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CSE 440 SECTION C  
WINTER 2017

# **BookWurm: Final Report**

## Finding Time to Read

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## Team

*Alison Wong:* Prototyping, conducting user research, drawing sketches

*Brandyn Bayes:* Prototyping, task analysis, general project management

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*Danial Chowdhry:* Prototyping, user research, drawing sketches

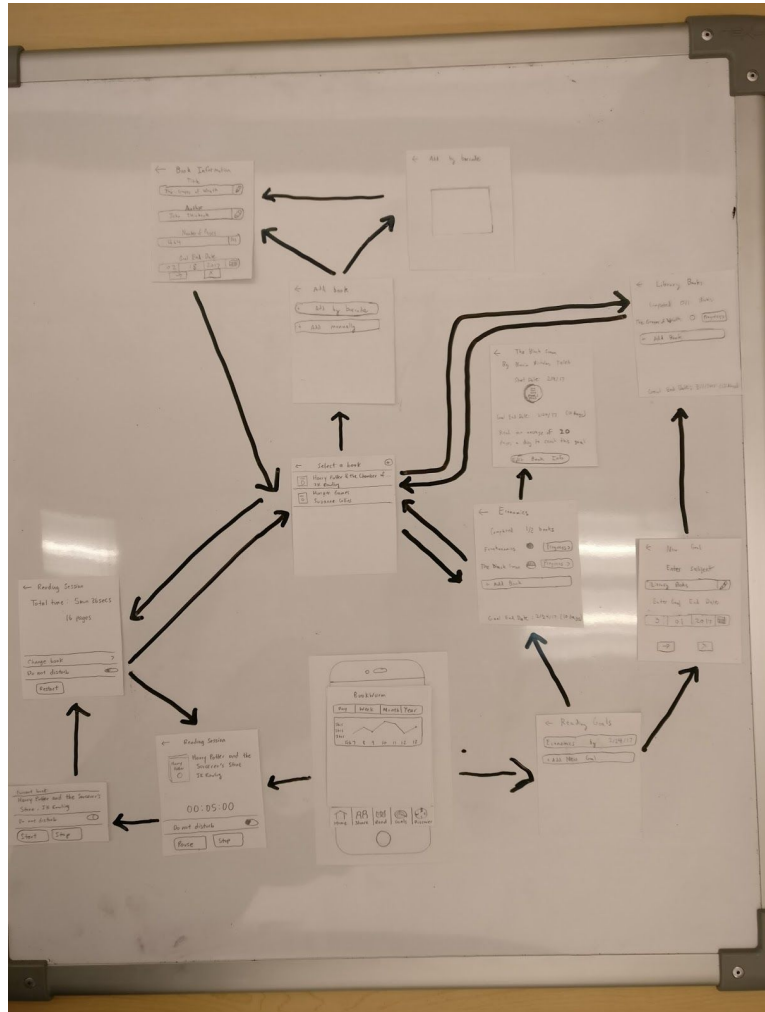
## Problem and Solution Overview

The habit of reading on a daily basis has become a sort of ideal in our technology focused society, instead of a habit. There are many individuals who used to enjoy reading but find themselves reading less as time goes on. Others are able to find time to read but find their reading habits to be too erratic. We hope to create a design that allows people to convert reading from an ideal in the back of their minds into a habit that they can monitor, manage, and more easily plan out. To this end, we propose using BookWurm, a design project that combines the usage of a smart bookmark and a phone application that easily allows you to track the amount you read and displays metrics to find out when to read for future sessions. BookWurm also suggests what kinds of books to work towards finishing next to help encourage people to be more engaged with their reading. Overall, we hope that BookWurm can add more incentives to the normal reading process.

## Initial Paper Prototype

Our initial paper prototype focused on both the mobile application, as well as the critical aspects pertaining to the bookmark itself. The critical paths that we focused on here were 1) being able to log the reading of a book, and 2) being able to set a goal relating to reading a collection of books. These collections are intended to be a set of books relating to economics, or even just a series of books, such as The Divergent Series.

The critical aspects of this design centered on the ability to see relevant statistics on the dashboard, being able to collect timing information, especially relating to the book that is read, as well as the ability to define out goals and track them as they are read. A key feature that was prominent in this early prototype was the ability to set the do not disturb feature while reading. For this particular feature, we allowed the person to set that they did not want to be disturbed while the timer was going, and in essence silencing their phone to take away potential distractions. Another key piece that also came out of this prototype was the idea of the library. In the library, a person can have a single place from which they can access all of the books they are currently reading, already have read, or plan to. This is indicative of our early research, which points towards people's tendency to re-read books that they have already read. By including the library, we believe that we make this easily possible, and enable a key scenario which may arise.



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## Testing Process

After creating our initial prototype, we paired up with two different groups to do heuristic evaluations. Based on the observations from the members of the other group, we were able to list down issues with our prototype that they felt was unclear or did not make sense. This was helpful in allowing us to make critical changes to our prototype before starting usability tests. Two groups of people evaluated our prototype - Travis and Vanessa from Goals and Habit Formation, and Katrina and Cynthia from Eye Strain and Breaks.

Our initial usability test was conducted with a male, 20 years old, pursuing an HCI degree. We performed the usability test inside of the technology exploration lab of Mary Gates Hall, which we chose for its open space. We had one individual read the script and tasks to the participant, while another was responsible for performing the necessary “wizard of oz” tasks. The additional two team members took notes during the process. The participant was asked to think aloud while walking through the tasks, which included:

- Syncing the bookmark to the application
- Skipping adding a book so they could explore the application
- Adding a new book
- Check upon an existing goal
- Check books that have been read
- Correct information about a mistimed reading session

We noticed that the order in which we presented certain tasks in the usability tests did not make sense to the participant. For example, we asked the person to add a book fairly late into the process, whereas it putting it earlier might help inform later tasks better.

We conducted our second usability test with a male student majoring in Informatics who we found in the Collaboration Lab in the Mary Gates basement as well, and we reprised our roles from the first usability test. We changed the ordering from the first usability test in order help tasks make more sense to the participant. We also noted that the wording of certain tasks, like asking the participant to “skip syncing the bookmark to explore the application” were worded in ways that could potentially confuse the participant, so we sought better wordings for our questions going forward.

Our last usability test was conducted with a male student in the UW CSE ACM lounge. We chose the ACM lounge to hopefully get a participant with a different perspective than in our previous usability tests conducted at Mary Gates. In this usability test, we tried to pay more careful attention to our wordings and also tried to prompt the participant for their perspective more often to see how they felt about the task being conducted and whether

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it seemed like something that would be convenient to them. Our last usability test went smoothly, and our prompting yielded more insights into how our design was perceived.

## Testing Results

We iterated through many paper prototypes throughout our heuristic evaluation, usability tests, and design critiques. As a result, some parts of our digital prototype differs greatly from our initial paper prototypes. The most important feedback and corresponding changes are described here, but a detailed version can be found in the appendix.

**Heuristic Evaluations:** Through this, we noticed some inconsistencies among our different screens, for example using interfaces from both iOS and Android, which should have been standardized in our application. We refined these before starting our usability tests. However, we mainly found the following problems with our prototype during this stage.

- Matching system to the real world: The evaluators realized that some of our titles were confusing. For example, the prompt “Enter Subject” wasn’t clear in the sense that the evaluator did not understand what “Subject” meant in our context. Our prototype was modified to use better naming conventions
- Matching system to the real world: Shapes of our progress bars did not resemble progress bars to the evaluators. We modified them to use circles in order to minimize the confusion for usability tests.
- Flexibility and efficiency of use: The ability to list current books in a person’s reading library was nonexistent. To solve this, the dashboard was updated to include a list of books to switch between, and our menu bar was changed to include a clear menu option for the library.

**Usability test 1:** It was during this stage when we found our task order was not ideal. Along with making sure we were conducting a better test, we also found the following problems and modified our design after this usability test.

- Settings page: Our participant was concerned about how the application pairs with the bookmark. We introduced a settings page, with little functionality, but made the necessary features available when necessary.
- Getting started: Our participant identified that when the application first opened up, it was not immediately clear as to how they should get started. To remedy this, we opted to include a getting started page. This page opens on the option to sync a new device, followed by an option to add a new book.
- Goal categories unclear: During the course of the usability study, when the participant first saw the goal page they confused the goal category of “Economics”

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for a book. To this end, we thought it would be helpful to label each section clearly as a collection, as well as showing the total number of books for that goal, as well as the participant's overall progress.

**Usability test 2:** For the second usability study, we found that certain ways the application was presented didn't quite connect with the participant. We tried to revise accordingly.

- Add button: The participant was unable to locate the button to add a book, so we made it more prominent. This was reverted later in response to a design critique.
- Confusing sync screen: The initial presence of the sync screen did not seem to make that much sense to the participant at first, as the nature of the question implied that the bookmark itself needed to be used to progress forward from this screen. We removed the sync screen from the paper prototype to avoid further confusion.

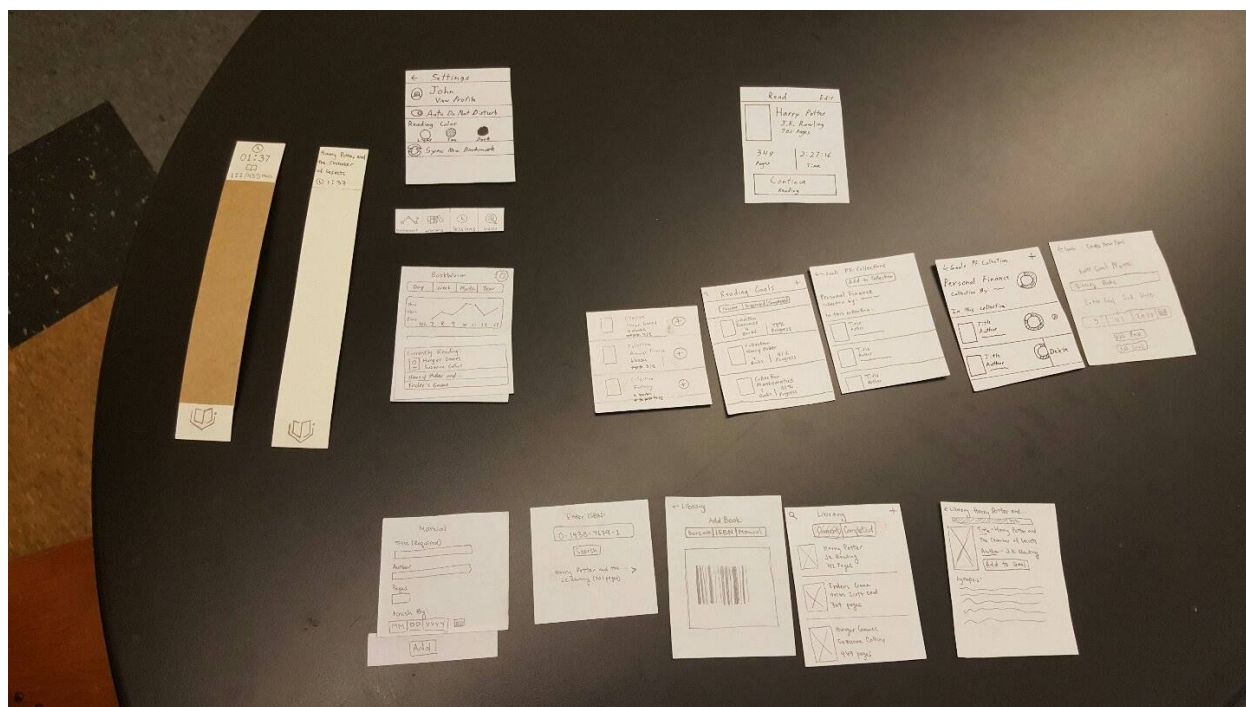
**Usability test 3:** In this usability study, even though completion of tasks generally went smoothly we acted upon many suggestions to make the application feel more consistent.

- "Read" has too many interpretations: The participant expressed confusion over the fact that "Read" can be interpreted in both past and present tense. In order to make the functionality of the button more clear, we changed the name of the button to "Sessions", as this implies that a participant can start and end a reading session on this tab.
- Connected book unclear from looking at bookmark: The participant expressed concern over not knowing the bookmark was paired to the correct book just by glancing at it, so we added the title of the book to the top of the bookmark in order to allow the reader to double check that the bookmark is paired with the correct book.
- Scanner should not be default screen when adding books: The participant brought up the point that the camera should only be brought up with the participant's explicit permission as there are privacy concerns related to use of the phone's camera. In response, we changed the default screen of the "Add book" screen to "Add by ISBN".
- Books should be addable upon goal creation: The participant expressed some annoyance over the idea of creating a goal and then going back and adding books to it after creation. In response, we added the option of adding books to a goal on its creation screen.

**Design Critiques:** We also received feedback after presenting our design each week during section and modifying it accordingly. The most important change that we made in

response to design critiques was adding “Suggested Goals”. We were having trouble making the idea of goals compelling to our participants, so it was suggested to us that we have a goal recommendation system that gives people suggested goals based on what books and goals they’ve completed in the past. We added suggested goals to our prototypes in order to make the idea of goals more interesting.

## Final Paper Prototype



Our final paper prototype is included above, and shows a series of screens, many of which have been significantly iterated upon since the original paper prototypes used for heuristic evaluations. The majority of the changes can be found in the test results section, but as a brief highlight to what has changed: 1) the labels have been revised to make it easier to find the necessary tasks, 2) have simplified a number of the screens to their core functionality to make it simpler to complete a specific task.

The final prototype focuses on delivering a clear step-by-step process through which our participants are able to step through each of the tasks that are presented to them. A key portion of this work went towards making sure that the different components, such as the library, could stand on their own, and made sense to be reused during different points of the application, such as the normal library page, as compared to when you wanted to select a book to add to a reading goal. There was also a significant amount of investment into re-labeling the different sections, such as the reading goals to be reading

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playlists. This made it easier to quickly interpret on the part of the individual using it as to how it was suppose to work.

The two primary tasks are 1) being able to track reading time for a book, and 2) being able to set goals relating to a playlist or collection of books. The first task is primarily supported through the ability to go into the sessions page, and track the time that is spent reading inside of the app, or via the bookmark. This particular task is meant to have a relatively low barrier to entry, and to take as few steps as possible (particularly with the bookmark, which only requires you to remove it from the book, and place it around your wrist while reading).

The second task supported by this prototype is the ability to set reading goals, or as they are presented in the application, reading playlists. For the playlists, a person is able to go to the goals screen, see any goals that they currently have, how they are doing on those goals, as well as other reading playlists that they might be interested in, based on their reading history.



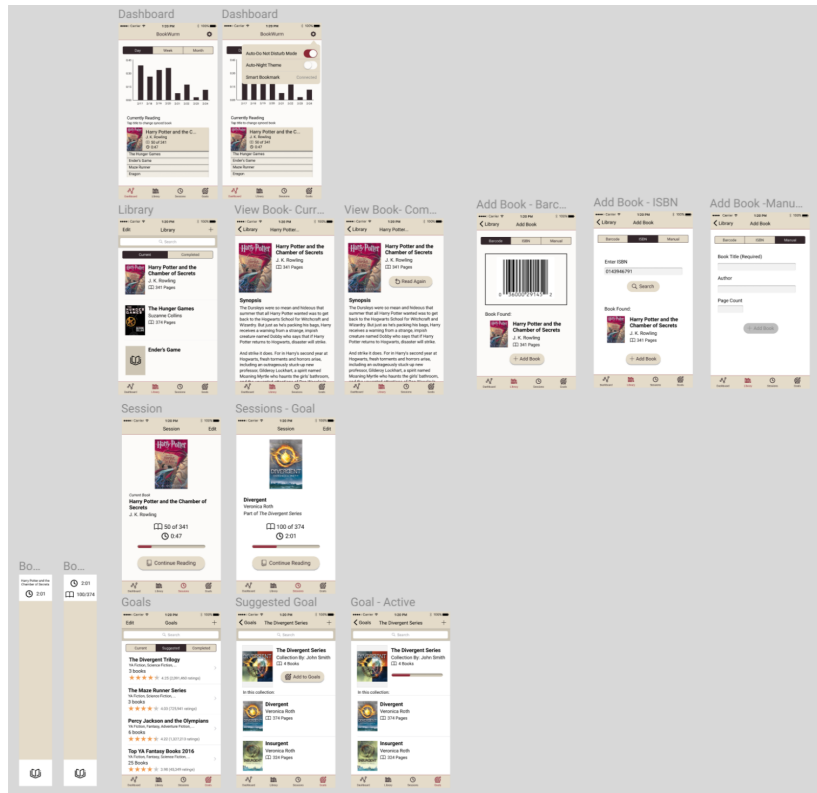
## Digital Mockup

For the digital mockup, we focused on refining large portions of the overall design, and also include different variations of the UX to show how it appears in different states. One of the more noticeable changes that we made when building the digital mock-up was to replace the UI elements with more specific versions, or ones that made more sense in the overall context. The most prominent example of this is the styling of progress bars. In our original paper prototypes, we used circular progress bars, however

based on the availability of preset elements, we instead used flat progress bars instead of trying to create our own circular ones.

To support the first task of logging a reading session, we focused on a very simple interface on the sessions page, which allows them to indicating that they are reading, and then be able to stop the timer when they are finished. There is also the availability of a small quick switch widget on the main dashboard, which allows a person to quickly change which book they are currently reading without having to dig through the different pages of the application. The quick switch is the other primary outlet that enables this task.

The second task supported by this design is the ability to set a reading goal relating to a series of books. The concept of the reading goal has been altered somewhat to instead be presented as a reading playlist, borrowing a number of different concepts from music applications, since these are more widely understood. To enable this task, we focused on creating a convenient interface through which a person can quickly set out a reading goal. We start by offering them a list of suggested ones based on what other people have created. They can also create their own list of books that they want to based on



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books in their library (or new ones added at that point). After the goal itself is created, the application tracks the person's overall progress through the series as they read the different books. Some important points of note: 1) the sessions page is updated to reflect when you are reading a book from a particular goal, 2) we opted to not include an end date as apart of the goal creation, as individuals from our testing leaned more towards just the reading of a group of books, not necessarily by a specific date.

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## Discussion

One of the biggest issues we had during our prototyping phase was understanding user flows. For our usability tests, we had created screens based on what we anticipated would be the path our participant would take. We also created screens for other paths a participant might use to accomplish a task we gave them since participants rarely follow the intended path. However, we found that even with the extra preparation, the participant would find a path we did not think of. Sometimes, a participant would even point out that they expected to be able to accomplish the task on a certain screen, and was surprised that they were unable to. Our team had to spend a lot of time discussing the thought process behind how a person would navigate from screen to screen.

There was also the issue of flexibility. We wanted to enable people who use our application in the way they felt was most comfortable. This meant that there were several ways to add books to a reading list/goal among other things. However, this resulted in some confusion during our testing. When a participant was given a task, occasionally, they did not realize or notice that they could complete it with the screen they were looking at. This meant we had to re-examine those screens and focus on how we could better emphasize what interactions were available.

Another big issue we ran into during our usability testing was language ambiguity. It was hard to pick singular words for our navigation bar that could convey to a person what that tab would allow them to accomplish. Our team initially felt that the term "Goals" was straightforward and clear, but during our usability tests, people were unsure what "Goals" meant or what they were supposed to be able to do in that tab. Another one was "Sessions" was previously labelled "Read" and one person asked before we started the test whether it meant present tense or past tense.

Our team felt it might have been interesting to see what results we would have gotten if we could have done one iteration/usability testing phase on the digital mockup. It would have been helpful to see the contrasting feedback we got based on the fidelity of the prototype we used for testing. The iterations were invaluable because it gave us the opportunity to refine our idea and see if the changes we made had the impact we desired.

For the final design, we still had some small tweaks to make to better match the user flows we identified during our usability tests. We realized that some of the flexibility we had originally incorporated did not make sense when taking into account the user flows we discovered so we had to adjust accordingly.

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## Appendix

### Usability Test Script - Version 1

Thank you for taking the time today to be a part of our usability study. As we explained to you before, the purpose of our project is to help people find the time to read. The purpose of this usability study is to get a better understanding of how people will interact with our product. Remember, it is the prototyping being tested and not you. Any problems or issues that you may run into is a problem with our design.

At the end of the study we will have time to discuss more about the project and answer any more questions you may have. But before we move onto the usability study, do you have any questions or concerns?

Tasks:

- You want to skip adding a book so you can explore the application
- What book are you currently reading?
  - What would you do if you wanted to change the book to the Hunger Games?
- You have been using the application for a few months now. You want to see what books you have finished reading, where do you go?
- Say you want to add a new book to read, how would you go about doing so?
- Say you want to look at your current goals, where would you go?
  - How would you view your goals for Economics books?
    - How would you edit this goal?
- Say the smart bookmark mistimed your last reading session, how would you go about correcting this?

### Usability Test Script - Version 2

Thank you for taking the time today to be a part of our usability study. As we explained to you before, the purpose of our project is to help people find the time to read. The purpose of this usability study is to get a better understanding of how people will interact with our product. Remember, it is the prototyping being tested and not you. Any problems or issues that you may run into is a problem with our design.

At the end of the study we will have time to discuss more about the project and answer any more questions you may have. But before we move onto the usability study, do you have any questions or concerns?

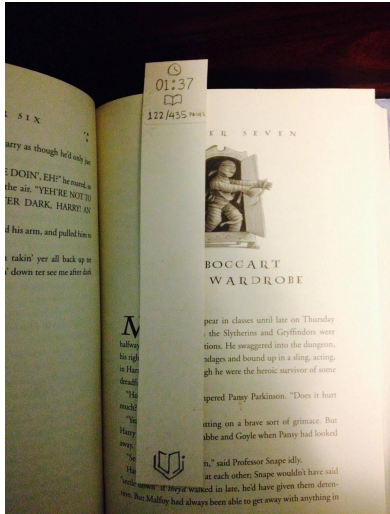
Tasks:

- You want to skip adding a book so you can explore the application
- Say you want to add a new book to read to your library, how would you go about doing so?
- What book are you currently reading?

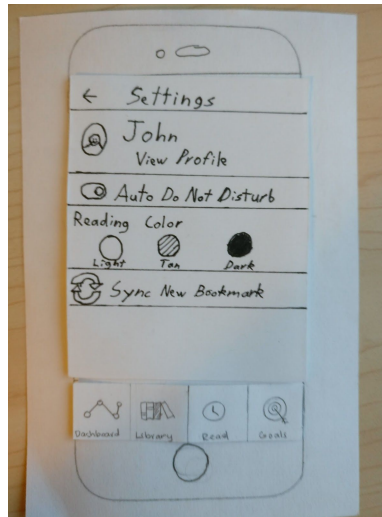
- What would you do if you wanted to change the book to the Hunger Games?
- You have been using the application for a little while now. You want to see what books you have finished reading, where do you go?
- Say you want to add a reading goal with several books. How would you go about doing it?
- Say you want to look at your current goals, where would you go?
  - How would you view your goals for Economics books?
    - How would you edit this goal?
- Say the smart bookmark mistimed your last reading session, how would you go about correcting this?

## Usability Test Incidents

Issues identified from Usability Test 1:

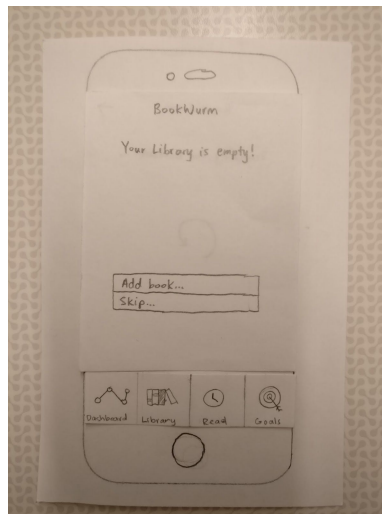
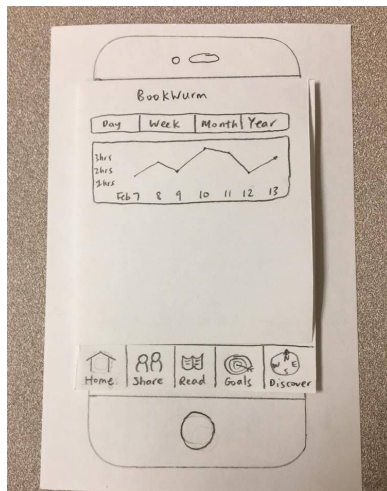
Before	After	Incident
	N/A	<p><b>Simple Bookmark Interface</b></p> <p>A positive point in going through the usability test with our participant was the bookmark interface. For the participant, he noted that it was really simple and straightforward. He also noted that it took a significant portion of the work out of trying to record the time spent reading.</p>

(No page existed for this previously)



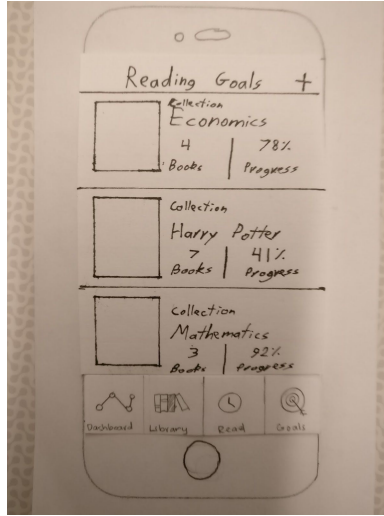
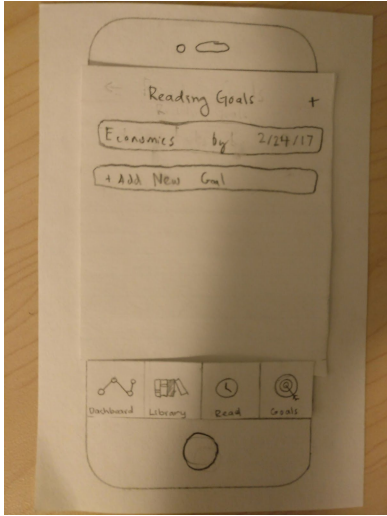
### Settings Page (Severity 3)

A point of concern for our participant was in how they would connect to their bookmark, or how it is that they might go about connecting to a brand new wearable if they were to lose the old one. For this change, we focused on introducing a settings page, with very little in terms of added functionality, but made the necessary features available when necessary.



### Getting Started (Severity 3)

Our participant identified that when the application first opened up, it was not immediately clear as to how they should get started. To remedy this, we opted to include a getting started page. This page opens on the option to sync a new device, followed by a prompt, asking the participant whether they would like to add a new book.

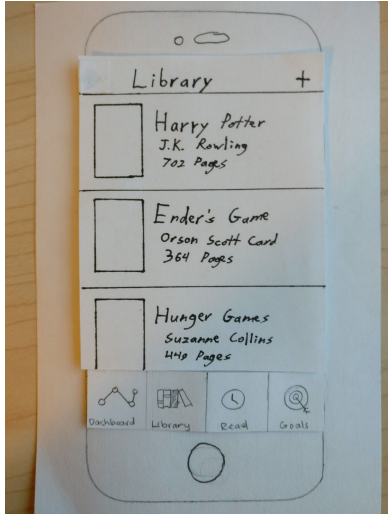
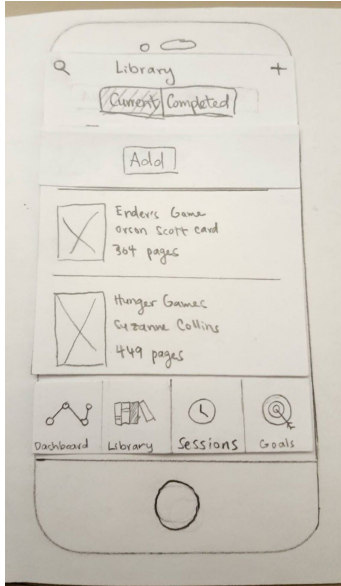
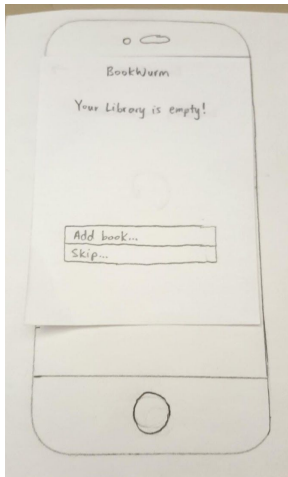


### Categories Unclear (Severity 3)

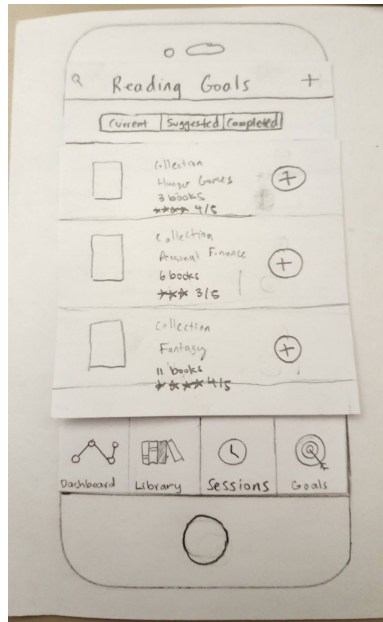
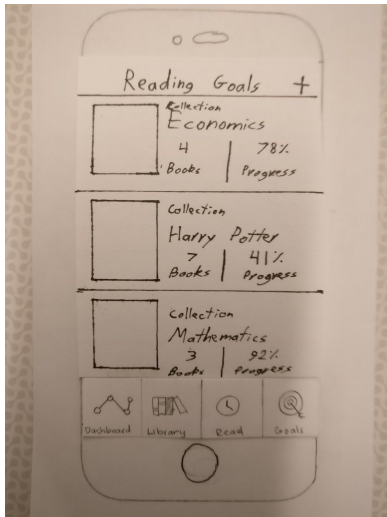
During the course of the usability study, when the participant first saw the goal page they confused the goal category of "Economics" for a book. To this end, we thought it would be helpful to label each section clearly as a collection, as well as showing the total number of books for that goal, as well as the participant's overall progress.



Issues identified from Usability Test 2:

Before	After	Incident
		<p><b>Difficulty in locating the add button (Severity 4)</b>            The participant had some difficulty in figuring out how to add a book, initially clicking read in order to add a book, and then when coming to the library screen, was not able to notice the plus in the upper left corner. This left the participant confused as to how to add a new book.</p>
	<p>(Removed)</p>	<p><b>Unnecessary sync screen (Severity 3)</b>            The initial presence of the sync screen did not seem to make that much sense to the participant at first, as the nature of the question implied that the bookmark itself needed to be used to progress forward from this screen. We removed the sync screen from the paper prototype to avoid further confusion.</p>

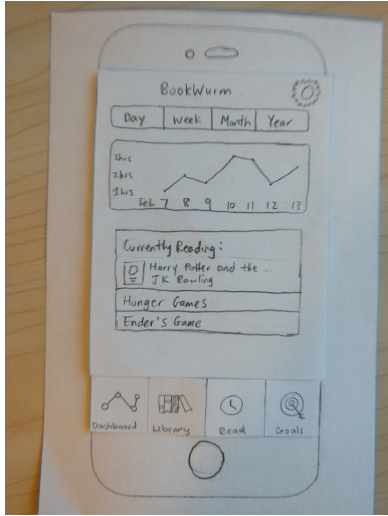
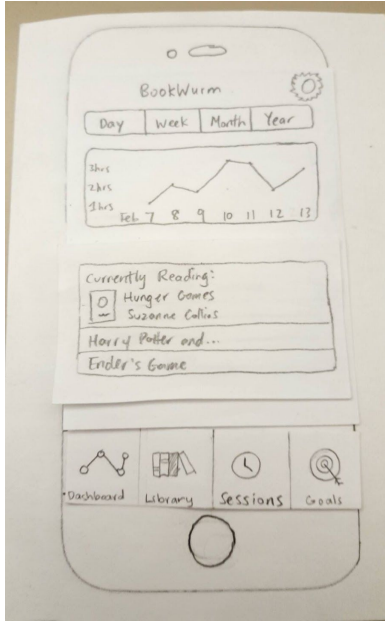
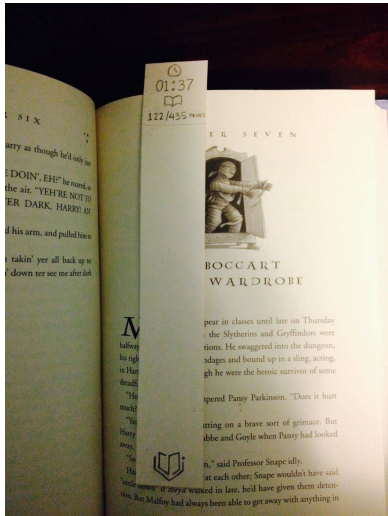



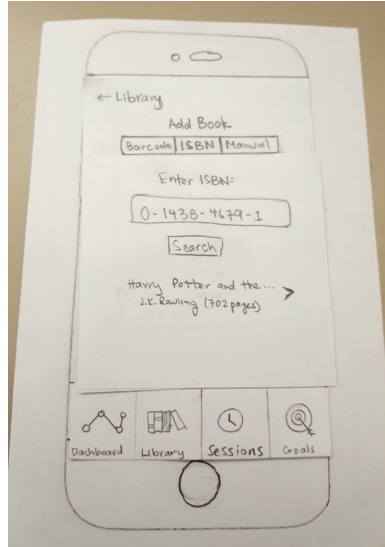
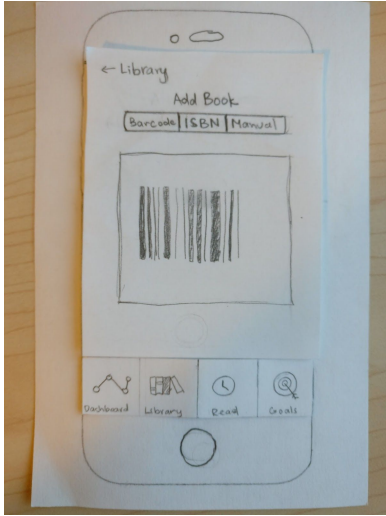


### Idea of goals not compelling enough (Severity 3)

The concept of setting a goal did not immediately make sense to the participant, so in response to feedback we attempted to make the goal more compelling by adding a "Suggested" tab to the reading goals screen in order to suggest functionality that would allow the participant to figure out what to read based on what is popular online.

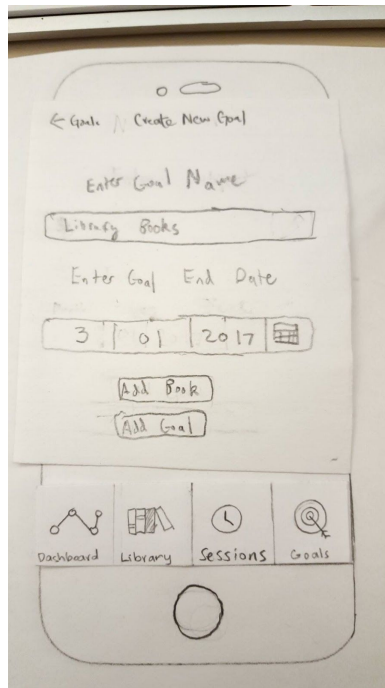
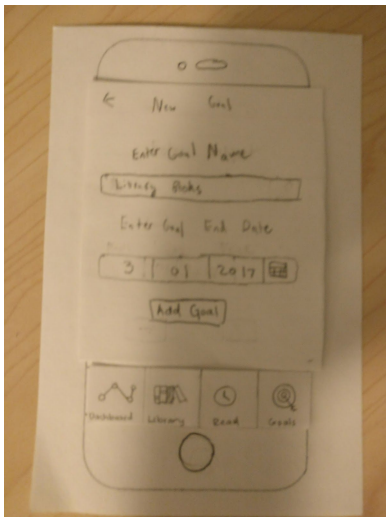
Issues Identified from Usability Test 3:

Before	After	Incident
		<p><b>“Read” has too many interpretations (Severity 2)</b></p> <p>The participant expressed confusion over the fact that “Read” can be interpreted in both a past tense and a present tense, and was unsure of what would happen if he clicked on the “Read” button. In order to make the functionality of the button more clear, we changed the name of the button to “Sessions”, as this implies that a participant can start and end a reading session on this tab.</p>
		<p><b>Connected book unclear from looking at bookmark (Severity 1)</b></p> <p>The participant expressed concern over not knowing the bookmark was paired to the correct book just by glancing at it, so we added the title of the book to the top of the bookmark in order to allow the reader to double check that the bookmark is paired with the correct book.</p>



**Scanner should not be default screen when adding books (Severity 2)**

The participant brought up the point that the camera should only be brought up with the participant's explicit permission as there are privacy concerns related to use of the phone's camera. In response, we changed the default screen of the "Add book" screen to "Add by ISBN"



**Books should be addable upon goal creation (Severity 3)**

The participant expressed some annoyance over the idea of creating a goal and then going back and adding books to it after creation. In response, we added the option of adding books to a goal on its creation screen.