count upwards.

Value #3: Easily customizable

A key insight from our need-finding interviews was that adults with ADHD often desired both agency and structure in their routines. We wanted to prioritize this throughout our design by providing ample opportunities for customization and personalization.

A few ways that we accomplished this are:

- Users can create custom task types with a certain set of fixed information, including the amount of time required to complete the task, the number of work sessions, and the priority level.
- Users can view tasks based on metrics that align with their mental models of tasks by sorting by priority level, task deadline, or the date the task was added.
- Users are not punished if they don't complete a work session's milestones. Instead, they are gently asked and encouraged to move these milestones to their next work session.

Tension in Values

Throughout the design process, we found that many of our design values were complementary. However, there were times when we found tension between our design values of simplicity and customizability. While we wanted to provide additional options for customization, we also wanted to ensure that the task flows remained simple and clear to complete. When determining which features to add to improve user control and customization, we prioritized features that could potentially reduce the mental load of completing a task.

In one such example, we originally only wanted to allow users to estimate the amount of time to complete a task using hours to reduce the number of steps to add a task. However, after receiving feedback from our evaluators that adding a task using only hours limited user control and flexibility and may not accurately match a user's mental model of their tasks, we decided to include both hourly and minute selectors.

On the other hand, we intentionally designed the calendar to be simple and focus on the day's tasks to avoid overwhelming users. We received feedback from evaluators to extend calendar functionality to an in-app calendar or week and month-long views. However, we thought the complexity of this functionality would overwhelm users and ultimately decided to maintain our original design for the calendar.

Final Prototype Implementation

Tools used:

From there, we built our final prototype using React Native, Expo, VSCode, and Supabase. React Native served as a great tool for implementing almost all of our front-end and UI requirements. We used several packages, including navigators, react-native-datepicker, and react-native-timer to implement our interactive and dynamic features. However, when attempting to integrate the Google and Apple

calendars into React Native, we ran into technical problems that could not be fixed given our limited time frame for implementation. Since calendar integration was not part of our core functionality, we opted to hard-code data instead.

We used Supabase for the backend to create a database to store users' previous and currently active tasks. Supabase was simple to set up and use, and the straightforward interface and extensive documentation allowed us to establish a back-end for our "create a task" and "start a task" flows. However, with Supabase, it was difficult to update data that was passed in directly through the app.

Hardcoded Techniques

While we were able to make significant progress on our tasks with our hi-fi prototype, some parts of our design were not entirely implemented within the deadline and, thus, were hardcoded.

All aspects of the app occurred in the context that a user had already added a few custom task types and tracked their task progress for a couple of weeks. Thus, we hardcoded the following information for demonstration purposes:

- User's upcoming tasks
- User's custom task types
- User's insights based on previous time management and tracking
- Calendar events

Wizard of Oz Techniques

The key functionality of our complex task, learning from personalized insights, is the calculation and management of valuable information about a user's task completion: the number of tasks completed, the most productive time periods, and tasks for which time was over or under-estimated.

Within the given time constraints, we weren't able to build out the full backend to capture the relevant information. Thus, we use a "wizard of oz" technique to display the following elements:

- User's insights based on previous time management and tracking
- Dynamic user welcome message that updates based on user's most recently completed tasks

Reflection & Next Steps

Reflection and Learnings

This quarter, our team underwent a rigorous design thinking process of ideation, need-finding, creating, and user-testing low-fi and medium-fi prototypes. We have gained invaluable insights into the design process, including the importance of centering the user's experience and the value of iterative testing. We have also gained insight into the challenges of developing a technological solution for ADHD.

Centering the user at all stages of the design process

Through the creation of POVs and individual interview synthesis, our team learned the value of constantly returning to the specific individuals we spoke to in need-finding interviews. Although we were initially tempted to generalize our design decisions to the broad experiences of adults with ADHD, **we returned to the specific experiences of those we spoke to in need-finding interviews and testing throughout the design process.** Similarly, we grounded all of our design decisions in their effect on our ideal user base, individuals with ADHD, ensuring that the application was considerate of their needs by reducing the possibility of overwhelming the user.

Value of iterative testing

Our team's key design decisions were based on results from low-fi testing and the heuristic evaluation of our medium-fi prototype. During low-fi testing, we were



surprised to learn just as much from bottom-line metrics (e.g. time that it took for a user to complete a given task) as we did from process metrics (the user's reactions and thoughts spoken aloud). By paying attention to both metrics during testing, issues with our design were immediately revealed, and we quickly learned the value of external testing and evaluation at each stage of the design process.

Developing a technological solution for ADHD

During need-finding interviews and external research, we discovered many problem areas where adults with ADHD are frustrated and feel their needs are not adequately met. These areas – lack of community around ADHD, difficulty managing relationships, and work and task management – are promising areas of future work for those interested in working on tools for ADHD.

We also discovered the value of having a team with diverse perspectives about a given disability when working on a technological solution to address its symptoms.

The varied experiences of our team members with ADHD were a great starting point for understanding that living with a disability may invoke shared and inevitably nuanced experiences.

Next Steps

In the future, there are many directions we would like to take with this project. First, we would like to solidify the backend implementation to ensure that we can provide useful and accurate insights for users. We would also like to fully implement certain functionality that we were unable to complete due to time constraints, including a “dark mode” and the integration of external calendars within our app. We would also like to test our hi-fi prototype with users in a longitudinal study to learn about the extent to which users are excited about using the application on a regular basis.



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