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<http://students.washington.edu/kkuan/490assg3.pdf>

Problem and Solution Overview

There is the potential every day to forget a necessary item when leaving the house. This problem is compounded by busy schedules and the myriad accessories the typical person leaves the house with. To solve the problem, we plan to design a system that will keep track of the items a person needs throughout the day, and when that person leaves the house it will remind them of the items they're missing. This reminder can be prompt-driven or automatic based on user preference. Optionally, the program could remind the user of tasks and activities.

Contextual Interview

Interviewee 1 is an undergraduate living on campus. His busy schedule makes him an ideal customer for our product. I observed him in the morning as he prepared for a typical day. His day begins very chaotically. His assignments and other papers are scattered all over the floor along with his clothes and textbooks. He only has about 20 minutes to do a variety of things before he needs to leave for class. These tasks he does are: looking out the window to check the weather, putting on clothes, boiling water for tea that he will bring with him, brushing his teeth, and finding his assignment that he needs to turn in today. While he is doing these things, he is also cleaning up. He makes his bed, and moves his papers and clothes off the floor. He packs into his backpack, the assignment he needs to turn in, lined paper, a calculator, and pencils. He needs all this for his math class. He also brings his watch, wallet, and room key. These are essential items that he brings every day. He doesn't bring his cell phone, since he can't use it during class.

Interviewee 2 is a male in his twenties, who is a busy graduate student. He has both a school and home office. He represents our target audience because he is busy, he is comfortable with computing devices, and he always forgets things. I interviewed him in his school office, during the middle of the day, therefore our conversation was reflective. I found out that he has difficulty organizing what to keep in which office. He usually forgets to transport books and supplies between his home and school office. He plans his study schedule per week. For example, he has no time to study at school on Monday, Tuesday, or Wednesday so he keeps his supplies at his home office those days. He uses a paper calendar because he likes to see the whole month and individual days concurrently. He also prefers this view. He doesn't use his cell phone calendar because the view is difficult to interpret. He would not want a device alerting him he forgot something, but he is interested in a device that would coordinate his supplies and activities between both offices. He would rather know where something is when he finds out it is missing, rather than an alert telling him he forgot something.

Interviewee 3 is a married mother of three. She works as an accountant during the week, but what keeps her most busy are her 16-, 18-, and 20-year old children. She works to ensure that they are where they need to be, when they need to be there, and that they haven't forgotten any of their own things, besides remembering to take care of herself. In our study, she represents your average busy, family-oriented mom. I observed her as she prepared at home for a busier-than-

usual Sunday. My "apprenticeship" consisted of familiar tasks, slightly augmented by inquiries as to how she remembered certain things, why she prepared things the way she did, etc.

All three interviewees were people with a busy schedule, but general similarities end there. The two students only take care of their own business, whereas the mother keeps track of multiple people. The students were focused more on remembering items, whereas the mother was more concerned with remembering scheduled activities. The students were also characterized as both being fairly relaxed but forgetful, whereas the mother often stressed about her schedule but rarely forgot anything. The grad student and mother both planned a week or more in advance, both keeping a paper schedule, but the undergrad didn't keep any form of schedule and prepared for his day the morning of. Unique to each individual were their reliance on items versus their ability to retrieve them later in the day: the grad student relied heavily on his tools, but only had one chance in the morning to remember them. The undergrad also relied on his possessions, but could generally retrieve them later in the day. The mother relied only on a few items that she couldn't leave the house without, a sort of automatic solution to the problem.

ESM

We chose our first subject for ESM because she holds a full-time job in addition to a schedule filled with multiple social activities. She is an ideal user because she is very busy and generally needs everything for the day when she leaves the house in the morning. Our second subject was chosen to give us some balance, as she is a full-time student with few extracurricular activities and represents a part of the population not encompassed by our first vision of the project.

For our sampling, we programmed three surveys into the phone to be taken in the morning (after leaving the house), midday, and after coming home at night. The morning survey asked how confident the subject was that she had all her required items with her, how inconvenient it would be to go back and get a forgotten item, and how long it took to get ready. The midday survey asked how many items the participant knew she'd forgotten, how inconvenienced she was, and how important the item was. The evening survey asked the participant how organized and forgetful she normally is and whether this particular day had more or less forgotten items with more or less annoyance. Each subject was given a phone for two days, and each was asked to complete each of the three surveys each day, for a total of 6 surveys each. The timing of the surveys was voluntary—due to problems getting the notifications to work, the subjects were instructed to take the surveys at the appropriate times in their schedules. Despite this problem, both subjects responded at the right times to every survey.

What we found was that both participants spend 30 minutes or less getting ready, but both were very confident that they had everything they needed after they'd left for the morning. However, by midday the participants found that they had normally forgotten something, although usually it was an item of minor annoyance. It was also always very inconvenient to go back to get a forgotten item. Both participants indicated that on a typical day they felt that they forgot more items and were more annoyed, which could probably be explained by a couple of factors. First, by participating in this study they were more aware of their preparation process and thus less likely to forget everything, and second they probably had clearer memories of the times when an important item was forgotten than when everything was with them. Surprisingly, despite very

similar answers to the rest of the survey, the participants had almost opposite answers when evaluating their own levels of organization and forgetfulness.

In retrospect, we should have included a question about how they managed their schedules as well as how a program or interface could help them remember more items. However, given the limited nature of our time for studying and programming the phone, I think we generated decent data.

As for the tool itself, we had problems getting the phone to actually prompt our users to take surveys. This may have been due to faulty XML or it might have been the design of our surveys.

Task Analysis Questions

1. Our target audience is busy people who keep calendars, are forgetful, and have the money to buy our device.
2. They currently keep schedules and need to remember daily items, activities, and which items are required for which activities.
3. We want to help them perform the existing tasks better, such as not forgetting important items and supplies during the day.
4. These tasks are learned by experience and by keeping calendars and lists. People will use whatever method they are most comfortable with.
5. These tasks are performed at home, in the office, in the car, and anywhere else they go during the day.
6. If the data (items and schedule) are important, people need to remember them. If they forget, it can lead to bigger problems. If people don't care that they forget things or their schedule, then they don't put much effort into remembering.
7. The user has paper, phone, and software calendars to help remember their schedules. They can also list tasks. Both are clues for what items they need to remember for the day. Time is another tool. Some people can save time and stress in the morning if they prepare the night before.
8. People are always performing the tasks of remembering what they need, whenever they leave the house and throughout the day.
9. Users must perform these tasks (remembering items and activities) before they happen or are required.
10. If a person forgets something, they may not have time to get it or buy another one. It may be too late if they forget a meeting or other activity. The importance of the item or activity is situational and depends on the person.

Analysis of New and Existing Tasks

Easy tasks:

1) Determining if all needed items are present

This is simply the task of getting out the door with all items one needs for the day. In the status quo, this involves personally verifying your items against the schedule, but we would like to improve this with our system and automate the checking of items, as well as speed up the process in general.

2) Looking at the schedule

This is done by opening the scheduling program (or paper book, if the schedule is kept on paper) and navigating to the desired day/week/month, depending on view.

Moderate tasks:

1) Adding an activity to the schedule

This is done by looking at the schedule and navigating to the place the new activity should go, then using the provided interface to add an item. Electronically, this is normally a new window that allows you to specify the properties of the new appointment. On paper, this involves writing the appointment in at the correct time.

2) Adding one new item to the database

This isn't really a task that the status quo supports, except in a very general, "I've bought this item and now remember that I have it and should bring it to x activities". In our purposes, this would require adding a tag to the item and using the program to identify it and associate it with different tasks.

Difficult tasks:

1) Generating the initial database

Again, this isn't really something in the status quo, and the most equivalent scenario would be coming down with amnesia and having to relearn all of one's possessions and what one would use them for. With the system, this would be done in a very similar way to adding one item in the database.

2) Generating initial schedule

There are two ways a person begins using a scheduling device: either they input each item by hand, or they export their schedule from their current program to the new program they will be using. Ideally, our program would be able to accept an exported schedule so that transferring over to using it would not be difficult.

Interface Design

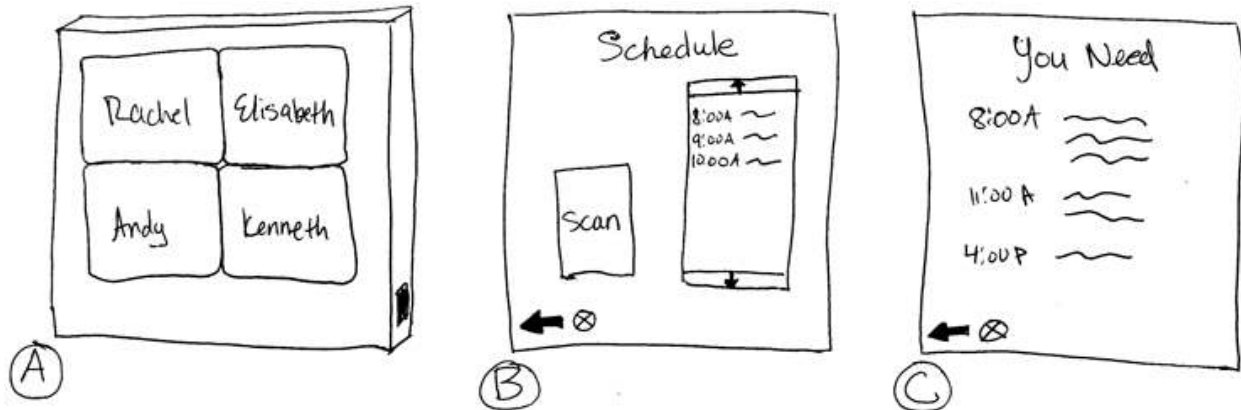
The most important trait of our target audience can be summed up in one word: "busy". People most likely to make use of our tool tend to be busy, forgetful people, perhaps in a hurry on their way out the door. Forgetting things, especially last minute, will make anyone irate. Technology in general doesn't stand up to irritation well, so our interface must be as simple as possible. Instead of trying to strike a balance between number of options on a screen versus depth of menu choices, we have to design an interface that contains a minimum of both.

There are two parts to our interface. The first part is a touch screen for the RFID scanning device. The touch screen allows the user to select who she is and then view her schedule for the day. The user can have the items she is carrying be scanned and figure out what items she may

be missing for the day. An average of three to four button presses would be all that are required to make complete use of this part of the tool.

The second part of our interface is the scheduling software that runs on a computer. The software allows the user to view her schedule by month, week, or day. The user can perform editing tasks such as adding activities to her schedule and adding the items required by a particular activity. The software also allows users to add RFID tagged items into the database.

Example 1: Determining if all needed items are present



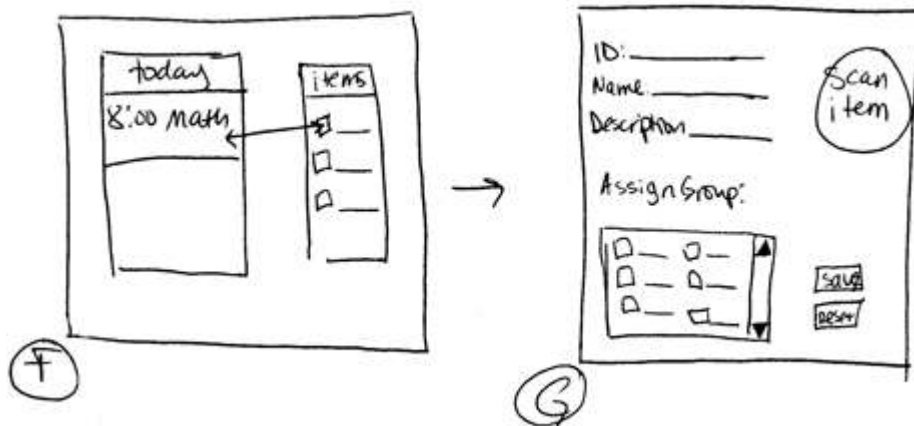
Before leaving, the user consults a touch screen/scanner. The screen presents the user with a selection of equally sized buttons to determine the user's identity, as in Frame A. Upon selecting their identity, the interface displays a schedule for the day, detailing activities and required items (Frame B). The user can select a range of activities for which she needs to be prepared, or can have the interface scan her for the entire day. She can also go back to the identification screen, or cancel out of the process entirely. Once she is satisfied with her selections, she presses the Scan button, and the scanner checks her for the appropriate items. If any are missing, the screen displays which items are missing, along with the activity they correspond to (Frame C). The user can then retrieve the listed items and go back to the schedule screen to re-scan. If the user has all her items, she is presented with a congratulatory message and sent on her way.

Example 2: Adding an activity to the schedule



To organize her schedule and attach items to activities, the user uses a computer-based scheduling program. Upon launching, the program displays a set of three view options: Day, Week, and Month (Frame D), which the user can choose from dependent on preference. The schedule is editable from any of these views. From the Day view, the user can add activities and search through a list of items, either visually or textually via a search box, and attach those items to selected activities (Frame E).

Example 3: Generating the initial database



While initially configuring the tool, the user must populate a list of tagged items that she wants the tool to know about. The user can access the scanning utility via a number of ways, but in the illustrated case, the user has searched for an item that doesn't currently exist and is prompted if she wants to scan the item in question (Frame F). On agreeing to do so, the user is presented with the registration utility. The user first scans the item, which automatically fills in the ID field with the RFID tag's specific ID. She can then enter a name and description, as well as pre-assign the item to existing groups ("Math Class", "Choir", etc.) (Frame G). After she is satisfied with her entry, she can save the information, or if unsatisfied, she can reset the form.