Campus Crunch:
Final Report

MIS3500 Class

April 20, 2022

Executive Summary

Many on-campus restaurants do not offer the option to order food before stepping foot in the restaurant. This is a problem for many restaurant **users**, including students living both on and off campus, faculty and staff of the university, and employees of the on-campus restaurants. Through a series of student interviews, it was revealed that the concept of an online-ordering system, where users can order through an app and pick up their orders in the restaurant at a specified time, is supported by user **needs** for time, convenience, comfort, health, and efficiency. These needs stem largely from the **context** of being in a university setting, where increasingly demanding expectations often force students to tightly budget their time. The COVID-19 pandemic has also played a major role in user levels of anxiety about being in public spaces. Finally, in a space where online ordering systems are commonplace in off-campus restaurants, there seems to be a desire for convenient, simple, and quick methods of ordering.

From this information, the **solution** of an online ordering app called Campus Crunch was derived. This app was developed based on information obtained from Michigan Technological University, but is meant to be applicable to any university. Interfaces for both the end user and the client side of the application were created and tested for usability. An A/B test experiment was also created to test the difference between different methods to add an item to the cart. We calculated a composite metric of time taken and user usability rating to conduct a t-test on. The **results** of this test showed no significant differences between the two methods used, and we have a variety of theories that may explain this.

Table of Contents

Problem Identification

Online ordering systems for on-campus restaurants do not currently exist at all universities. This means that individuals without that option must order their food in person and wait in the restaurant for their food to be prepared. The sections below outline why this is a problem and who this problem affects.

The Need

Based on preliminary user research, several factors were identified that suggest there is an existing need for an online ordering system for on-campus restaurants. The first of these factors is **time**. Time is a valuable resource on college campuses; students and faculty are tight on time and many do not want to spend it waiting for food. Some students must sacrifice valuable homework and study time to stand in line and wait for their food to be prepared. Others may wish to grab food between their classes but can't because of lengthy waiting periods. When asked if they would use an online ordering system on campus, one user said, "I would order food prior to going to the [North Coast Grill & Deli] after class in order to save time," emphasizing that there is a need for students to be able to reduce their wait time by ordering ahead of time. Another user also stressed this when they said, "I order using an app whenever I can. Skipping the line saves time." In fact, one user even said, "Wait time reduction pushes the need for online ordering," which indicates that saving time is one of the most important needs that online ordering apps typically address.

The second need that was identified through user research was **convenience**. Of the people that were interviewed, most identified that the primary reason they avoided eating at on-campus restaurants was inconvenience. Some on-campus restaurants are in out-of-the-way locations for some students, and on top of that they are often open at weird hours. Commuting students have also expressed that it is a hassle to have to stay on campus waiting for food long after their classes have ended, especially when poor weather conditions are involved. "[An online ordering system] would likely increase the number of times I would order something on campus," one user commented, referring to the increased convenience. Another speculated that "having [the] ability to push buttons and get food is a decrease in hassle and people will

make purchases without thinking about it as much," which suggests that on-campus restaurants may see an increase in customers or customer frequency if they adopt an online ordering system.

The third need that was identified was **comfort**. When asked about what they don't like about their campus's current ordering system, one user said, "I have to talk to people. That's what I dislike." Many introverts avoid on-campus restaurants because they are not very comfortable speaking to strangers or waiting around in public spaces. Some even avoid going to new locations because of the unfamiliarity and unpredictability of potential interactions. Through interviews, it became evident that many introverted people prefer to use apps because they offer minimal human interaction and a familiar interface that can be accessed from a comfortable space.

The fourth need identified was **health**. Due to the COVID-19 pandemic, many people now feel anxious at the thought of being in crowded public spaces for any longer than absolutely necessary. Of the people that were interviewed, several expressed interest in the potential for contactless pickup and reduced waiting time in public areas.

The fifth and final need identified was **efficiency**. Peak mealtime hours can cause backed up queues and even longer waiting times for customers. Because of this, restaurant employees that were interviewed expressed interest in an ordering app's potential to help manage large inflows of orders. "If people order ahead of time, a spike in customers can be displaced/managed more efficiently by spreading out orders or cooking in larger batches," one user pointed out. This indicates again that an online ordering system could be beneficial for both customers and on-campus restaurants.

The Context

The needs identified above exist within college campuses, and are most relevant when school is in session. The COVID-19 pandemic has been a contributing factor to the need as well, and will still hold relevance in a post-pandemic environment due to residual anxiety about public health. First years and students with social anxiety are often reluctant to go to unfamiliar places, so student attitudes and behaviors also have an impact on the need. On-campus restaurants can be very busy during peak mealtime

hours which contextually creates a need for efficiency for both customers and employees.

The User Groups/Personas

The key user groups that experience a need for an online ordering system are students living in on-campus housing, students living in off-campus housing, and university faculty and staff.

These user groups can be divided up into certain personality or demographic types called personas. The personas that were considered during this project are as follows.

- Frank is a frugal student who lives off campus.
- Larry just wants to grab a quick lunch between classes.
- Ian is an IT guy who is primarily concerned with how a system would be maintained.
- Kevin is a cook who feels like he *must* know every customer's food allergies, ever since the incident.

Each user persona has a different set of needs, but that is further divided by which end of the system they are interacting with. Frank and Larry would be part of the End-User side of the system while Ian and Kevin would be part of the Client side of the system. Consideration of client personas influenced the direction of this project to include how a Point of Sales (POS) system would receive information from an online ordering system.

Value Propositions

“Save time by not standing in line!”

After identifying user needs such as time, convenience, comfort, health, and efficiency, it became evident that one of the primary goals of this project would be to create a system that simplified the user experience of ordering food on campus. Providing an option to order food through an app would fulfill a modern convenience that some universities are missing.

The user experience of an online ordering system would fulfill many different needs better than existing solutions. For example, an ordering app that allows users to order remotely and then show up to pick up their food is less demanding on customer time than the current standard ordering system, which includes waiting in line, speaking to an employee, and then waiting in store for the food to be prepared. By having orders take place through an online system, there could also be organized documentation of personal order history, receipts, and other records that can be repeatedly accessed by the user.

User Experience

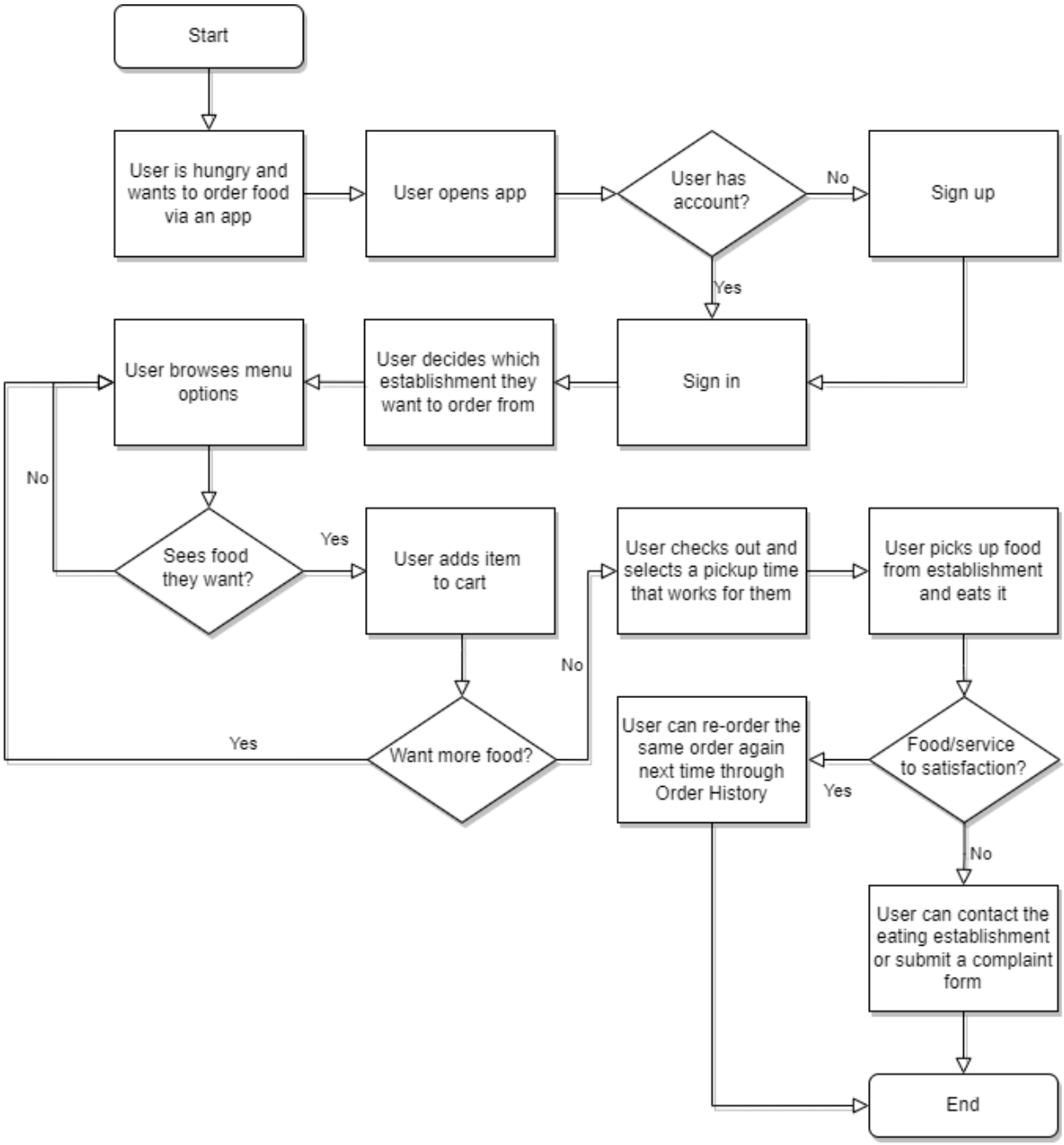
Reasons Why Users Will Use Our System

The standardization and widespread implementation of online ordering systems since the COVID-19 pandemic has familiarized society with the online ordering process and will trigger the user to engage with our proposed experience. It eliminates negative experiences such as waiting time, poor customer service, and confusing ordering processes. Our system is easy to use and orders can be placed quickly.

The results from interviews and usability testing have shown a big interest in the implementation of an online ordering system for campus restaurants and the results supported the benefits in our system. The historical development of online ordering in the U.S. also supports the proposal of an implementation on campus: “Online food

ordering has grown 300% faster than dine-in since 2014 and now accounts for roughly 40% of the total restaurant sales" (Flynn, 2022, [shorturl.at/dnoCJ]).

Expected Flow of the Experience



Expected Issues in the Normal Flow and Solutions

Unavailability of products might be an issue that could occur regularly. The restaurant sends a message of what is unavailable if already ordered, and items can be

transparent or crossed out and not interactable so that they cannot be ordered. If ordering an item with multiple ingredients and there is a specific ingredient not available, a pop-up with what ingredient is unavailable will appear.

If an order is not ready on time, the restaurant explains that there will be a delay via a message to the customer.

Connectivity issues are handled and a banner will show “connection lost” and a statement below whether an order has or has not been submitted.

Possible complaints can be filed by the customer through a message or in person. They can then be handled by a manager or the owner.

Physical and Digital Touchpoints

End-users will experience digital touchpoints through the app interaction – logging in/out, placing and managing orders, giving feedback to the restaurant, interacting with the restaurant when being messaged, and leaving a complaint if necessary. All of these touchpoints are managed in the app itself which we make sure have a consistent interface.

When interacting with the staff directly, guidelines will be in place to ensure a consistent way of communication and high user satisfaction.

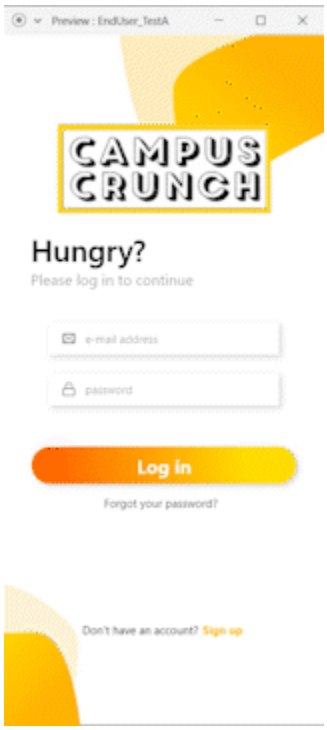
Users and potential users will also have digital touchpoints with advertising of the app on MTU web pages, MTU (restaurant’s) social media and Discord, and physical touchpoints through posters at the restaurants to promote using the app. The advertisements will have a consistent theme in the look of the app (animations) to meet the expectations once the app opens and because the yellow and orange colors promote enthusiasm and are often used to attract impulsive buyers.

Both physical and digital interaction between the users and clients are happening when an order is picked up. The restaurant staff is checking out the order in their interface according to the pickup number the end-user presents and hands over the order. Important for us is the way this interaction happens so that the process is fast, painless, and satisfactory overall. To achieve this, it should be implemented in employee communication training.

Further digital interaction happens on our client's side where the staff manages orders, the menu, messages, changes settings, and logs in or out of the system. Through further design improvements of the system and more user testing, the experience to use the client system should become as seamless as possible. To achieve high satisfaction of our clients, we will train them in a short (online) workshop on how to use the system, how to contact us when there are issues, and where to find frequently asked questions.

User Interface

Interactive Prototype



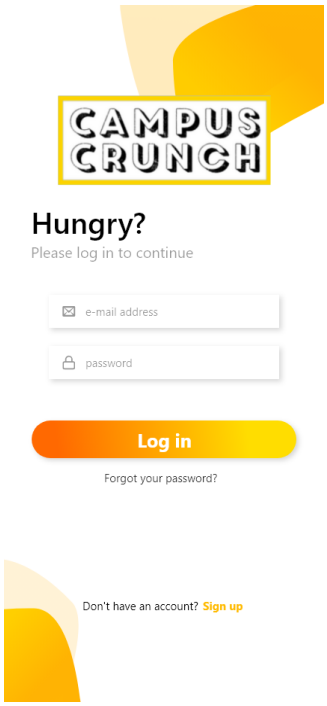
The information architecture is largely divided into four sections through the global navigation system: home, orders, cart, and account. The home section is what kicks off the navigation, and leads to the core flow of the application. The cart section links into this flow, at a later point. This allows for the cart portion to be accessed throughout the application. The previous order section allows the user to access previous information that they may desire, and the account section lumps together the

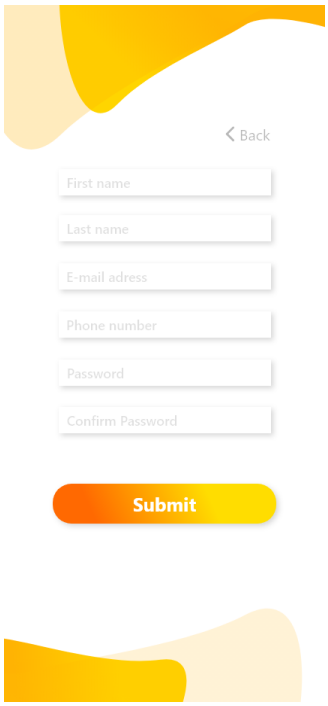
account information and various other settings that may not be required often, such as language settings.

We developed this system after considering alternative ordering systems, and thinking through the general process that a user may go through when ordering food. We attempted to keep simplicity in mind for this structure, with the user going through a 1-2-3 step process. First you select your restaurant, then you add your items to your cart, and then you check out. There have been effectively no questions about how to accomplish the primary goal of the application, being ordering food. This leads our team to believe that this system should be rather easy to navigate.

User Interface Progression

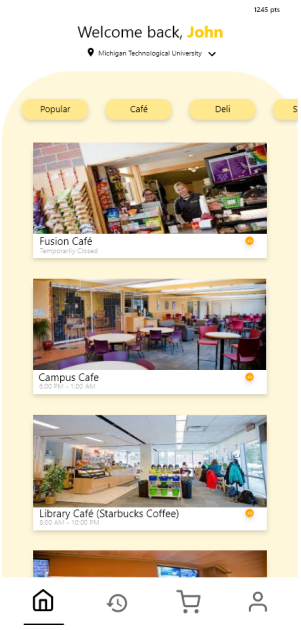
- Login Page / Sign Up Page





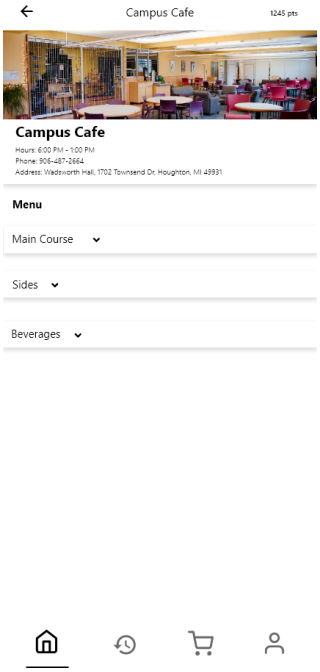
This would be the first screen user would see once they open the app. In order to proceed, the user would need to click on the “Log in” or “Submit”.

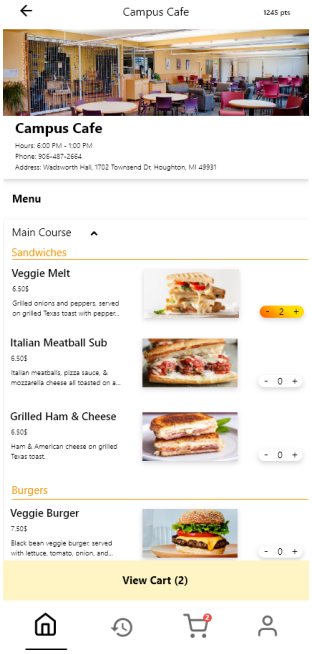
- Homepage



The homepage is going to include restaurants around the campus, allowing users to choose any restaurants as they wish.

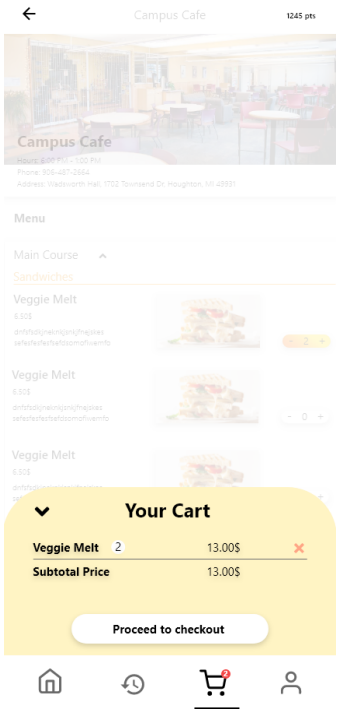
- Menu Selection





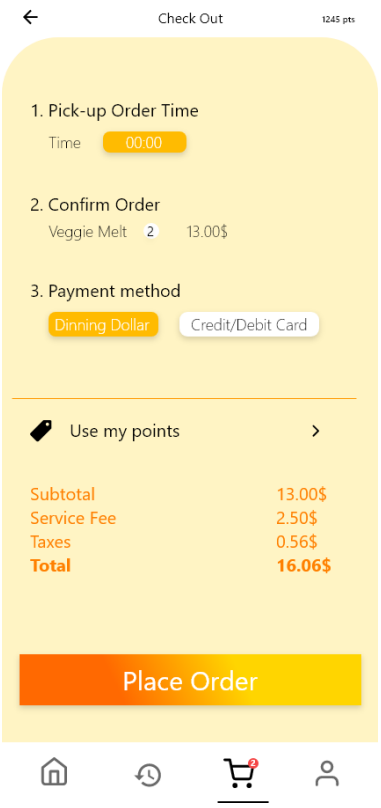
Once a restaurant is picked, the menu page will be shown with categories split into main course, sides, and beverages. Users will pick the following categories to view more including the description and the price.

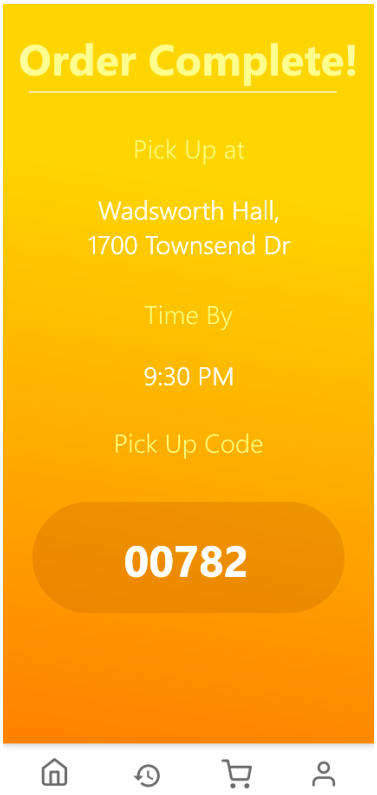
- Cart



After the user chooses a quantity of food or beverages, they will automatically be added to the cart and “view cart” will pop up at the bottom of the screen. By clicking “view chart” a user can review their cart and proceed to checkout.

- Checkout/ Confirmation Code





For the checkout page, the user would pick the time they wish to pick up, confirm, choose a payment method of their order, and lastly place their order. Once it is placed, the confirmation page will be displayed with pickup location, time of pickup and confirmation code.

Experiment

The goal of the experiment was to determine the user accessibility and ease of use of the online ordering app. To test this, an A/B test aimed at improving the quality of the cart management and menu system was created. For this A/B test, we made a minor change in our end-user interface to test if our users had an easier time when we changed the labeling and buttons on adding menu items to their cart. Specifically, Model A had simple plus and minus buttons that would add or remove the corresponding menu

item directly into the cart. Model B had the same plus and minus buttons, but it also had an add to cart button which had to be pressed in order to deploy the item(s) to the cart. We chose this change to make as we were unsure how clear the plus and minus buttons would be for users of the app.

In order to determine how effective the change was, we tracked the amount of time it took for users to open the app and navigate to the menu, add two specific menu items to the cart, and then open the cart for viewing by pressing the view cart button. We decided to include the opening of the app and menu navigation in order to test for the overall effectiveness of the flow of our app as well. After performing the experiment, we followed up with the users and asked them a series of questions, with two of them asking for subjective ratings of the ease of access and usability of the menu. We averaged those two values given to us by the users and then plugged that value (R) into a formula in order to create a factor that could be easily compared between the two tests. The equation used to create our metric is: $R \times \frac{T_n}{T_{max}}$. We then applied an independent, two-sample t-test to our sample of calculated metrics from our testing using a confidence level of 5%.

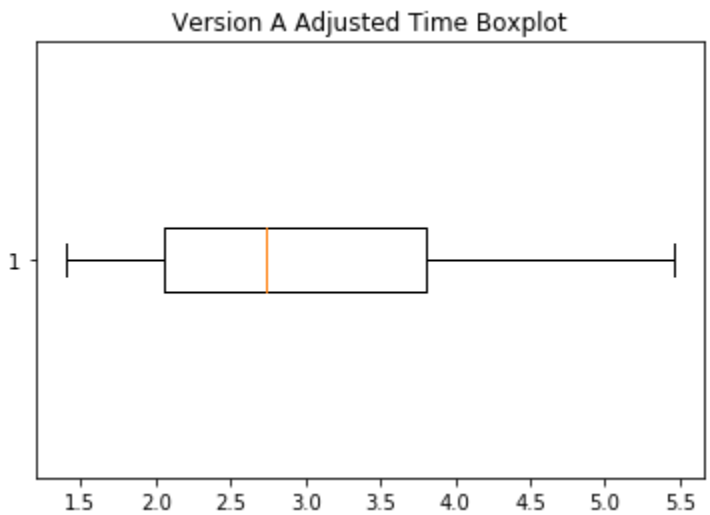
As part of the testing process, we wanted to ensure that we were testing a relevant segment of the market. We decided to perform our A/B test on undergraduate Michigan Tech students, or those who had graduated from Michigan Tech within the past year. Additionally, we made sure that the usability testing was only performed on those who had not participated in previous usability testing that we had done. This helped maintain the validity of our experiment. Additionally, we are not concerned about our chosen starting point for the experiment, as both sets of users should have relatively similar experiments, with the only difference being biases or experience that the users themselves had. Users were randomly assigned to either group A or group B prior to the start of the experiment based on which member of our group is interviewing them.

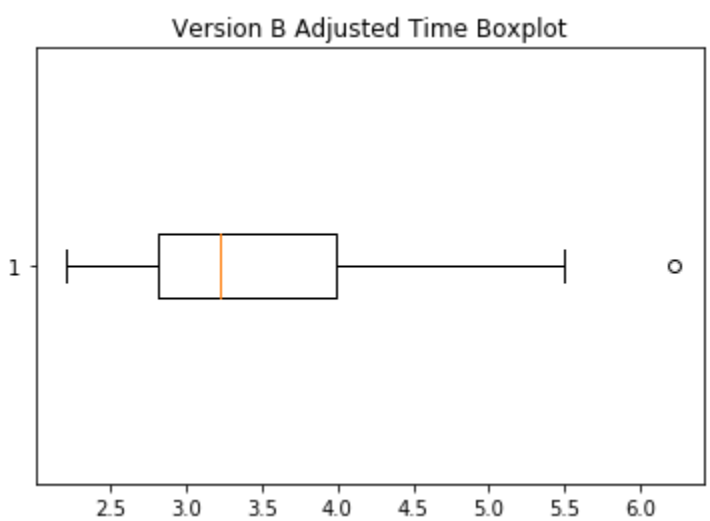
Results

Some descriptive statistics of our two datasets follow in the table below. The statistics are with outliers removed, resulting in 14 data points for each sample. The t-test resulted in a p-value of 0.465 with outliers, and .255 without. This p-value failed to

reject the null hypothesis, requiring a p-value less than 0.025. Repeating the t-test using time values only also failed to show a significant difference.

	Min	Max	Mean	Variance
Metric A	1.399	5.463	3.034	1.759
Metric B	2.207	6.223	3.587	1.402
Time A	9.4	42.0	20.35	96.560
Time B	14.06	43.0	23.775	80.827





When we completed our experiment, we found that our data was not quite what we had anticipated. We had hypothesized a significant difference between the two datasets, but we found that there was not. This may have been due to several factors. One of them may have been our choice of measurements, which we attempted to synthesize into one single factor. While in theory a Likard scale should have helped with the distribution of our results, our results might have been affected by a desirability bias since we were interviewing other students from MTU, who might have given us higher subjective ratings on our project in order to try and boost our results. Additionally, we might have been subconsciously directing users toward a higher score by stating that a seven was the best score when asking for a rating. Using a neutral phrasing, or balancing the sentence by using both a positive and negative scoring guide might have helped ensure a better range of responses. It is also possible that the difference between the two versions of the app was not relevant enough to influence the overall user experience, which would allow us to use the data as a general review of the flow of the tested portion of the app.

Our time values also showed high variation among the sample. Our small sample sizes of 14 likely contributed to this. Using a larger sample size would likely alleviate our high variance and also give our results more validity.

Additionally, users also provided feedback regarding the usage of the incrementing counter, which we can apply to other parts of the app in order to create a consistent experience.

Conclusion

Campus Crunch fulfills the need of an online order-ahead system for on-campus restaurants. By utilizing stakeholder interviews, user testing, user-centered design practices, and usability analysis, we were able to develop a system that allows for quick and intuitive navigation and provides Michigan Tech a modern convenience that was previously unavailable. This solution recognizes the user’s need for time, convenience, comfort, health, and efficiency.