

Design and Implementation of a Planner Application

A Project
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Submitted to the Graduate School
Appalachian State University
in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE

February 2018
Department of Computer Science

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Chapter 1

Introduction

Keeping up with assignments, tasks, tests, and other goals is critical for college students. 87% of students say that better time management and organizational skills would improve their grades [1]. Many of the students who do engage with planners use a paper planner [2]. Why do students who are constantly connected to technology still use pencil and paper to keep track of their school careers? Some applications already exist to serve this purpose, but they have not replaced paper planners. The goal of this project is to conduct user research and usability studies that will uncover the downfalls of current available applications and discover the needs of students. This research will then be used to develop a web application that makes it easy for college students to keep track of their assignments, tests, tasks, and to-do lists.

Chapter 2

Background

There is a wealth of studies surrounding the usability of applications. Three approaches are described below.

2.1 Evaluation Matrix

Suzanna Conrad and Julie Shen suggest that a usability study should be conducted as follows: an exploratory survey is held to begin the studies, followed by evaluation matrix testing (which gives a website scores based on usability), and three rounds of formal usability testing [5]. A formal usability study is an observation of a user using the target product, usually by one or more facilitators taking notes on the user's process and explaining which tasks the user must attempt to complete [5]. An evaluation matrix is developed based on the initial survey, reflecting the interests of the target user group [5]. Each interest is given a weight based on a point system [5].

2.2 Goal Focused Usability Studies

Brenda Battleson, Austin Booth, and Jane Weintrop [4] present the idea that goals for the product must be set before any testing or planning begins. These goals then become the basis for the questions used in formal usability studies [4]. Studies suggest a planned list of tasks for the user to complete along with post test discussion questions for the user to discuss how they felt using the product [4].

2.3 Goal-Oriented Design

Alan Cooper, Robert Reimann, David Cronin, and Christopher Noessel [3] suggest a goal-oriented view on the development of products[3]. Generally, products are developed based on the wants and needs of the developers of the product, but the goal-oriented design process attempts to eliminate this problem [3]. Usability testing is used to test the product after it is complete, but not generally to guide the design of a product [3]. In goal-oriented design, there are six phases for the design of a product: Research, Modeling, Requirements Definition, Design Framework, and Design Refinement [3]. The "Research" phase consists of researching existing products, stakeholder interviews where the designer will obtain the stakeholder's vision for the product along with business related information, and user interviews and observation. This phase is the foundation for every other phase in the design process [3]. User interviews should take place where the product interaction normally happens [3]. Facilitators should avoid a fixed set of questions, assume the role of an apprentice (not an expert), use open-ended and closed-ended questions to direct the discussion,

Table 2.1: User Interview Questions [3]

Question Type	Question
Goal Oriented Questions	What makes a good day? A bad day? What activities currently waste your time? What is most important to you? What helps you make decisions?
System Oriented Questions	What are the most common things you do with the product? What parts of the product do you use most? How do you work around problems? What shortcuts do yo employ?
Work Flow Oriented Questions	What did you do when you first came in to-day? What did you do after that? How often do you do this? What things do you do weekly or monthly, but not every day? What constitutes a typical day? What would be an unusual event?
Attitude Oriented Questions	What do you see yourself doing five years from now? What would you prefer not to do? What do you procrastinate on? What do you enjoy most about your job (or lifestyle)? What do you always tackle first?

focus on goals first and tasks second, avoid making the user a designer, avoid discussing technology, encourage storytelling, ask for a show-and-tell, and avoid leading questions [3]. Table 2.1 demonstrates the types of questions that will be most helpful during user interviews.

Phase two, "Modeling", is where the designer will produce 'Personas' [3]. These personas are user archetypes based on patterns in user and customer behaviors, attitudes, aptitudes, goals, environment, tools, and challenges [3]. A persona represents a range of the potential users [3]. These are sorted into persona types and one primary persona is chosen for each of the primary interfaces of the product [3]. The next phase is the "Requirements Definition" phase. In this phase, the designer

constructs scenarios where their primary persona would use the product and then compiles this scenario into the product requirements, which include the functional and data needs, user mental models, design imperatives, product vision, business requirements, and technology requirements [3]. The fourth phase is the "Design Framework" phase where the designer constructs rough frameworks for the interfaces of the product then uses 'key path' scenarios which test how the developed persona would interact with the product [3]. The fifth phase is the "Design Refinement" phase, where the design becomes more detailed and takes a more concrete form, including visualization and branding [3]. The last phase is the "Design Modification" phase. This phase is concerned with maintaining the conceptual integrity of the design under changing technology constraints [3]. These phases make up the process called 'Goal-Directed Design' and aims to generate products that are usable, viable, and build-able [3]. Digital products often fail because the developers have misplaced priorities, are ignorant about real users, lack a design process, or suffer from a conflict of interest by performing the designing and the developing [3]. If designers stick to the concepts behind Goal-Directed Design and use this thinking through-out the development of products, designers can create products that will "surpass the competition, make devoted fans of their users, and - perhaps - make the world a better place, one pixel at a time" [3].

Chapter 3

Related Work

There are a number of existing planner applications. However, this project will focus on free applications only. One of the well-known applications is called MyStudyLife. MyStudyLife boasts that it is an app for students, teachers, and lecturers designed to make study life easier to manage. Another existing product is named Trello. Trello is popular in the computer science world and claims to be useful for organizing and prioritizing tasks. WeekPlan is another online planner, slightly different from the previous two as it boasts that it is based on '4 key principles based on best-selling methodologies'. All of these applications will be used for testing in this project's design process.

Chapter 4

Preliminary Findings

The user interviews phase of this project has been completed. The interviews were conducted without a prepared set of questions, but all of them did start with "Do you have a planner?". The goal of user interviews is to find out what the target user's goals are and how they would like a planner to be in a perfect world. After the users were questioned about their uses of planners and past experiences, they were each directed to three different sites; Trello, MyStudyLife, and WeekPlan. The user was directed to login with test account credentials, click around, vocalize their thoughts, and provide an overall opinion. Eight user interviews were conducted on a variety of college students. One student was from University of North Carolina at Chapel Hill, another was from Asheville-Buncombe Technical Community College, and the rest were from Appalachian State University. Two of the interviewees were graduate students, five were undergraduate students, and one was in a nursing program. Of the undergraduate students, there were two sophomores, one junior, and two seniors. Every one of the subjects used some form of a planner, with three using a digital

option, google calendar.

4.1 User Interviews

4.1.1 User Interview No. 1

Age: 21

School Status: Undergraduate Student at Appalachian State University

Major: Computer Science

Q: Do you have a planner?

A: Yes

Q: How often do you look at your planner?

A: Now, 3-4 times a week, but last year when I was really busy it was like my life.

Q: Do you use the calendar or the day to day list?

A: Both, I really like seeing a birds eye view of everything on my calendar, but I also like to plan out my days with lists. When I get home I have a whiteboard on my wall where I transfer everything I need to do that day so I can keep seeing it all day.

Q: When you plan your days, do you plan it at the start of the week or the each day?

A: I could never plan out my days by week, its always by day.

Q: Do you ever schedule your days out, like by time?

A: Rarely

Q: Do you think you would like to see reports, like if one class is taking up more of your time?

A: Yeah, I think that would be really cool.

Q: Have you ever tried online planners?

A: No, not really.

Q: Why?

A: I'm an old school person I guess. If I don't write things down I won't remember them.

Q: If you found an digital planner that offered capabilities that you really liked, do you think you would switch?

A: Yeah, especially if it was connected to my google drive. I find that Ive stopped using applications not on my google drive. If it was accessible on my phone that would pretty awesome too.

Q: Have you used Trello?

A: Yes, I was forced to use it for a class.

Q: So I take it that you didn't like it?

A: No, well, I really like the process aspect of it. I like that I can put things into in progress and then moving things to the done column makes me feel really accomplished. Like marking things off my list or doing some kind of action when I finished things makes me feel good. Checking a box is less satisfying. The thing about Trello is that I really like seeing a birds eye view of everything. Its good for day to day planning, but not for a whole planner.

Q: So you would like it better if it had a calendar?

A: Yeah, for sure.

The subject was then directed to MyStudyLife with test credentials and then instructed to click around and get a feel for the application, thinking aloud.

She saw the dashboard, and was confused what to click on at first. She tried to add a task to the task list. and was slightly overwhelmed by the options. She liked that you could pick a color for the subject of the task.

After creating a task, she saw that to mark a task as complete she would have to move a percentage completed bar to 100%. She did not like trying to apply a percentage to a task, also stated that it was not satisfying enough when done.

She stated multiple times that the application was not intuitive.

She liked the month view, but the month view doesnt show tasks on days. She could

only see a task for a specified day by clicking on that day. She did not like this.

She saw that there was a task list view, but did not like the way it was setup or that you still had to use the percentage bar to mark a task as complete.

She clicked through other parts of the dashboard and didnt find much that she liked about the other functionalities, like she found the search feature unnecessary.

The subject was then directed to WeekPlan with test credentials.

She was immediately confused and overwhelmed.

She did not like the terminology or the 24hr format.

She also did not like that it showed days by time.

She found really nothing she liked about this site except for the analytics. She thought it would be cool to see analytics, but possibly depressing.

4.1.2 User Interview No. 2

Age: 22

School Status: Undergraduate Student at Appalachian State University

Major: Mathematics

Q: Do you have a planner?

A: Yes

Q: How often do you look at your planner?

A: Every day

Q: I see that you use google calendar, why did you choose an online planner?

A: I can always access it from anywhere.

Q: Is there capabilities you wish you had with Google Calendar?

A: I wish I could see a task list with due dates and also if theres a long list for a day sometimes the calendar view gets kind of messy to look at.

Q: Do you ever schedule your days out, like by time?

A: Sometimes, usually on pencil and paper.

Q: If you found another online application that gave you these capabilities would you switch?

A: Yeah for sure. I tried some other online planners, but I didnt find any that I liked.

The subject was then directed to Trello with test credentials and then instructed to click around and get a feel for the application, thinking aloud..

He immediately said "Oh this is cool."

He liked all the options for tasks, although voiced the need for recurring tasks.

He liked the ability to label a task with a class/color, which is not currently available with his planner. Overall, he liked Trello, but really wanted to be able to see a

calendar view.

The subject was then directed to MyStudyLife with test credentials.

He immediately reacted well to the abundance of features. He liked the calendar and task views and thought that he would use this planner.

He attempted to make a task and exam.

He voiced annoyance with the inability to see task on the calendar and inability to edit from the calendar.

Overall, he thought this planner was close to what he needed, but had extra features he didn't need and needed to expand on the calendar view.

The subject was then directed to WeekPlan with test credentials.

He commented that the interface was not intuitive.

He liked the animation that happens when a task is checked.

Overall, the interface was too annoying and messy for him.

4.1.3 User Interview No. 3

Age: 22

School Status: Graduate Student at University of North Carolina at Chapel Hill

Major: Social Work

Q: Do you have a planner?

A: Yes

Q: How often would you say you look at your planner?

A: Well it depends. When Im busy I look at it every day, multiple times a day, but when Im not busy I would say I look at it 2 to 3 times a week.

Q: Do you use just a calendar or a day by day list?

A: Both, I keep track of what I need to do each day on the day by day list. If Im really busy I might make a schedule for that day, but mostly its just a list of things I need to do each day and my calendar.

Q: When you plan out what needs to be done each day? Do you plan each day out as you go?

A: I plan out my weekly stuff, but mostly I plan out for each day what needs to be done that day.

Q: Do you think it would be helpful for you to see reports like how much time or percentage of tasks you spend on each class?

A: Yeah actually, that could be kind of nice to know.

Q: Have you ever tried online planners?

A: Nope, the closest would be google calendar, but I dont use that as my planner.

Q: Why havent you tried any online planners?

A: I am an in person kind of person. I like to hold my planner and be able to write

on it and see it. I havent ever thought about trying online planners.

The subject opted to try out each website for a week and then give her feedback.

After the week was up she stated that she really liked Trello, but wished it had a calendar functionality. She really valued the ability to plan week by week. MyStudyLife had too many functionalities and was overcomplicated for her needs and the same for WeekPlan.

4.1.4 User Interview No. 4

Age: 24

School Status: Nursing student at Asheville-Buncombe Technical Community College

Q: Do you have a planner?

A: Yes, I love planners.

Q: How often do you look at your planner?

A: Every day

Q: Do you use the calendar or the day by day list?

A: The day by day lists for sure, I dont have much written on the calendar part. I have everything color coded too.

Q: Do you ever schedule your days out, like by time?

A: Sometimes, but not in my planner.

Q: When you plan out your days, do you do it each day or at the start of the week?

A: At the start of the week I plan out my day by day to do lists. I could never do it day to day, that makes me anxious.

Q: Do you think reports, like how much of your tasks each class is consuming would be helpful?

A: No, I dont think so.

Q: Have you tried online planners?

A: Yes, I havent seen any I like. They all kind of suck, but I would love to switch for accessibility purposes.

The subject was then directed to Trello with test credentials and then instructed to click around and getting a feel for the application, thinking aloud.

She immediately thought that the interface looked "cool". She liked that you can have a checklist and stated that she is "all about checklists." She was not sure what the attachments feature was for, but still thought it was cool.

Overall, she thought Trello was pretty cool. She liked the list features and the process

of moving tasks over and being able to see upcoming tasks.

The subject was then directed to MyStudyLife with test credentials.

"Ooh this looks fun," she exclaimed. She liked that this one provided a calendar view with time slots, however she thought it was weird that you can't click on things in the calendar or view tasks.

She liked the task view.

Overall, she liked the functionalities of this planner, but felt it could be laid out differently and refined. She felt that there wasn't a great way to put tasks to days that aren't due dates and wishes there was a way to plan out what she would like to complete each day.

The subject was then directed to WeekPlan with test credentials.

Immediately, she felt the interface was confusing and strange. She did not wish to continue playing with this planner.

4.1.5 User Interview No. 5

Age: 21

School Status: Sophomore at Appalachian State University

Major: Computer Science

Q: Do you have a planner?

A: Yes.

Q: How often do you look at your planner?

A: 0-5 times a day depending on the workload.

Q: Do you use the calendar part of your planner or the day by day?

A: Day by day and I use the calendar on my phone.

Q: Do you plan out your days, like by time?

A: When I have a heavy schedule I do.

Q: Have you ever tried an online planner?

A: I tried a couple and used on in the terminal for a while, but I didn't really like any of them.

The subject was then directed to Trello with test credentials and then instructed to click around and getting a feel for the application, thinking aloud.

He clicked around silently for some time and then came to a quick conclusion that if he were going to use a digital planner, it would be like this one. He stated that he liked this layout, but he didn't feel like it would make him switch to a digital option.

The subject was then directed to MyStudyLife with test credentials.

As with Trello, he clicked around silently for a few minutes and then came to another quick conclusion that he liked Trello better as it was simpler.

The subject was then directed to WeekPlan with test credentials.

He once again clicked around for some time and then gave his thoughts. He did not

like this interface, but felt that if it were mixed with Trello he would possibly use it.

4.1.6 User Interview No. 6

Age: 23

School Status: Graduate Student at Appalachian State University

Major: Computer Science

Q: Do you use a planner?

A: Yes, google calendar.

Q: How often do you look at your calendar?

A: Every hour.

Q: So I take it you prefer the calendar view?

A: I like to look at each week, but not necessarily the whole month.

Q: Do you plan out what you are going to do each day?

A: Not really.

Q: Do you think reports would be helpful to see?

A: Yeah, might be hard to implement correctly though since most of the time I'm working on something I take breaks as well.

Q: Have you tried any other online planners?

A: Like freshman year, but I can't remember which ones.

The subject was then directed to Trello with test credentials.

So click around and get a feel for the application. Try to say your thoughts out loud.

He initially thought the site looked "pretty cool". He asked if you can sort by due date and I directed him how to do that.

He really liked the options on each card and due date abilities, but really would like a calendar with a weekly view and times.

The subject was then directed to MyStudyLife with test credentials.

He immediately found the calendar and liked that it had that capability.

He liked that you can put your full schedule of classes, but noticed that you can't view tasks on the calendar without clicking on individual days.

The subject was then directed to WeekPlan with test credentials.

He clicked around for a bit, silently. He then said, "I don't know. This is pretty weird."

4.1.7 User Interview No. 7

Age: 22

School Status: Senior at Appalachian State University

Major: Computer Information Systems

Q: Do you have a planner?

A: I try but fail, so nah, I stick to notifications and reminders on my phone.

Q: Do you use a specific app or just reminders through the calendar?

A: Both the calendar and the reminders app on iOS

Q: Have you ever tried any online planners or planner apps?

A: I havent!

Q: Do you think you would use an online planner if you found one that met your needs?

A: I think I would! Probably when I get a more portable laptop.

Q: Do you like to keep track of just due dates or do you like to plan out what tasks youre going to do on which days?

A: A little of both, sometimes due dates, sometimes medication reminders, and appointment/meeting reminders. Or sometimes its even just to remind me to respond to emails if its important.

The subject was then directed to Trello with test credentials and then instructed to click around and getting a feel for the application, thinking aloud.

She liked the interface. She really liked the labeling features where you can "create your own recognizable scheme".

She liked that tasks can be as detailed as you want them to be and that it's easy to sort between activities that are done, in progress, or need to be started so it gives "a sense of accomplishment".

Overall, she felt like she would use the site, but wishes there was an ability to have notifications possibly on a task by task basis.

The subject was then directed to MyStudyLife with test credentials.

She immediately loved the interface of this planner. She liked the ability to adjust percentage bars on tasks and the ability to keep all academic related items in one place, even exams.

She felt that this planner was more academically based and wouldn't be as good for non-academic tasks.

She stated that she wished she had known about this earlier this year.

The subject was then directed to WeekPlan with test credentials.

She liked the different sections like the week planner, high impact tasks, and parking lot section. She liked the ability to keep non-academic related tasks separately and felt this planner was good for planning and goal setting.

Overall, she felt this site was more busy and a bit overwhelming. She thought the site could get cluttered if you have a lot on it.

A little of both, sometimes due dates, sometimes medication reminders, and appointment/meeting reminders. Or sometimes its even just to remind me to respond to emails if its important.

4.1.8 User Interview No. 8

Age: 21

School Status: Junior at Appalachian State University

Major: Nutrition

Q: Do you have a planner?

A: Yes

Q: Is it a paper planner?

A: Yes, but I've been really lax about using it lately, I really need to get better about that.

Q: Have you ever tried any online planners?

A: I tried google calendar and windows calendar, but I don't need to keep a schedule so I stopped using those.

Q: So do you use the day by day portion of your planner over the calendar?

A: Yes, my planner has 2 weeks on a page and I write stuff for each day.

Q: So do you plan out what you are going to do each day?

A: Yes, at the beginning of the week.

The subject was then directed to Trello with test credentials and then instructed to click around and getting a feel for the application, thinking aloud.

She liked the columns, but also not sure about using them in practice. She thought that it would take time to set up to her liking, but likes that it's personalized. She asked if there is a mobile app and I answered, "yes".

Overall, she would probably try out this planner, but she would like it if it was an app on her computer better. She also really liked the color coding options and the ability to connect to google.

The subject was then directed to MyStudyLife with test credentials.

Her immediate response was that this site seemed more user friendly than Trello. She couldn't figure out what "resit" meant on the exam creation form. She also thought that the calendar was weird, but liked that buttons told you what action they performed when she hovered the mouse over them.

She liked the to do list better on Trello, but liked the ability to mark percentages on tasks and organize by subject on this site. She also liked the exam piece, but felt it could be treated as a task.

Overall, she decided she liked Trello better. She felt MyStudyLife put extra pressure on her with the circles/percentages on the dashboard.

The subject was then directed to WeekPlan with test credentials.

She clicked around for a while silently. She exclaimed when she check off a task and there was an animation and mentioned that the animation was a great incentive for completing a task, however she felt the application as a whole had too much going

on.

She felt this site would be better for work or maybe collaboration. She also mentioned that the days are tiny and have tiny text that is hard to read.

Overall, she did not like the layout of this site.

Chapter 5

Proposed Future Work

I plan to use the user interviews from Chapter 4 and follow the process outlined by Alan Cooper and discussed in Chapter 3. The following subsections describe the proposed design creation process. After developing a design framework, I plan to implement the framework. I will try to further my knowledge of web frameworks during the implementation process. Once there is a functioning, deliverable product, I will develop an evaluation matrix and have the users re-evaluate each website from the initial interviews and my new product, producing scores and comparing my product with its competitors. Any problems found with my product during this evaluation, I will attempt to fix and then run usability testing again. In the end, the goal is to create an online planner that is more effective than the current options and entices students who use paper planners or no planner at all to switch over to my product.

5.1 Modeling

In the next phase of development I will discover behavior and work flow patterns by analyzing the interviews. Subjects will be grouped together based on these patterns and synthesized into user models, or personas. Each persona will be designated a type, such as primary, secondary, and supplemental. These types will decided how influential each persona is on the design.

5.2 Requirements Definition

In Requirements Definition phase I will develop context scenarios, a "day in the life" of the persona using the product, and use these scenarios to analyze the functional and data requirements of users. I will also involve my own goals for the product and intertwine this information into a requirements definition, which balances user and technical requirements that the design will follow.

5.3 Design Framework and Refinement

In the Framework Definition phase I will produce a rough, high level sketch of the product views. The goal is to define the overall structure and user experience. The rough sketch will then be tested with scenarios, similar to context scenarios. These scenarios will test how well the persona can complete it's goals using the rough design. Then, I will increase the detail of the rough sketch and produce a detailed documentation of the design.

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Word Count: 5350