Perfect Timing

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Problem & Solution

College students do their best to plan out their daily tasks, but consistently fall behind schedule, fail to get everything done, or simply can't find time to plan consistently. Classes, homework, and work keep students busy and stressed. These students need an easy and quick to use time management solution that will assist them in planning their days so that they may finish their coursework on time, while still fitting all the other important aspects of their lives into their schedule. Though there exists time management applications, we found that these rely on users to already be good at time management. These applications are more often a tool that holds information, such as a schedule, instead of a solution which actually helps users plan their time. As a solution to this we propose a time management application that will minimize manual data entry and provide the individual student with thoughtful calculations to help them schedule their time. The solution will have the ability to import already existing events from other sources, such as a school website or Google Calendar, to avoid duplicate entry by the student and provide a single centralized calendar. In addition to basic features like reminders, another main feature will be the use of course and personal statistics to calculate a recommended time to allot for specific assignments. Statistical data for course assignments will be collected from the time logs of many different users and uploaded, which will allow other users to see how much time it usually takes to finish these assignments, and they can then schedule their own time appropriately. In order to motivate students to provide their data, they will not be given course statistics or recommendations for how to schedule an assignment if they are not consistently providing their own data. An intrinsic motivator to log time will be that if they are not logging their time properly, the recommendations they do receive would not be accurate and therefore not helpful to them.
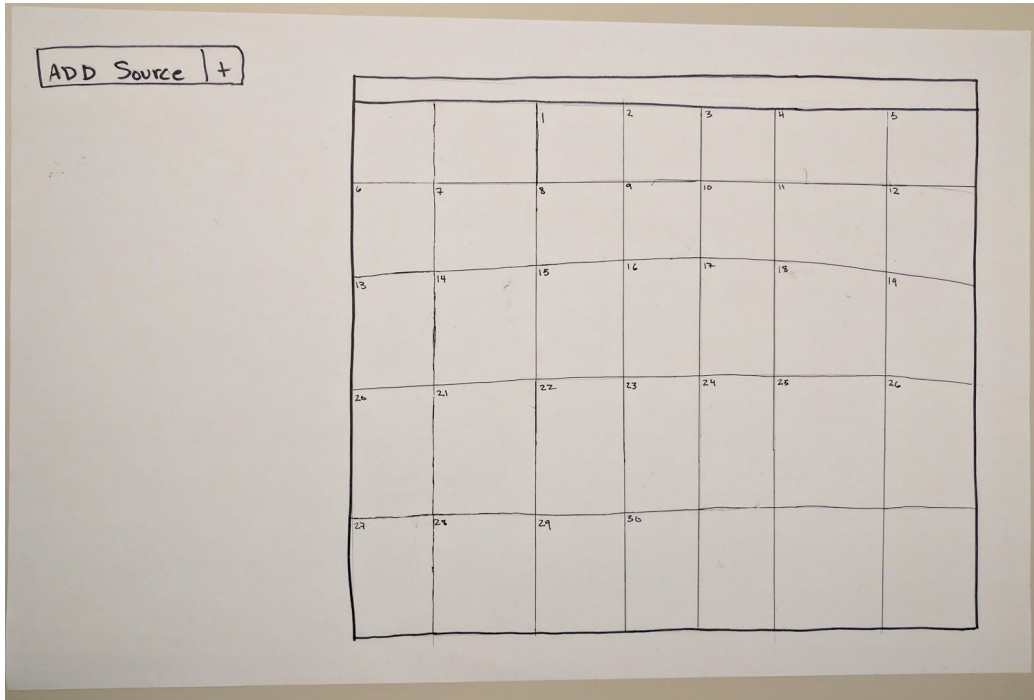
Initial Paper Prototype

The paper prototype is designed primarily as a desktop web application, with a few key interactions taking place on a mobile companion app.
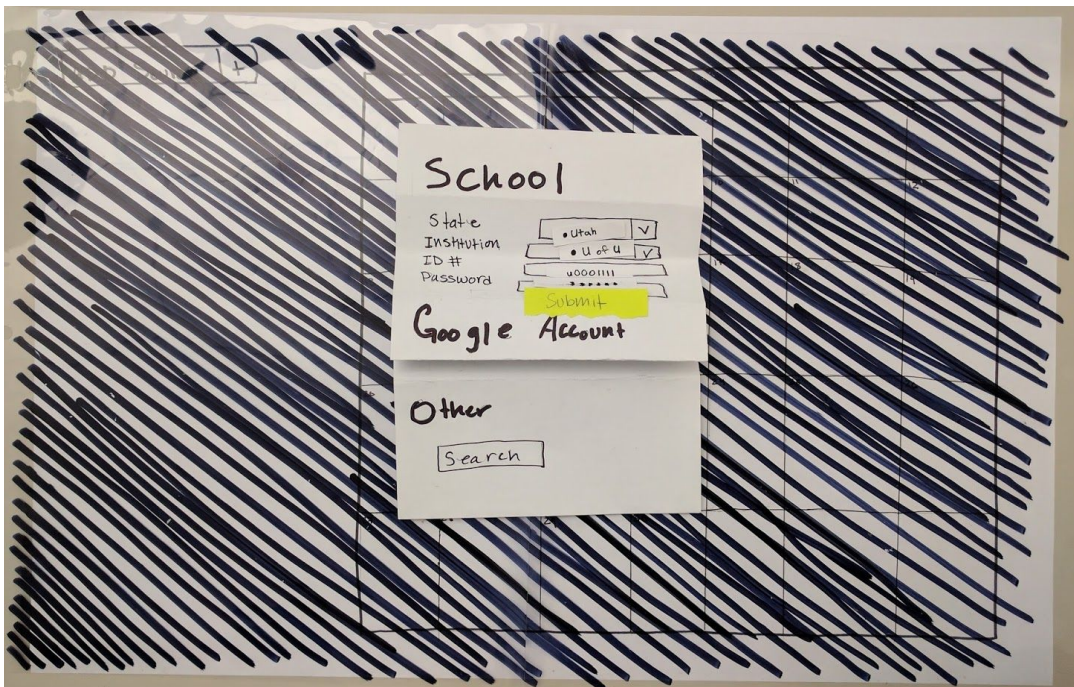
Overview

Preliminary Task: Importing Classes and Calendar from Existing Apps

Application home page.

Source selection modal window.

Task 1 & 2: Schedule from a List of Tasks and Determine Time to Allot

Example A

Main page with imported school sources.

Assignment planning page.

Assignment planning page with recommendations.

Class 2

Assignment 1

Statistics for this assignment
- Hours Spent — Average: 7
- Grade — Average: B+

Overall Course Statistics
- Hours Spent — Average: 5
- Grade — Average: B-

Personal Statistics
- Hours Spent — Average: 6
- Grade — Average: B+

Priority
- Percent of grade: 5%
- Select a Priority: • Medium [v]

Recommendations
Total time: 7 hours
November 10: 2 PM - 5 PM
November 14: 6 PM - 8 PM
November 15: 5 PM - 7 PM

Priority:
Medium

[Change] [Accept & Schedule]

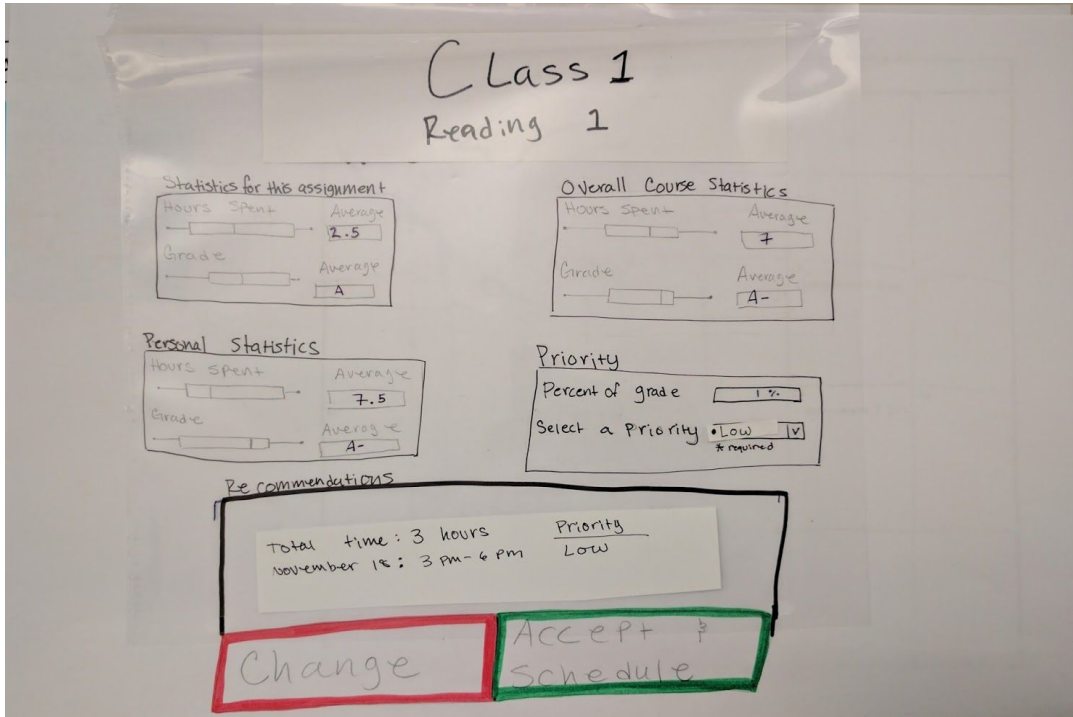Main calendar page with assignment work time added to the schedule.

ADD Source +

- University of Utah
  - Class 1
    - HW 1 [Schedule]
    - Quiz 1 [Schedule]
    - Reading 1 [Schedule]
- Class 2
  - Assignment 2 [Schedule]
  - Assignment 1 [Schedule]

Calendar:
- 10: • Assignment 1 2-5
- 14: • Assignment 1 6-8 PM
- 15: • Assignment 1 5-7 PM
- 18: • Assignment 1 Due
- 22: • Reading 1 Due
- 23: • HW 1 Due
- 25: • Assignment 2 Due
- 29: • Quiz 1 Due
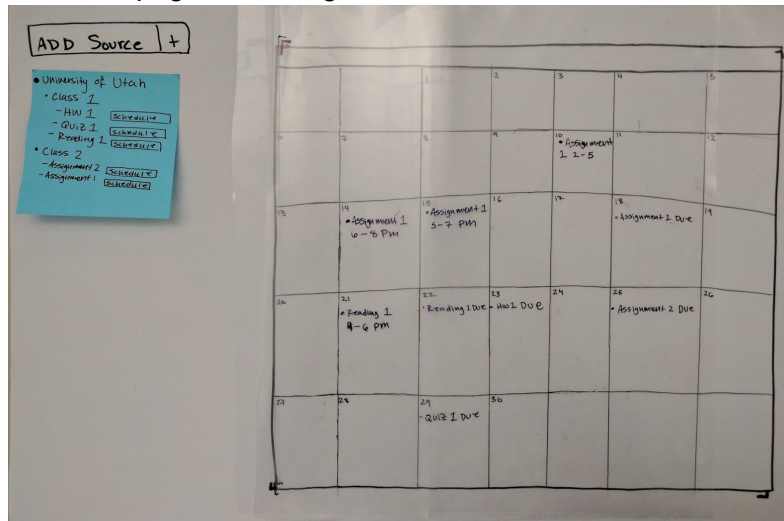
Example B
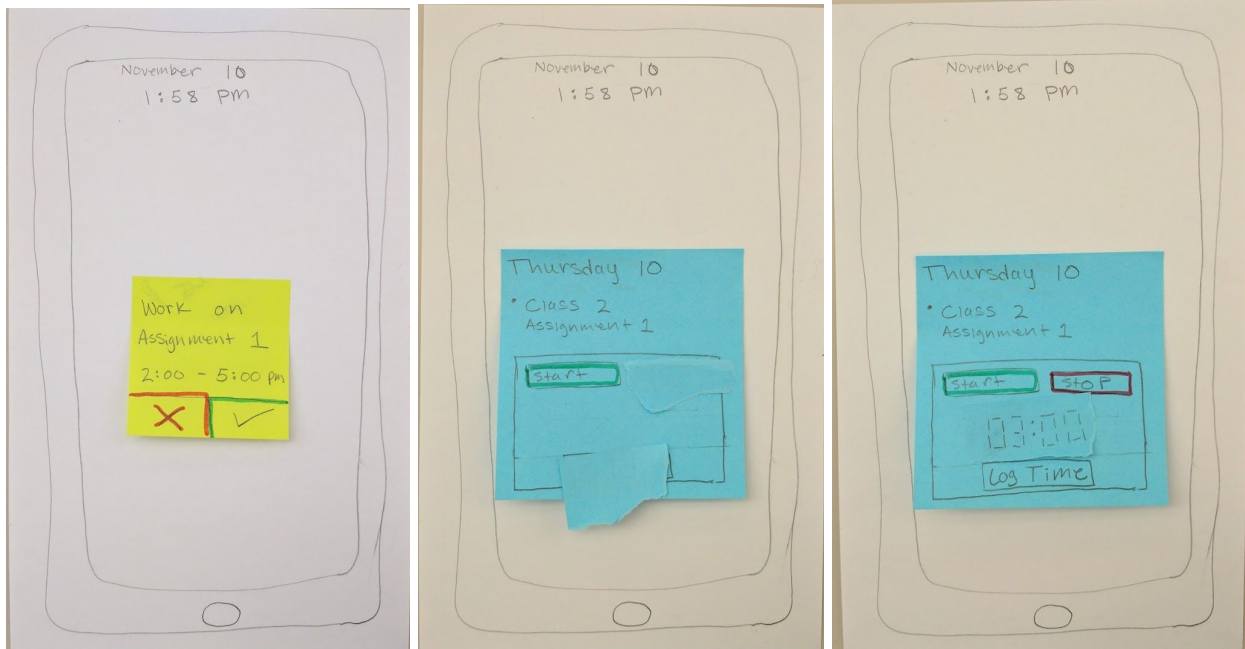
Assignment planning page.

Modal to change the recommended plan.
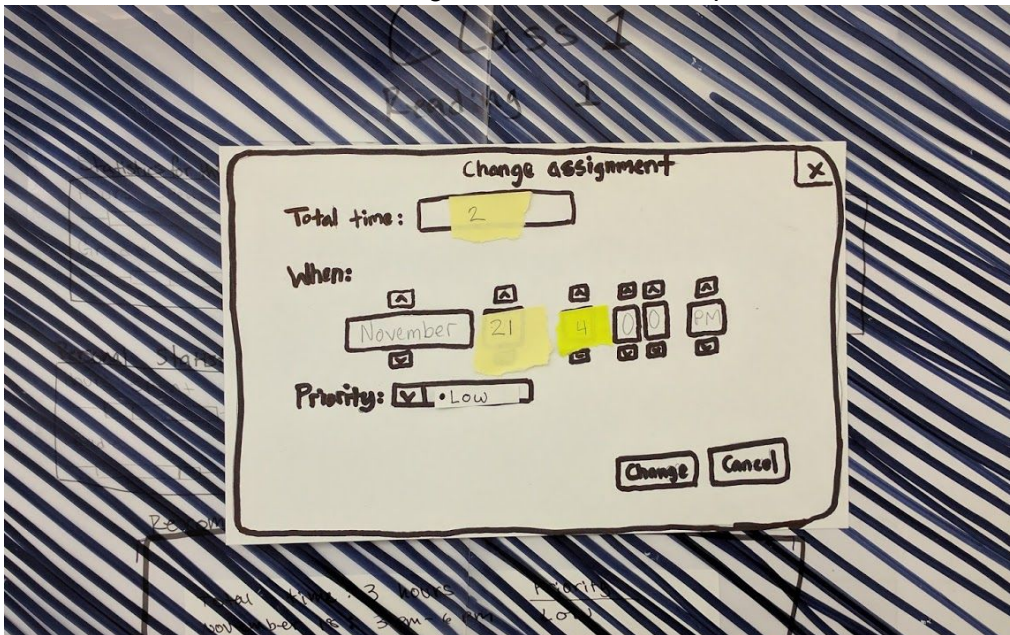
Main calendar page with assignment work time added to the schedule.

Other Tasks: Transitioning Between Tasks and Accurately Timing Tasks

The mobile companion app reminds the user that it is time for her to work on her assignment. She accepts and starts the completion timer. When she is finished, she hits 'Stop'. The app will ask her if she wishes to log the recorded time as the duration necessary to complete her work. If she chooses to log it, the application will take it into account when scheduling her future assignments, and when other students in her class schedule theirs.

Testing Process

Methods

Our design underwent three different types of processes to improve it from the initial prototype. First was two rounds of informal heuristic peer evaluations using the initial paper prototype. One round of usability testing was also done using this initial design. After all the results from the heuristics evaluations and the first usability test were examined and changes completed, we did two additional rounds of formal usability tests with members from our user base. Time was taken between each usability test to examine results and implement any changes as decided before beginning the next usability test. Inspections of the prototype were made continuously by all team members throughout the period of heuristic evaluations and usability tests. These inspections raised group discussions and in some cases, prompted improvements to the prototype.

Usability Tests

For each usability test we started by explaining our project and the purpose the app would serve. We then explained to each participant what a usability test is, what we hoped to gain from them, and how we would be conducting the test with them. At this point we asked them if there was anything that needed clarification before we began. Once any questions were answered, tasks were assigned one at a time. Assistance was only provided if the participant required it to complete the task, and move on to the next portion of the test. All of the participants were assigned the same tasks, in the same order. At the end of the usability test we provided clarification on the path we expected if it was different than the one the user pursued. Finally, we asked each participant if there was any feedback they would like to contribute. All usability tests were conducted in the university library, since this is a common environment for college students.

The most significant change to our usability test process came after the first test. It was decided that the participant would be given the tasks written down in addition to our verbal instructions. A change of instructions was made before the third test. In addition to the same information the other participants received, this participant was told to explicitly inform us when they believed they were finished with a task.

Roles:
Test 1: Facilitator- Alejandra, Computer - Andrew, Observer - Brant
Test 2: Facilitator - Alejandra, Computer - Alejandra, Observer- Brant
Test 3: Facilitator - Alejandra, Computer- Andrew, Observer - Eric

Participants

The participant for the first usability test was a Communications student and part-time employee at the University of Utah. This student was chosen because he meets our main criteria of being a busy college student interested in keeping up with his schoolwork. His knowledge of technology was representative of the typical college population.

The participant for the second usability test was a Computer Science student at the University of Utah who also has an internship. This student is early into the major, so his classes include general requirement courses and major specific classes. These different types of classes often require very different amount of time to complete the coursework. This participant represented a student who would benefit highly from this solution. This coupled with his busy day-to-day life made him a great participant.
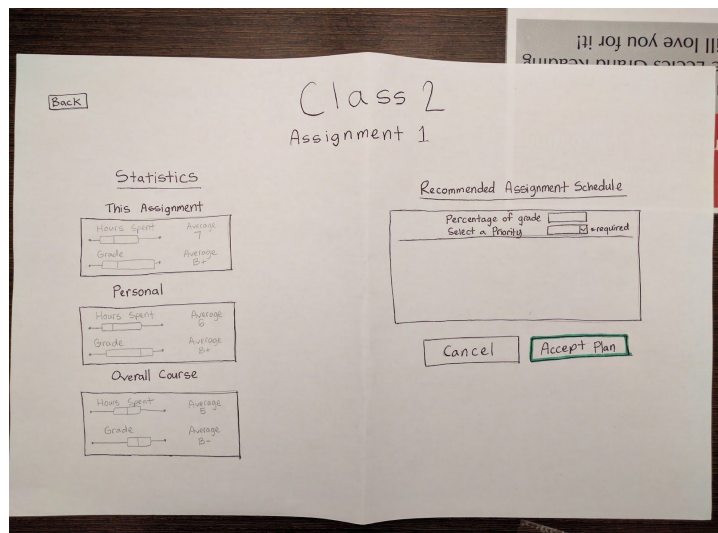
The participant for the thirds usability test was a Computer Science upperclassman at the University of Utah. Though he does not have a job, he is an individual who is organized and likes to do well in school. He takes a full course load, which keeps him very busy. Contrary to our other participants, this student is one that is much more organized about his schoolwork. Because of these reasons, this participant brought the perspective of another style of student to test our designs.

Testing Results

Heuristic Evaluations

The heuristic evaluations revealed main issues in our initial paper prototype, all of which were rated a severity of two or one. One of the main issues was lack of context in the add sources button on the left of the page Once a source was imported, there was also confusion about why there were items on the left panel that also exist in the calendar. There was confusion about what the "schedule" button actually did, which is to allow the user to plan time to finish that task. We received feedback that it was difficult to tell the type of event, due date versus working time from the main calendar view. The feedback from the assignment planning page was that the information did not flow well and there was a lack of distinction between informational boxes and boxes that required user input.

To remedy these issues we made the left side a distinctive eft panel with a title that relates its contents with the main calendar and a color coding scheme to the calendar events. The "schedule" button was changed to "plan", which better describes its purpose and the action the user will be doing when clicking it. The most significant change was to the assignment planning page. This page was completely redesigned to help the user better understand the information it presents, and guide them on how to use it.
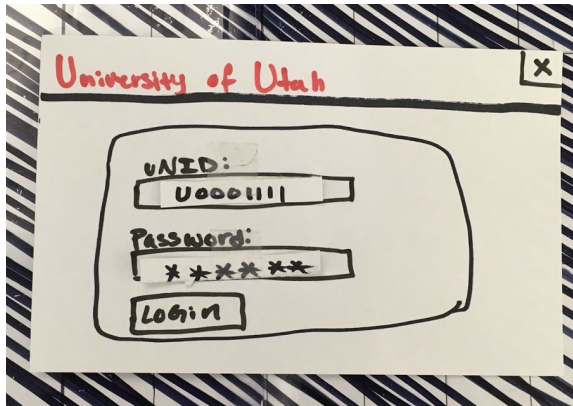

Usability Tests

The first usability test revealed that the labels for the sources options were not clear when the participant attempted to log into his Google account to then import his Canvas calendar that he had already synced up there. We also learned that users expect the calendar to be interactive, instead of solely informative. To remedy the first issue, the labels on the source import buttons were changed to reflect the intent the user has while going through the import process. We also added keyword
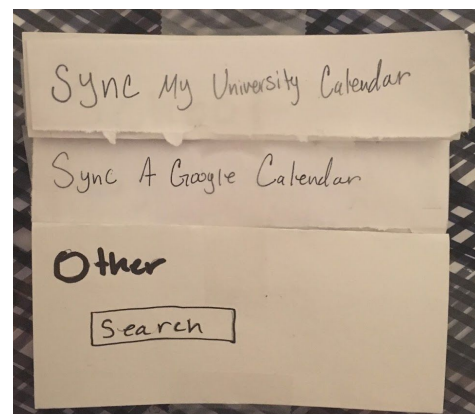
detection when importing from a Google account such that the application can attempt to detect when the user has school information on their Google account and redirect them to the school login. We also made the main calendar interactive. When an event is clicked on, the planning page for that event is brought up.

During the second usability test we discovered that having the user's institution login on the source select modal window confuse the participant about what ID number they needed to enter. Since this is still a Perfect Timing page, the user questioned whether they should be entering their credentials for the application instead of their institution. This participant also suggested a map for the color coding scheme on the main calendar page, which we did include. To resolve ID number confusion, the task of logging into an institution was separated into two steps. First, the participant would choose a state and institution as before. Then they would be presented with a separate modal window to enter their institution's credentials. It was decided that this modal would be from the actual institution login page so that the user is using a familiar page. This confirms that it is their school's credentials that should be entering as well as provides the user with a stronger sense of security about the information they are submitting.

The third and final usability test brought up the issue that there was a lack of connection between the sources panel and main calendar. Our participant felt confused about what sources were and consequently had a difficult time remembering the options listed on the menu. A severe issue that was discovered during this test was the lack of a confirmation modal when exiting a page, or the application itself, with unsaved data. To address the first issue, the title of the left panel was changed to "Calendar Sources"

to better convey the mapping between the lists on the left hand side and the items on the main calendar. To resolve the second issue, a modal was added, such that any time the user tries to exit a page without having saved their plan, the modal will warn them and allow them to save their plan at that point.
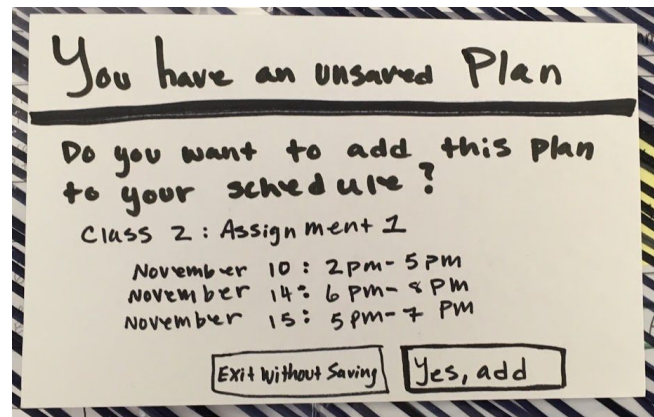
Final Paper Prototype

Our final paper prototype maintains a similar design as our initial prototype using a desktop web application with a companion mobile application but with a number of improvements.
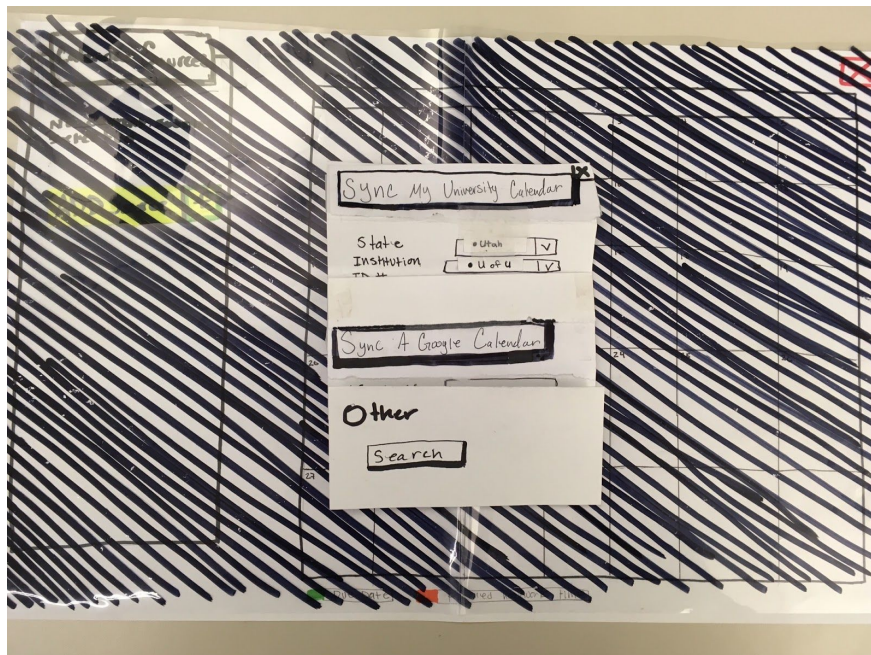
Overview
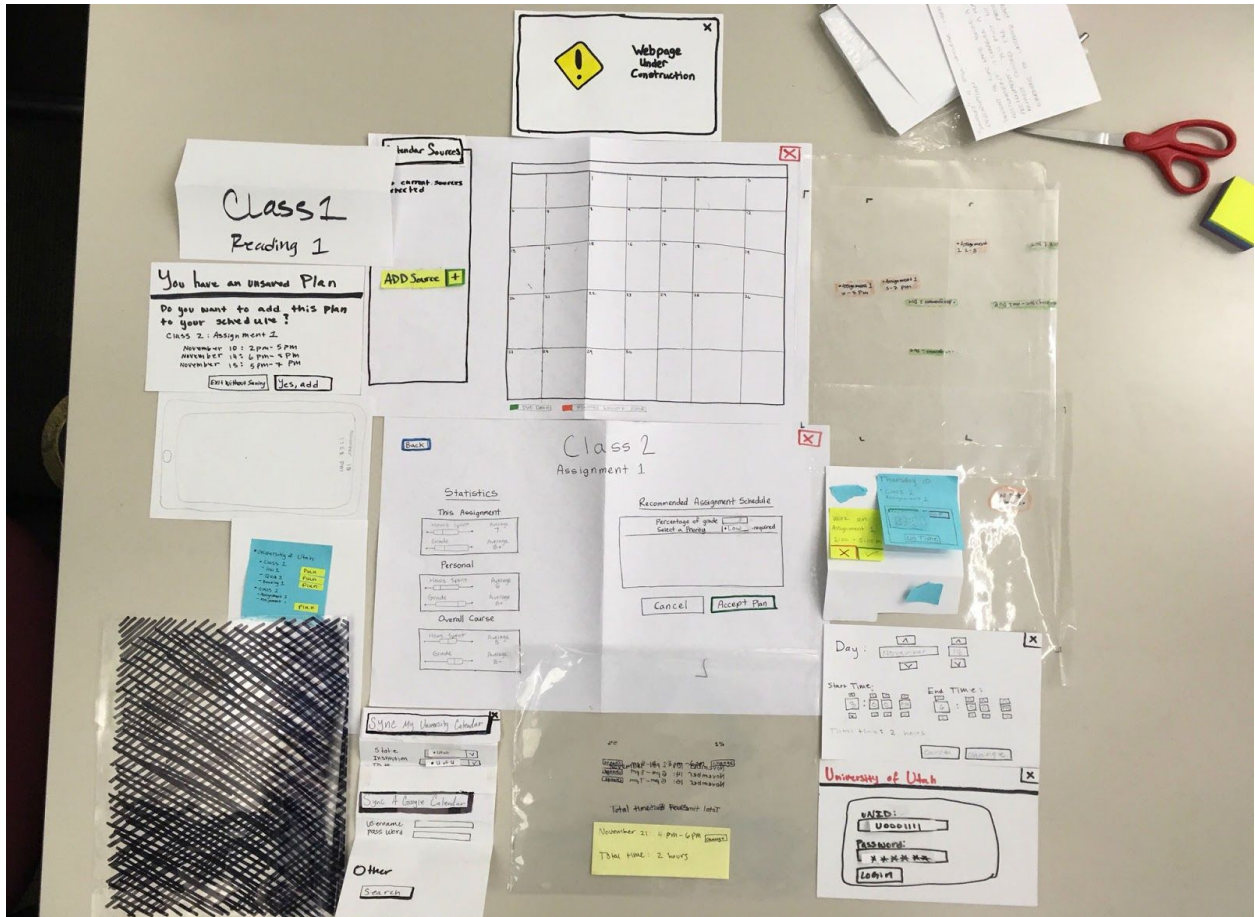
Most of the pieces are templates and elements belonging to the desktop web application with a couple mobile pieces.
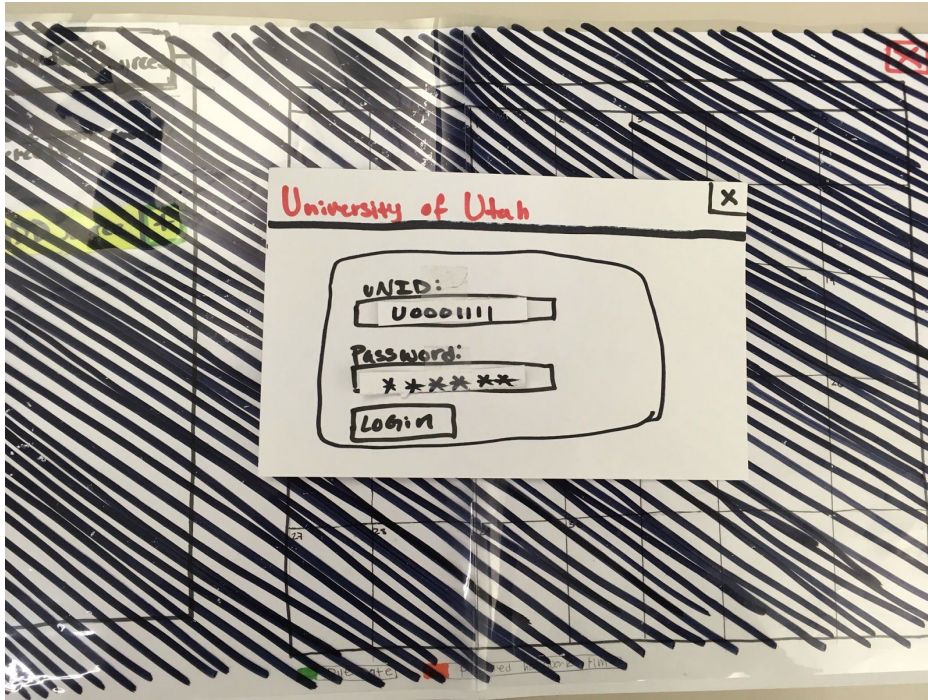
Preliminary Task: Importing Classes and Calendar from Existing Apps
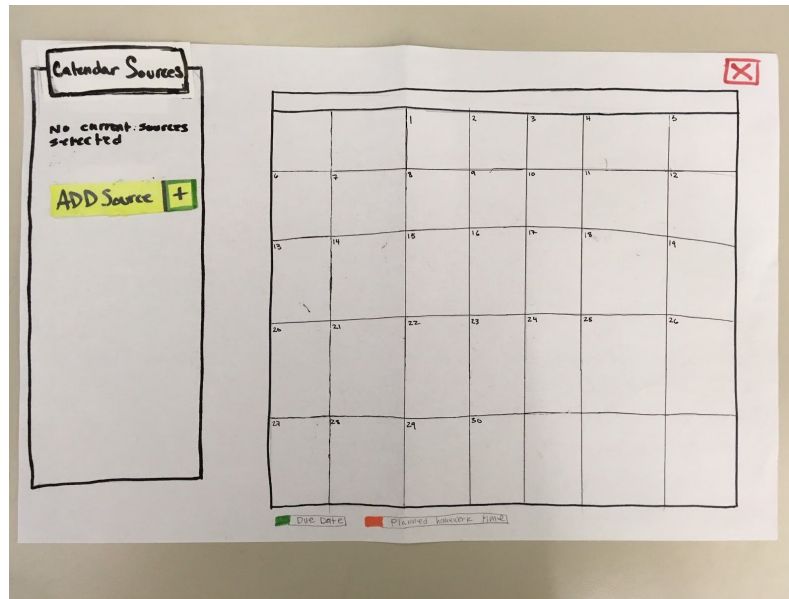
The desktop application's home page when the user opens it for the first time. She presses the 'Add Source' button.
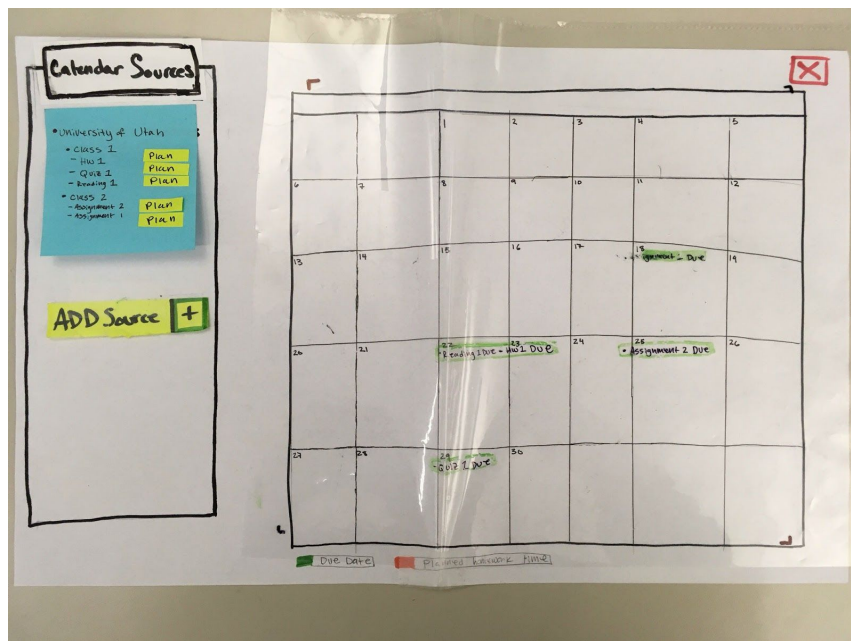

She is presented with a modal window that allows her to select different kinds of sources to import from. She chooses to import from her school's LMS.

Perfect Timing presents a login form appropriate for the user's chosen school. She enters her U ID and password, and clicks 'Login'.

Task 1 & 2: Schedule from a List of Tasks and Determine Time to Allot

Example A

With her assignments now imported into the application, she can now select an assignment to plan. She selects 'Class 1: Reading 1'.
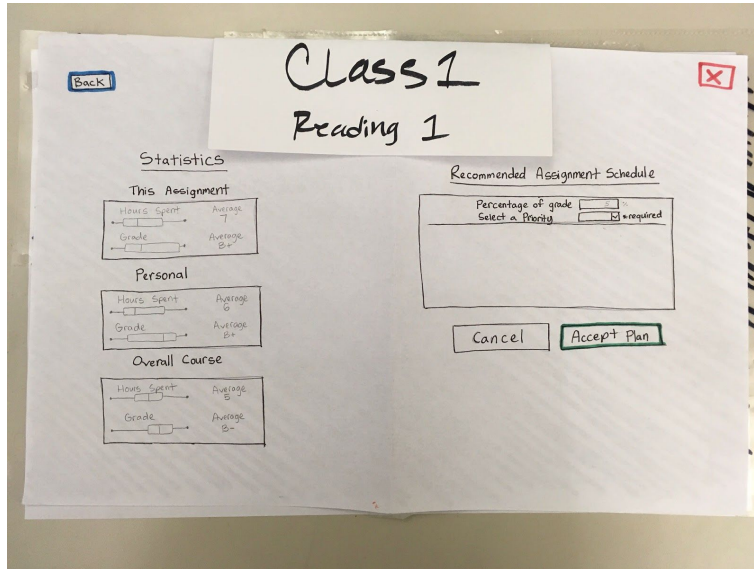
She is presented with a screen that shows her various statistics for average time spent on the assignment. These statistics are drawn from prior students and her own personal averages for the class.
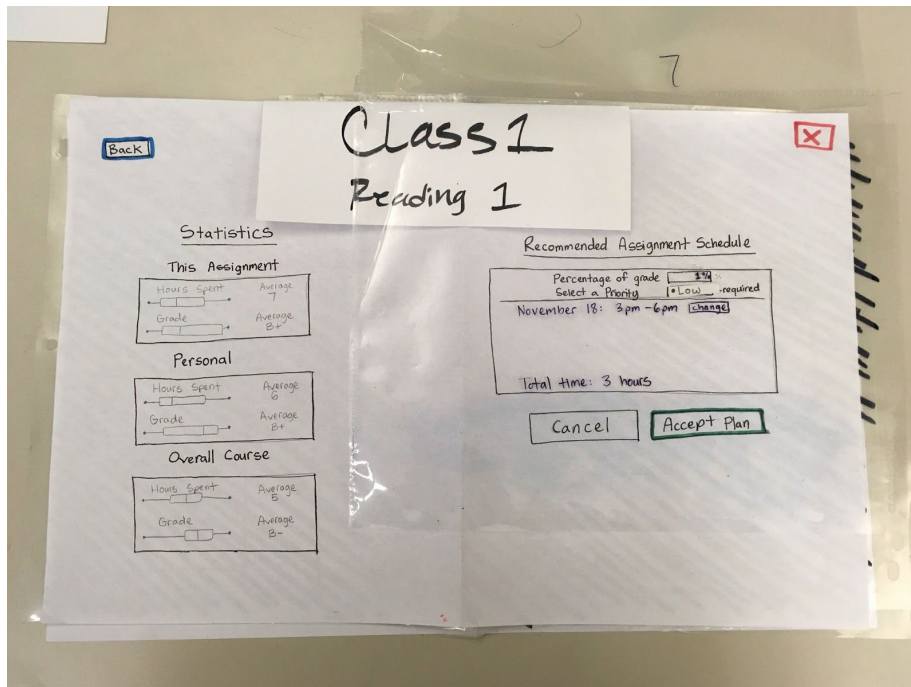
Once she selects a priority to give the assignment, she is given a recommendation for when and how much time she should spend on the assignment based on its due date and the estimated time it should take her. She accepts and schedules the recommendation.
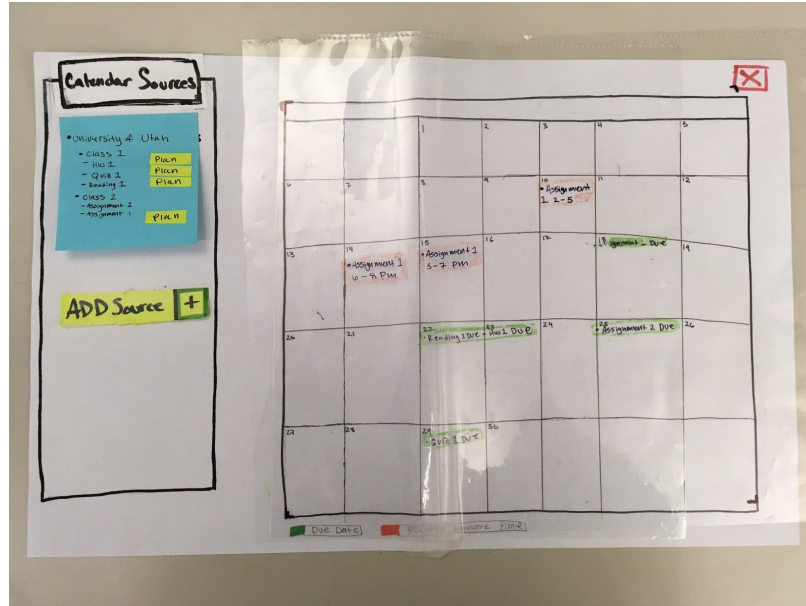
The application returns her to the main screen, where she can see that her time recommendations have been added to her calendar.

Example B

From the above screen, the user chooses to plan into her schedule 'Class 1: Reading 1'.
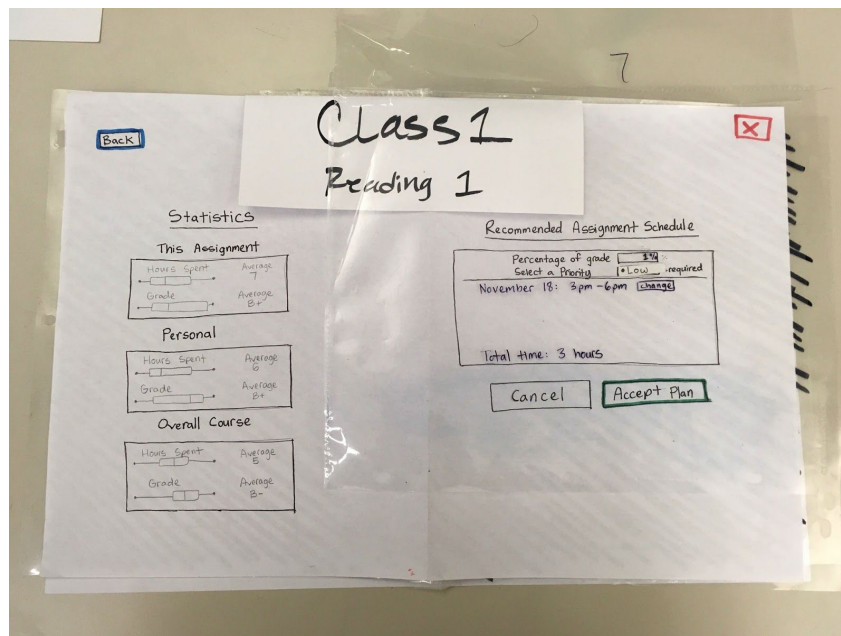
As before, she is presented with statistics for her class and assignment, and selects a low priority. This time however, she wants to change the recommendation before planning it into her schedule. She presses the 'Change' button.
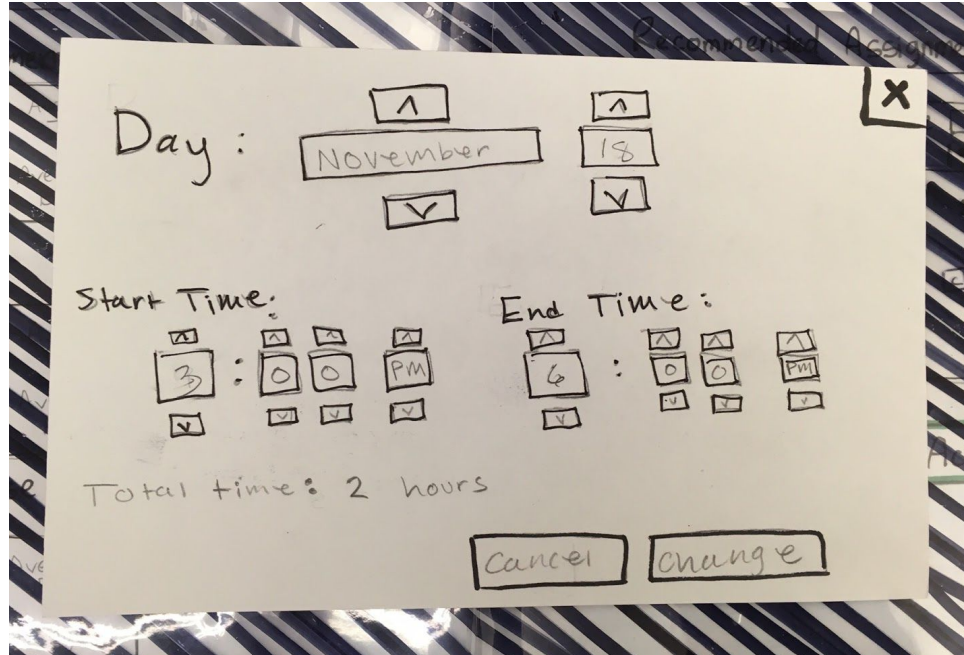
She changes the recommendation for 4pm - 6pm on November 21st, and hits 'Change'.
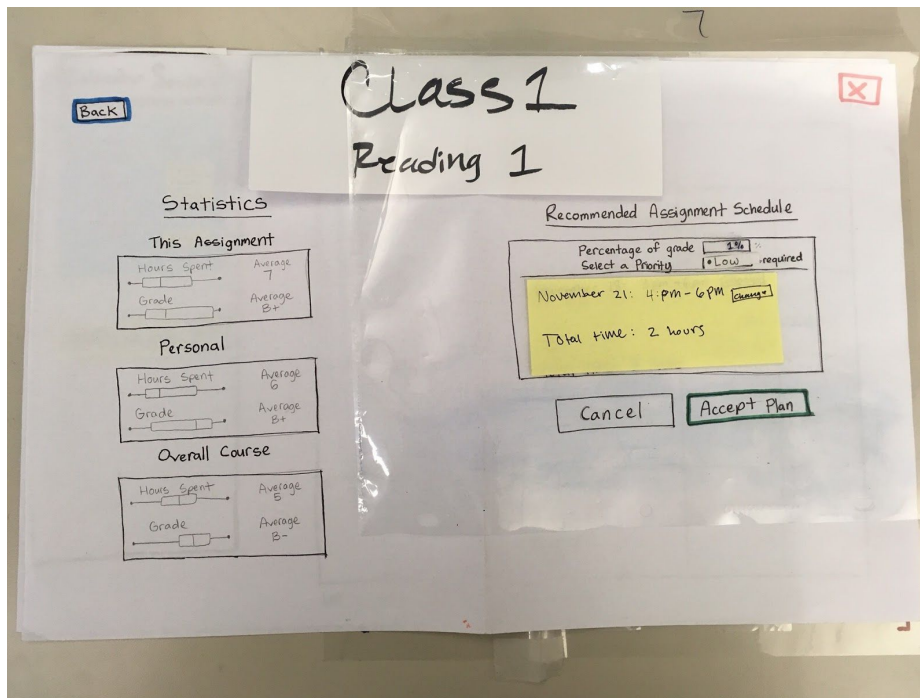
The modal window closes, and she is brought back to the planning screen, now with her changes visible.
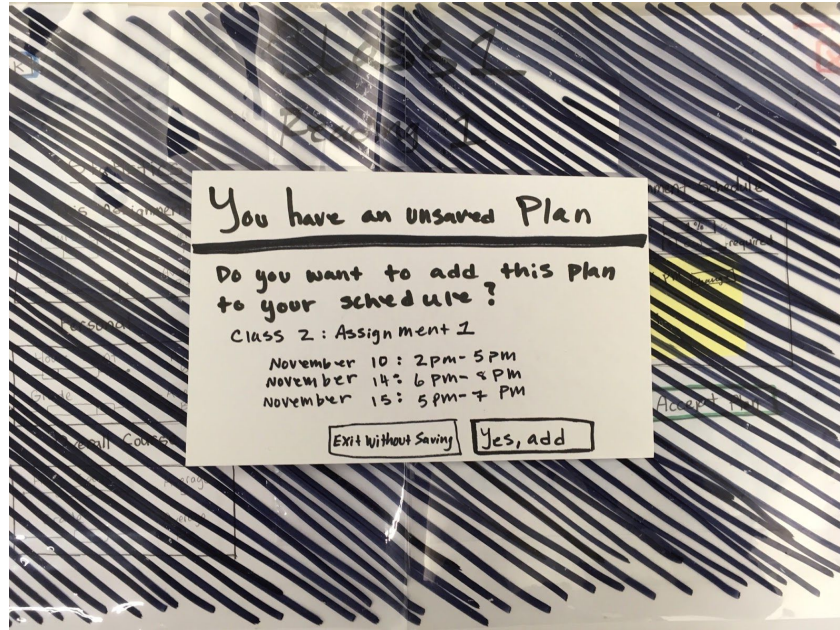
If the user attempts to leave the screen by pressing the 'Back' or 'X' button, she is presented with a window asking if she would like to leave with or without saving (note that the image shows the wrong assignment, but the idea is still the same).
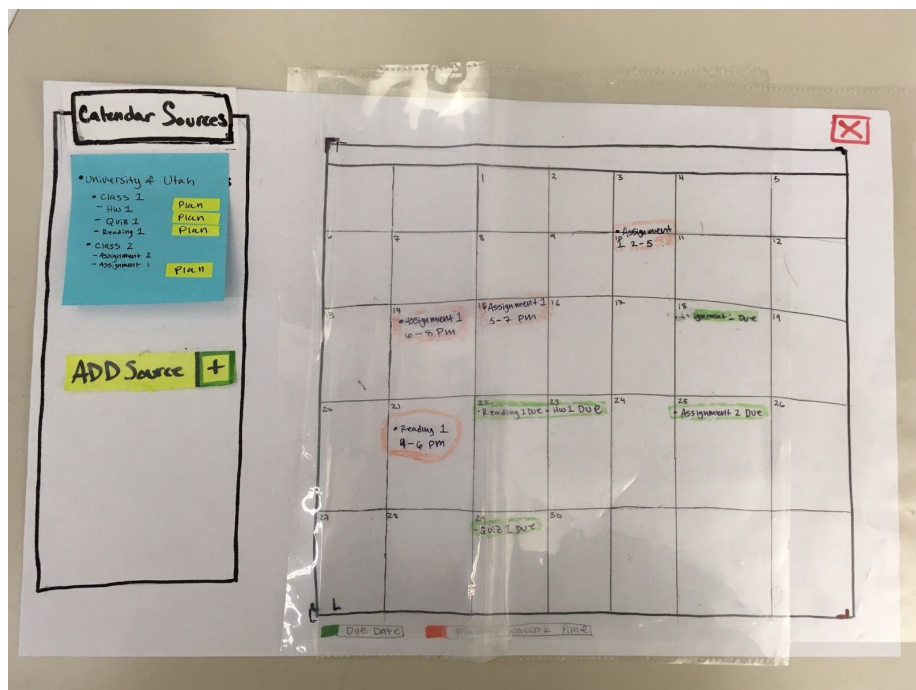
Once she presses the 'Yes, add' button, she is brought back to her calendar view with 'Reading 1' planned on her schedule.

Other Tasks: Transitioning Between Tasks and Accurately Timing Tasks
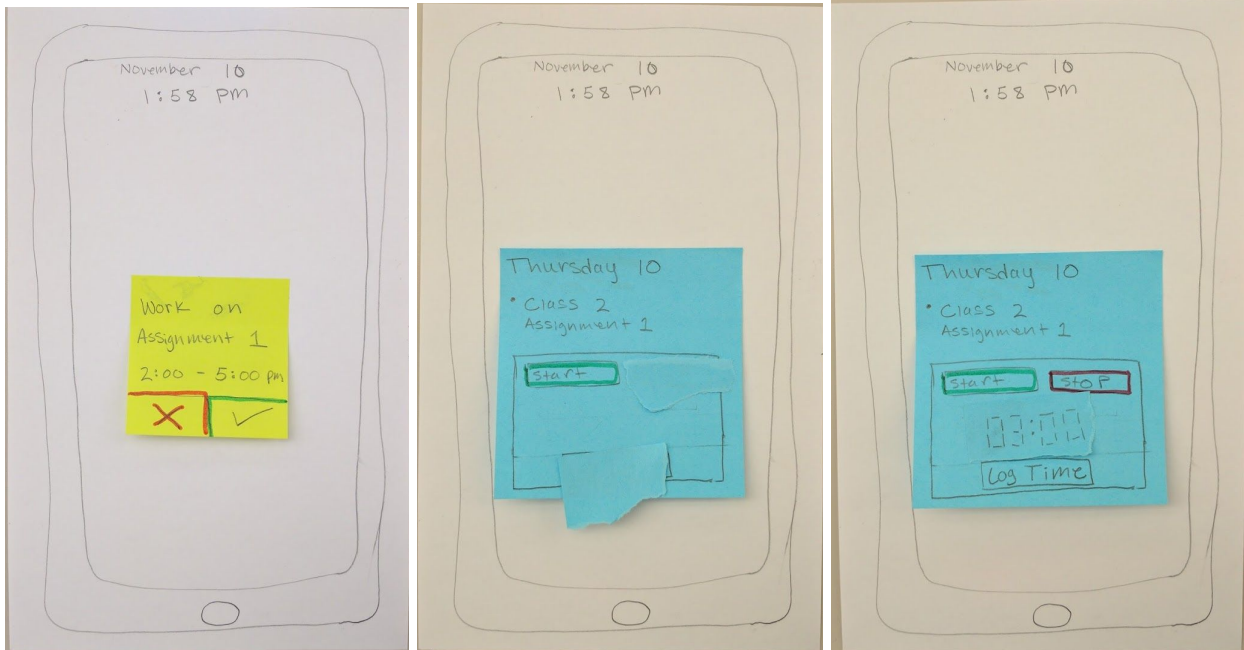
 The mobile component functions exactly as designed and described in the initial paper prototype.

Digital Mockup

Overview

Panel 1 (top-left)

Calendar Sources — Add Source

◀ ▶ November 2016 | Week | Month | Year

SUN MON TUE WED THU FRI SAT

Sync My University Calendar

State

Institution

Rhode Island (RI)
South Carolina (SC)
South Dakota (SD)
Tennessee (TN)
Texas (TX)
Utah (UT)
Vermont (VT)
Virgin Islands (VI)
Virginia (VA)
Washington (WA)
West Virginia (WV)
Wisconsin (WI)
Wyoming (WY)

Sync a G...

Other

Search

Panel 2 (top-right)

Calendar Sources — Add Source

◀ ▶ November 2016 | Week | Month | Year

Sync My University Calendar

State — Utah

Institution

Sync a Google Calendar

Other

Search

Panel 3 (middle-left) — Login

THE UNIVERSITY OF UTAH®   UNIVERSITY OF UTAH HEALTH CARE

Login

uNID: (e.g. u8675309)   Forgot your uNID?

Password: Forgot your password?

LOGIN

Panel 4 (middle-right) — Login

THE UNIVERSITY OF UTAH®   UNIVERSITY OF UTAH HEALTH CARE

Login

uNID: (e.g. u8675309)   Forgot your uNID?
u0001111

Password: Forgot your password?
•••••••••••

LOGIN

Panel 5 (lower-left) — Class 1 / Reading 1

Statistics

This Assignment
Hours Spent — Average 7
Grade — Average B+

Personal
Hours Spent — Average 6
Grade — Average B+

Course
Hours Spent — Average 5
Grade — Average B-

Recommended Assignment Schedule
Percentage of grade [1] %
Select a priority [   ] ★ required

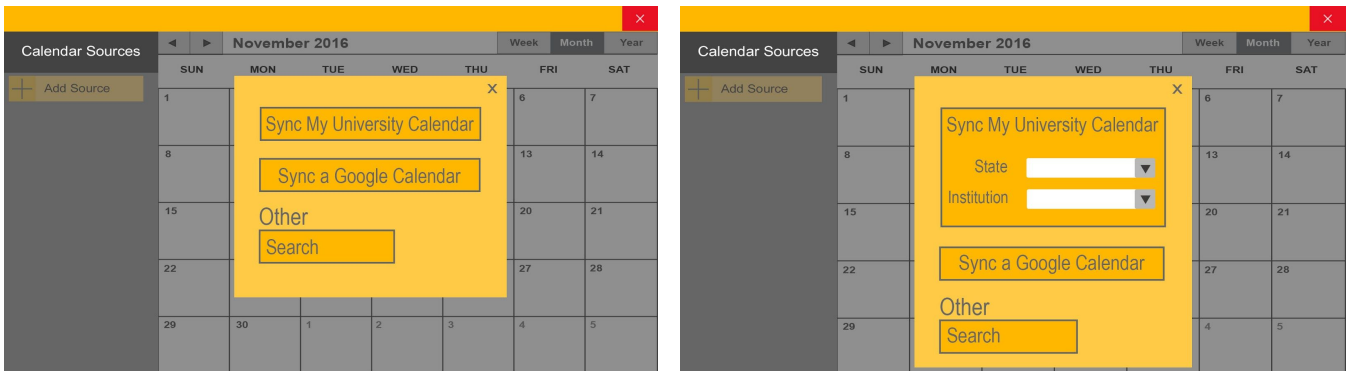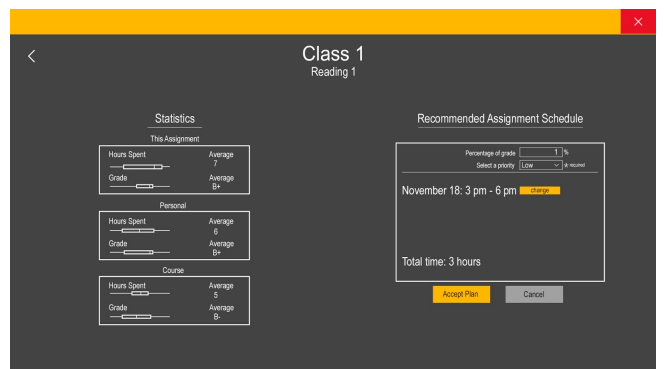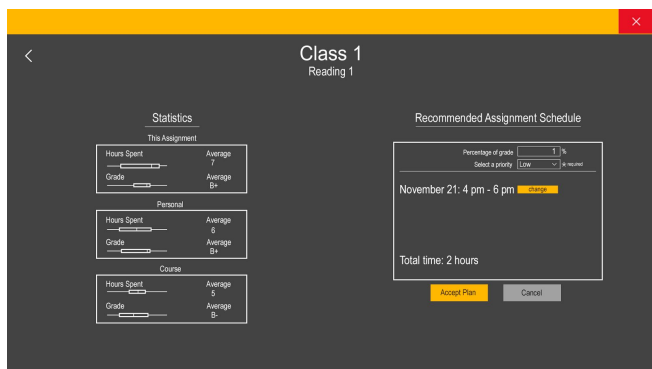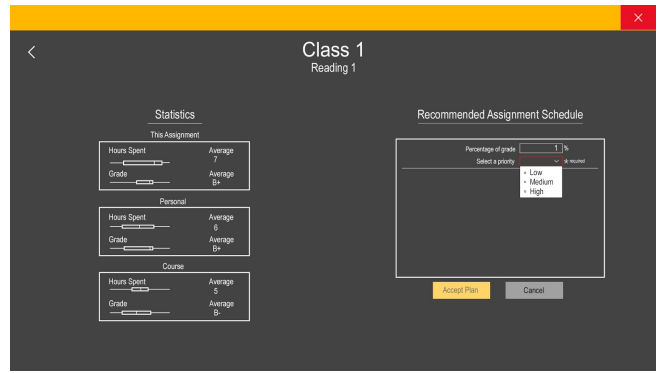Accept Plan   Cancel

Panel 6 (lower-right, row 3) — Class 1 / Reading 1

Statistics

This Assignment
Hours Spent — Average 7
Grade — Average B+

Personal
Hours Spent — Average 6
Grade — Average B+

Course
Hours Spent — Average 5
Grade — Average B-

Recommended Assignment Schedule
Percentage of grade [1] %
Select a priority [Low] ★ required
• Low
• Medium
• High

Accept Plan   Cancel

Panel 7 (bottom-left) — Class 1 / Reading 1

Statistics

This Assignment
Hours Spent — Average 7
Grade — Average B+

Personal
Hours Spent — Average 6
Grade — Average B+

Course
Hours Spent — Average 5
Grade — Average B-

Recommended Assignment Schedule
Percentage of grade [1] %
Select a priority [Low] ★ required

November 21: 4 pm - 6 pm   Change

Total time: 2 hours

Accept Plan   Cancel

Panel 8 (bottom-right) — Class 1 / Reading 1

Statistics

This Assignment
Hours Spent — Average 7
Grade — Average B+

Personal
Hours Spent — Average 6
Grade — Average B+

Course
Hours Spent — Average 5
Grade — Average B-

Recommended Assignment Schedule
Percentage of grade [1] %
Select a priority [Low] ★ required

November 18: 3 pm - 6 pm   Change

Total time: 3 hours

Accept Plan   Cancel

Screen 1 (top-left)

Class 2
Assignment 1

Statistics

This Assignment

Hours Spent — Average 7
Grade — Average B+

Personal

Hours Spent — Average 6
Grade — Average B+

Course

Hours Spent — Average 5
Grade — Average B-

Recommended Assignment Schedule

Percentage of grade [5] %
Select a priority [ ] ★ required

Accept Plan   Cancel

Screen 2 (top-right)

Class 2
Assignment 1

Statistics

This Assignment

Hours Spent — Average 7
Grade — Average B+

Personal

Hours Spent — Average 6
Grade — Average B+

Course

Hours Spent — Average 5
Grade — Average B-

Recommended Assignment Schedule

Percentage of grade [5] %
Select a priority [ ] ★ required

• Low
• Medium
• High

Accept Plan   Cancel

Screen 3 (middle-left)

Class 2
Assignment 1

Statistics

This Assignment

Hours Spent — Average 7
Grade — Average B+

Personal

Hours Spent — Average 6
Grade — Average B+

Course

Hours Spent — Average 5
Grade — Average B-

Recommended Assignment Schedule

Percentage of grade [5] %
Select a priority [Medium] ★ required

November 10: 2 pm - 5 pm   change
November 14: 6 pm - 8 pm   change
November 15: 5 pm - 7 pm   change

Total time: 7 hours

Accept Plan   Cancel

Screen 4 (middle-right)

Class 1
Reading 1

Change 'Reading 1' Plan   X

Planned Days

Date   From   To
November 18th, 2016   3:00pm   6:00pm   —

+ Add Day

Cancel   Change

Screen 5 (lower-middle-left)

Class 1
Reading 1

Change 'Reading 1' Plan   X

Planned Days

Date   From   To
November 18th, 2016   3:00pm   6:00pm   —

◄   November 2016   ►
Su Mo Tu We Th Fr Sa
30 31 1 2 3 4 5
 6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 1 2 3
 4 5 6 7 8 9 10

+ Add Day

Cancel   Change

Screen 6 (lower-middle-right)

Class 1
Reading 1

Change 'Reading 1' Plan   X

Planned Days

Date   From   To
November 21st, 2016   3:00pm   6:00pm   —

1:00pm
2:00pm
2:30pm
3:00pm
3:30pm
4:00pm
4:30pm

+ Add Day

Cancel   Change

Screen 7 (bottom-left)

Calendar Sources
+ Add New Source

◄ ►   November 2016   Week Month Year

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

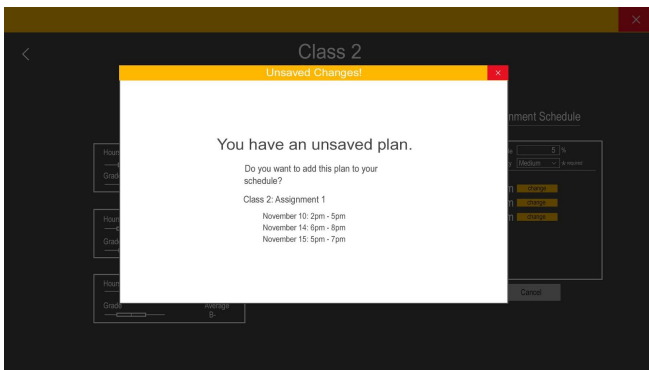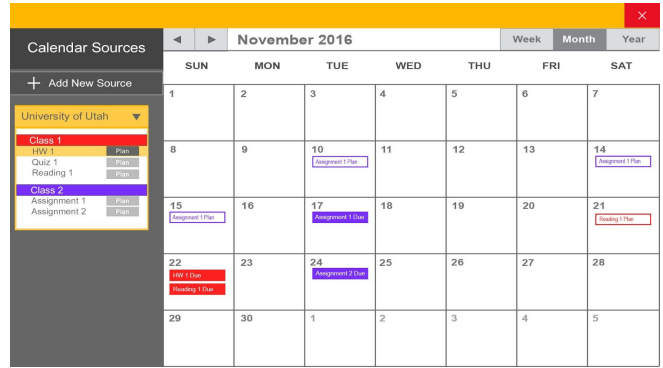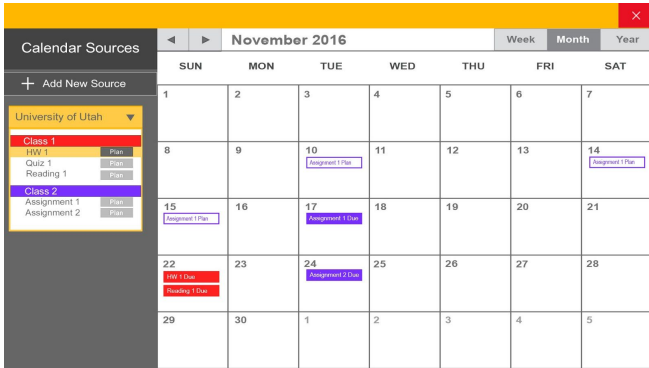## Screen 8 (bottom-right)

Calendar Sources
+ Add New Source

University of Utah ▼

Class 1
  HW 1   Plan
  Quiz 1   Plan
  Reading 1   Plan
Class 2
  Assignment 1   Plan
  Assignment 2   Plan

◄ ►   November 2016   Week Month Year

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17 Assignment 1 Due	18	19	20	21
22 HW 1 Due, Reading 1 Due	23	24 Assignment 2 Due	25	26	27	28
29	30	1	2	3	4	5

Calendar Sources

Add New Source

University of Utah

Class 1
HW 1   Plan
Quiz 1   Plan
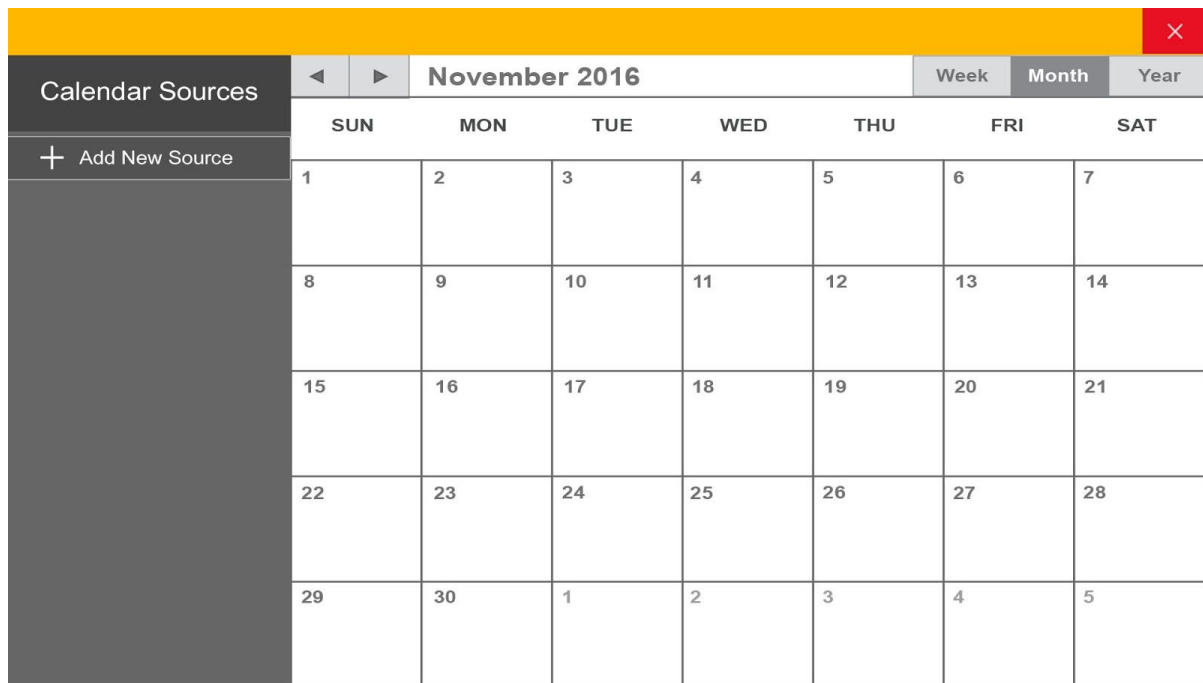Reading 1   Plan
Class 2
Assignment 1   Plan
Assignment 2   Plan

◄ ► November 2016   Week Month Year
SUN MON TUE WED THU FRI SAT

Tasks

Preliminary Task: Importing Classes and Calendar from Existing Apps

Calendar Sources

＋ Add New Source

◄ ► November 2016   Week Month Year

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

The application's home page, which shows the user's current calendar.
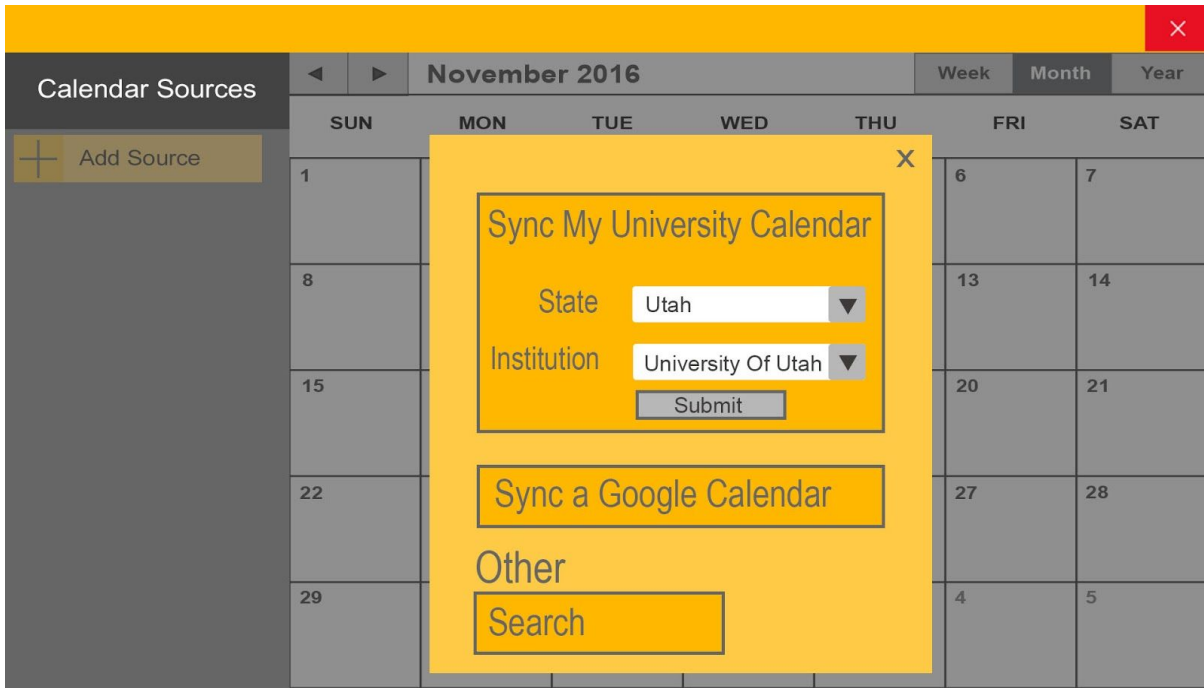
She is presented with a modal window that allows her to select different kinds of sources to import from.
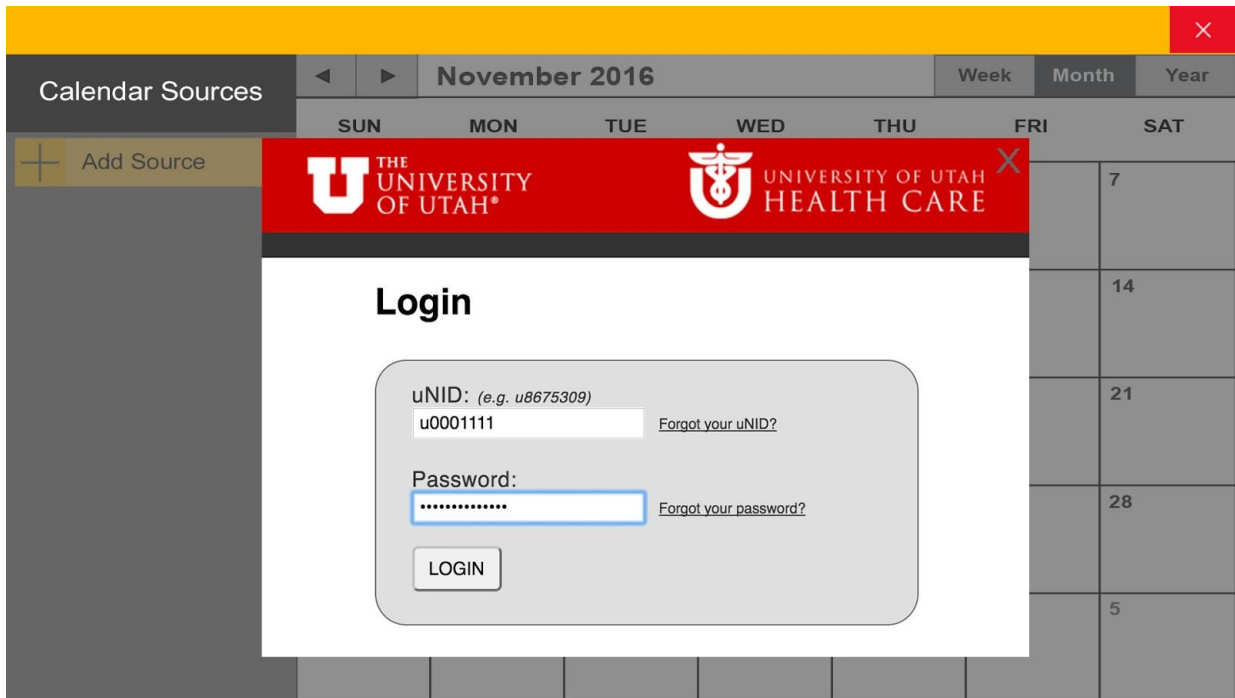
Perfect Timing presents a login form appropriate for the user's chosen school.

Task 1 & 2: Schedule from a List of Tasks and Determine Time to Allot

EXAMPLE A

With her assignments now imported into the application, she can now select an assignment to plan.

She is presented with a screen that shows her various statistics to help her plan her time.

Class 2
Assignment 1

Statistics

This Assignment

| Hours Spent | Average 7 |
| Grade | Average B+ |

Personal

| Hours Spent | Average 6 |
| Grade | Average B+ |

Course

| Hours Spent | Average 5 |
| Grade | Average B- |

Recommended Assignment Schedule

Percentage of grade [5] %
Select a priority [Medium ▼] ★ required

November 10: 2 pm - 5 pm [change]
November 14: 6 pm - 8 pm [change]
November 15: 5 pm - 7 pm [change]

Total time: 7 hours

[Accept Plan]   [Cancel]

Once she selects a priority to give the assignment, she is given a recommendation for when and how much time she should spend on the assignment based on its due date and the estimated time it should take her.

Calendar Sources

+ Add New Source

University of Utah ▼

Class 1
HW 1 [Plan]
Quiz 1 [Plan]
Reading 1 [Plan]
Class 2
Assignment 1 [Plan]
Assignment 2 [Plan]

◄ ► **November 2016**   [Week] [Month] [Year]

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10 Assignment 1 Plan	11	12	13	14 Assignment 1 Plan
15 Assignment 1 Plan	16	17 Assignment 1 Due	18	19	20	21
22 HW 1 Due Reading 1 Due	23	24 Assignment 2 Due	25	26	27	28
29	30	1	2	3	4	5

After accepting, the application returns her to the main screen, where she can see that her time recommendations have been added to her calendar.

EXAMPLE B
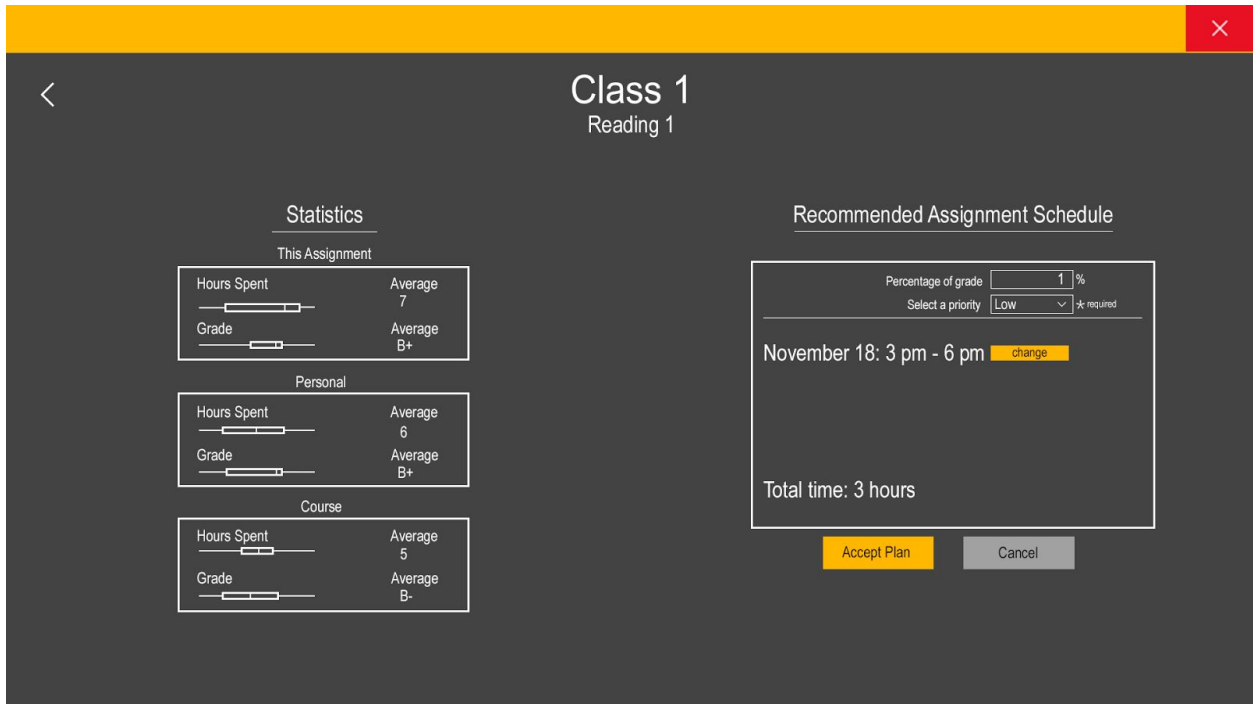
As before, she is presented with statistics for her class and assignment, and selects a low priority. This time however, she wants to change the recommendation before planning it into her schedule.
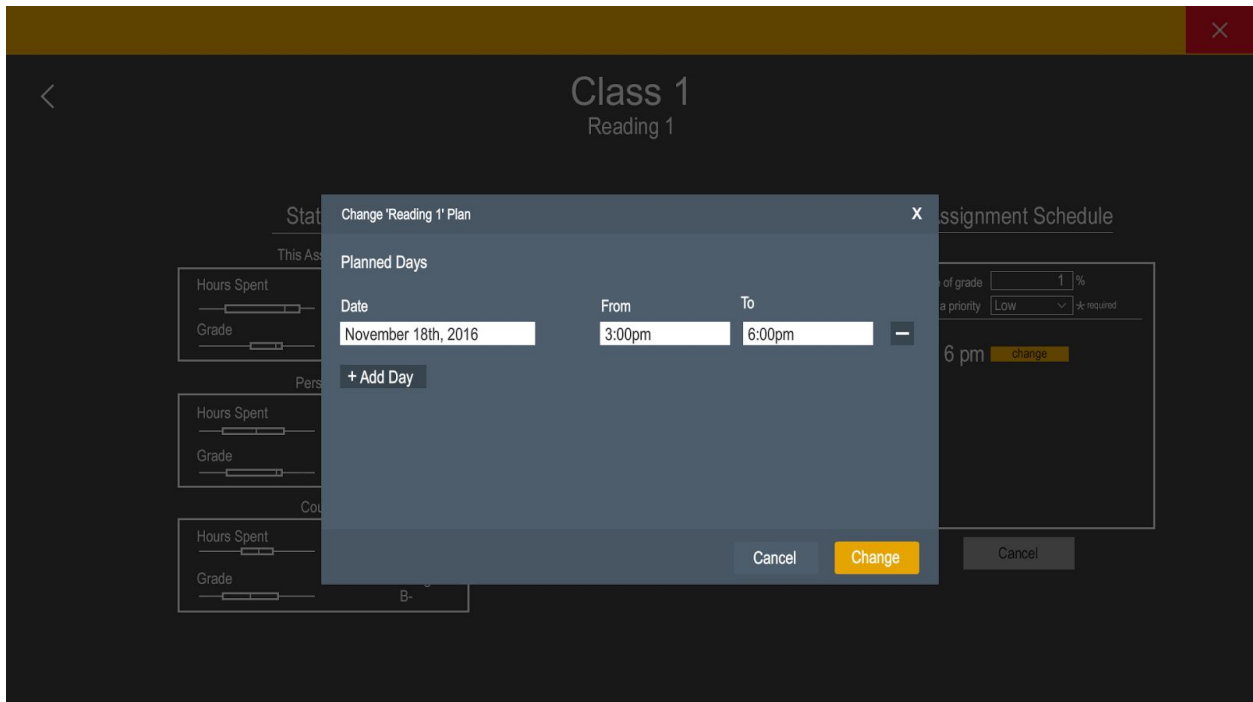
The modal can be used to adjust working time manually by the user.

Selecting a date.

Class 1
Reading 1

Change 'Reading 1' Plan   X

Planned Days

Date   From   To
November 18th, 2016   3:00pm   6:00pm   —

    «   November 2016   »
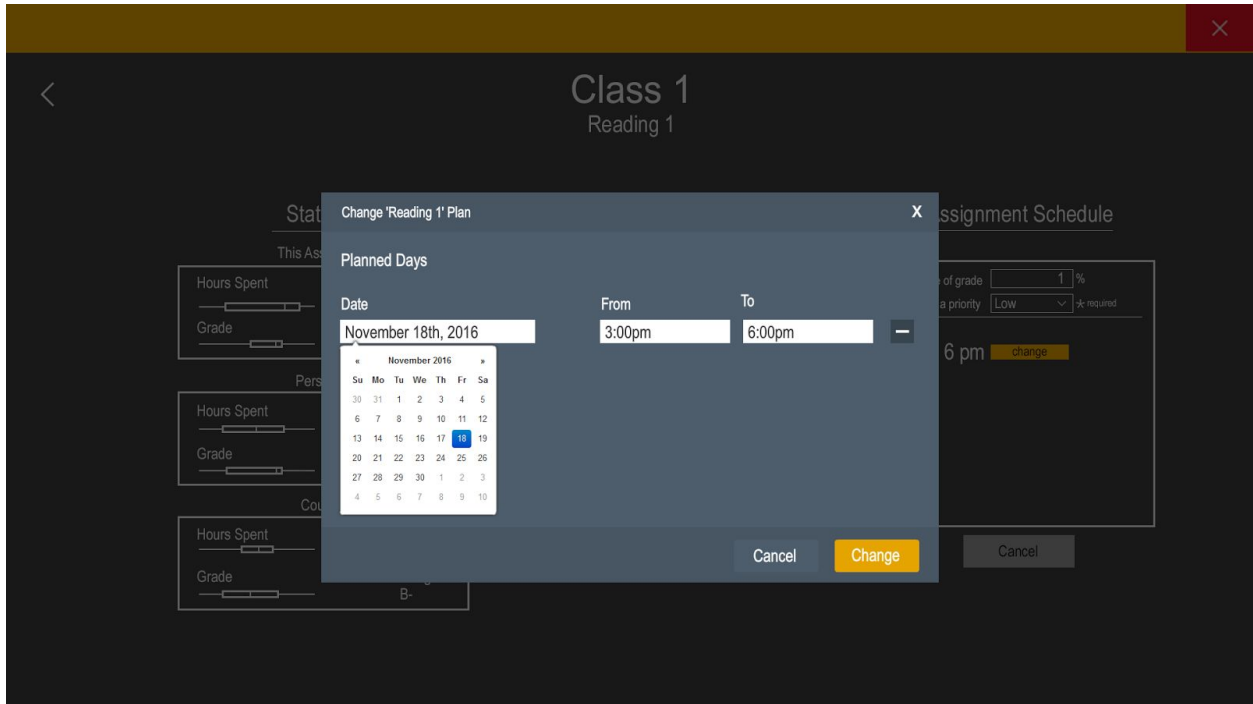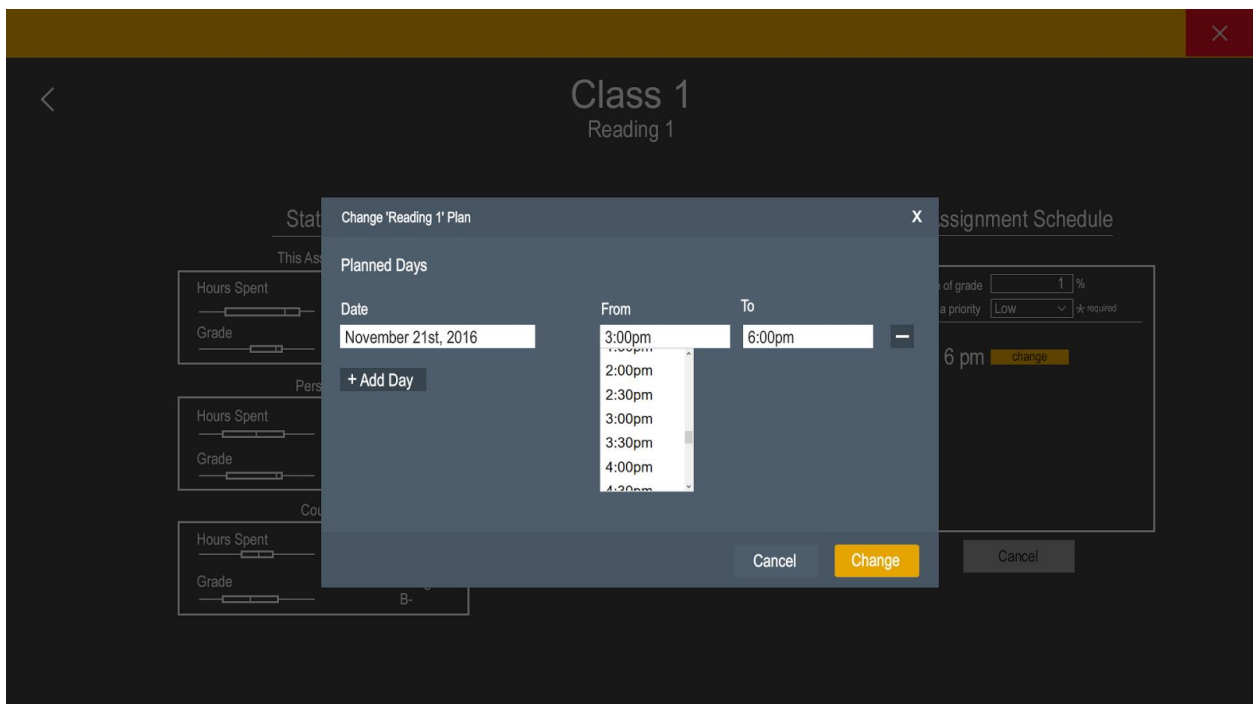   Su Mo Tu We Th Fr Sa
    30 31 1   2   3   4   5
    6   7   8   9   10 11 12
    13 14 15 16 17 18 19
    20 21 22 23 24 25 26
    27 28 29 30 1   2   3
    4   5   6   7   8   9   10

                        Cancel   Change

Selecting a date.

Selecting a time.

Class 1
Reading 1

Change 'Reading 1' Plan   X

Planned Days

Date   From   To
November 21st, 2016   3:00pm   6:00pm   —

+ Add Day   1:00pm
                      2:00pm
                      2:30pm
                      3:00pm
                      3:30pm
                      4:00pm
                      4:30pm

                        Cancel   Change

Selecting a time.

Class 1

Reading 1

Statistics

This Assignment

Hours Spent   Average
                     7
Grade   Average
                     B+

Personal

Hours Spent   Average
                     6
Grade   Average
                     B+

Course

Hours Spent   Average
                     5
Grade   Average
                     B-

Recommended Assignment Schedule

Percentage of grade   1   %
Select a priority   Low   ⌄   ⁎ required

November 21: 4 pm - 6 pm   change

Total time: 2 hours

Accept Plan   Cancel

The modal window closes, and she is brought back to the planning screen, now with her changes visible.

Class 2

Unsaved Changes!   ✕

You have an unsaved plan.

Do you want to add this plan to your schedule?

Class 2: Assignment 1

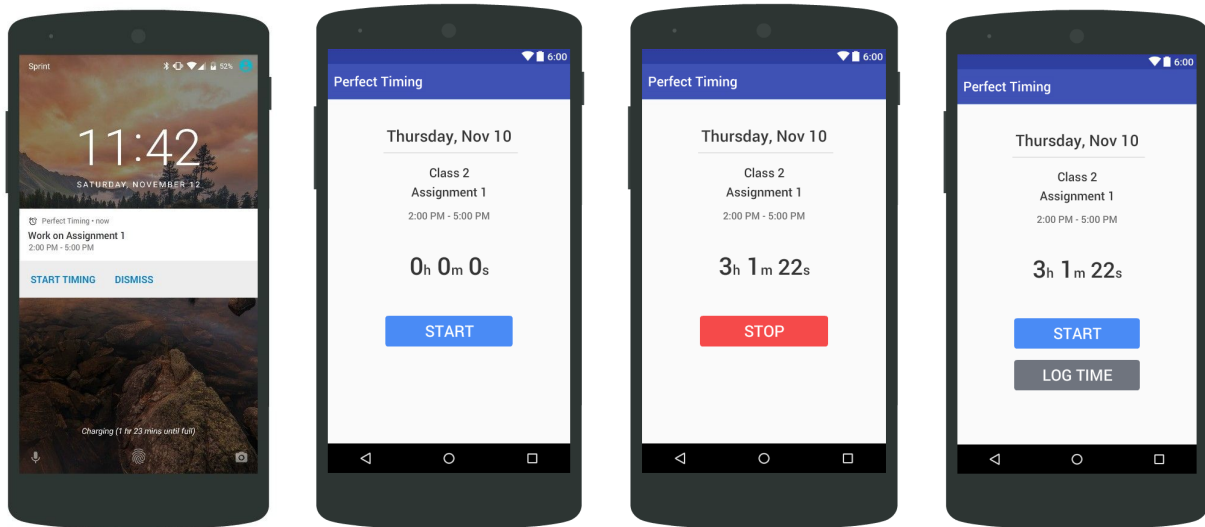November 10: 2pm - 5pm
November 14: 6pm - 8pm
November 15: 5pm - 7pm

If the user attempts to leave an assignment planning page by pressing the 'Back' or 'X' button, she is presented with a window asking if she would like to leave with or without saving.

Once she presses the 'Yes, add' button, she is brought back to her calendar view with 'Reading 1' planned on her schedule.

## Other Tasks: Transitioning Between Tasks and Accurately Timing Tasks

The mobile companion app reminds the user that it is time for her to work on her assignment. She accepts and starts the completion timer. When she is finished, she hits 'Stop'. The app will ask her if she wishes to log the recorded time as the duration necessary to complete her work. If she chooses to log it, the application will take it into account when scheduling her future assignments, and when other students in her class schedule theirs.

Transition from paper prototype

In our final paper prototype we had added a color scheme map for the events in the main calendar. This map was present before any sources were imported. We changed this so that the mapping will now appear as sources are imported and events that use those colors are added in the calendar. This ensures that the user only sees the parts of the scheme that are relevant to them at any given moment in the app.
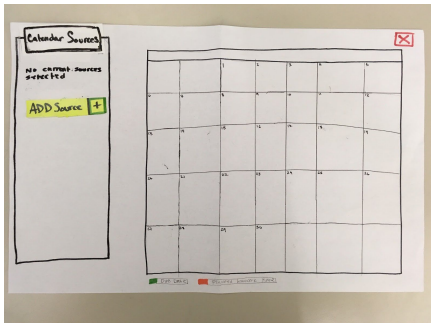

Final paper prototype main page.
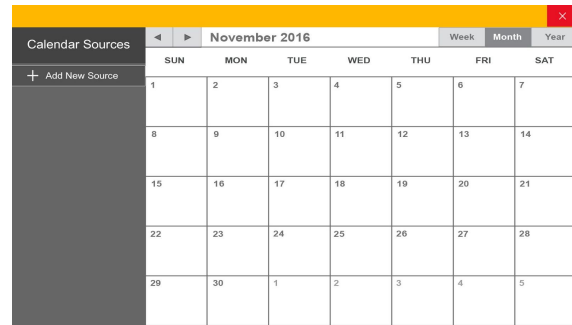
Digital mockup main page.

We also changed the color coding for each class. Before the digital mockups this wasn't fully realized. We had discussed using slightly different shades of a color to distinguish between an assignment plan and an assignment due date. When we created the digital mockups, we discovered that it made sense to outline an assignment plan for a class and have the due date be the same solid color.
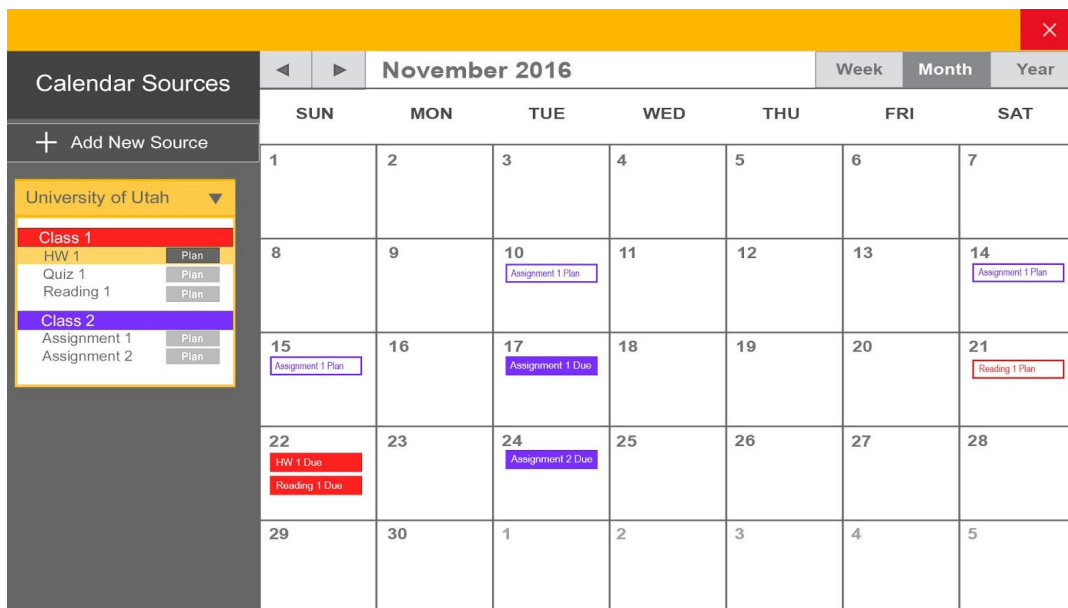
The notification on the phone was changed from a pop-up to an interactive Android notification compatible with Android's design principles. The 'Start Timing' and 'Dismiss' buttons perform the equivalent actions in the digital mockup. The 'Start Timing' button was put on the left since this

is consistent with Android Nougat's recommendation that the primary action be on the left in this style of notification.

Our design supports a student being able to 'scheduling from a list of tasks and determine the time to allot' primarily by interactions with the web application. First, by assisting the student to import the tasks that are required by their courses at school. Second, by directing the student to plan these tasks into their schedule. Third, crowdsourced data will be used in order to report and recommend suggested times that the student may or may not use when scheduling.

Our design supports the student 'transitioning between tasks and accurately timing tasks' by using the mobile application. The notifications on mobile, particularly on Android, lends itself as a smooth way to transition between tasks. The user receives a notification to start a new task in their notification panel until they take action. Tracking the amount of time is accomplished by using a minimal completion timer that they use to complete and log the time.

Discussion

What did you learn from the process of iterative design?

Throughout the process, we learned that it is important to get feedback from people that are completely removed from our design process. We realized that it is challenging to view our design process and the tasks that we are attempting to accomplish outside of our tunnel vision. During each iteration, the user in the usability tests seemed to have a focus on very different aspects of the design. Part of this may have been because we learned that we should have done a better job at first defining the tasks for the user to accomplish. We continued to learn that the scope of our design is larger than we had originally thought. We found different ways in which we need to prevent errors and give the user control and freedom.

How did the process shape your final design?

Once again, this process reminded us as a team that we are not like the user. In the initial paper prototype, many of the buttons had labels which were intuitive to us the designers. In every single iteration of usability tests, we discovered issues related to labels which confused our participants. This showed an obvious bias on our part when deciding on these labels, and the testing process allowed us to identify which labels were not intuitive to the user base, and then test that the new label did not suffer from the same problem.

We realized as made the transition to digital mockups that we were less concerned with the design patterns of the devices and operating systems that we designed for during our paper prototyping. These were details were manifested during the transition to the digital mockups.

*How have your tasks changed as a result of your usability tests?*

While there were no major changes to our tasks, the process for logging into a school source to import it was separated into two parts. This diminished ambiguity about which credentials needed to be provided at this step and increased the sense of security on the user's part, an aspect which was completely overlooked in the initial design.

Do you think you could have used more, or fewer, iterations upon your design?

Three iterations allowed us to make significant improvements to the design; however, two more tests and iterations would have been the most beneficial. One additional test would have allowed us to test the changes that were made after the third usability test to confirm the changes fixed the issues as intended. Another test, after implementing the results of the fourth test and converting the design to a digital mockup would have been very useful as well. This final test would have allowed us to test fine details such as colors and fonts for any outstanding issues. Most importantly, it would allow us to test whether there were issues that we introduced when converting the design to digital form. We consider that at this stage there is not a necessity for a higher amount of iterations, since the most salient issues arose from the paper iterations, an excessive amount of testing and iterations would cease to yield significant results.

Appendix

Testing Materials
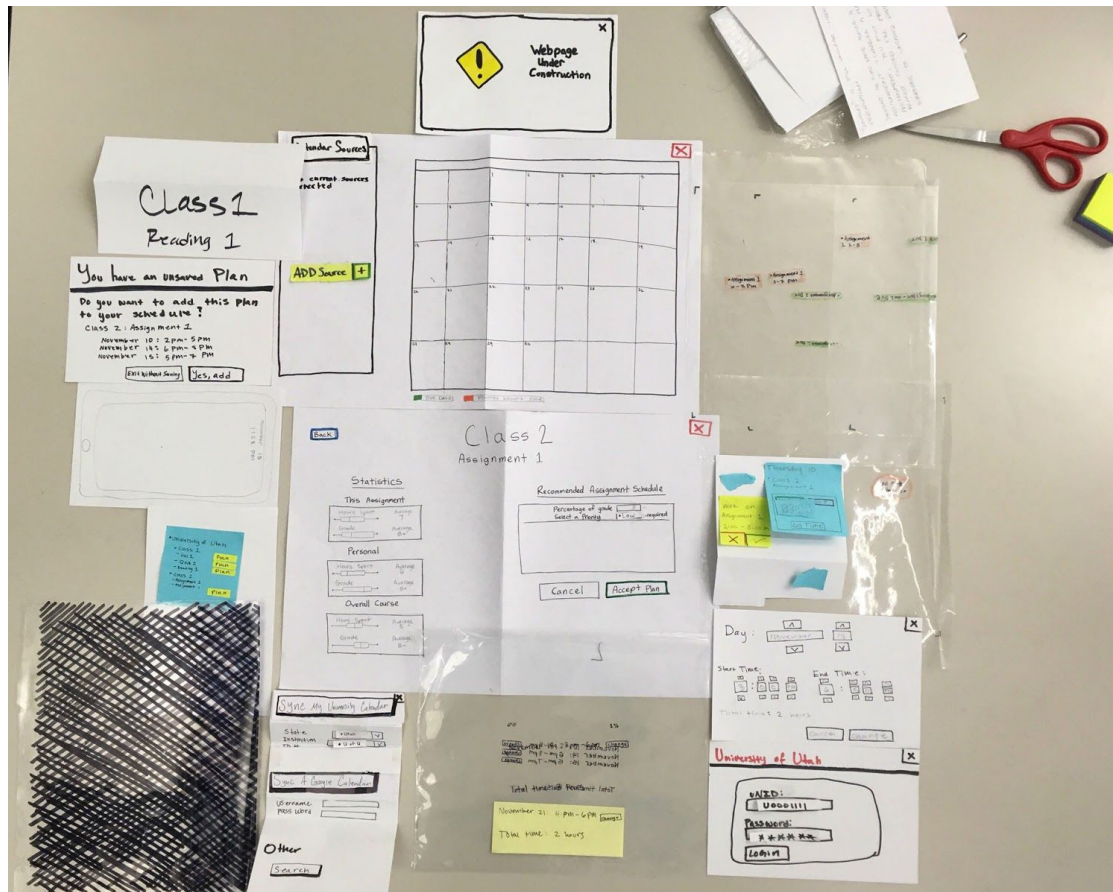
Critical Incidents

There were two critical incidents throughout our usability tests. The first, and most significant, occurred in the first usability test.

Critical Incident 1: Since people are able to sync some school websites into their Google calendars, the participant attempted to import his assignments by importing the Google calendar he has synced with the school system, instead of using the school login option. This was assigned a severity of 4 four because it would only populate the assignment due dates and not propagate the student's credentials to actually obtain the statistics the app needs for core functionality.

Critical Incident 2: After changing the plan to one of his liking, and accepting his changes, the participant felt that he was done, even though he had not finalized the plan. He sat waiting for further instruction, but when he realized the screen to save ot the calendar was still up he let us

know that by then, he would have exited the application thinking he was done scheduling the assignment. This incident was assigned a severity of three because the participant will not have the schedule to complete the assignment added to their calendar, and therefore the reminders won't be set either. It is possible that the user forgets to work on this assignment at all because they assume it is scheduled in and they would get a reminder. The functionality of this feature would be completely lost.

Instructions

For the first usability test, the following instructions were spoken to the participant. For the second and third test, they were spoken and written on a notecard which the participant could reference at any time during the task.

Preliminary Task: "Please log in and import your school's website".

Task 1: "Make a plan to complete assignment 1 for class 2. Give it a medium priority and accept the recommended plan."

Task 2: "Make a plan to complete reading 1 for class 1. Give it a low priority and make the plan for 4 pm - 6 pm on November 21st."

Task 3: "Follow your plan to complete assignment 1 for class 2. Record the time you spend working on the assignment and log that time when you are done."