

**NUTRISWIPE INC.**

**Project Part III: Evaluation**

**By:**

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# Evaluation Description

## Heuristic Evaluation

We completed our heuristic evaluation in class using our classmates as our evaluators/experts. A heuristic evaluation is when a group of usability experts evaluate your interface based on a set of principles the system is expected to maintain. This technique helps determine errors and faults in the interface. Possible errors and faults that could be found are: missing parts to the interface, errors that may have been made while building the interface and the interface not working like the group says it will. We gave our classmates a list of principles that we think are necessary to have for our interface to function properly. We decided on our heuristics by looking at some sample heuristics from the textbook, class lectures, and websites. We then decided which ones would work best with our interface. Listed below are the principles that were used to complete the heuristic evaluation.

### *User control and freedom*

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

### *Flexibility and efficiency of use*

Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

### *Aesthetic and minimalist design*

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

### *Learnability*

Ideally, products would have no learning curve: users would walk up to them for the very first time and achieve instant mastery. In practice, all applications and services, no matter how simple, will display a learning curve.

### *Match between system and the real world*

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

## **Results from the Heuristic Evaluation**

The users in our heuristics evaluation mainly thought that there was a lot of user control and freedom in our design. The only thing that concerned them was the fact that some of the buttons were not predictable enough. Our design was definitely flexible and efficient to all users in our heuristics evaluation. According to the users, our design did not have any unnecessary information. There was some information that needed to be changed, but it was not unnecessary content. The learnability of our system was the highest rated heuristic that we had. Our system took only seconds for the users to know how to use the design. The heuristic evaluators wanted to see the design be more personal, matching the system and the real world. Other than that, they really enjoyed our design.

## **Cognitive Walkthrough**

The cognitive walkthrough assesses learnability and usability through users exploring and becoming familiar with the interactive system. It examines learnability and novice behavior. The results from this evaluation technique was designed to help us determine how new users will interact with the system. We also completed this evaluation technique in class, and our evaluators were our classmates and our professor. As a group we chose a task that was to be carried out by our classmates using our prototype. Each user was to carry out the given task, and evaluate the interface by the four standard cognitive walkthrough questions. Listed below are our task, and the actions to complete the given task. Below that are the actions to complete the task and how the group answered the four questions for us.

User characteristics:

- Eats on Campus
- Uses 49er Express
- Has used campus-dining services before

Task: Look up food to purchase

- View Nutritional Record
- Find Food Item (Whopper)
- Add Funds from Credit Card
- Add meal (Whopper)

### **Action: View Nutritional Record**

1. *Will users be trying to produce whatever effect action has?*

“No, it is a little unclear what the nutritional record will display – is it my record?”

2. *Will users be able to notice that the correct action is available? (Is it visible?)*

“Yes, the button to view the nutritional record is clearly visible and easy to access.”

3. *Once found, will they know it is the right one for desired effect? (Is it correct?)*

“Yes, the nutritional records of calories, fat, etc are available once we click on the button.”

4. *Will users understand feedback after action?*

“Yes, the information is clearly labeled.”

### **Action: Find Food Item (Whopper)**

1. *Will users be trying to produce whatever effect action has?*

“Yes, because it is easy to understand what will happen.”

2. *Will users be able to notice that the correct action is available? (Is it visible?)*

“Yes, it is clearly visible with a button.”

3. *Once found, will they know it is the right one for desired effect? (Is it correct?)*

“Yes, because you can clearly distinguish between a Whopper and a Whopper Jr.”

4. *Will users understand feedback after action?*

“Yes, the nutritional facts are clearly displayed after selecting Whopper.”

### **Action: Add Funds**

1. *Will users be trying to produce whatever effect action has?*

“No, because we are unsure what we are adding funds to.”

2. *Will users be able to notice that the correct action is available? (Is it visible?)*

“Yes, the button is clearly visible.”

3. *Once found, will they know it is the right one for desired effect? (Is it correct?)*

“Yes, because there is an input box to enter money amount.”

4. *Will users understand feedback after action?*

“No, because it does not do anything such as an alert after you enter the amount. In addition, there is no way to enter a card number.”

### **Action: Add Meal**

1. *Will users be trying to produce whatever effect action has?*

“Yes, because it is clear that this addition will add an item.”

2. *Will users be able to notice that the correct action is available? (Is it visible?)*

“Yes, button is clearly visible.”

3. *Once found, will they know it is the right one for desired effect? (Is it correct?)*

“Yes, because food items are clearly displayed.”

4. *Will users understand feedback after action?*

“No, feedback is not precise. Maybe it should display what it looks like after a food item has been added as opposed to simply stating, “Your item has been added.””

### **Cognitive Walkthrough Evaluation of Results**

In our cognitive walkthrough, we had our users first “view the nutritional record.” Upon completing the task, their only concern was that the View Nutritional Record button was a little unclear as to what the button would do once clicked. We realized that in order to fix this problem we would have to change what the button said. Something like “View My Nutritional Record” would work here.

The next task performed by the users was to “find a food item.” The students had to use our prototype to find their food item (we told them to find the Whopper). We incorporated this function into our prototype so that students would be able to look up the nutrition facts of the foods they plan to eat. Students normally don’t have time to look up the calories of a food item they are about to eat—especially in a restaurant or a cafeteria. With our interface, it would be readily available for them right before they are going to eat. The users found this part of the evaluation easy to understand. They saw nothing wrong with this function.

The next task included adding funds to their 49er card. Although this task could not specifically be performed without a credit card, we did the best we could to show the student users a suitable example. In our design we did not clarify where the students would actually be adding their funds to. We decided that the design should allow the students to enter their desired amount and then they would be able to choose which campus account they would like to add their funds to (49er, optional dining, etc.).

The last task performed by our users was the “add a meal” function. The students felt as though this function needed to have an alert after the meal had been added. This was a great idea so that the students will know in confidence that their meal has been added to their nutritional record.

## **Design Rationale for Evaluation Tasks**

It was important for us to make sure that our prototype was going to be an acceptable system for students on campus. We had a choice to test our participants on multiple tasks, but felt it to be necessary to choose the most important task of our system: to find the nutritional value of a food item. We wanted to make sure that this task would be an easy task for users to carry out and that it would be something that is learned fast by the users. This was our reasoning behind using a stopwatch to time our participants. This way we could compare our prototype with another more familiar interface—the World Wide Web.

The reasoning behind choosing the World Wide Web as the opposing interface is because this is the only thing we really have to compare our interface to. This is what people would do as of now to view a nutritional table of any sorts for a food in a restaurant (that is, if they even found the time to do that). There are many different restaurants on campus and we decided to use Burger King for our prototype and for the evaluation. There really was no reasoning behind what restaurant we chose, but we did have to choose a restaurant and not a cafeteria on campus. This is because there is absolutely nothing to look at in the cafeteria that lets anyone know what they are eating and how healthy it is. You could guess, but that’s about the extent of it. The restaurants at least have a way of letting people know by their websites online.

We wanted to test the users on how fast each interface was and how well they enjoyed each. We expected everyone at the end of our evaluation to have an opinion about both interfaces. Below are the tools/materials we used during our evaluation:

- A computer w/ monitor with a working web browser such as Mozilla Firefox or Internet Explorer
- A description of what the users will be tested on
- A list for the student users including the variety of foods to be looked up on both interfaces
- Consent forms filled out by all student users participating in this experiment
- An observer who watched and took notes from a distance to observe what the student is doing
- A stopwatch
- Survey/Questionnaire for all student participants filled out at the end of their testing

### **Carrying Out Our Evaluation Plan: Consent Form**

This is the consent form given to each student before completing any tasks in our evaluation plan:

Our group is doing an evaluation on two completely different interfaces to see which one is more efficient for the user. During this evaluation you will be given clear instructions as to what to do with each interface being used. This test will be done on a laptop computer using a mouse. Please note that you will be timed and observed from a distance during this evaluation. At the end of the evaluation you will fill out a survey so our group can better evaluate each interface. We want you to know that you can leave the test at anytime. By signing below you agree to the terms listed above.

Name (Print) : \_\_\_\_\_

Name (Sign) : \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/2007

## **Carrying Out Our Evaluation Plan: The Instructions Given to Participants**

These are the instructions that were given to each group before they began their tasks:

### **Group 1 Evaluation Instructions**

Thank you for participating in this study. We will be testing two different interfaces that should give you the same results. The purpose of this study is to see what interface is easier to use and faster to use. You have been given a list of certain food items (below) from the Burger King fast food joint.

Your task is to use the Internet first to find the nutritional facts of each of these food items listed below. An Internet browser will already be opened and the Google search engine will already be on your screen. Once you find the nutritional facts of the first item you must stop and an observer will return you to the original search engine home page where you will then be directed to find the nutritional facts of your second item. You will be timed for finding each item's nutritional facts.

Once you complete the first part of the task the observer will exit the browser for you and will open a different interface that is supposed to represent a touch screen. You will use the same list of food choices given to you below and you must find the nutritional facts of each food using only the interface we have provided for you. Once you find the nutritional facts for the first food item you must stop and the observer will return you to the main screen. From there you can find the nutritional information of the second food item. Again, you will be timed for finding each item's nutritional facts. Please let the observer know if you have any questions before we get started. When you are finished, the observer will direct you to the exit where you will fill out a short survey about the evaluation. Please note that you can leave at any time during this study.

Note: By nutritional facts we mean information such as calories, fat, protein, etc. Information you would find in the nutritional value sections of any food item such as a cereal box.

#### **Food Items:**

- Whopper
- Whopper Jr.

## **Group 2 Evaluation Instructions**

Thank you for participating in this study. We will be testing two different interfaces that should give you the same results. The purpose of this study is to see what interface is easier to use and faster to use. You have been given a list of certain food items (below) from the Burger King fast food joint.

Your task is to use an interface we provide for you that is supposed to represent a touch screen. You will use the list of food choices given to you below and you must find the nutritional facts of each food item using only the interface we have provided for you. Once you find the nutritional facts for the first food item you must stop and the observer will return you to the main screen. From there you can find the nutritional facts of the second food item. You will be timed for finding each item's nutritional facts.

Once you complete the first part of the task you will then use the Internet to find the nutritional facts of each of the food items listed below. The observer will exit out of the first interface and open an Internet browser with the Google search engine already on your screen. Once you find the nutritional facts of the first item you must stop and the observer will return you to the original search engine to find the nutritional facts of your second item. Again, you will be timed for finding each item's nutritional facts. Please let the observer know if you have any questions before we get started. When you are finished, the observer will direct you to the exit where you will fill out a short survey about the evaluation. Please note that you can leave at any time during this study.

Note: By nutritional facts we mean information such as calories, fat, protein, etc. Information you would find in the nutritional value sections of any food item such as a cereal box.

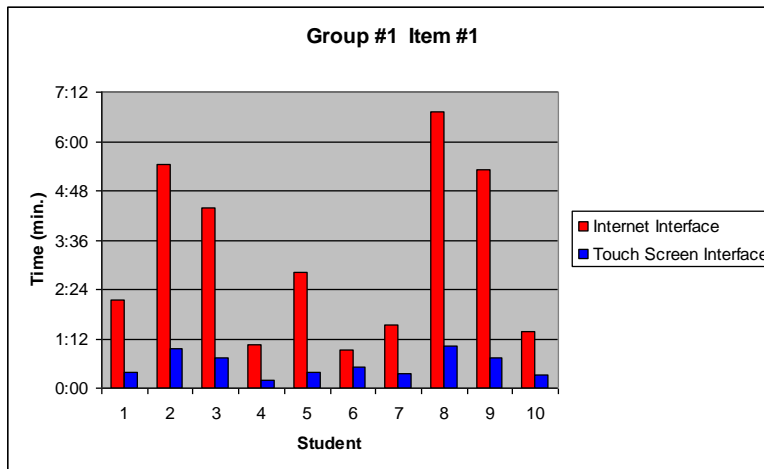
### **Food Items:**

- Whopper
- Whopper Jr.

## Evaluation Results

Group #1 used the Internet Interface first and the Touch Screen Interface second. These are the results we received for group #1 searching for food item #1:

Group #1 Item #1		
Student	Internet Interface	Touch Screen Interface
1	2:08	0:24
2	5:27	0:57
3	4:23	0:44
4	1:03	0:12
5	2:49	0:23
6	0:56	0:31
7	1:32	0:22
8	6:43	1:01
9	5:19	0:44
10	1:22	0:19

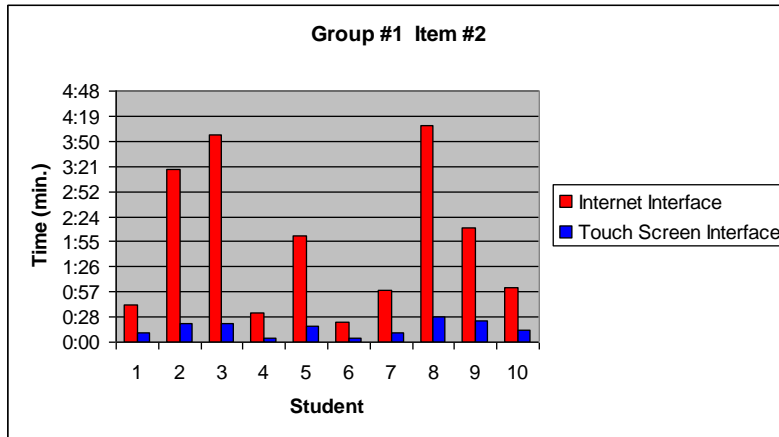


The average amount of time it took all 10 students in group #1 to find food item #1 on the Internet Interface was about 3:10 (min.). The average amount of time it took all 10 students in group #1 to find food item #1 on the Touch Screen Interface was 33.7 seconds. A difference of 2 minutes and 36.3 seconds!

These are the results we received for group #1 searching for food item #2:

### Group #1 Item #2

Student	Internet Interface	Touch Screen Interface
1	0:42	0:10
2	3:18	0:21
3	3:58	0:21
4	0:34	0:05
5	2:02	0:19
6	0:23	0:04
7	1:00	0:11
8	4:09	0:29
9	2:11	0:24
10	1:03	0:13

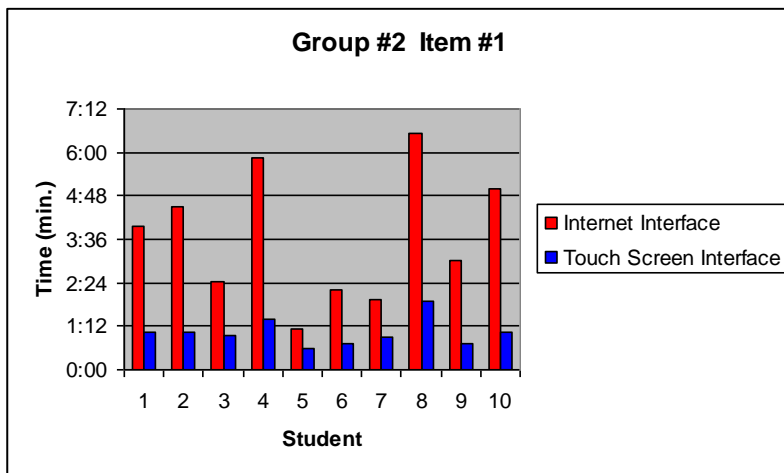


The average amount of time it took all 10 students in group #1 to find food item #2 on the Internet Interface was about 1:56 (min.). The average amount of time it took all 10 students in group #1 to find food item #2 on the Touch Screen Interface was 15.7 seconds. A difference of 1 minute and 40.3 seconds!

Group #2 used the Touch Screen Interface first and the Touch Internet Interface second. These are the results we came up with for group #2 searching for food item #1:

## Group #2 Item #1

Student	Internet Interface	Touch Screen Interface
1	3:58	1:03
2	4:31	1:01
3	2:25	0:58
4	5:51	1:23
5	1:08	0:36
6	2:13	0:44
7	1:57	0:55
8	6:31	1:54
9	3:00	0:42
10	5:01	1:02

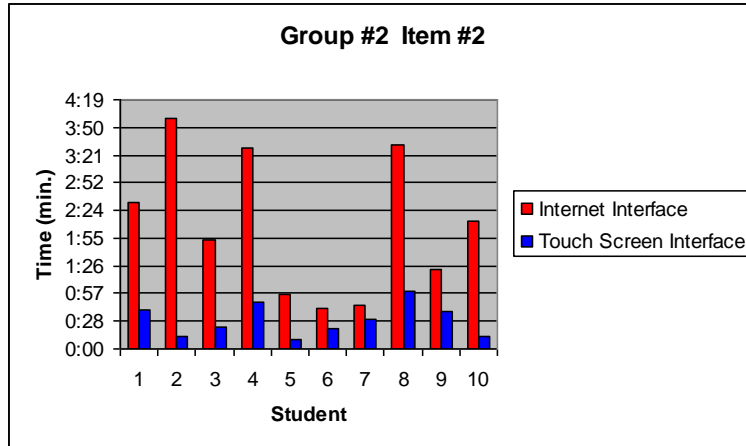


The average amount of time it took all 10 students in group #2 to find food item #1 on the Internet Interface was about 3:40 (min.). The average amount of time it took all 10 students in group #2 to find food item #1 on the Touch Screen Interface was about 1:02 (min.). A difference of 2 minutes and 38 seconds!

These are the results we received for group #2 searching for food item #2:

## Group #2 Item #2

Student	Internet Interface	Touch Screen Interface
1	2:33	0:40
2	4:00	0:13
3	1:54	0:22
4	3:29	0:49
5	0:56	0:09
6	0:42	0:21
7	0:46	0:31
8	3:32	1:00
9	1:22	0:39
10	2:13	0:13



The average amount of time it took all 10 students in group #2 to find food item #2 on the Internet Interface was about 2:13 (min.). The average amount of time it took all 10 students in group #2 to find food item #2 on the Touch Screen Interface was 29.7 seconds. A difference of 1 minute and 43.3 seconds!

## Data Results Analysis

While conducting the evaluation the participants were observed so that our group could record what problems the participants faced, how they overcame those problems, and the techniques they used to arrive at their desired destination.

The problem that a few students faced when using our interface was that they would choose the wrong navigational buttons and they felt as if they had to click on each touch screen button to get a feel for the layout. The students thought that first time users would get a little confused when using our prototype, but would quickly get a feel for the structure of the interface after a little practice. The participants had no trouble understanding the main screen since our group told them that it would come up after they swiped their 49er card.

Once the participants got used to the layout they found that the interface was very helpful and all in all, a “cool” idea. The participants liked that the touch screen buttons were large and the colors were pleasing to the eye. The aspect of time was no problem for our interface. The results show that using our interface was always faster than using the Internet to look up nutrition facts for certain food items. This held true for every participant. It is important to keep in mind that as the Internet has many options for users it’s easy to “get lost” when trying to find a certain piece of information. Our interface only offered two food items to look

up. If we were allotted more time we would have added each food item Burger King offers on campus to our database.

The participants didn't like that the daily balance information was at the bottom of the screen. They wanted this information to be private and so they thought it should be in a different part of the interface. The overall funds balance should be located in the Add Funds section and the daily calorie balance should be located in the Nutritional Record section.

Overall, our interface seemed to be effective and the students found that an interface like this would be helpful when eating on campus.

## **Questionnaire**

After the evaluation we gathered some quantitative data using a questionnaire (with the Likert Scale). We had each student who participated to fill out a questionnaire about the different interfaces before they left the evaluation site. Listed below are the questions we included in our questionnaire pertaining to our prototype.

*1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Disagree*

- ▶ I understood what the point of the design was.  
1      2      3      4      5
  
- ▶ At first glance I could figure out how the design was to be used.  
1      2      3      4      5
  
- ▶ Using this design is a timely process.  
1      2      3      4      5

## **Survey**

After our evaluation we had each participant fill out a brief survey on top of the short questionnaire about each of the techniques used in the experiment. Here are the survey questions we used in our evaluation:

- ▶ What did you like/dislike about the design?
- ▶ Which design was easier for you to use? Why?
- ▶ Which design was faster for you to use? Why?
- ▶ What aspects of the design did you like the best? What aspects of the design did you like the least?
- ▶ What can we do to make our design better for the student community?

## **Evaluation Implications**

Overall, our design worked out pretty well. The heuristic evaluation, the cognitive walkthrough and the user testing (our evaluation) allowed us to see how the design worked and what needed to be changed. What we saw from most users during testing is that they could use our system easily. Users pointed out that the main menu was very easy to understand. It had large buttons that allowed the user to pick what menu item they wanted easily.

The first button was the “View Nutritional Record” button. This went straight to the chart that showed the nutritional information. Through our cognitive walkthrough we realized that this button wasn’t as predictable as it should have been. Users were unable to predict what nutritional record they would be viewing. Making the button say “View My Nutritional Record” would have made a more predictable button.

“Add Funds” was made to allow a user to add funds to their 49er card. The users in the cognitive walkthrough stated that it would be nicer if they knew where they were adding their funds to before they clicked on the button. They also noted that there was no way to show them how they would pay in order to add any funds. We obviously were not planning on implementing this function to work and we felt as though we gave enough of an example for the users to get a feel as to what it would be like. With more time and planning we would have been able to create a form of some sort.

The “Add Meal” button allowed the user to click on a meal and add it to their nutritional record. It worked well and could be improved with the addition of thumbnails showing the different food items.

Also, on the main screen we had calories and dollar balances for the student’s account. Since some users were concerned with privacy, these were to be moved to other menus in the system so that they don’t show up right away.

We wanted to make our design secure to use. We thought about adding a 30 second automatic time out where the system would log out if it was idle for 30 seconds. This secures the student’s personal information which they might not want other students looking at.

Users also wanted a way to be able to view not just daily nutritional records but maybe weekly or monthly. Some people are interested in keeping track of all of this information. This is something that we would need to change in the future if there was more time.

All in all, we did face some small problems, but we were glad that the planning for our prototype was successful in a way that the things needed to be changed were small things – but definitely things that would make a huge difference in our design.

## **Conclusion**

Throughout our process we have tried our best to think outside the box, make our prototype accessible to as many people as possible and make it an easy-to-use system. In our evaluation plan, we discussed the idea of creating two different groups of users that would look up nutritional information on certain food items on the Internet first and our prototype last and vice versa for the second group. After the analysis, the time it took for both groups to find the food items on our prototype vs. the Internet was noticeably faster. This result means that our prototype is very user-friendly due to the fact that everyone is already familiar with the Internet yet our prototype was faster to use.

Knowing what we know now we would have tried to make our prototype more accessible to an even broader audience. After listening to Jeremiah Rogers' presentation we realized that having touch screen really is not accessible to users with sight deficiencies. How will visually impaired people know where to touch on the screen? How do they know what option they would be answering? How would they be able to see these results? Although we thought we put a lot of consideration into the user-friendly aspect of our prototype, we obviously did not put enough consideration seeing as we did not think to make it accessible to the visually impaired community.

After putting that into consideration, if we had more time we would think of implementing a type of system that would make the touch screen accessible to the visually impaired community. Possibly doing something along the lines of having a headset attached to the prototype that blind users would be able to hear with and adding the ability to use commands with the prototype might have worked. However, we were too far along in our project to try to implement this onto our prototype. It really would have been nice if we could have come up with a prototype that *everyone* could use.

Some other things that could have been done differently are parts of the design process. In our prototype there would be instances of buttons to press that may have confused the user. We changed some of our 'exit' buttons to 'go back' buttons. The word 'exit' may have made the user think that they were exiting their whole profile when really we meant to go back to the previous menu screen. Some of the aspects of our

prototype could have been a little clearer so that it would be understood by all users to mean the same thing. Overall, we think that we have learned a lot more about our prototype what still needed work—things we couldn't even see at first.

Going way back to the previous parts of our project and remembering our three rough prototype ideas, and coming down to our final very user-friendly and time-friendly prototype, it's easy to see that we have come a long way. We went from a prototype that listed all the foods on campus on each individual machine to having it specifically designated to where on campus the machine was located. Not only did we think to keep just the information on the prototype and utilize 49er Express for personal profiles, but we also thought about furthering our prototype to have the user's information sent to their cellular devices if they wanted. We know that no matter what there is going to be some aspect that we have missed to make it more compatible, but as for right now we feel we implemented a lot of ideas and made very important and smart changes since the beginning.

Given more resources, resources being time, materials, and volunteers, we feel as though we could have gotten more valid results. The results we got from our limited experiment were good. They gave us a comparison to something that can already show the information that we intended to provide through our prototype, and our prototype was much quicker and easier. With more resources, we feel that we could have fully implemented our prototype making it fully useable with every aspect of it working. Installing our prototype at a food center on campus and having students actually use it would have been possible. Having students actually access their 49er accounts to log in their information, getting dietary advice, and seeing the nutrition facts of what they are eating using the prototype would have been great. We could have later surveyed the users after a period of time to see the effects it had thus far. Because it would have been used by many students with actual information we could get feedback as to what else we should change. That would be the best way, we feel, to go about getting the best information to make our prototype better. We are very happy with our prototype and think it would be a successful machine used on campus if it were ever carried through.