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DSGN 1: Project 3

## I. Data Collection

Our redesign we chose was the alarm clock section of the clock app on an iPhone. We decided to use an interview methodology as well as asking interviewees to perform a list of actions (Figure 1.0) we wrote out. We decided to collect our data from specifically college students on campus because we figured a majority of college students would use the alarm clock section to wake up for school, work, or life activities. We also wanted to interview students in more populated areas that weren't quiet due to needing to ask them to set off an alarm so that wouldn't be ideal in a quiet setting.

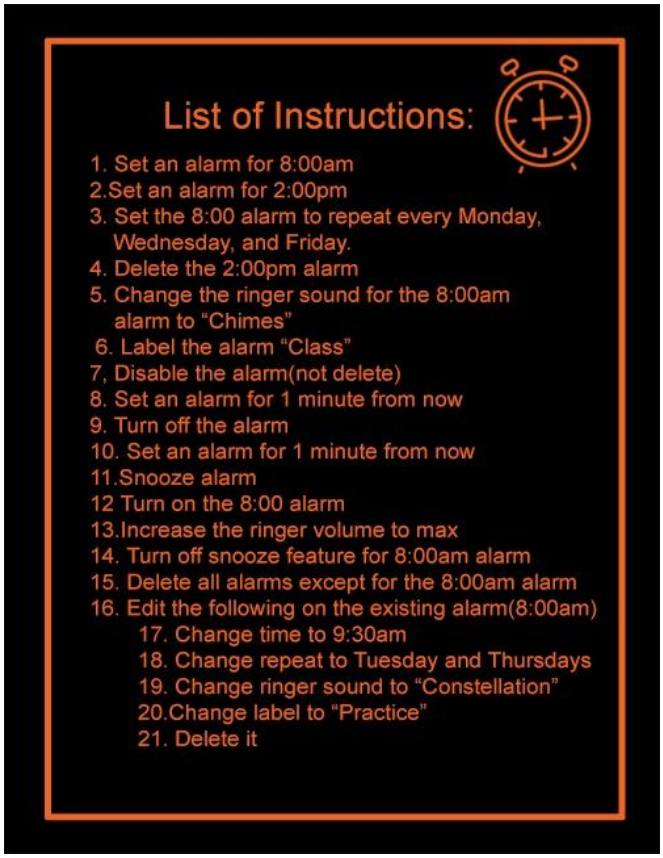



*Figure 1.0 List of Instructions*

Before we asked interviewees to perform the list of instructions, we also asked them a couple of questions:

1. Do you own an Android or an iPhone?
2. Do you use the alarm on the phone?
3. Have you used the iPhone clock app as an alarm before?
4. If so, how often?
5. Why/why not do you use an alarm?
    a. If not, what do you usually use as an alarm?
    b. How often?
6. What are your general thoughts on the iPhone clock app?

Then, after interviewees performed the list of actions, we followed up with more questions:

1. After completing these steps, what are your general thoughts?
2. If they made any specific errors/actions, ask interviewees why they think they made that error/action.

For more in depth interview answers, link to interview spreadsheet here.

We specifically wrote out those different steps of instructions because we wanted to cover all the functions the alarm clock app had to offer. We started off with instructions to set alarm to see if the main function of the app was achievable for both Android and iPhone users. Then we asked for interviewees to delete an alarm with no instructions on how to delete because there are multiple ways to delete an alarm. We also asked interviewees to delete multiple alarms at once to see if this would change how they chose to delete alarms off the phone without giving away the fact that there were multiple ways to delete alarms. This way we can see what was the most common way and instinctive way for someone to delete an alarm off an iPhone. Another instruction we gave was for users to snooze an alarm with no specific way to snooze the alarm because there are also multiple ways to snooze an alarm. Lastly, we just tested different functions within the editing alarm section of the app to see if both Android or even iPhone users would make errors while completing our instructions.

We decided to ask whether interviewees if they used Androids or iPhones because those who own iPhones would naturally know more about the functions and interface of the alarm clock versus someone who owned an Android. When we asked if they used alarms, specifically iPhone alarms, we wanted to gauge whether they would have background knowledge of using the app. Asking how often they use it also helped us get a better understanding of why they would make slips or mistakes when performing the list of instructions. Then we asked for general thoughts before and after they performed the list of actions because we wanted to see if by actually interacting with the app and following instructions instead of just thinking about past experiences, the interviewees would change their opinion about the alarm clock app. We also followed up with asking about specific actions interviewees would make, like why they would tap on the alarm to edit, or why they decided to delete an alarm a specific way when there's multiple other ways, in order to see how their mind processes the instructions because that's not something we can just see from their actions.

Link to Project 3 Data

| Error | 1. Tapping on alarm to edit | 2, Not knowing how to adjust ringer volume | 3. Not knowing how to disable the alarm | 4. Not knowing how to snooze alarm when alarm goes off | 5. Scrolling the AM/PM instead of the minutes | 6. Having to tap edit or save a few times before it registers | 7. Clicking the wrong day for repeats |
|---|---|---|---|---|---|---|---|
| # of Interviews | 6 | 1 | 3 | 3 | 3 | 1 | 3 |

*Figure 1A*

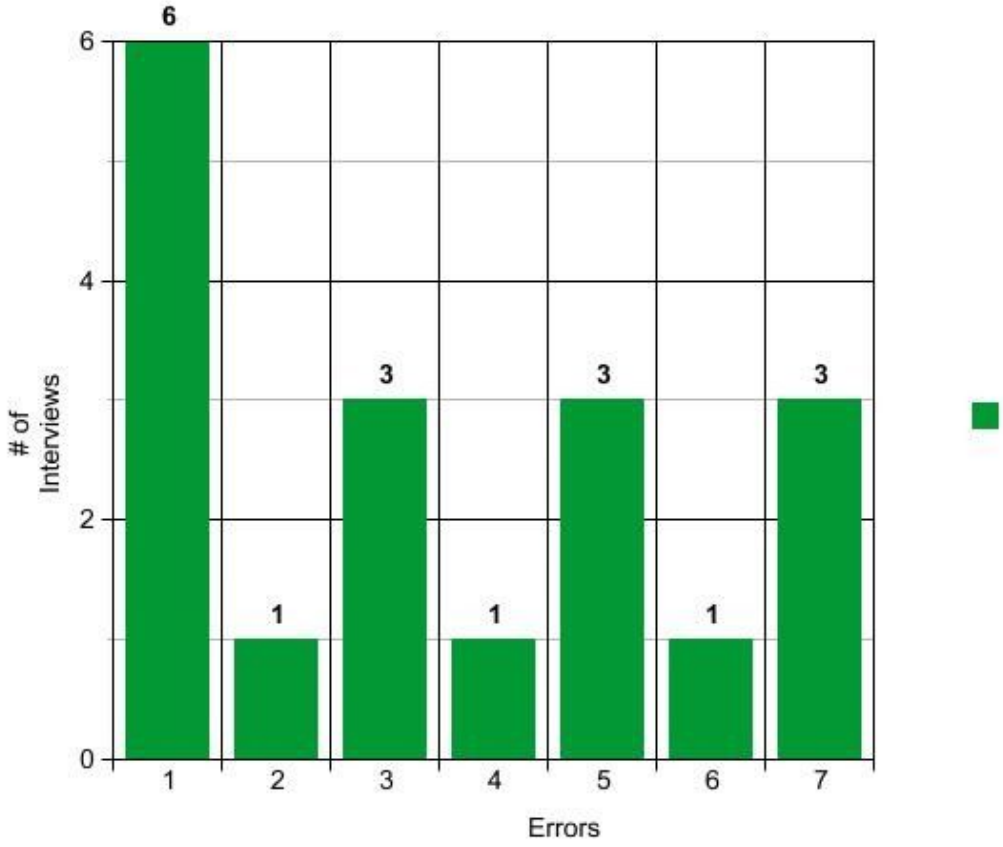



*Figure 1B. Note: Use figure 1A as reference to the type of errors(x-axis)*

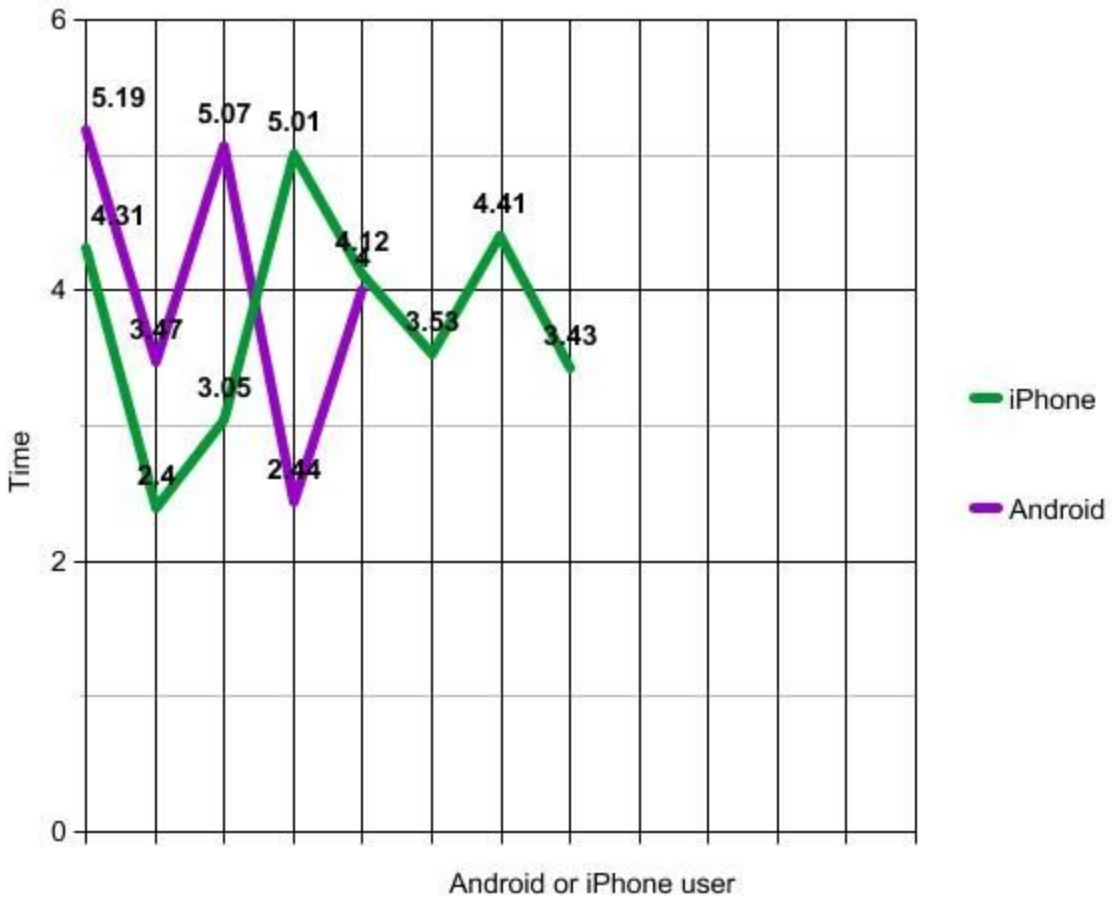


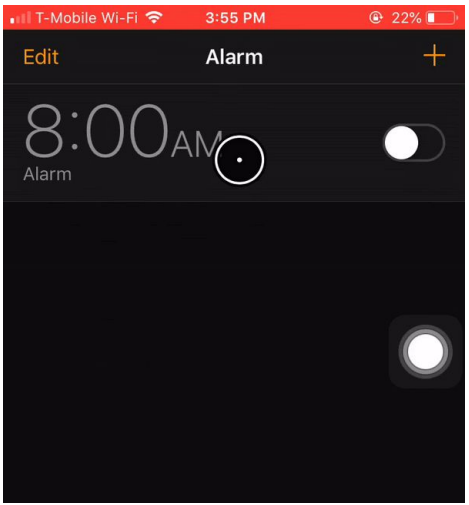

*Figure 1C. Note: 5.19 means 5:19(5 minutes and 19 seconds)*

| | | |
|---|---|---|
| iPhone | Average Time: 3:47 | # of Interviews: 8 |
| Android | Average Time: 3:36 | # of Interviews: 6 |

*Figure 1D.*

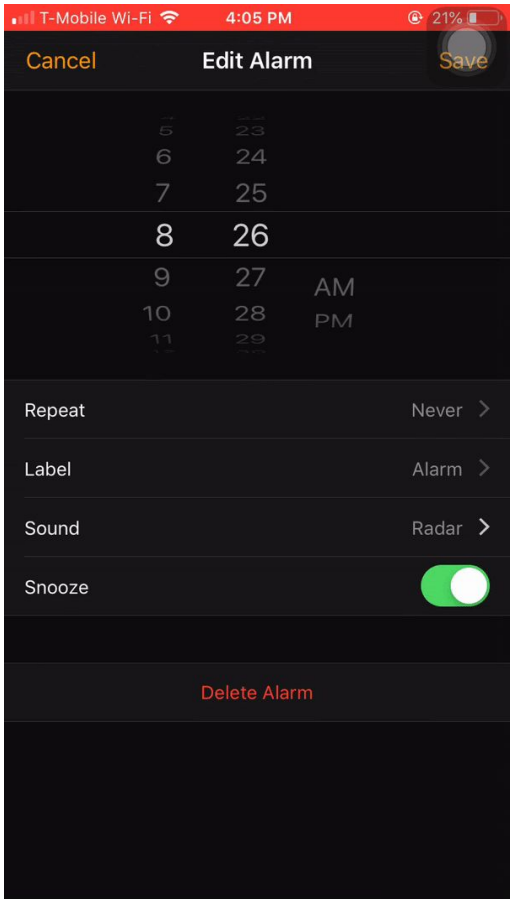
**II. Error Analysis**

*GIF Evidence of Errors:*



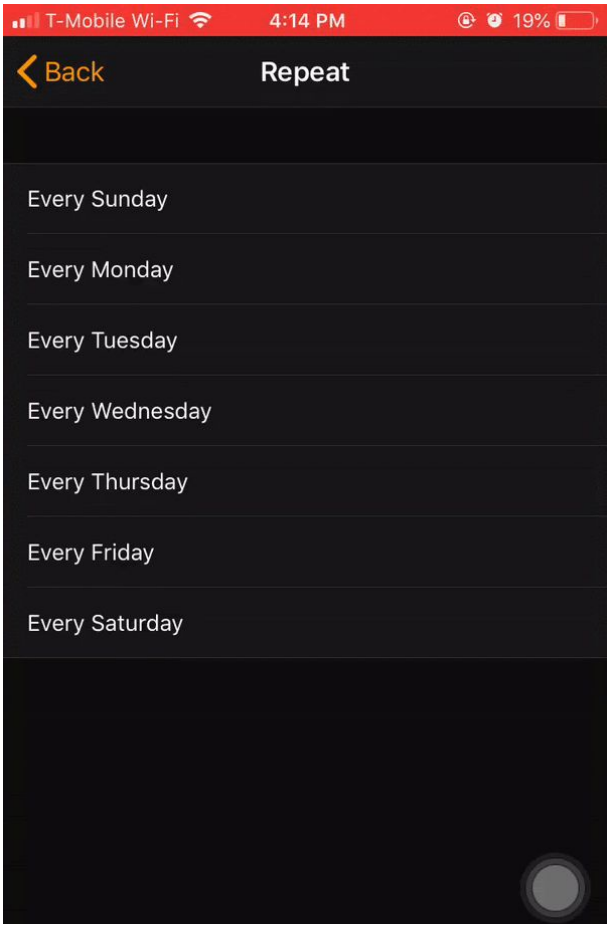

← Example of interviewee tapping on edit bar to edit alarm
*Figure 2A.*

Example of interviewee making a slip and scrolling AM or  PM when they wanted to scroll through minutes →
*Figure 2B.*




*GIFs to show evidence of errors*

Example of interviewee tapping on the wrong day →
*Figure 2C.*



**One** out of 14 of our interviewees stated that they could not press the 'edit' or 'save' button. We observed that they tapped the location of the option on the screen multiple times because it did not register right away. Apparently, they were not tapping the area of the button because there was no clear *signifie*r of where exactly they had to press. We classified this user's particular error as a *knowledge-based mistake* because they lacked the knowledge of precisely where to press to get to the next screen. Another reason that this error may have been made is because the user was going too fast and ended up making more mistakes in pressing 'edit'. This may also vary because the user knew they were being watched and so the pressure caused them to make several *memory-lapse mistakes*. Due to this mistake, the bridge between the *gulf of execution* and *gulf of evaluation* could not be crossed right away, leaving the user confused as to what their actions had done. While no other users in our interview pool experienced this same issue, many of them had similar problems with pressing to 'edit'.

Another problem that occurred is when **three** of the 14 users had trouble selecting the right days for when their alarm should 'repeat' (Figure 2D). They stated that it was hard to tell where each button ended and where the next began because there is actually no clear divider that *signifies* the area of each button. They made the error of selecting the wrong day or deselecting the correct day because of a *deficit in knowledge*. In this instance **two** of the three were android users who experience a much brighter and distinguishable design on their respective device. The picture to the right shows how nearly impossible it is to view the 'dividing lines' between each day; a user has to turn the brightness all the way up in order to distinguish them clearly, and select the day they desire. We classified their errors to be *mistakes* because they were not knowledgeable of this particular version of the clock app.

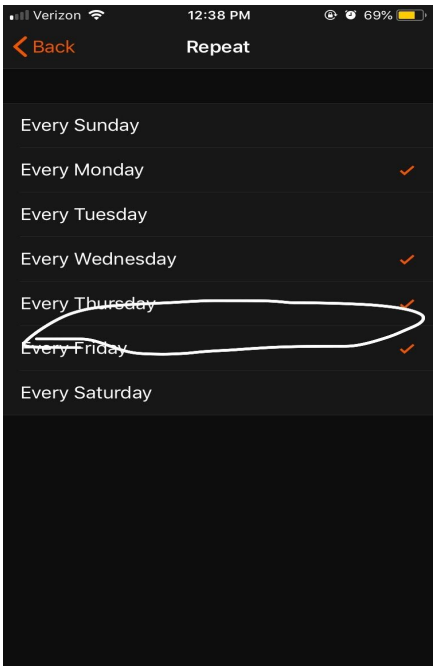



Figure 2D: Without turning up the brightness, these lines are nearly invisible.

**One** out of the 14 interviewees struggled when they were trying to adjust the ringer volume for the alarm. Part of our instructions were to turn the ringer volume all the way up in order to test adjusting volumes for our alarm. Based off previous instructions, the interviewee assumed this function would be part of the editing section of the app instead of buttons on the side of the phone and tapped on sound section of the alarm clock to adjust volume. This knowledge based mistake was made due to the Android user interviewee not knowing that to adjust iPhone volumes, it would be to use the buttons on the side of the phone and not the app itself.

Another issue that affected **three** out of the 14 interviewees were they did not know how to disable the alarm. A feature the alarm clock app has is to disable a alarm by tapping a switch left and right. When looking back at interviewees, it showed that those who did not know how to disable the alarm were all Android users. This showed that the iPhone feature to disable functions like alarms, notifications etc, were only known to iPhone users. This is a knowledge-based mistake because all Android users lack the knowledge of knowing what the button on the alarm meant.

**Three** of the 14 students had trouble snoozing the alarm when it went off (Figure 2E). One of the students explained that this issue occurred because he never had to snooze an alarm on his phone before. This is a *knowledge-based mistake* because he had no knowledge on how to perform the task. The reason he had no knowledge and could not acquire that knowledge is because there were no *signifiers* telling him that he had to slide down the notification in order to open the menu with the option for snoozing. Interestingly, the student above is an an iPhone user, meaning not all iPhone users know how the alarm works just because they have it. In this case, he does not use alarms so the functions were new to him. The other **two** users who made this mistake were Android users (as seen in interview 8 on the right). The reason they lacked the knowledge on how to snooze the alarm is because they are unfamiliar with the iPhone alarm app, just like the iPhone user above. However, we feel that this data does not reflect real life because alarms are most often snoozed when people are waking up. In their waking up, the interface for snoozing is different, and the user is more liable to make a slip especially because they are still drowsy. We speculate that the signifier issue will be fixed if the user had to snooze when the phone is locked, meaning less people will make the mistake of not knowing how to snooze. However, people tend to be drowsy when they wake. They are more likely to make an action-based slip and hit the off button instead of the snooze button, despite knowing how to snooze. Unfortunately, we do not have first hand interviews of the above. We would observe the user using the alarm clock as they wake up, but that may have some ethical issues.

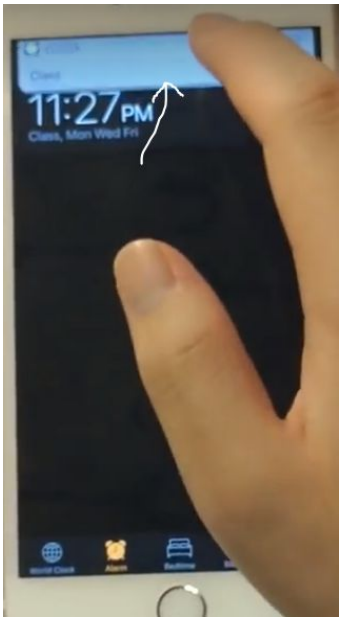
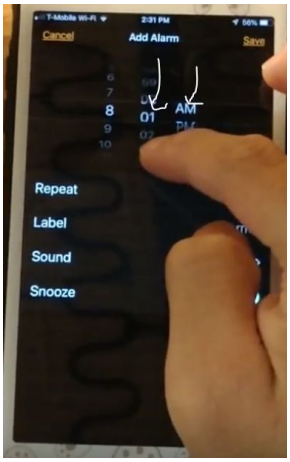
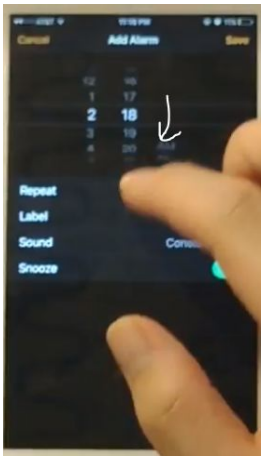


Figure 2E




A sixth error occurred when **three** of 14 users scrolled the am/pm while scrolling the minutes (Figure 2F). All three users explained that their finger had slipped. Two of them further reasoned that the scrolling area was too small. One of them even pointed out that even small fingers would make this slip. Because the users knew that they have to scroll the

minutes bar, but made the unintentional error of scrolling the am/pm bar at the same time, this error is classified as an *action-based slip*. The right action was executed on the wrong interface. The error exists because the alarm app *affords* scrolling multiple bars at the same time, as seen in interview 11. Another issue lies in the fact that users want to see what they are changing. This causes the user to slightly move their finger to one side, then slide the bar on that side instead of the intended one. If the interface had *afforded* vision of the bar, perhaps a larger scroll bar, then the user would not make these slips.

Figure 2F

An error that was the most prevalent in our interviews was when individuals would edit the alarm and would initially tap on the alarm instead of clicking "edit". This error is demonstrated in Figure 2A. Tapping on the alarm to edit was the most common error amongst all the interviews. **Six** out of the 14 interviews had the instance where the interviewee assumed that clicking on the alarm would allow them to edit it, only to find out the only way to edit the alarm is to click the "edit" label at the top left of the screen. This error classifies as a *knowledge-based mistake* because the users did not achieve their goal of accessing the edit options due to their lack of knowledge. The interviewees did not have the right mental model of the app. The individuals that made this error were not aware of this specific design of the app and so therefore they did not achieve their expected outcome. When the interviewees were asked about this specific error, one individual talked about how they found it annoying to click edit everytime they had to edit an alarm. Two individuals explained that they made the error because they were used to tapping on alarms for editing on an Android phone. The biggest trend made during interviews was that the most common error was tapping on the alarm for editing because that is how Android alarm apps function.

## III. Design Space


Figure 3A Design Space #1

The first design space, Figure 3A, shows that the redesign and Android were ranked first first because it was the most accessible and had good signifiers for editing an alarm clock. We

redesigned the edit section to show that you tap on the alarm itself to edit functions in the alarm. This differed from Apple's original alarm because based off our interviews and all the slips and mistake that we tracked, we realized many users naturally want to tap the alarm to edit and Apple did not provide that. When looking at our redesign and Android apps, it made it accessible for users to just tap on alarm bars in order to edit an alarm and in addition, there was an edit option for users to use if they did not want or know about tapping on the alarm itself to edit. Apple's design only allowed users to tap the edit button to edit the alarms, which was a good signifier for users to know they could edit, but not accessible, because users instinctively tap on the alarm itself when they want to edit an alarm setting. By adding this accessibility function to iPhone users, it mitigates the slip iPhone users have of instinctively tapping on the alarm bar to edit and also mitigates the mistake of Android assuming iPhones have the same functions their alarm app has.

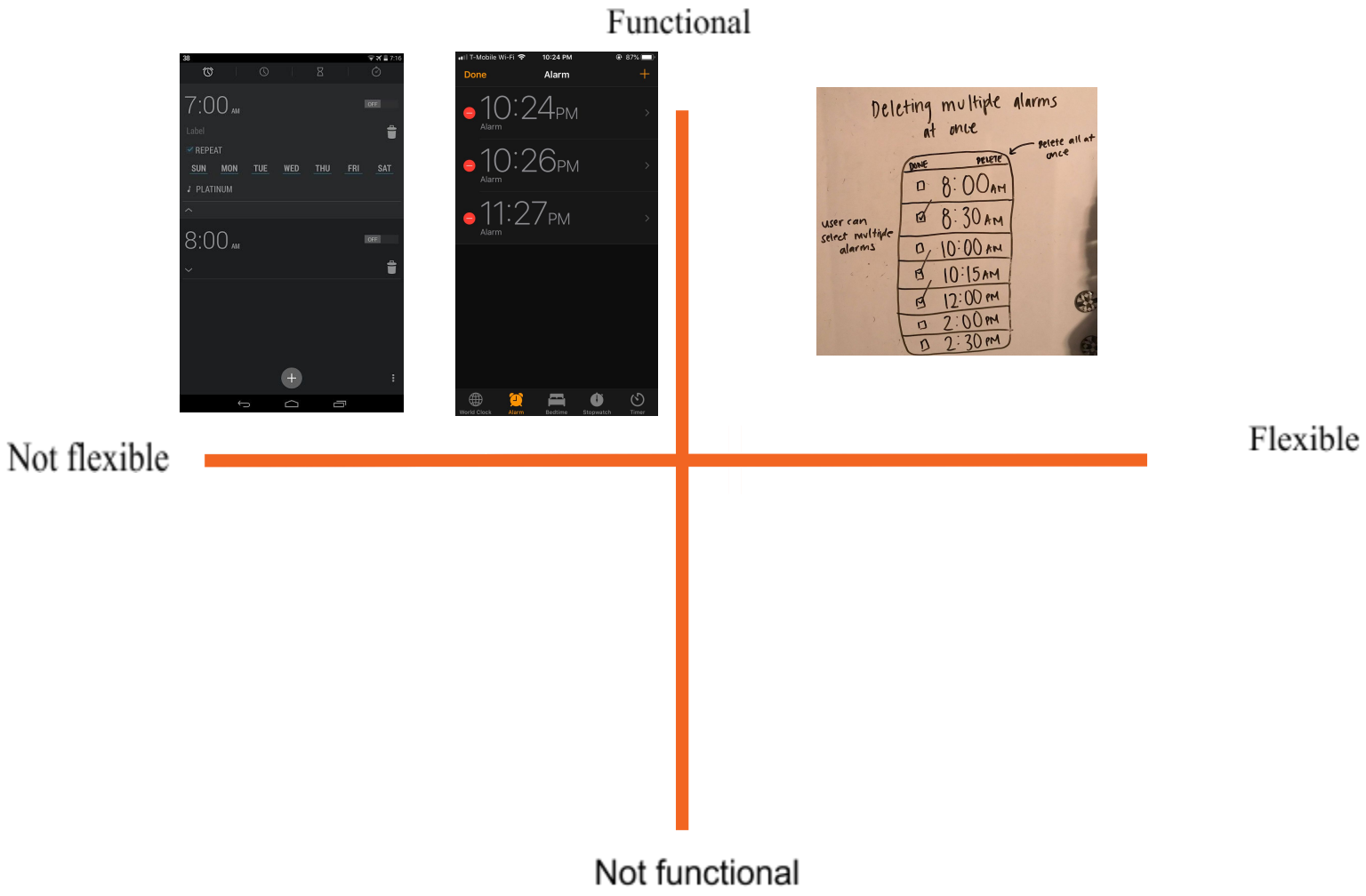



Figure 3B: Design Space #2

This second design space talks about having both functionality and flexibility of deleting multiple alarms. It's ranked that the redesign has both the most functional and flexible option when it comes to deleting multiple alarms and then Android and Apple ranks the same. Both Android and Apple were both functional when it came to deleting alarms, the users had options to delete alarms one by one. With the redesign, it helps improve flexibility because instead of deleting multiple alarms one by one, users can check off all the alarms they want to delete and deleting them all at once, making it more efficient and flexible when it comes to delete multiple alarms.

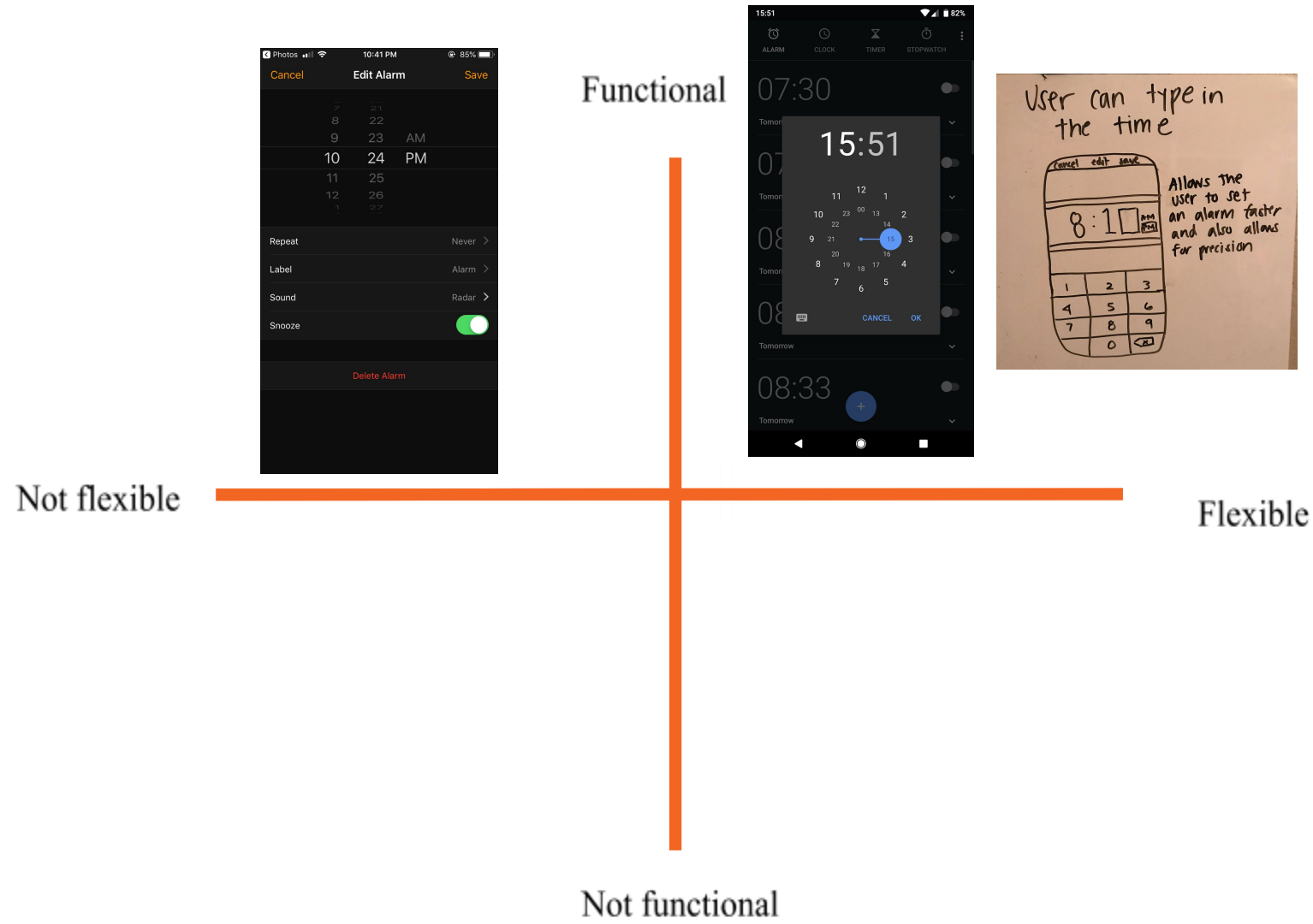



Figure 3C: Design Space #3

This last design space talks about the function and flexibility when it comes to editing the actual time set for an alarm. Ranked first is the redesign as well as the Android alarm app. Both the designs allow users to manually type in whatever specific time the alarm should be set at. This affords both a functional alarm as well as good flexibility for users to easily change the time when they need to. iPhone user's alarm app is ranked last because of the scroll function it has. Although it is functional, it doesn't afford users flexibility to easily change their alarm time. Many interviewees complained that the scroll function forced to to continuous scroll to get to their specific time and would almost always slip and scroll past the number they were looking for.

**IV. Redesign and Tradeoffs**

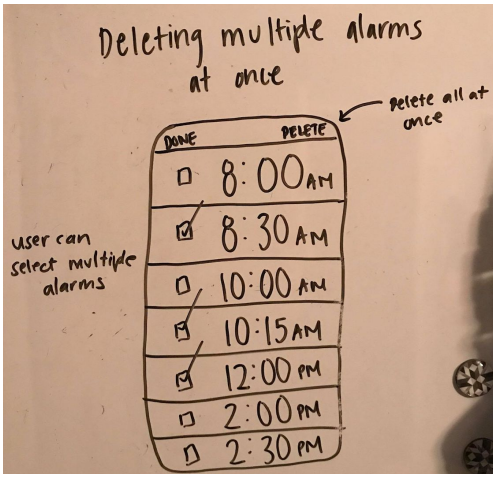



Figure 4A

For our redesigns, we designed the function of deleting multiple alarms to be based off a checklist so that the user can efficiently select multiple alarms and then delete them all at once (Figure 4A). We based this redesign off of the error where people attempt to tap the alarm to edit them. This aspect of our redesign is influenced by the one interview that mentioned how it was annoying to click edit every time a specific change needed to be made to the alarms.

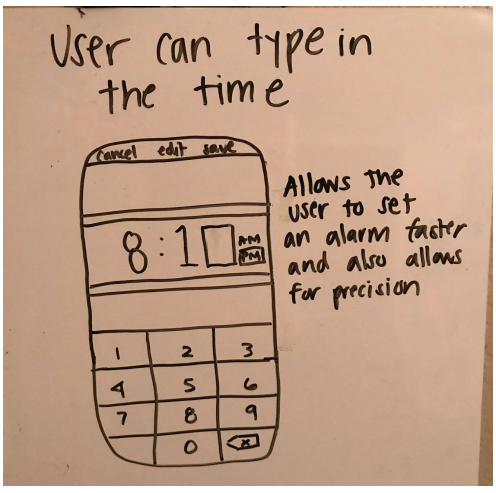



Figure 4B

Since one of the most common errors people made included accidentally scrolling past certain times they meant to set for their alarms, we decided to redesign the way users can set the times for their alarms (Figure 4B). Rather than incorporate the scrolling function, we kept it simple and proposed a redesign where the user can type in the time rather than select it. By allowing the user to type in the time, they are able to set a precise time efficiently. The redesign includes empty boxes to signify that the user can input a number into box as part of the time. When the user taps on the empty box, a numeric keypad appears. The keypad consists of only numbers, which signify that the user can only enter numbers for the time, and a symbol for deleting, which signifies that the user can delete an individual number that was just inputted. We also plan for our design to include the AM/PM so that the user does not need to scroll and make mistakes. In order to minimize the error of accidentally scrolling to AM/PM, we eliminating

the scrolling function and changed it to a simple design where the user can just tap on either AM or PM.

Based on the amount of similar errors made within the 'edit' feature of the app, we decided that we would redesign how you would be able to edit the alarm (Figure 4C). We propose that rather than pressing 'edit' then choosing the alarm the user wishes to edit, the user should be able to press the alarm directly and enter the editing screen. Many of our interviewees said that this would simplify the layout and reduce the amount of tapping they would have to do in order to edit alarms. Android users in particular found it annoying that they had to keep pressing edit in order to edit a specific alarm as opposed to just tapping the alarm directly (as they do on Android devices). We observed similar feelings when we were introduced to the Android layout for alarms. Being able to click directly on an alarm *affords* both tapping less and a better experience, as users would not get confused after pressing the alarm to try editing only to result in no change. From our observations, we can assert that users are more likely to tap the alarm or something directly on it in order to edit it.

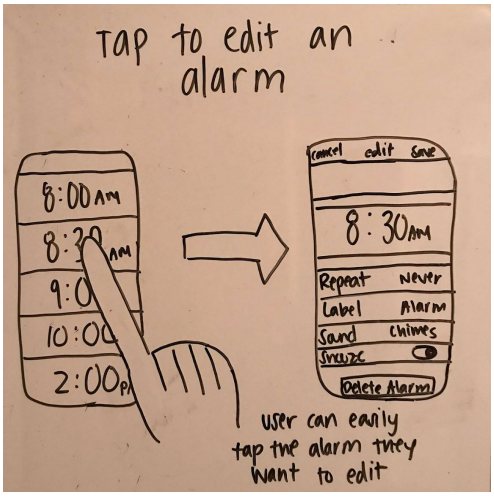



Figure 4C

In our redesign of setting the time, we identified the tradeoff of functionality versus flexibility. By including an option to set the time by type rather than having to scroll through each individual hour, minute, and AM/PM, we acquired a more functional feature to edit in while also increasing its flexibility. More than half of our interviewees (8 of 14) either had an issue with changing the time using the scroll wheels or stated that the feature is annoying or both. Some of the reasoning was that the wheel moved too fast or it took too long to find a specific minute or hour. Making this change will allow the alarm to be more functional in that it creates less error because it will not require people to scroll through trying to set the time. At the same time, if a user happens to like the idea of scrolling through to set the correct time, they will not lose that function thus making our redesign more flexible.

In the redesign for editing alarms, we made it so that simply tapping the alarm allows the user to enter the edit menu for that alarm. There is no extra step to tap the edit button first, then tap the alarm (which the current design requires). This makes it easier for experienced users to access the edit menu. But accessibility trades off with signifiers. The redesign loses the edit button, which was a signifier to show the affordance that alarms can be edited. In the new design, new users will have trouble finding out how to edit, or will never learn, that alarms can be edited. However, we reasoned that many users are already experienced with touch interfaces. It is

natural for them to tap the alarm, thinking that it will open the menu for editing the alarm. The extra accessibility will allow the user to quickly edit the alarm and move on with the rest of their life.