

# StudyBuddy

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## Time Tracking and Study Support

CSE 440 Section B

3f- Final Report

Autumn 2017

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## Problem and solution overview

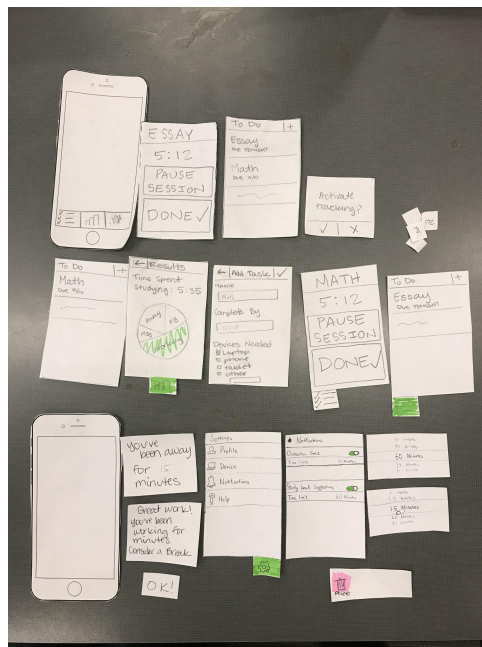
People's time is valuable and limited, especially for college students who have to balance school, work, and social lives. As university students we spend a lot of time “studying” or “working,” but with the large number of distractions around us it can be surprisingly easy for our productivity to lag. Frequently, friends will go to study together and end up spending more time on Facebook or shopping than actually doing what they had intended. This time loss commonly manifests in a collection of short breaks and so students are often unaware of the scope of the cumulative amount of time being wasted. In a busy schedule this wasted time can lead to loss of sleep, lower prioritization of physical activity, and even poor performance on assignments and exams.

While many students are interested in boosting productivity, it's a complicated goal and not necessarily easy to do. In order to address this issue, Study Buddy makes use of physical sensors and integrated software to help students track and improve their productivity - and also to create more balanced study habits overall.

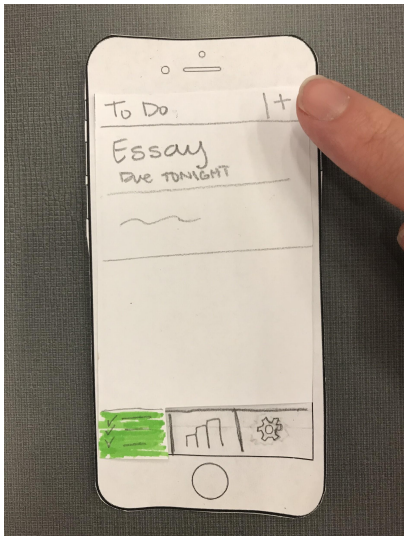
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## Initial Paper Prototype

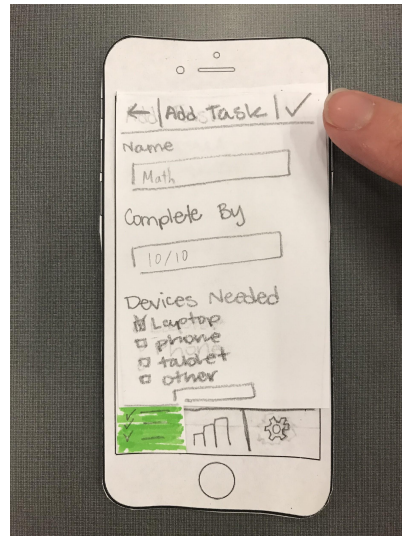
Our paper prototype consists of a mobile application, and a webcam indicator that will show the sensors are activated. The mobile application tracks the customer's tasks, activates sensors, and visualizes the data it collects. An overview of the initial prototype is shown below, and walk-throughs of the tasks follow.



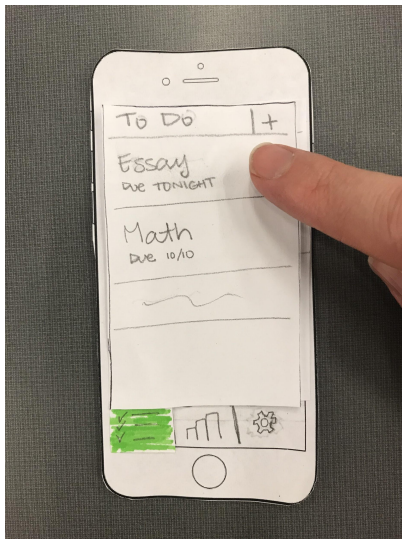
## Task 1: Track the amount of time a person spends distracted while trying to study



(Figure 1.1) Default screen, customer can add tasks

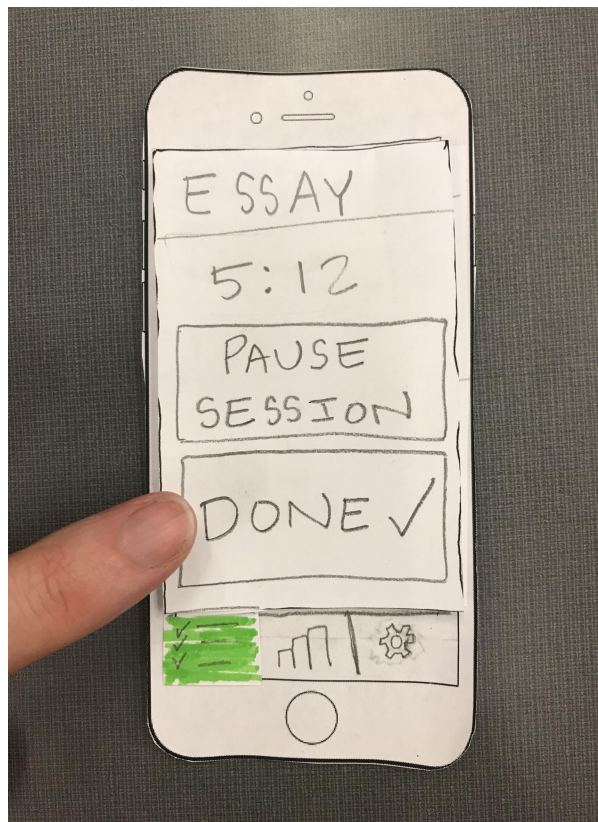


(Figure 1.2) Template to add new assignment or task

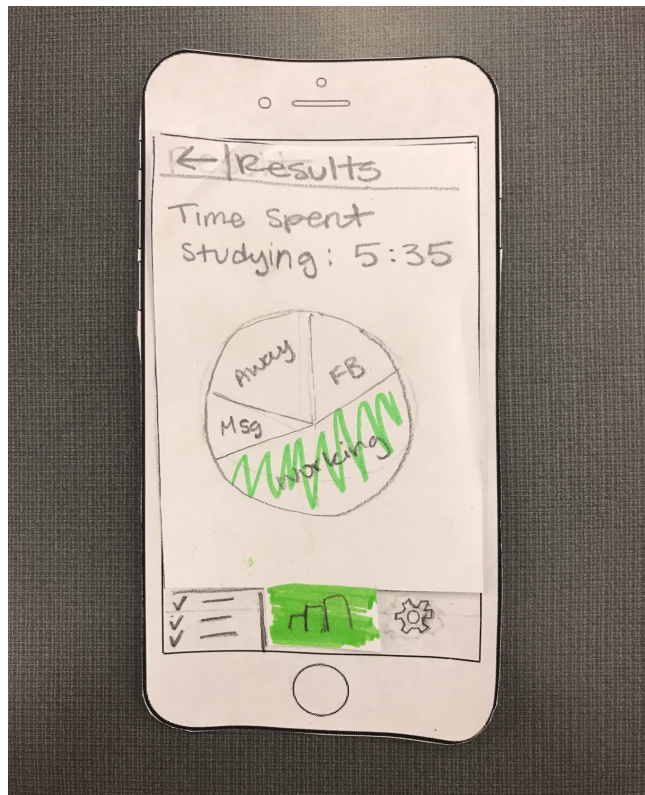


(Figure 1.3) Customer selects task to begin working, the webcam and software sensors are activated. The webcam tracks the customer's eye movements, and the software sensors track their usage.



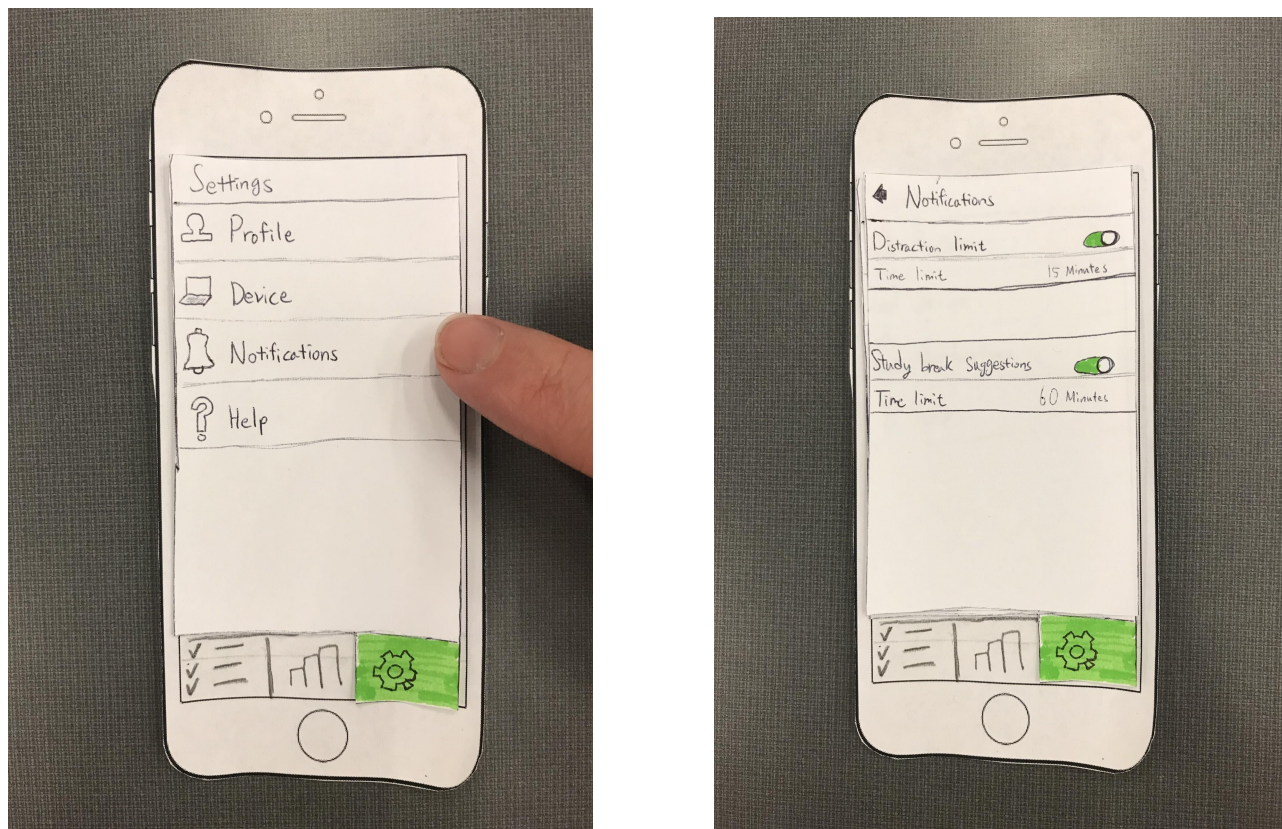


(Figure 1.4) Customer selects they are done with the assignment

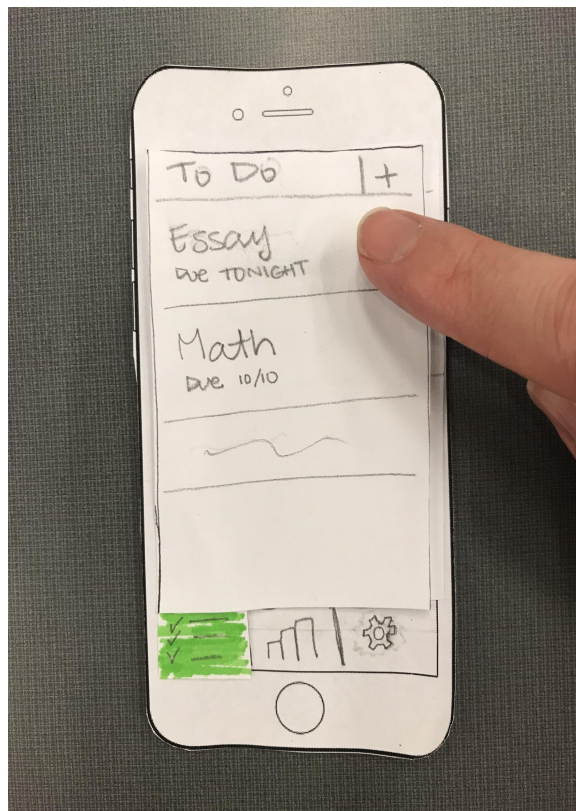


(Figure 1.5) Customer can view their results and see what they spent time

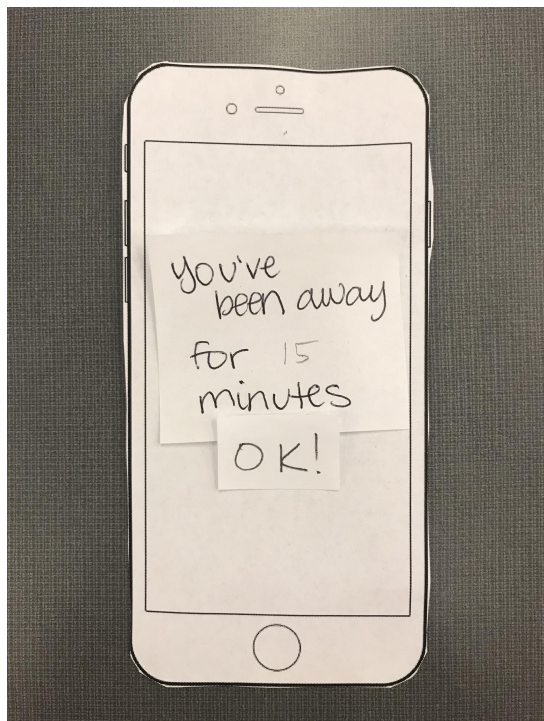
## Task 2: Receive notifications to promote balanced study habits



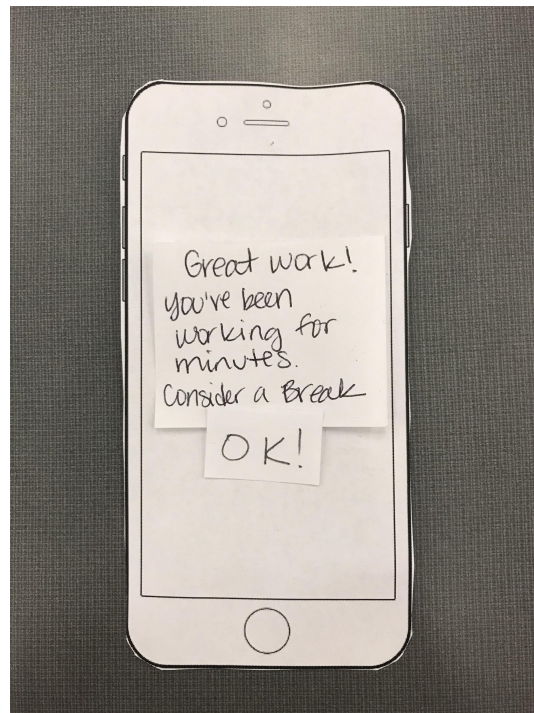
(Figure 2.1) Customer sets notification preferences



(Figure 2.2) Customer activates sensors and begins working



(Figure 2.3) Customer is notified because they've been distracted



(Figure 2.4) Customer is encouraged to take a break after working for a long time

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## Testing Process

The first step in testing our paper prototype was conducting two heuristic evaluations. The first evaluation was completed by the RAPID team which has Quinn, Jamie, Angus and Yiyun. The second evaluation was performed by Uyen, an interaction design major. These two evaluations revealed critical style and usability issues, like the lack of a back button and confusion over the presentation of results. It was helpful to initially perform these evaluations, and allowed us to make important changes to our prototype before beginning the usability tests.

We then proceeded with user testing. Our first participant is a senior at the University of Washington, studying Early Childhood and Family studies. We chose this participant because she is a student who may want to use our product, and she is not in a technology or design related field so she could provide a fresh perspective from those we received in our heuristic evaluations. Over the course of this first user test we realized that our script was too loose - that is, our initial descriptions of the tasks to be completed weren't detailed enough and we found that additional prompting was necessary during testing. For instance, the participant wasn't sure whether she should be trying to view her overall time tracking results, or those pertaining only to a particular assignment. Moving forward, we clarified the task descriptions so that mid-test intervention was not necessary.

Our second participant is a junior in the UW Department of Communication. He juggles a very active social life in between his studies and says he is often pulled away from his work, so we thought he would be an ideal test participant for our design. During this test, we found that it was quite effective to avoid directly answering the participant's questions mid-test. For instance, when he was confused about the "Pause Session" function in the app, instead of telling him what was "supposed" to happen or how the design was meant to work, we instead asked him questions about what he *thought* should happen or how he *expected* it to work. This, in turn, helped to illuminate some important design flaws which we were able to address later. Moving forward, we embraced this idea of letting the participant struggle with the design rather than intervening to avoid awkwardness or uncomfortable moments.

Our third participant is a senior in the UW Department of Physics. We chose this participant because he was one of our original interviewees before for the design research, and he is very interested in our design. By this point in our testing, the process felt quite comfortable and the test went smoothly.

Overall, we learned that being well-prepared with a detailed script and embracing the willingness to let participants grapple with the design (rather than intervening to alleviate awkwardness) were key to gaining insight from user testing.

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## Testing Results

Unsurprisingly, our first try at the paper prototype had some glaring flaws and omissions. Feedback from our two initial heuristic evaluations was extremely helpful in catching these basic issues before presenting the prototype to users for testing. Specifically, we were missing a “Back” button on our Settings page and our initial method of displaying results was very ambiguous in regard to which particular results it was showing. Luckily, we were able to address these issues before asking users to navigate the design to complete our tasks.

Most of our design iteration took place in the gaps between the three user tests we performed. In our first user test, we uncovered three design problems:

- On our Results page, the drop-down menu we had added to differentiate between result categories had inconsistent navigation icons (using both upward and downward carats)  
This confused our participant, but was easily fixed later.
- Before even reaching the Results page, the user was unsure of what results she was about to view when the “View Results” notification popped up. While we had addressed this issue on the results page itself, we saw we hadn’t solved the problem completely and so we added further navigation options.
- At one point, after being notified that she’d been distracted, the participant described that she might not want to return to work (despite the notification) and she didn’t feel she had an explicit way to do this. This was a difficult problem to address but we decided to simply create subsequent notifications that would “piggyback” on one another.

In the end, these issues all ended up being relatively easy to address before the next test.

In the second user test, we learned two things:

- Our “Pause Session” function can be confusing for the user. Specifically, our participant did not understand exactly what it meant to pause the session: were they taking a short break in which the sensors would be deactivated? Would this pause count as a distraction? Or did pausing constitute “stopping” the assignment altogether until it was actively selected again in the future? To address this, we added an explicit transition alert describing exactly what “pausing” would do.
- The participant was also confused by the fact that though he was working on his laptop, notifications appeared on his mobile screen. This was easily fixed by subsequently presenting notifications on whichever device the participant was using.



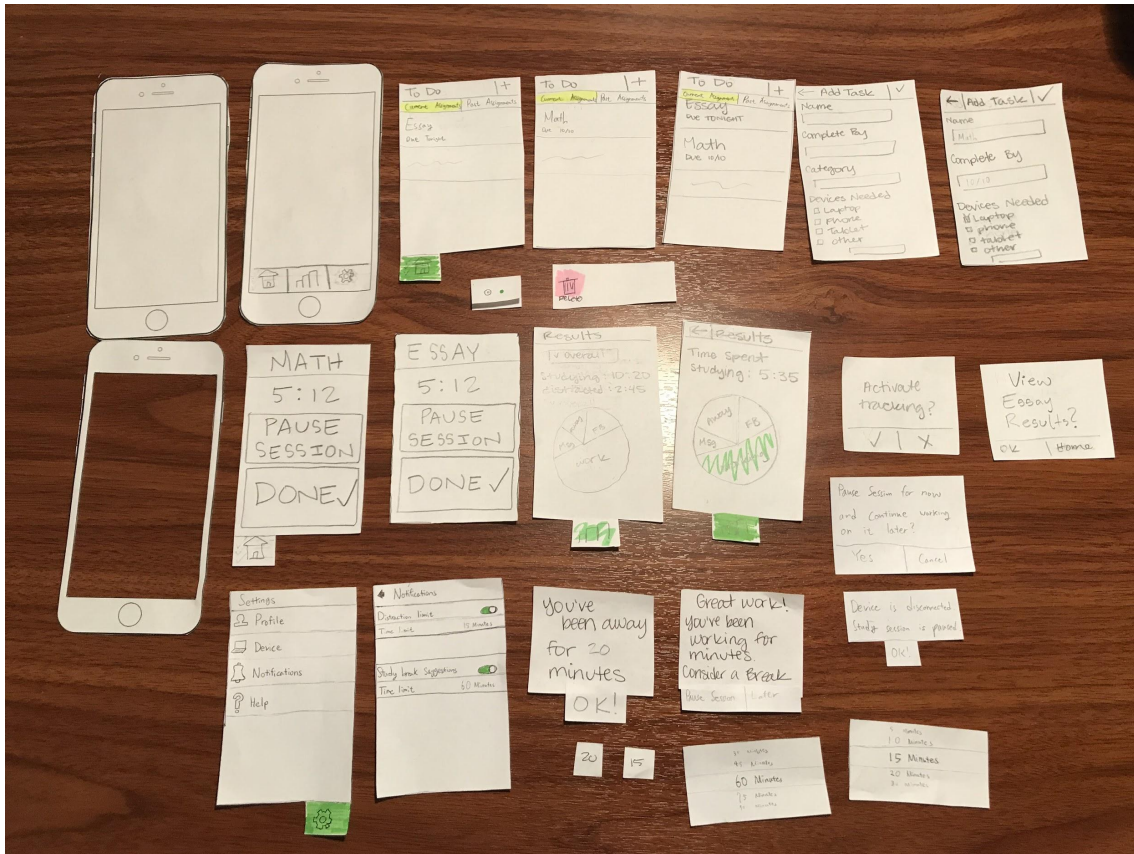
During the third user test, we uncovered three issues which were much more subtle than the rest:

- The participant was unsure what should happen upon finishing an assignment. To address this we added a “Past Assignments” tab to provide easy and intentional navigation and reflection on past assignments (recognition rather than recall)
- The participant wanted to be able to “Pause Session” from the study break suggestion notification. This seemed like a reasonable feature and was an easy fix.
- The participant wanted the study session to be paused automatically if/when he forgot to tap out. Again, this was a subtlety in functionality which we hadn’t considered but decided that it was a valuable addition to the design.

All in all, we were happy to find that each of the three user tests revealed new flaws in the design, but that from one test to the next the flaws became more subtle and less severe overall.

Finally, during the design critique we received the feedback that our assignment selection list felt more like a “to-do” list than a time-tracking tool. In response to this, we decided to add a general “time tracking” button to the top of the assignment list. This allows the user to use StudyBuddy as a general time- and distraction-tracking tool in an assignment-agnostic sense (that is, distractions can be tracked over a period of time not pertaining to any specific assignment) and drives home the point that the app is a time tracking tool and not simply a list of tasks or assignments to complete (see digital mockup for this change).

# Final Paper Prototype



Our final paper prototype did not change drastically from the original. As mentioned above, the improvements we made were mostly small details which helped with basic functionality and enhanced explicit transition messages which help the user to understand exactly what is happening at each step.

Specifically, for Task 1 (Tracking the amount of time a person spends distracted while trying to study) detailed alerts and prompts help to inform the user what is happening when tracking is paused and a drop-down menu on the results page helps to give users the ability to select the particular results they want to view.

For Task 2 (Receive notifications to promote balanced study habits) we added more options for how to handle and react to notifications on the fly. For instance, when StudyBuddy suggests a study break, the user can now opt to pause the study session or decline the study break by tapping “later”.

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## Digital Mockup

Below are overview photos of our digital mockup and walk-throughs of each of our primary tasks. Switching to digital tools did not cause many changes, yet, we realized the sizing of our elements on paper did not translate well to digital elements. We also discovered the importance of color to distinguish the different assignments. Additionally, we had to shorten the text on our buttons since handwriting looks different than typed text.

In response to the critique we received we aimed to make our application less focused on tasks, and more focused on tracking. To do this, we incorporated an instant tracking option so the user has the flexibility to track their time without specifying exactly what they're working on. We still left the functionality to add tasks since that was requested by our participants. We also worked on creating additional results views since the presentation of the collected data is crucial to the success of the application.

This design supports our first task of tracking your time while studying by allowing users to easily start the tracking. Once they press one button the webcam and software sensors will activate, collecting accurate information about how they are spending their time. The webcam will focus on eye movements and physical presence, and the software trackers will capture their usage data. This data together will provide a more holistic view into the customer's time usage. The customer can view their results at any time from the results tab, which will be aggregated based on time and tasks if specified.

The design also supports our second task of promoting balanced study habits through notifications. The customer can enable and set preferences for the types of notifications they want to receive from the settings tab. Then, once they have started tracking, StudyBuddy will track if they have been distracted longer than they wanted or have been focused for a specified period and should take a break. An appropriate notification will be displayed on their phone and laptop.

**INSTANT TRACKING**

**Start Tracking**

**ASSIGNMENT TRACKING +**

Current Assignments | Past Assignments

**Essay**  
DUE TONIGHT

**Math**  
DUE 10/10

Home | Bar Chart | Settings

**ADD TASK**

Title

Complete By  
mm/dd/yy

Category

Devices

- Computer
- Tablet
- Phone

Home | Bar Chart | Settings

**ESSAY**

**05:00**

**Pause**

**Complete**

Home | Bar Chart | Settings

**SETTINGS**

- Profile
- Device
- Notifications
- Help

Home | Bar Chart | Settings

**SETTINGS**

Distraction Limit

Time limit 15 minutes

Study break suggestions

Time limit 60 minutes

Home | Bar Chart | Settings

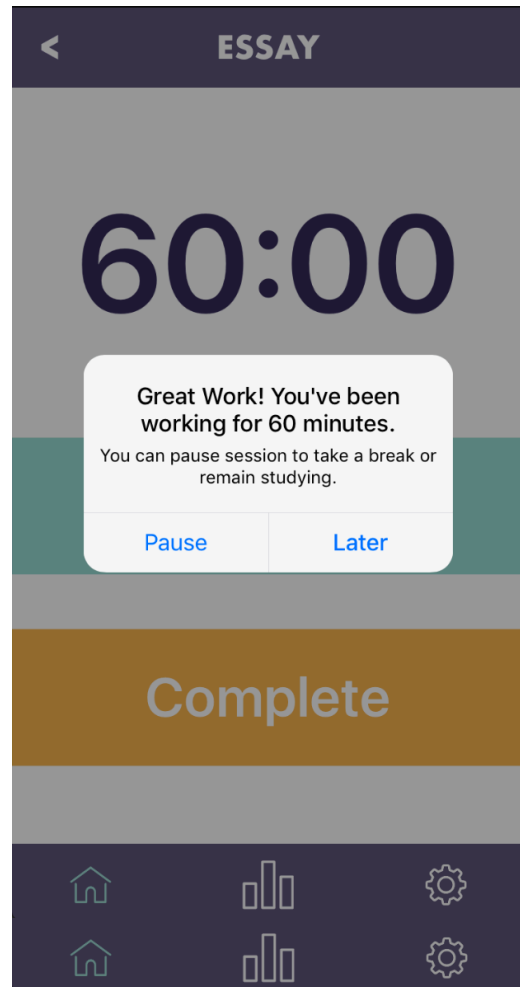
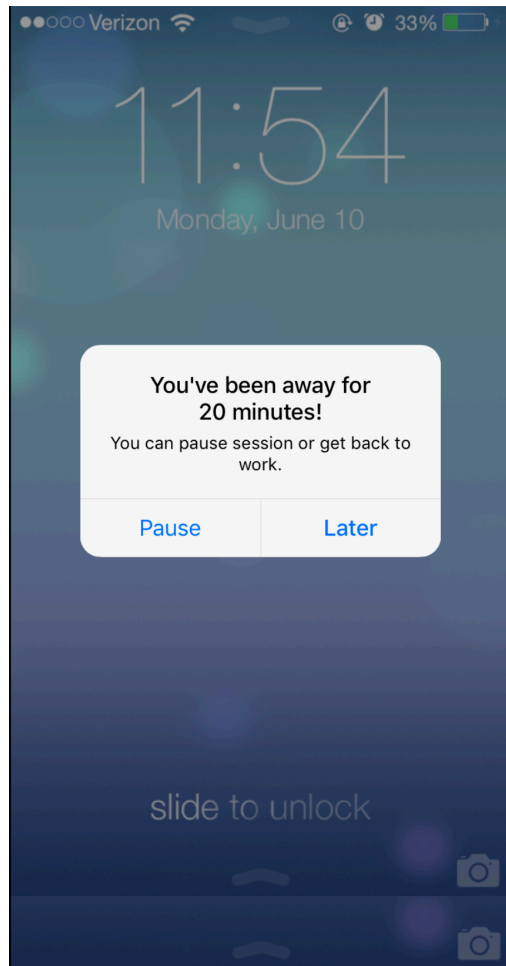
**RESULTS**

Overall ▾

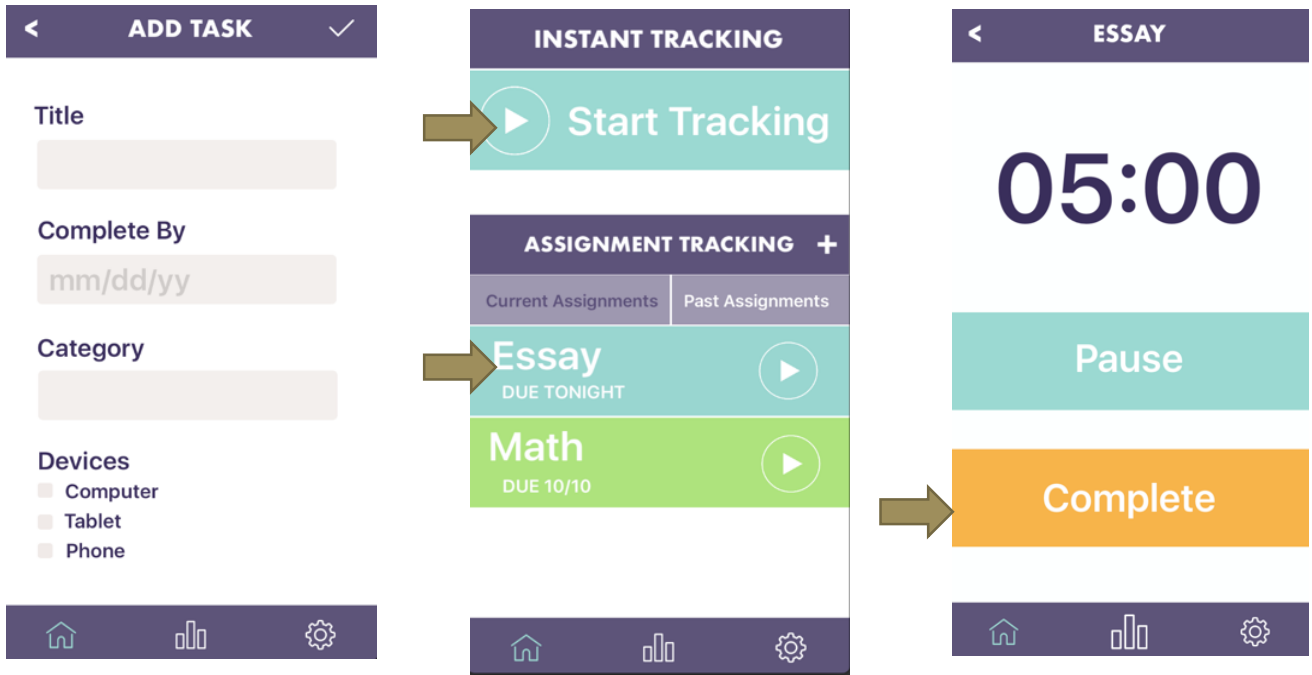
Total Time 10:25:00  
Focused for 05:00:00  
Distracted for 5:00:25

Home | Bar Chart | Settings

## Digital Mockup Overview Continued

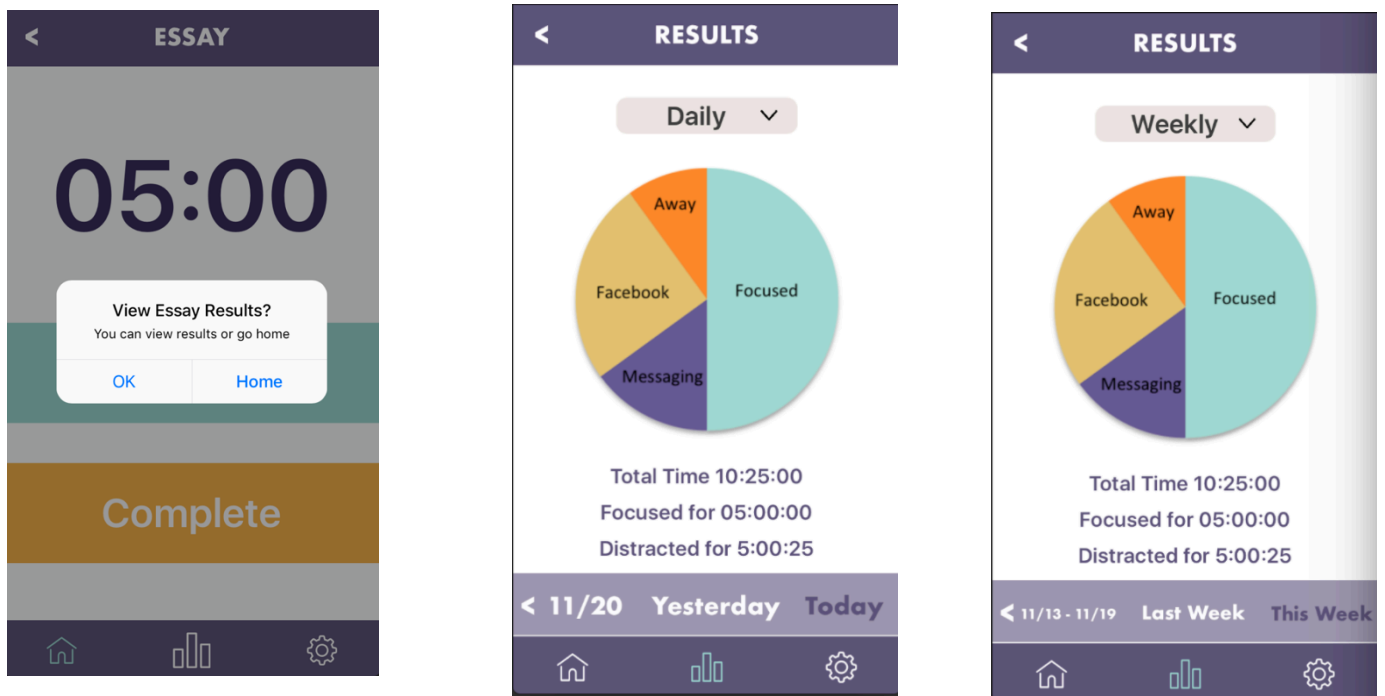


## Task 1: Track Time while studying



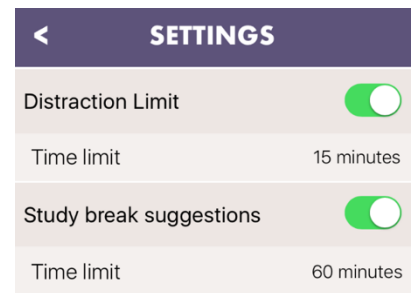
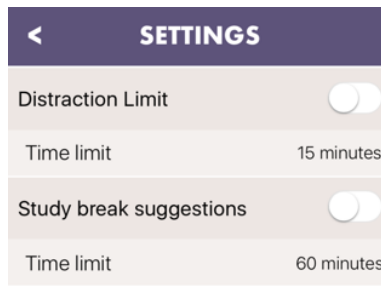
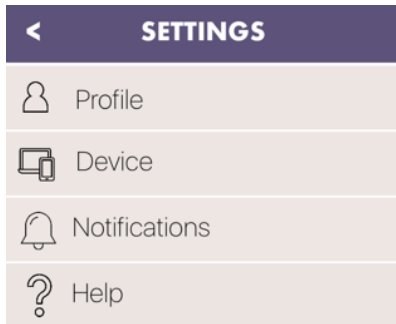
Customer can either add a task then track by tasks or start instant tracking right away

The customer completes the task

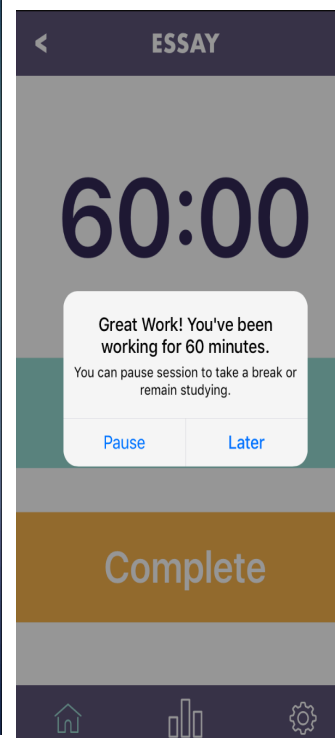
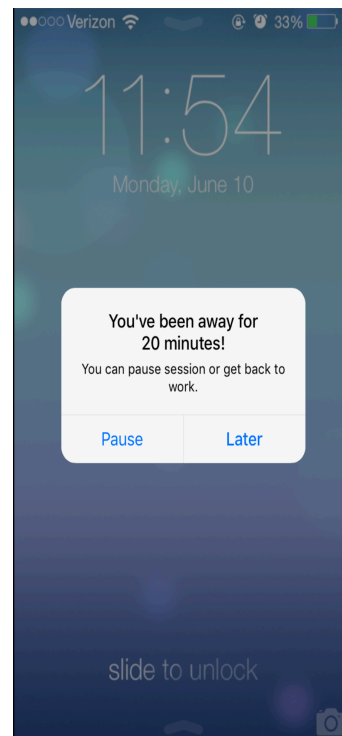
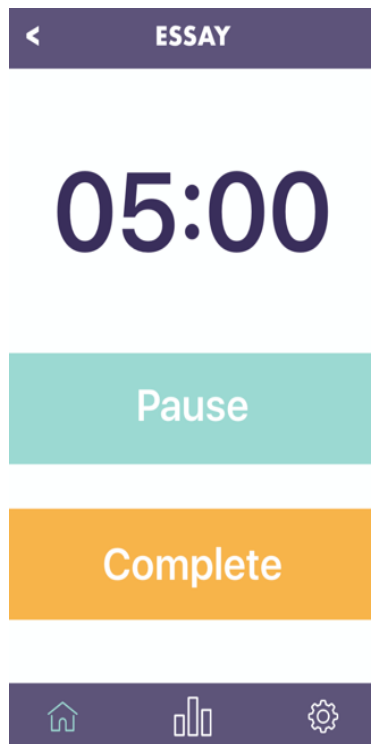
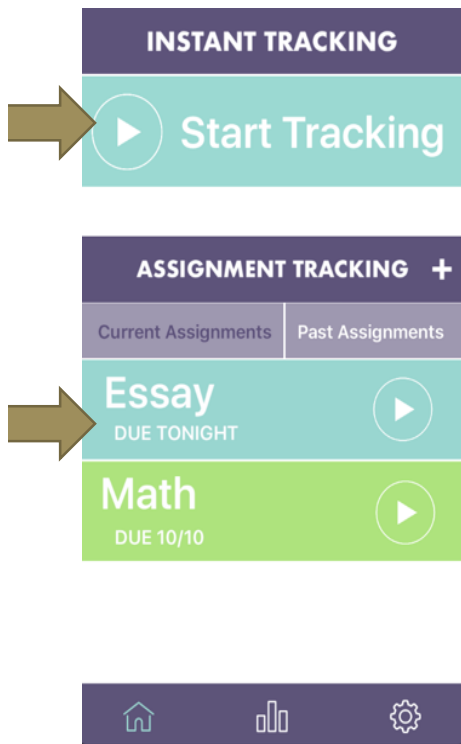


The customer would like to view results. If they go home, they can easily view them later by clicking the graph icon in the navigation bar.

## Task 2: Receive notifications to promote balanced study habits



Customer goes into settings, and enables notifications for distractions and productive break suggestions



Customer starts tracking

Customer receives notification when it is time to get back to work and when it's a good time for a break

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## Discussion

When we first considered paper prototyping and user testing for our project and overall design, it seemed it would be difficult to accomplish anything meaningful. After all, our design is motivated by - and in fact relies on - the user passively neglecting the tasks at hand; and this is not something that can be easily replicated in active, hands-on user testing. However, over the course of this phase of the project, we've found that these techniques really have allowed us to identify key areas where, despite our assumptions, user interaction with the design has to be facilitated in a careful and intentional way. Additionally, the iterative design process seems to have highlighted these areas in succession, with new layers of increasingly subtle issues emerging only after the preceding, more coarse design flaws were identified and dealt with.

With each subsequent user test, we began to see that once the basic functionality of the design was in place, fresh nuances to our two initial tasks began to emerge. For instance, once a participant understood the basic process of activating sensors and pausing a session, they then wanted to be able to pause the session from the notification alert box which popped up in a different context. We hadn't thought of extending the initial task in this way, but it was a good addition to the design and we wouldn't have come across it without iterative changes between user tests.

Ultimately, with each user test we learned more about the strengths and weaknesses of our design - and even about potential features and improvements we had never considered before. Because of this, it seems that we could have benefitted from performing even more user tests. Presumably, we would eventually reach a limit where we would have learned as much about the usefulness of the design as possible without changing its scope, but we don't feel that reached that point in the three user tests we were able to perform. But all in all, the iterative design process with paper prototyping, user testing and heuristic evaluation turned out to be very informative and highly beneficial for the details and overall functionality of our design.



## Appendix

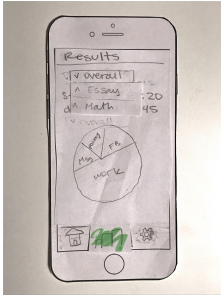
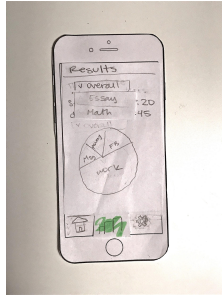
### Script excerpts:

Task 1: “For the first task, we’d like you to use the app to begin working on an assignment and track the amount of productive study time vs time you spent distracted while trying to work. Start by adding a new assignment, then begin tracking and get to work on the assignment you added. We’ll assume that while you were working you were somehow distracted for part of your study session. When you’re done, mark the assignment done and view your time-tracking results.”

Task 2: “The second task we’d like you to complete is based on receiving notifications. We’d like you to start by setting your preferences for different types of notifications, then select an assignment, activate the system and begin studying like you did in the previous task. During your study session, once one of your preference thresholds has been met you’ll receive a notification. React to it in whatever way feels natural to you.”

### Critical Incidents:

User Test #1:

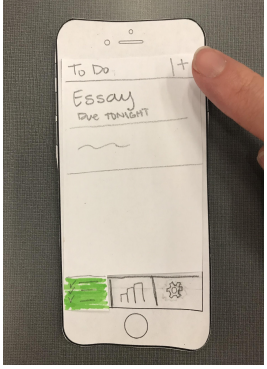
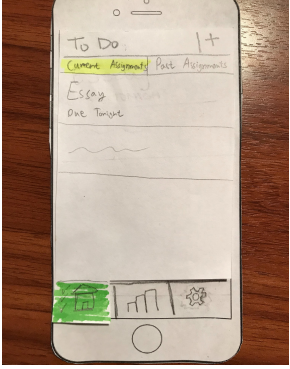
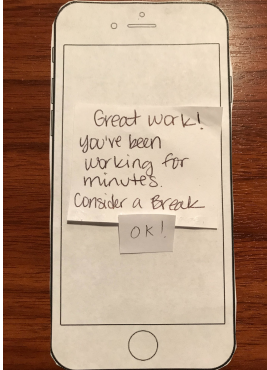
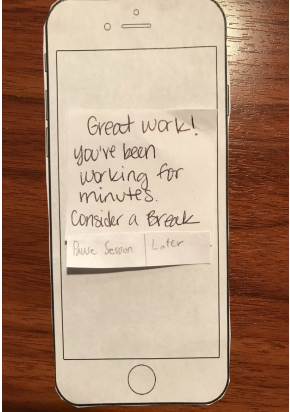
Before	Incident	Severity	Revision	After
	<b>H4 Consistency</b> Discontinuity in drop-down menu icons	2	Remove upside-down carats from menu items	

	<p><b>H3 Control and Freedom</b> User decided not to return to work after being notified that they were distracted</p>	<p>2</p>	<p>Create subsequent notifications that “piggyback” on top of the original notification</p>	
	<p><b>H6 Recognition not Recall</b> User wasn't sure which results she was about to view</p>	<p>3</p>	<p>Add clarification in “view results?” prompt to specify which results will be shown</p>	

User Test #2:

Before	Incident	Severity	Revision	After
	<p><b>H6 Recognition rather than recall</b></p> <p>User was not sure what it meant to “Pause Session”. Need to provide clearer guidance here.</p>	<p>3</p>	<p>Provide a transition screen that clarifies what will happen if “Pause” is selected.</p>	
	<p><b>H1 Visibility of system status</b></p> <p>User wanted to be able to receive notifications on laptop screen as well as mobile device, in case the phone wasn't nearby.</p>	<p>3</p>	<p>Provide notifications both on the mobile app and laptop</p>	

User Test #3:

Before	Incident	Severity	Revision	After
	<p><b>H1 Visibility of system status</b></p> <p>User was not sure what happens after the assignment is finished.</p>	3	Provide a past assignments tab where users can see the past assignments.	
	<p><b>H7 Flexibility and efficiency of use</b></p> <p>User wanted it to be able to "Pause Session" from the study break suggestion notification.</p>	2	Provide "Pause Session" button on the study break suggestion notification.	
	<p><b>H7 Flexibility and efficiency of use</b></p> <p>User wanted the study session to be paused automatically when the user forgets to tap-out.</p>	2	Fix it to pause the study session automatically when the device used for the study session is disconnected.	