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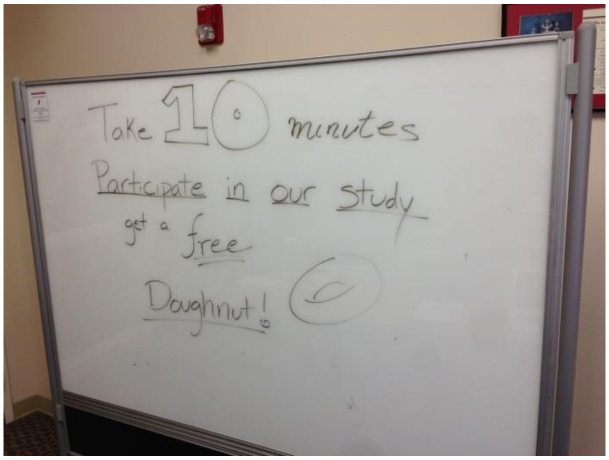
# Group 8 Milestone 4

## Part 1: Experimental Design and Procedure

Our study protocol began with us securing a mostly soundproof room in the Student Learning Center on campus. To advertise that we were conducting usability testing in the room we placed a large whiteboard near the room informing people that we were conducting testing and that participants would receive a free doughnut. Here is an image of the whiteboard advertisement:



When a participant came to the testing room they were then briefed about the project and what they would be doing from the following script:

> Hi, thank you so much for taking time out of your day to help us. You will be conducting usability testing for a program that we have designed. First, I'll give you some background on what we're doing here. We have identified a problem on this campus where many students are interested in finding internship and job opportunities, but they don't necessarily how to go about doing it. As it turns out, UGA offers a ton of great resources to help people out, but many students just don't know that they exist. Our solution to this problem was to make an online course for people to take where it lays out the ways UGA can help them and how they can help themselves. Afterwards, we have a quiz for them to take to make sure that they have retained the information presented to them. Now, people are probably not going to want to do something like this on their own, so we thought that a good way to compel people to take the course was to put a hold on their registration if it is not completed within a certain amount of time. Of course, the natural follow up to that is that we need some way to keep track of who has and has not done it and a way to manage the student database. That's where this comes in. You

will be using the administrator side of the system. It allows you to perform various operations on a student database to effectively manage the system.

After participants were briefed on the purpose of the system, we had 3 separate briefing where we explained which style of usability testing they would be completing. The 3 scripts used are as follows:

Benchmark Task Completion:

> For this test we would like you to go through a list of common tasks that the system can perform. We will provide you with a list of tasks to perform and we just ask that you complete them to the best of your ability. Before we begin testing, you should know that we will be recording your onscreen actions while you participate in the test. All footage will only be used for our analysis later on and it will all be deleted when we have finished with our analysis. If you have any objections to this that is fine, however we can not proceed any further with testing. Otherwise, you will find the list of tasks next to the computer, and you may begin.

Thinkaloud Evaluation:

> For this test we are going to do what we call a thinkaloud evaluation. What this means is that as you are using the system, we would like for you to speak aloud what you are doing and why you are doing it. We will provide you with a list of tasks to perform and we just ask that you complete them to the best of your ability. Before we begin testing, you should know that we will be recording your onscreen actions and audio while you participate in the test. All recordings will only be used for our analysis later on and it will all be deleted when we have finished with our analysis. If you have any objections to this that is fine, however we can not proceed any further with testing. Otherwise, you will find the list of tasks next to the computer, and you may begin.

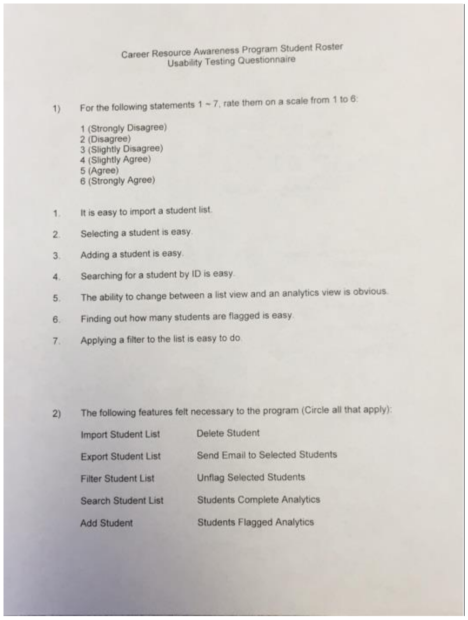
Retrospective Testing:

> For this test we are going to do what we call a retrospective evaluation. What this means is that as you are using the system, we will be recording a video of your onscreen actions. We will provide you with a list of tasks to perform and we just ask that you complete them to the best of your ability. Once you have completed these tasks we will review the footage we have captured of your testing and ask you questions about what you did and why you did it. Before we begin testing, you should know that we will be recording your onscreen actions and audio while you participate in the test. All recordings will only be used for our analysis later on and it will all be deleted when we have finished with our analysis. If you have any objections to this that is fine, however we can not proceed any further with testing. Otherwise, you will find the list of tasks next to the computer, and you may begin.

After participants were briefed and gave consent, a tester began the recordings and presented the participant with a startup version of the program. The list of tasks that users were asked to perform is as follows:

1. Import “StudentRoster.txt”
2. Filter the list by “Flagged”
3. Unflag the first 5 students
4. Remove the filter
5. Search for a student with the ID number:
   810 924 674
6. Send an email to the student with that ID number
7. Add a new Student with the following information:
   Last: Doe
   First: John
   ID: 810 246 802
   Email: jdoe@uga.edu
   Hours: 56
8. Unflag the student you just added
9. Delete the student you just created
10. Find the number of students who are flagged
11. Export the updated list as “Updated List”
12. Close the program

Once a participant completed testing one of the testers ended the recording. We then asked the participant to complete a survey about their experience. The following is an image of the front and back of the sheet that the survey was on.



Career Resource Awareness Program Student Roster
Usability Testing Questionnaire

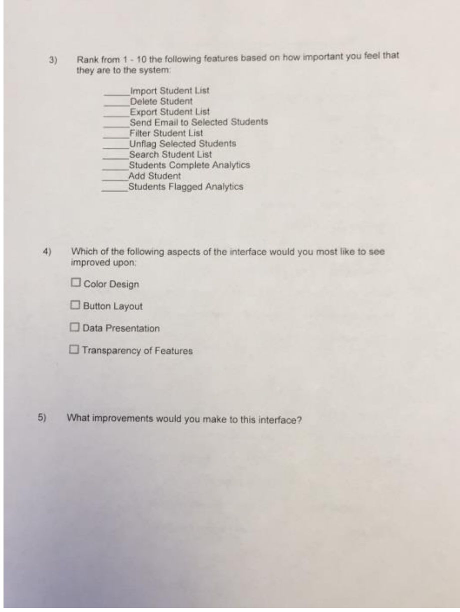
1) For the following statements 1 ~ 7, rate them on a scale from 1 to 6:

1 (Strongly Disagree)
2 (Disagree)
3 (Slightly Disagree)
4 (Slightly Agree)
5 (Agree)
6 (Strongly Agree)

1. It is easy to import a student list.
2. Selecting a student is easy.
3. Adding a student is easy.
4. Searching for a student by ID is easy.
5. The ability to change between a list view and an analytics view is obvious.
6. Finding out how many students are flagged is easy.
7. Applying a filter to the list is easy to do

2) The following features felt necessary to the program (Circle all that apply):

Import Student List — Delete Student
Export Student List — Send Email to Selected Students
Filter Student List — Unflag Selected Students
Search Student List — Students Complete Analytics
Add Student — Students Flagged Analytics



3) Rank from 1 - 10 the following features based on how important you feel that they are to the system:

_____Import Student List
_____Delete Student
_____Export Student List
_____Send Email to Selected Students
_____Filter Student List
_____Unflag Selected Students
_____Search Student List
_____Students Complete Analytics
_____Add Student
_____Students Flagged Analytics

4) Which of the following aspects of the interface would you most like to see improved upon:

□ Color Design

□ Button Layout

□ Data Presentation

□ Transparency of Features

5) What improvements would you make to this interface?

Once the participant completed the survey they were thanked for their time and given a doughnut on the way out.

Testing was administered on a group member's laptop in a soundproof room in the SLC. The program was run with a cleared desktop background on screen. QuickTime was used to record the screen video and audio on the laptop. No additional equipment was used to record. There was only one participant in the testing room at a time so as to avoid any distractions. Participants were given a mouse to use while they completed the testing.

Our Heuristic Evaluation was conducted by having experts in design (other HCI students) explore the system without the guidelines we set forth for the other types of testing. The experts were provided with a list of the heuristics and a blank sheet of paper. We then asked them to record any usability issues they noted and assign a severity rating to each.

## Part 2: User Demographics

The user demographics for our usability study may be a point of contention when analyzing our results. The target demographic for the system is UGA administrators and faculty members. With that being said, it would be very difficult for us to convince 15 different administrators to participate in usability testing for our project. Instead we used typical UGA students to conduct our testing. While we recognize that this is not a true representation of our target user base, we believe that the results found in our testing still reflect the good and bad elements of our project in terms of raw usability. It is worth noting that for our heuristic evaluations we exclusively used HCI students to conduct testing in an effort to reflect using “experts” in design.

## Part 3: Experimental Design Justifications

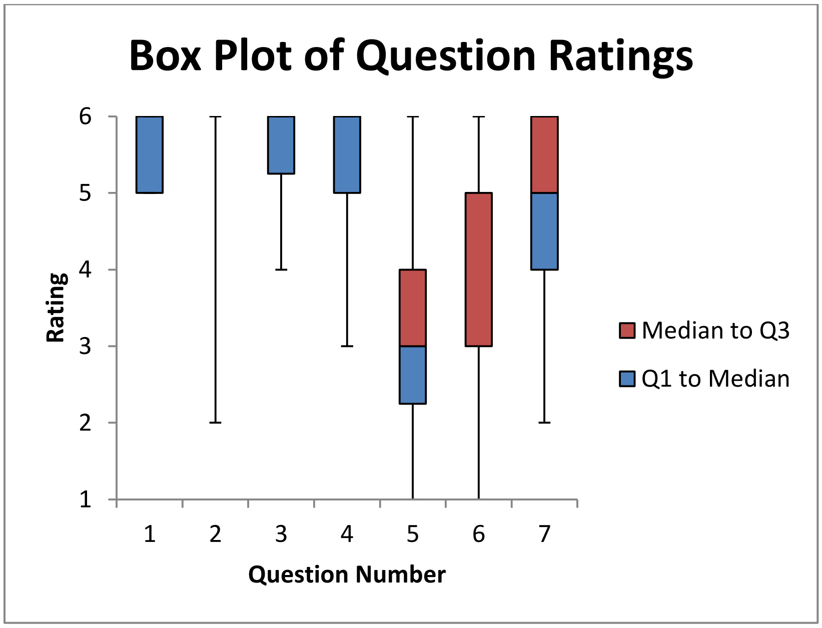
There are two different sets of tasks that we had users complete. The first is the task list set forth for the benchmark/thinkaloud/retrospective testing sessions. The list is shown above in Part 1 of this document. We chose those tasks because we felt that they accurately encompassed every action that a user could take within the system. Even for functionality such as filtering, where the user can filter by different criteria, we felt that only one filter was necessary to accurately evaluate the effectiveness and usability of the feature. Since our system has a fairly limited amount of functionality, we approached the task list with a “no stone left unturned” mindset.

Our second task set was for the heuristic evaluation, however task set may not be the appropriate term. Instead, we explained to the participant what the purpose of the system is and the basic idea behind it. We then had them do an exploratory test of the system and make note of any usability errors they encountered during testing. All participants in the study were given the questionnaire when they finished.

## Part 4: Results and Analysis

After conducting usability testing, some very important issues became clear. One of the biggest problems that we identified was people not recognizing that certain functionality was provided to them, especially in the heuristic evaluations, which had less guidance than the others. Notably, many participants were not even aware that the analytics section existed, as the icons to switch to that view were not clearly marked as such. This was most clearly expressed to us in the first section of the post-testing questionnaires. In this section we provided participants with a series of statements and asked them to express their agreement with said statements with a number from 1 to 6. The statements we used are as follows:

1. It is easy to import a student list.
2. Selecting a student is easy.
3. Adding a student is easy.
4. Searching for a student by ID is easy.
5. The ability to change between a list view and an analytics view is obvious.
6. Finding out how many students are flagged is easy.
7. Applying a filter to the list is easy to do.

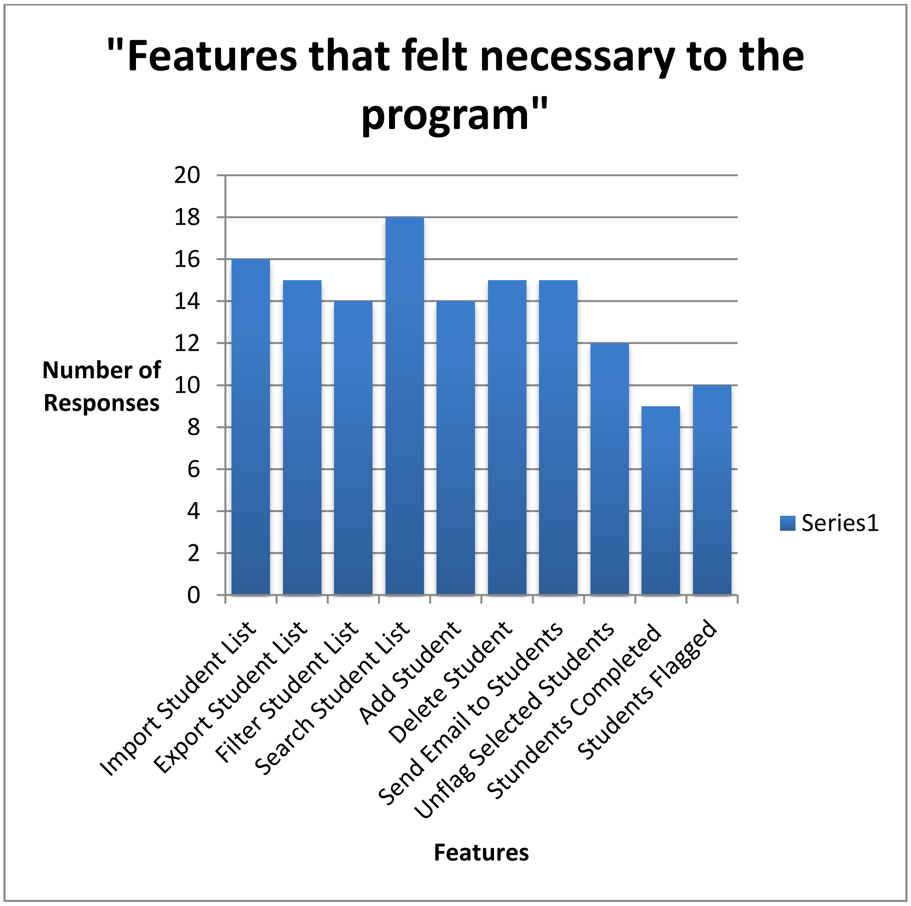


The above graph represents the rating that people gave in response to the aforementioned statements. Questions 5 and 6, the questions relating to the analytics of the list, clearly received much lower scores than the other questions. Between this and the free response section on the questionnaire, this was probably the complaint that we heard the most. On a related note, participants also noted that the filter option was not immediately apparent to them. Given a second cycle of development, the lack of transparency of functionality would be the first issue that we address. Some examples of fixes we would need to implement are adding labels to the buttons that switch between list and analytics view.

Another fix would be to give more indication that the icons are actually buttons. As it is now, there is no indication, whether it is a change in color of the buttons or a change in the cursor, that the icons can be pressed. This just adds another level of obfuscation of functionality.

An interesting expansion on this point comes up when we look at the second section of the survey, where we asked users to circle all of the features that "felt necessary to the program." The results from this section are shown below.

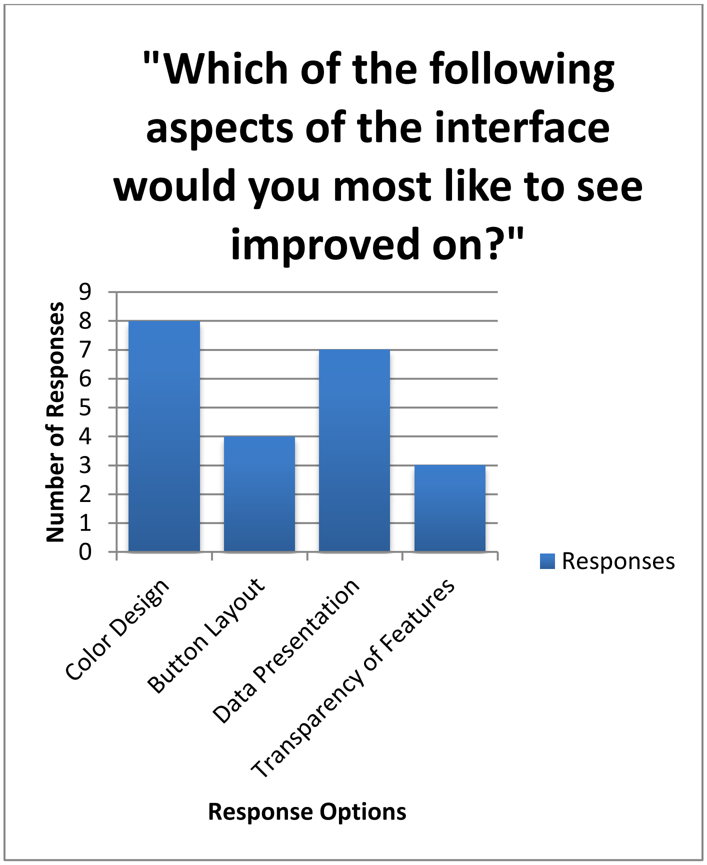
| Feature | Responses |
|---|---|
| Import Student List | 16 |
| Export Student List | 15 |
| Filter Student List | 14 |
| Search Student List | 18 |
| Add Student | 14 |
| Delete Student | 15 |
| Send Email to Students | 15 |
| Unflag Selected Students | 12 |
| Students Completed | 9 |
| Students Flagged | 10 |



The trend we see here is that the sections relating to analytics received fewer positive responses than virtually every other section by a decent margin considering the sample size of the data. This has a few possible causes. The first may just be that several participants never found the analytics section to the confusion surrounding the button, and as a result, did not know what the question was referring to. Another may be that the section itself feels disjoint from any actual operations that the program performs, and consequently people did not feel that the section was *necessary*. The other possible reason is the demographics of the testers. Again, we used student participants due to logistical constraints of getting faculty members to agree to testing. While we did receive many good responses in regards to usability and design, the students lack the more intimate knowledge of what our expected users would actually like to accomplish with the program. Now, it may be that if we administered testing to faculty members as well we would receive the same responses, but we have no way of measuring that at this point in time. Regardless, this just further goes to prove that we need to retool how we approach the analytics section of the program.

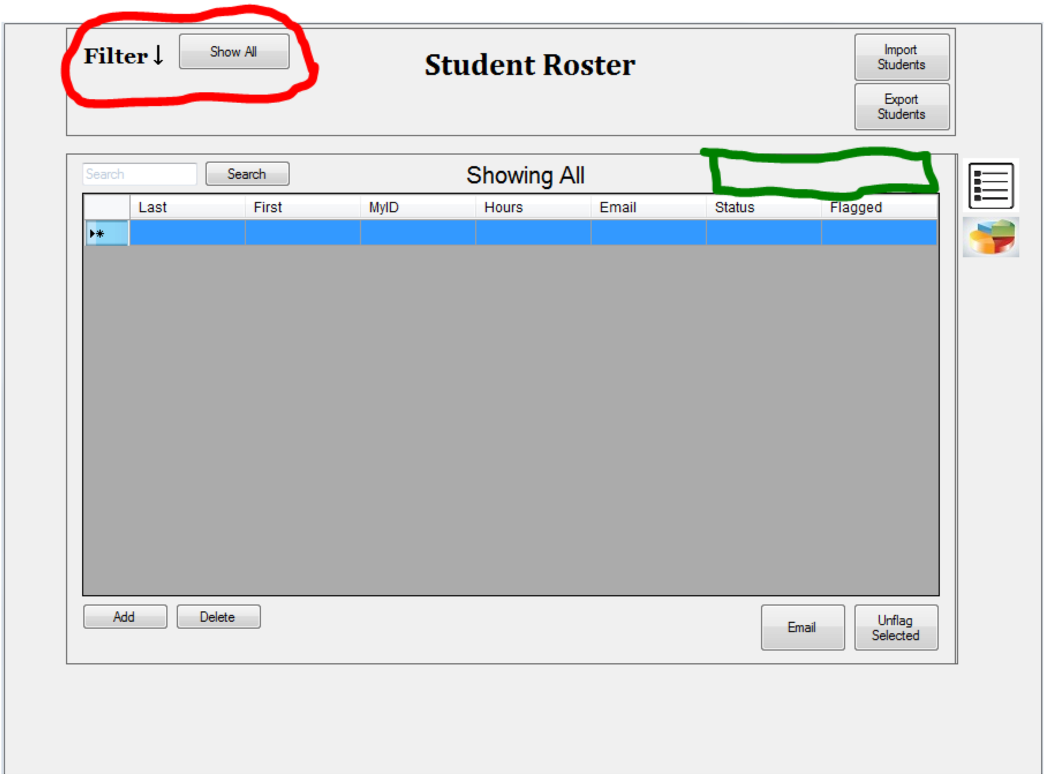
Another response we frequently received was that the design of the program left much to be desired. On another section of our questionnaire we asked which element of the interface users would most like to see improved. We then provided them with a list of features that we identified as the weaker areas of our program. The four areas we defined were: Color design, Button Layout, Data Presentation, and Transparency of Features. The results from this section are shown below.

| Improvement | Responses |
|---|---|
| Color Design | 8 |
| Button Layout | 4 |
| Data Presentation | 7 |
| Transparency of Features | 3 |



This chart clearly shows that our design was a big problem for users. We did expect this to an extent before we began testing. Most of our effort was put into functionality and usability over aesthetic design. Given more time and another development cycle our efforts would turn to making the program better looking. We are not sure exactly how we would improve upon colors and design at this time, but it would become our main focus now that the program is working well and we have been able to identify specific usability issue to address.

The aforementioned problems were to biggest problems we identified during testing across all participants, however they were not the only ones. Several other issues were identified during testing, albeit less ubiquitously across the participants. Another issue noted by multiple people was the accessibility of the filtering capability. The filter for the program is operated from a drop-down menu located in the top left corner of the screen. We received comments that the filter was either hard to find or it was unclear that that it was a clickable element of the interface. Upon further review of the filter, we have concluded that tis confusion is likely due to the location of the filter buttons. As it is now, the filter button is the only button in the program that can operate on the list, but is not located on the list itself. The fix to this issue would clearly be to move the button to an open location on the list interface. The problem and resolution location can be seen below.

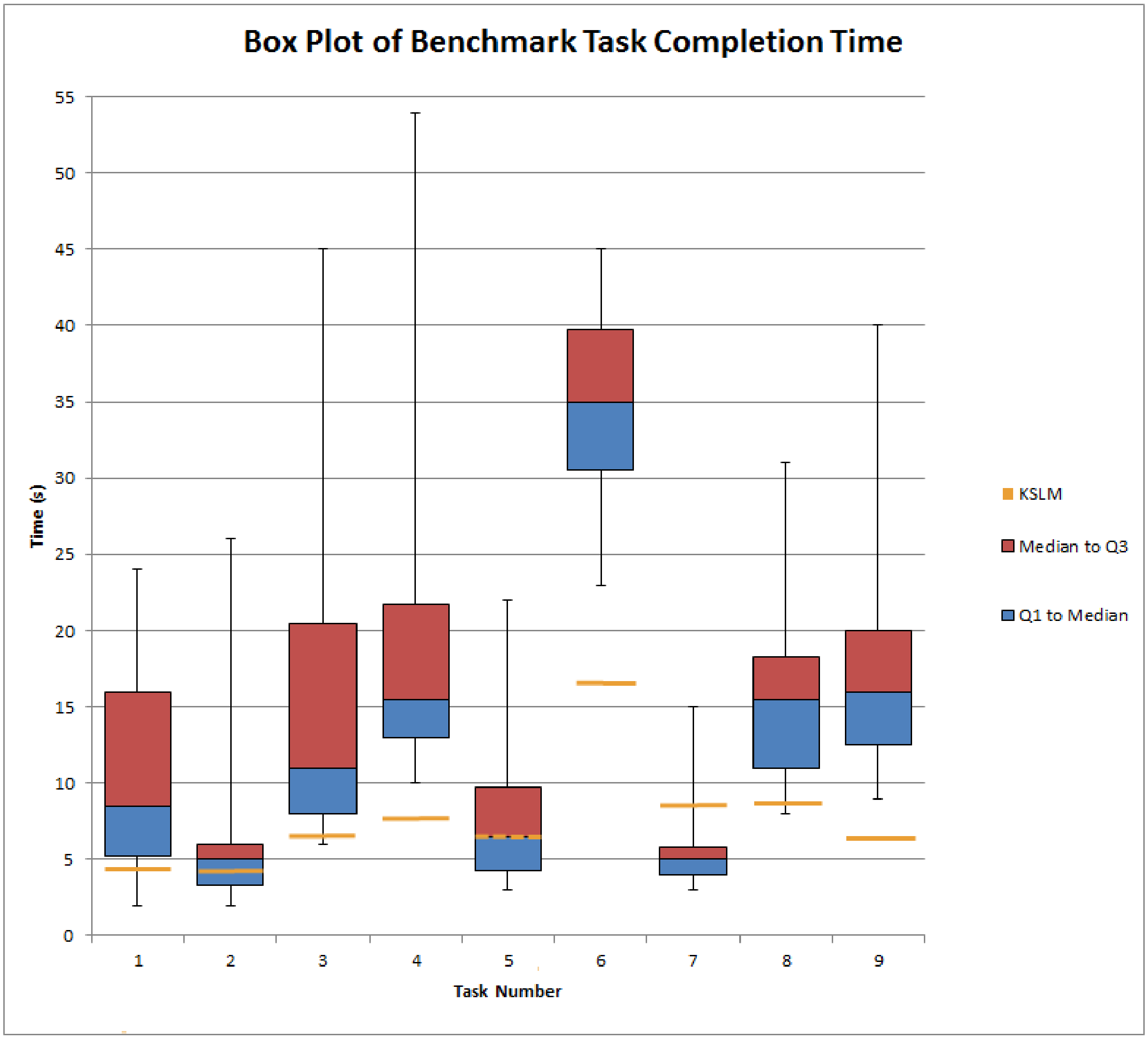


The problem is noted in the red circled area, and as you can see, it is in a separated box from the list itself. The simple fix here would be to move the buttons to the enclosed green area in the top right of the list section. This space is currently empty and would help to resolve confusion around the button.

Another good point that came up during testing was that we lacked a progress bar for the importing and exporting functions. This was not a direct issue during testing because we were using a small list of students to import, but were this to be implemented at the university, or even just department level, the time it would take to parse out students lists would raise dramatically. This could pose a problem if the program reacts any slower than instantaneously and we do not tell the user that something is happening. The clear fix to the issue would be to add in a progress to keep the user informed about the status of the system. We also received a note about the way we present the student ID numbers in the list. Currently, it shows numbers in blocks of nine (810111222). This can be hard to read, and the tester suggested that we chunk the number into blocks of three (810 111 222). This fix is a simple and effective way to make reading the ID numbers more user friendly.

The final set of issues we encountered during testing related to user control and freedom. Due to a mix of time constraints and inattention to design detail, there were a few key user control features that we neglected to add into the interface. The first of these is the ability to select the entire list with a single button click. This issue is a bit complex, since there technically is a way to select the entire list, but we have no way to make it more apparent to users. It can be done by clicking in the top left corner of the table, similar to the function provided in Microsoft excel. The problem is that we have no way to alter the appearance of this button to denote to users that this functionality is present. The only way people can discern it is to have an intuition from previous experience with similar programs. In the future, we would look into adding a custom button of our own to allow users to select an entire list. Another issue that we identified in this domain was the lack of consistency across actions the user can take, primarily seen in the lack of a 'flag student' button. During our design process, we justified the lack of a 'flag button' by postulating that such a feature would be superfluous to our programs process. Of course after testing, it has become clear that this lack of consistency and control is confusing and alienating to users. A flag button would need to be added to future designs. The final user control issue identified, and the most serious, is the lack of an undo feature in the program. When designing the prototype, we discussed the idea of an undo button, but decided that we should first focus our efforts on performing actions rather than undoing them. Undo is certainly a feature that we would need to add in a second development cycle, especially considering the amount of mistakes we have seen people make during testing. Adding undo would be a top priority in the follow-up design.

On top of the qualitative data we gathered during testing, an interesting finding arose during our analysis of the quantitative data that we gathered. This data was gathered by first calculating a KSLM analysis of our task list to find the predicted times it would take for users to complete the tasks. We then analyzed the videos we captured during testing to measure the actual times that users took to complete tasks. Below is a box plot that shows the actual data from the users. The orange line in each column denotes the KSLM predicted time for each task. An important thing to note about this graph is that three of the twelve tasks we used in testing have been removed. These three tasks are: Remove the filter, Find the number of students who are flagged, and Close the program. Remove the filter was omitted because we later realized after testing that when a user performs the Unflag action in the step before, the program automatically removes the filter and returns them to the master list. As a result of this, there is no measurable data for that task. The second task, find the number of flagged students, was removed because of the extreme inconsistencies in the results. The problem with this task was that some testers never actually found the analytics section while they were using the program. Instead, they would try to count the list by hand or just skip that step altogether. Since we had already received numerous other responses that this part needed to be fixed, we decided to omit it from the graph to keep the data focused. The final task, close the program, was left out as it is simply not a data point that we are concerned with testing. It was included in the task list to signify that the test was done. Bearing those facts in mind, the adapted task list and graph are included below.



1. Import “StudentRoster.txt”
2. Filter the list by “Flagged”
3. Unflag the first 5 students
4. Search for a student with the ID number:

    810 924 674

5. Send an email to the student with that ID number
6. Add a new Student with the following information:

    Last: Doe<br>
    First: John<br>
    ID: 810 246 802<br>
    Email: jdoe@uga.edu<br>
    Hours: 56

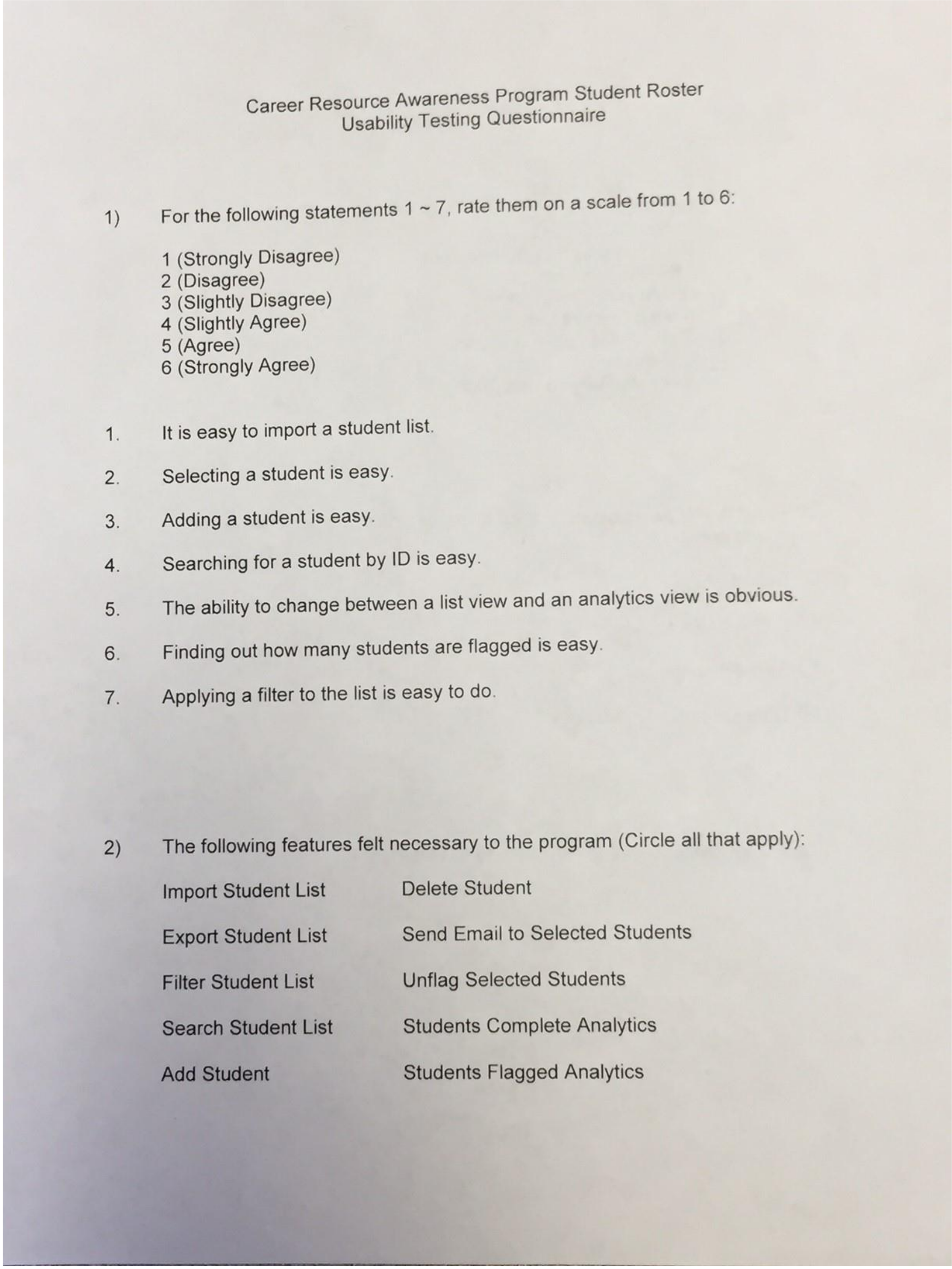
7. Unflag the student you just added
8. Delete the student you just created
9. Export the updated list as “Updated List”

This graph shows us a couple of things. First off, as expected, there are pretty significant outliers for each task. If we exclude those outliers though, and look solely at the middle of the data, a majority of the tasks have a very low spread of times. Most notable among these are tasks 2, 3, 5, and 7. Having such a small spread for these tasks suggests to us that these features were easy to use for the majority of users. Going off of this, we can gain insight into the features that worked most effectively and apply the design behind those to other areas of the program. If we look at the actual tasks that were completed in these steps, we see that they all were actions that had single action, clearly labeled buttons. So the takeaway from that is to make efforts to streamline our processes to involve the minimum amount of input possible. Of course, this isn't possible for all of our features, such as the Add Student functionality (task 6), but it certainly reinforces the notion that we need to fix the analytics icon.

Perhaps the most important highlight from this data is the discrepancy between our KSLM predictions and actual results, and there are a few factors at play here. The first thing to consider when looking at this data is that all of the participants had never used the program prior to testing, and consequently had to spend time locating features and figuring out functionality that more experienced users would not need. This is mot highlighted in the first task, where users need to import the student list. At this stage it is the first interaction they have had with the system at all, so it makes sense that they would not perform the actions as quickly. The other large gaps we see in tasks are the ones that have the user type input on the keyboard. There will of course be broad variation between typing speeds, however the raw size of the gap between the predicted and actual results is interesting. We believe that it is present due to a blend of unfamiliarity with the program and having to read what they are typing from a sheet of paper next to them. Either way, the typing based discrepancies are less concerning than the button based ones. Tasks 3, 8, and 9 have no overlap with their KSLM predicted times (excluding outliers). The common theme among these tasks is finding and selecting students. This suggests to us that there may be a way to improve upon our search and selection methods for the list, although admittedly, we do not currently have any solutions to that problem.

In conclusion, the overall responses we received from testing were largely positive. People seemed to be very impressed with the functionality of the system and the general ease of use, barring the aforementioned issues with the analytics section. The main areas of issue that we identified were transparency of certain features and the aesthetic design of the program. Given another lifecycle of development we would devote the majority of our effort towards making filters and analytics more obvious, as well as giving the program a more pleasing skin and color design. We actually received on remark on our free response in the questionnaire that the design of the program reminded him of OASIS. If anything tells us that we need to reskin the program, it's that. We would also need to spend some time looking into fixes for the more minor usability issues such as the filters functionality consistency, but overall, we feel that the program is in a good place for an initial prototype.

****Included below are full sized images of the questionnaire given to participants after testing**



Career Resource Awareness Program Student Roster
Usability Testing Questionnaire

1) For the following statements 1 ~ 7, rate them on a scale from 1 to 6:

1 (Strongly Disagree)
2 (Disagree)
3 (Slightly Disagree)
4 (Slightly Agree)
5 (Agree)
6 (Strongly Agree)

1. It is easy to import a student list.
2. Selecting a student is easy.
3. Adding a student is easy.
4. Searching for a student by ID is easy.
5. The ability to change between a list view and an analytics view is obvious.
6. Finding out how many students are flagged is easy.
7. Applying a filter to the list is easy to do.

2) The following features felt necessary to the program (Circle all that apply):

Import Student List

Export Student List

Filter Student List

Search Student List

Add Student

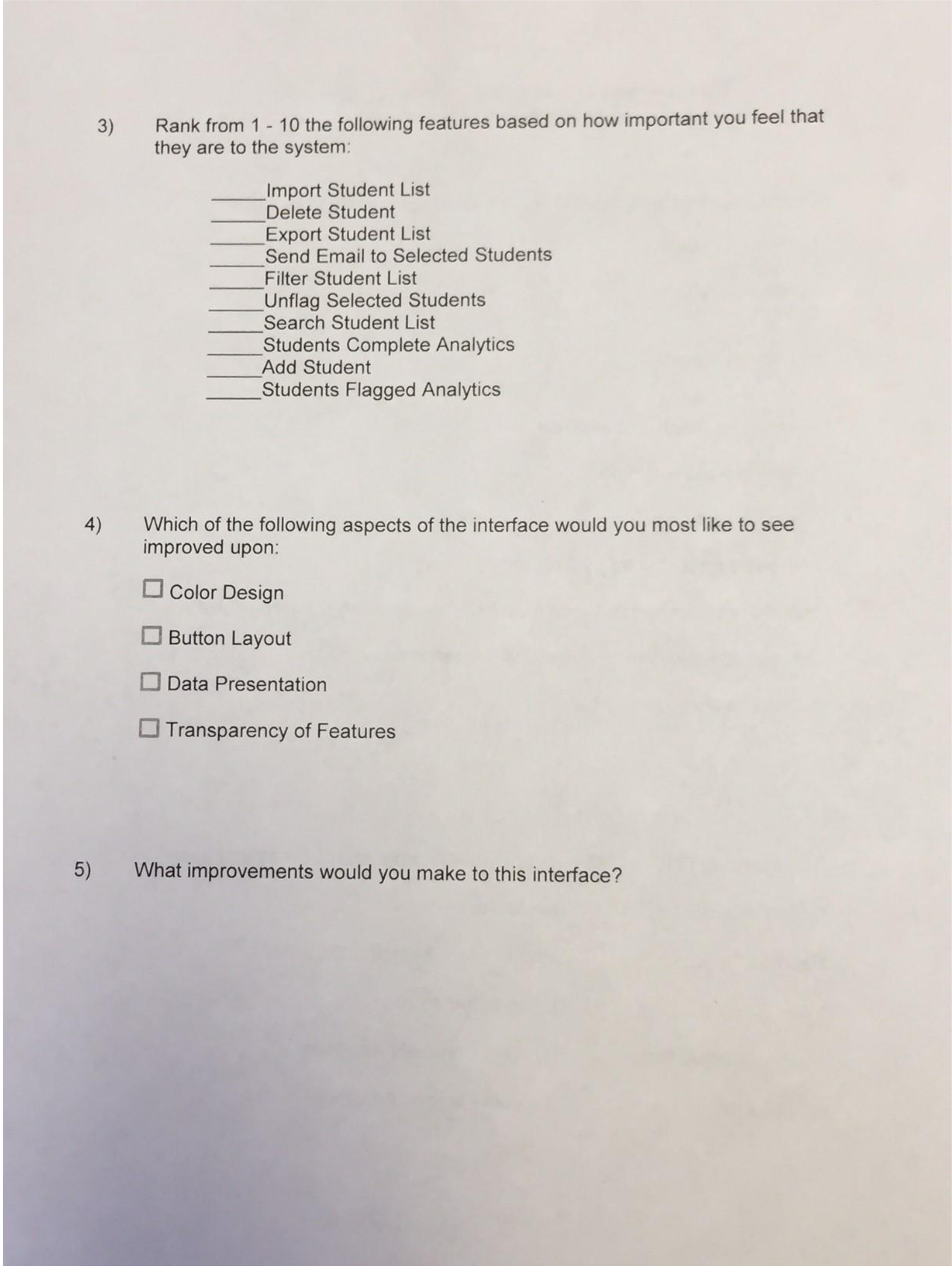
Delete Student

Send Email to Selected Students

Unflag Selected Students

Students Complete Analytics

Students Flagged Analytics



3) Rank from 1 - 10 the following features based on how important you feel that they are to the system:

_____Import Student List<br>
_____Delete Student<br>
_____Export Student List<br>
_____Send Email to Selected Students<br>
_____Filter Student List<br>
_____Unflag Selected Students<br>
_____Search Student List<br>
_____Students Complete Analytics<br>
_____Add Student<br>
_____Students Flagged Analytics

4) Which of the following aspects of the interface would you most like to see improved upon:

□ Color Design

□ Button Layout

□ Data Presentation

□ Transparency of Features

5) What improvements would you make to this interface?