# PROJECT 3:

# "START SIMPLE
# WITH MY PLATE"
# APP USER
# EVALUATIONS

**TEAM MEMBERS:**

**GROUP #3:**
Morgon Kaufmann
Emma Mayes
Jake Parker
Thanh Pham
Stephen Russell
Nicholas Ward
Benjamin Waters

**INTRODUCTION**

In response to this a troubling trend of poor nutritional habits in the United States, the U.S. Department of Agriculture (USDA) introduced the "Start Simple with MyPlate" campaign. A part of this campaign includes an app of the same name (USDA, 2019). The goal of the app is to educate Americans about simple, easy choices they can make every day to be healthier and to enable them to make these choices incrementally over time. In this way, the choices become habits, and the habits subsequently become a lifestyle. The objective of this project was to successfully improve upon this app so that the USDA can better reach their goal.

Phase 3 consisted of user interviews to put the improvements implemented in Phase 2 to the test and to determine what the direction will be for future improvement iterations. The basis for every successful prototype is the testing and iteration of it by the participants. The research team tested the new "Start Simple With My Plate" app on eight participants and recorded their feedback. The first four participants used the original interface, and the second group of four participants used the modified interface. Both the original and modified interfaces were tested based on the eight tasks identified in Phase 1 of the project. Data was collected and expressed using questionnaires like the NASA-TLX Workload questionnaire to measure Total Workload, Mental Demand, and Frustration metrics (NASA, 2019); IBM's CSUQ usability questionnaire was also administered to gather feedback and valuable data needed to gauge the success of the app with respect to usability as well as comments for improvement (Lewis, 1995). This data is calculated to better design a user-centric application. Post-interview feedback from the users illustrated likes and dislikes of the interfaces, and the users provided recommendations for improvement that should be pursued in further iterations of the app.

**FINDINGS FROM THE USABILITY STUDY**

<u>Time on Task</u>

Task 1 required participants to initialize the app by selecting notifications preferences and swiping through the intro information screens. This task took longer to complete on the modified interface than the original interface (mean original = 20.5 seconds, mean modified = 27 seconds). Completion times for the original ranged from 15 seconds to 27 seconds with most times less than 23 seconds. Completion times for the modified ranged from 12 seconds to 37 seconds with most times less than 30 seconds.

Task 2 required participants to set daily goals with either the "pick for me" option or by going through the goals and selecting them themselves. This task took longer to complete on the modified interface than the original interface (mean original = 12 seconds, mean modified = 20 seconds). Completion times for the original ranged from 2 seconds to 33 seconds with most times less than 10 seconds. Completion times for the modified ranged from 7 seconds to 46 seconds with most times less than 17 seconds.

Task 3 required participants to edit daily goals by going into their set goals and editing them to choose more, less, or different goals. This task took less time to complete on the modified interface than the original interface (mean original = 64.5 seconds, mean modified = 41.75 seconds). Completion times for the original ranged from 36 seconds to 122 seconds with most times less than 52 seconds. Completion times for the modified ranged from 21 seconds to 64 seconds with most times less than 50 seconds.

Task 4 required participants to complete their selected nutrition goals by checking them off in their respective categories. This task took longer to complete on the modified interface than the original

interface (mean original = 30.25 seconds, mean modified = 36 seconds). Completion times for the original ranged from 16 seconds to 55 seconds with most times less than 31 seconds. Completion times for the modified ranged from 15 seconds to 63 seconds with most times less than 37 seconds.

Task 5 required participants to browse badges on the browse badges screen. This task took less time to complete on the modified interface than the original interface (mean original = 16.25 seconds, mean modified = 15 seconds). Completion times for the original ranged from 4 seconds to 22 seconds with most times less than 22 seconds. Completion times for the modified ranged from 10 seconds to 22 seconds with most times less than 14 seconds.

Task 6 required participants to use the MyPlate 101 tab to learn more about each food group. This task took longer to complete on the modified interface than the original interface (mean original = 32.75 seconds, mean modified = 85.75 seconds). Completion times for the original ranged from 19 seconds to 57 seconds with most times less than 36 seconds. Completion times for the modified ranged from 33 seconds to 133 seconds with most times less than 127 seconds.

Task 7 required participants to manage notifications by going into settings and selecting if they would or wouldn't like notifications. This task took less time to complete on the modified interface than the original interface (mean original = 16.5 seconds, mean modified = 11.75 seconds). Completion times for the original ranged from 8 seconds to 23 seconds with most times less than 19 seconds. Completion times for the modified ranged from 8 seconds to 16 seconds with most times less than 12 seconds.

Task 8 required participants to use the support center on the app. This task took less time to complete on the modified interface than the original interface (mean original = 54 seconds, mean modified = 47.75 seconds). Completion times for the original ranged from 32 seconds to 86 seconds with most times less than 51 seconds. Completion times for the modified ranged from 19 seconds to 107 seconds with most times less than 35 seconds.

### Time on Task (original interface)

|  | P1 | P2 | P3 | P4 | Avg. TOT* |
|---|---|---|---|---|---|
| **Task 1** | 17 | 27 | 15 | 23 | 20.5 |
| **Task 2** | 10 | 3 | 33 | 2 | 12 |
| **Task 3** | 52 | 122 | 36 | 48 | 64.5 |
| **Task 4** | 16 | 55 | 19 | 31 | 30.25 |
| **Task 5** | 22 | 17 | 4 | 22 | 16.25 |
| **Task 6** | 36 | 57 | 19 | 19 | 32.75 |
| **Task 7** | 19 | 23 | 8 | 16 | 16.5 |
| **Task 8** | 47 | 86 | 32 | 51 | 54 |

**Time on Task (modified interface)**

| | P1 | P2 | P3 | P4 | Avg. TOT* |
|---|---|---|---|---|---|
| **Task 1** | 30 | 12 | 29 | 37 | 27 |
| **Task 2** | 7 | 10 | 46 | 17 | 20 |
| **Task 3** | 50 | 21 | 32 | 64 | 41.75 |
| **Task 4** | 37 | 15 | 63 | 29 | 36 |
| **Task 5** | 22 | 10 | 14 | 14 | 15 |
| **Task 6** | 127 | 33 | 50 | 133 | 85.75 |
| **Task 7** | 16 | 8 | 11 | 12 | 11.75 |
| **Task 8** | 35 | 19 | 30 | 107 | 47.75 |

## Task Completion Success Rate

When looking at task completion, all participants successfully completed all of the tasks for the original interface, achieving a 100% completion rate. For the modified interface, all tasks except for Tasks 6 and 8 also were successfully completed with a 100% completion rate. Task 6 (Learn more about…) and Task 8 (Using the support center) had a 75% completion rate; Participant 4 was unable to complete these tasks successfully without guidance from the moderator, thus marking it as an incompletion of the task. It is important to note that Participant 4 for the modified interface was noticeably fatigued during the interview and was having trouble comprehending the interface as a whole as a result, thus leading to frustration and task incompletion for Tasks 6 and 8.

**Task Completion Rates – Original Interface**

| Participant | Task 1 | Task 2 | Task 3 | Task 4 | Task 5 | Task 6 | Task 7 | Task 8 |
|---|---|---|---|---|---|---|---|---|
| **1** | √ | √ | √ | √ | √ | √ | √ | √ |
| **2** | √ | √ | √ | √ | √ | √ | √ | √ |
| **3** | √ | √ | √ | √ | √ | √ | √ | √ |
| **4** | √ | √ | √ | √ | √ | √ | √ | √ |
| **Success** | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| **Completion Rates** | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

**Task Completion Rates – Modified Interface**

| Participant | Task 1 | Task 2 | Task 3 | Task 4 | Task 5 | Task 6 | Task 7 | Task 8 |
|---|---|---|---|---|---|---|---|---|
| **1** | √ | √ | √ | √ | √ | √ | √ | √ |
| **2** | √ | √ | √ | √ | √ | √ | √ | √ |
| **3** | √ | √ | √ | √ | √ | √ | √ | √ |
| **4** | √ | √ | √ | √ | √ | - | √ | - |
| **Success** | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 |
| **Completion Rates** | 100% | 100% | 100% | 100% | 100% | 75% | 100% | 75% |

Errors

A non-critical error in this context is an error that does not prevent the successful completion of the scenario. This mainly included misclicks within the interface that deviated from the path to completing the given task.

On the original interface, the task in which participants made the most errors was Task 8. This is because many of them tried to use the back button to go to the last page, while it instead exits them out of the support center. On the revised interface, the task in which participants made the most errors was Task 6. This may be due to the semi-confusing page of "MyPlate101", as the page label is not intuitive to all user groups, which illustrates this page could use more adjustments than the ones that were implemented. On the original interface, Task 2 was the only one completed by all four participants without a critical error. On the revised interface, Tasks 0, 4, 5, and 7 were all completed without a non-critical error.

**Errors made by each participant (original interface)**

| | P1 | P2 | P3 | P4 | Avg. TOT* |
|---|---|---|---|---|---|
| **Task 1** | 1 | 0 | 0 | 0 | 0.25 |
| **Task 2** | 0 | 0 | 0 | 0 | 0 |
| **Task 3** | 1 | 4 | 0 | 1 | 1.5 |
| **Task 4** | 0 | 2 | 0 | 0 | 0.5 |
| **Task 5** | 1 | 0 | 0 | 2 | 0.75 |
| **Task 6** | 0 | 1 | 0 | 0 | 0.25 |
| **Task 7** | 2 | 1 | 0 | 1 | 1 |
| **Task 8** | 1 | 4 | 1 | 3 | 2.25 |

**Errors made by each participant (modified interface)**

| | P1 | P2 | P3 | P4 | Avg. TOT* |
|---|---|---|---|---|---|
| Task 1 | 0 | 0 | 0 | 0 | 0 |
| Task 2 | 0 | 0 | 1 | 0 | 0.25 |
| Task 3 | 2 | 1 | 0 | 1 | 1 |
| Task 4 | 0 | 0 | 0 | 0 | 0 |
| Task 5 | 0 | 0 | 0 | 0 | 0 |
| Task 6 | 7 | 0 | 0 | 4 | 2.75 |
| Task 7 | 0 | 0 | 0 | 0 | 0 |
| Task 8 | 0 | 0 | 0 | 4 | 1 |

## TOTAL WORKLOAD (from NASA-TLX Questionnaire)

The total workload, defined from the NASA-TLX Questionnaire, is a weighted sum (with weights being user-defined in the second half of the questionnaire) of six different factors: mental demand, physical demand, temporal demand, effort, performance, and frustration level. The greater the workload index, the greater the workload was for the user. The average total workload index for the original interface, 47.42, was greater than the average workload index for the modified version, 26.92. Both interfaces had the same standard deviation in results of approximately 10.75. Since the average workload index is lower for the modified interface, this indicates that the modified interface demanded less total work from its users compared to the original interface.

| Participant | Original Interface | Modified Interface |
|---|---|---|
| 1 | 61.67 | 18.33 |
| 2 | 32 | 15.67 |
| 3 | 44 | 42 |
| 4 | 52 | 31.67 |
| Average | 47.42 | 26.92 |
| Standard Deviation | 10.88 | 10.61 |

## MENTAL DEMAND (from NASA-TLX Questionnaire)

When specifically looking at the scoring of the mental demand metric from the NASA-TLX Workload Questionnaire, both the original interface and modified interface averaged to the same score of 33.75. However, the standard deviation for the modified interface (30.89) was greater than the standard deviation for the original interface (21.61). Looking specifically at Participant 4 for the modified

interface, the mental demand score was significantly higher compared to the other three participants; this could be due to the mental fatigue that the user exhibited during the interview process, as mental demand is typically greater (or perceived as greater) when fatigued. This score also explains the higher standard deviation in scoring for the modified interface compared to the original interface.

| Participant | Original Interface | Modified Interface |
|---|---|---|
| 1 | 70 | 15 |
| 2 | 30 | 5 |
| 3 | 20 | 30 |
| 4 | 15 | 85 |
| Average | 33.75 | 33.75 |
| Standard Deviation | 21.61 | 30.89 |

## FRUSTRATION (from NASA-TLX Questionnaire)

When specifically looking at the frustration level metric from the NASA-TLX Questionnaire, the frustration level was lower overall for the modified interface. The original interface had an average score of 52.5, while the modified interface had an average of 20; the frustration level between interfaces was more than halved when the interface was modified. The standard deviation for the modified interface (16.58) was higher than the standard deviation for the original interface (13.46). Participant 3 in the modified interface was the outlier within the modified interface participant group, with their score being the only result that is greater than the minimum score given in the original interface (40).

| Participant | Original Interface | Modified Interface |
|---|---|---|
| 1 | 40 | 5 |
| 2 | 45 | 5 |
| 3 | 50 | 45 |
| 4 | 75 | 25 |
| Average | 52.5 | 20 |
| Standard Deviation | 13.46 | 16.58 |

## USABILITY METRICS (from IBM CSUQ Usability Questionnaire)

For the original version, most participants (75%) agreed that they were satisfied with the ease of the use of the system. Most participants (75%) also agree that it was easy to recover from a mistake. Most participants (75%) also agree that the organization of information on the app is clear. None of the participants agreed that the system sent clear error messages to fix errors. Only half of the participants (50%) marked that they were overall satisfied with the system presented in the original interface.

For the modified version, almost all of the questions yielded a higher percent agree rate from participants.

All participants (100%) agreed that they were satisfied with the ease of use of the system. All participants (100%) also agreed that they can efficiently complete their work with this system, can recover quickly from mistakes, and that the information provided was easy to understand. Only one participant (25%) agreed that the system sent clear error messages to fix errors. All of the participants (100%) marked that they were overall satisfied with the presented modified interface, which is a significant increase compared to the 50% of participant overall satisfaction in the original interface.

## Post-Task Overall Questionnaire (ORIGINAL)

*\*Percent Agree (%) = Agree & Strongly Agree Responses combined*

| Questions | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean Rating | Percent Agree |
|---|---|---|---|---|---|---|---|
| Overall, I am satisfied with how easy it is to use this system | 0 | 1 | 0 | 2 | 1 | 3.25 | 75% |
| It was simple to use this system | 0 | 1 | 1 | 1 | 1 | 3.5 | 50% |
| I can effectively complete my work using this system | 0 | 1 | 1 | 0 | 2 | 3.25 | 50% |
| I am able to complete my work quickly using this system | 0 | 2 | 0 | 0 | 2 | 3.5 | 50% |
| I am able to efficiently complete my work using this system | 0 | 2 | 0 | 1 | 1 | 3.75 | 50% |
| I feel comfortable using this system | 1 | 0 | 1 | 0 | 2 | 3.5 | 50% |
| It was easy to learn to use this system | 0 | 2 | 1 | 0 | 1 | 4 | 25% |
| I believe I became productive quickly using this system | 1 | 1 | 0 | 1 | 1 | 4 | 50% |
| The system gives error messages that clearly tell me how to fix problems | 2 | 1 | 1 | 0 | 0 | 5.75 | 0% |
| Whenever I make a mistake using the system, I recover easily and quickly | 0 | 1 | 0 | 1 | 2 | 3 | 75% |
| The information (such as online help, on-screen messages, and other documentation) provided with this system is clear | 1 | 2 | 0 | 0 | 1 | 4.5 | 25% |
| It is easy to find the information I needed | 1 | 1 | 0 | 1 | 1 | 4 | 50% |
| The information provided for the system is easy to understand | 0 | 1 | 1 | 0 | 2 | 3.25 | 50% |
| The information is effective in helping me complete the tasks and scenarios | 1 | 0 | 1 | 0 | 2 | 3.5 | 50% |
| The organization of information on the system screens is clear | 0 | 0 | 1 | 1 | 2 | 2.5 | 75% |

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean Rating | Percent Agree |
|---|---|---|---|---|---|---|---|
| The interface of this system is pleasant | 0 | 0 | 2 | 0 | 2 | 2.75 | 50% |
| I like using the interface of this system | 1 | 0 | 2 | 0 | 1 | 4.25 | 25% |
| This system has all the functions and capabilities I expect it to have | 0 | 1 | 1 | 0 | 2 | 3 | 50% |
| Overall, I am satisfied with this system | 0 | 1 | 1 | 1 | 1 | 3.5 | 50% |

## Post-Task Overall Questionnaire (MODIFIED)

*Percent Agree (%) = Agree & Strongly Agree Responses combined*

| Questions | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean Rating | Percent Agree |
|---|---|---|---|---|---|---|---|
| Overall, I am satisfied with how easy it is to use this system | 0 | 0 | 0 | 4 | 0 | 2.25 | 100% |
| It was simple to use this system | 0 | 0 | 1 | 3 | 0 | 2.75 | 75% |
| I can effectively complete my work using this system | 0 | 0 | 0 | 4 | 0 | 2.50 | 100% |
| I am able to complete my work quickly using this system | 0 | 1 | 0 | 3 | 0 | 3.50 | 75% |
| I am able to efficiently complete my work using this system | 0 | 0 | 1 | 3 | 0 | 3.00 | 75% |
| I feel comfortable using this system | 0 | 1 | 0 | 3 | 0 | 2.75 | 75% |
| It was easy to learn to use this system | 0 | 0 | 1 | 2 | 1 | 2.50 | 75% |
| I believe I became productive quickly using this system | 0 | 1 | 0 | 2 | 1 | 2.75 | 75% |
| The system gives error messages that clearly tell me how to fix problems | 0 | 1 | 2 | 1 | 0 | 4.00 | 25% |
| Whenever I make a mistake using the system, I recover easily and quickly | 0 | 0 | 0 | 4 | 0 | 2.75 | 100% |
| The information (such as online help, on-screen messages, and other documentation) provided with this system is clear | 0 | 1 | 0 | 3 | 0 | 3.00 | 75% |
| It is easy to find the information I needed | 0 | 0 | 1 | 3 | 0 | 2.50 | 75% |
| The information provided for the system is easy to understand | 0 | 0 | 0 | 3 | 1 | 2.25 | 100% |
| The information is effective in helping me complete the tasks and scenarios | 0 | 0 | 1 | 3 | 0 | 2.75 | 75% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| The organization of information on the system screens is clear | 0 | 1 | 0 | 3 | 0 | 3.25 | 75% |
| The interface of this system is pleasant | 0 | 1 | 0 | 2 | 1 | 3.00 | 75% |
| I like using the interface of this system | 0 | 0 | 1 | 3 | 0 | 2.75 | 75% |
| This system has all the functions and capabilities I expect it to have | 0 | 0 | 2 | 2 | 0 | 3.00 | 50% |
| Overall, I am satisfied with this system | 0 | 0 | 0 | 4 | 0 | 2.50 | 100% |

## USABILITY SCORES(from IBM CSUQ Usability Questionnaire)

**Overall**

The overall value represents the aggregate satisfaction score of the interface. The lower the score, the more satisfied the participant is. Most participants were overall more satisfied with the modified user interface as evidenced by a lower average score and smaller standard deviation.

| Participant | Original Interface | Modified Interface |
|---|---|---|
| 1 | 5.11 | 3.12 |
| 2 | 2.37 | 3.74 |
| 3 | 2.68 | 2.47 |
| 4 | 4.32 | 2.21 |
| Average | 3.62 | 2.89 |
| Standard Deviation | 1.14 | 0.59 |

**SysUse**

SysUse, or System Usefulness, measures system usefulness by measuring how easy it is to complete tasks as well as become productive. The modified interface had a lower average score of 2.75 compared to the original interface's average score of 3.60; paired with the modified interface having a lower standard deviation, this indicates the modified interface was more useful and was easier to use to complete the assigned eight tasks.

| Participant | Original Interface | Modified Interface |
|---|---|---|
| 1 | 5.00 | 3.75 |
| 2 | 2.00 | 3.13 |
| 3 | 2.88 | 2.13 |
| 4 | 4.50 | 2.00 |
| Average | 3.60 | 2.75 |
| Standard Deviation | 1.21 | 0.72 |

**InfoQual**

InfoQual, or Information Quality, deals with information quality and measures the quality of the feedback. Since again the modified interface values for average and standard deviation are lower than the original, it shows that the modified interface feedback is easy to understand and was overall considered helpful. However, this score on the modified interface of 3.07 was the highest usability score given out of the scores provided by the CSUQ Questionnaire; therefore, this indicates that information quality is an area that would be prime for more improvement, as it was the poorest scoring area of the app.

| Participant | Original Interface | Modified Interface |
|---|---|---|
| 1 | 5.14 | 3.14 |
| 2 | 3.00 | 4.14 |
| 3 | 2.29 | 2.43 |
| 4 | 4.86 | 2.57 |
| Average | 3.82 | 3.07 |
| Standard Deviation | 1.21 | 0.67 |

**InterQual**

InterQual, or Interface Quality, measures how happy the user is with the interface by assessing if the app performed as expected by the user. The modified interface average (2.94) was slightly lower than the original interface value (3.33); however, the standard deviation was lower for the original interface. This indicates more variation in participant responses for the modified interface compared to the original interface; Participant 2 in the modified interface, in particular, is noted as an outlier in their scoring. The participant had a preference towards being quick in completing tasks; since there were some features that prevented them from quickly completing tasks, such as a "Check All" button that marked all goals as complete, this led to a deduction in scoring by this participant when it came to interface quality since some of the tasks came off as inconvenient without these features. The recommendations provided, as discussed in the next section, should help lower the standard deviation of the scores for the modified interface as well as the overall average scoring for this metric in testing future iterations.

| Participant | Original Interface | Modified Interface |
|---|---|---|
| 1 | 4.33 | 1.75 |
| 2 | 2.00 | 4.67 |
| 3 | 3.00 | 3.33 |
| 4 | 4.00 | 2.00 |
| Average | 3.33 | 2.94 |
| Standard Deviation | 0.91 | 1.17 |

Likes, Dislikes, Participant Recommendations

Upon completion of the tasks, participants provided feedback for what they liked most and least about the SmartPlate app and provided recommendations for improving the app for future iterations.

**Liked Most**

The following comments capture what the participants liked most in the <u>original</u> interface:
- Inclusion of badges for goals that were completed
- How easy it was to check off daily goals by just checking checkboxes


The following comments capture what the participants liked most in the <u>modified</u> interface:
- "Skip" button included on the initialization screen
- The "Pick for Me" option had tiers of how many goals to select and liked the idea of options
- The interface was intuitive and easy to navigate

**Liked Least**

The following comments capture what the participants liked the least in the <u>original</u> interface:

- The support center overall was inconvenient and not aesthetically pleasing
- "Pick for Me" option did not explain much and defaulted to only assigning one goal per day

The following comments capture what the participants liked the least in the <u>modified</u> interface:

- "Edit" button was kind of lost in the upper corner of the "Goals" screen
- Signing up for app updates was under the Support Center, not as its own option under "Help"
- Inconvenient to check off every individual goal in the "Today's Goals" list

**Recommendations for Improvement**

The following were participant recommendations for improvement given for the <u>original</u> interface:

- Allow users to choose how many goals to set for "Pick for Me" instead of defaulting to one goal per day
- Create an "Add custom goal" option for each food group to let users add own self-defined goals
- "Notifications" option in the sidebar menu is misleading when managing notification settings; either condense the pages into one menu or get rid of this option on the sidebar menu
- In the support center, it is hard to discern what page in the center the user is currently on
- The back button in the support center should go back to the previous page instead of exiting the entire support center; add a "Done" button to exit the menu instead
- Overall, the support center needs improvement

The following were participant recommendations for improvement given for the <u>modified</u> interface:

- Add a "Done" button to the "Today's Goals" menu. Since users need to use the back button after checking off goals, it feels like the actions are not saved and that progress would be lost by leaving the page
- Add a "Check All" button on the "Today's Goals" list to allow users to quickly check off all goals at once
- On the badges page, instead of "Complete Goal" as the button for the user to press to learn how to achieve the goal, have it say "How to achieve goal!" so users understand the functionality
- Move "Sign up for email updates" to be an option under the main "Help" menu as opposed to being nested in the support center
- On the "MyPlate101" page, move the food categories as a floating menu at the top of the screen instead of having the options listed at the bottom of the screen where the user has to scroll to get to them
- Add a suggestion for a number of goals to pick when using manual goal selection and setting goals or have a suggested maximum number of goals to set

## CONCLUSION

Overall, the modified interface scored better across multiple metrics compared to the original interface. The NASA-TLX Workload Questionnaire revealed trends in total workload, mental demand, and frustration that indicated that the modified interface required significantly less work than the original interface; while the mental demand needed to complete the interfaces was the same for both, the difference could be attributed to an outlier participant result as discussed previously. The IBM CSUQ Usability Questionnaire yielded a similar better scoring for the modified interface compared to the original, with the overall, system usefulness, information quality, and interface quality scores all being scored better for the modified interface when compared to the original.

The recommendations made by the participants who completed the original interface aligned with the improvements made to the modified interface, highlighting which changes were effective. For example, the "Pick for Me" tiered goal option was a recommendation from the original interface that was implemented and was liked in the modified interface. These interviews, most importantly, highlighted the areas that most need improvements. Improvements such as making the "Edit" button more visible on the "Edit Goals" screen were not considered enough, as this button being lost on the screen was a noted dislike on the modified interface. The scores with the lowest differences in improvement illustrate areas where it is possible to pursue further improvements, such as the scoring for the interface quality. Future iterations would provide a space to implement these recommendations in pursuit of interface improvement. Hopefully, in future testing, a greater pool of users are available for testing so that the majority of users can be presented with a version of the "Start Simple with MyPlate" app that inspires them to set and achieve healthy eating goals within their daily lives.

References

Lewis, J. R. (1995). IBM computer usability satisfaction questionnaires: Psychometric evaluation
and instructions for use. *International Journal of Human-Computer Interaction*, *7*(1),
57–78. DOI: 10.1080/10447319509526110

NASA. (2019, August 15). NASA TLX: Task Load Index. Retrieved from
https://humansystems.arc.nasa.gov/groups/TLX/

U.S. Department of Agriculture (USDA) (2019, March 13). USDA Announces Launch of the Start Simple
with MyPlate Campaign. Retrieved from
https://www.usda.gov/media/press-releases/2019/03/13/usda-announces-
launch-start-simple-myplate-campaign