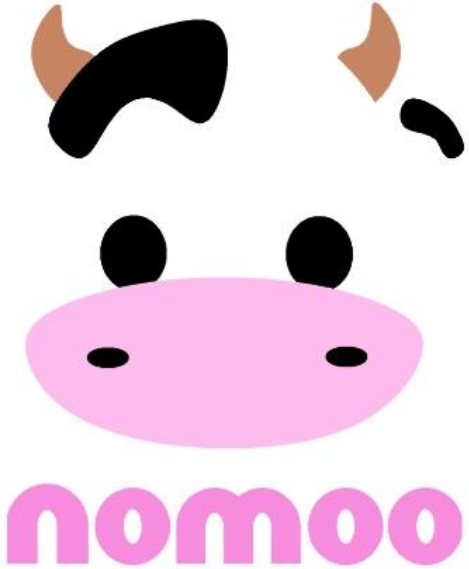


USABILITY REPORT

EVGENIYA GOROBETS

MURAD AKHUNDOV

CHRIS WONG

VANNIE KOPALAKRISHNAN

FIZZA AKHZAR

THOMAS MACDONALD

BOUNDLESS

TABLE OF CONTENTS

NoMoo is an app prototype that seeks to help lactose-intolerant users find suitable restaurants and food to eat.

Executive Summary

“This has more features than I’d think a lactose-free app would have.”

-- Participant [2]

Executive Summary

In order to develop our product, usability testing was performed. We aimed to receive usability feedback on our product, building on the experiences users enjoyed, and resolving the issues that users encountered. After completing our usability testing, we used the feedback to consider and implement changes in preparation for the next round of testing.

Executive Summary

Each test consisted of a pre-study questionnaire, 3 scenarios for the participant to engage in, and a post-study interview.

PRE-STUDY QUESTIONNAIRE

SCENARIOS

POST-STUDY INTERVIEW

Executive Summary

6

Individuals participated in usability testing.

100%

Participants identified as being lactose-intolerant.

Executive Summary

During testing,

- 83% of participants understood the icon symbols used to convey lactose severities of menu items.
- 33% of users weren't confident in the lactose severity rating system.
- 33% of users found it difficult to read the text on the camera's overlay screen.

Executive Summary

Overall, the app was perceived well by participants. Users were impressed with the concept of having a camera analyse the lactose content of items on a restaurant menu. Users also found it easy to navigate throughout the prototype.

The rest of this report details the research methods used for usability testing. It also covers the analysis of the data collected, and reflections for next steps. The videos, raw data, assignment attribution, and references can be found in the appendices.

Research Methods

PURPOSE

The purpose of the usability testing was to:

1. Understand the thought patterns of users interacting NoMoo.
2. Figure out if and how different features of the app were being used by participants.
3. Get user feedback on the potential relevance of the information presented to them in the app.

Research Methods

3 research methods were used to conduct usability testing:

PRE-STUDY QUESTIONNAIRE

OBSERVATIONS OF SCENARIOS

POST-STUDY INTERVIEW

Research Methods

PRE-STUDY QUESTIONNAIRE

The pre-study questionnaire focused on the collecting **participant demographic information**.

OBSERVATIONS OF SCENARIOS

Observations of scenarios were done by encouraging participants to **think aloud**. Participants' **choice of actions** and **behaviour** during each scenario were observed as well.

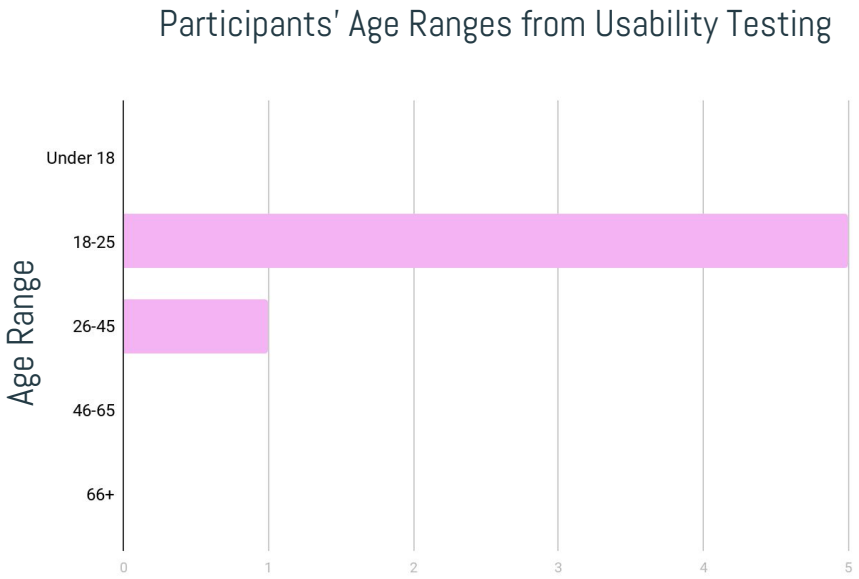
POST-STUDY INTERVIEWS

Post-study interviews served as a way to debrief the participants while getting their **feedback and thoughts** on different issues or successes they had during the usability testing stage.

Participant Recruitment

Participants were recruited by word of mouth by asking classmates, acquaintances and friends of the NoMoo team. Participants were chosen on the basis of whether they identified as lactose-intolerant.

Participant Demographics



The majority of participants identified as being 18-25 years of age.

Participant Demographics

All participants owned a smartphone and regularly use apps with a map and a camera feature. Thus, they can be considered to be technologically literate.

Participant Demographics

Participants were also asked about their occupations:

- 5 of the 6 participants identified as being students.
- 1 of the 6 participants identified as a full-time worker.

Participant Demographics

- 4 of the participants identified as sensitive to milk or mildly lactose-intolerant.
- 2 of the participants identified as moderately to extremely lactose-intolerant.

Data Recorded

Qualitative observations for each scenario and post-study interview answers were recorded. The qualitative observations were further supported by video recordings of each session. The raw data collection and recorded videos can be found under Appendix A and B.

Data Recorded

Observations were recorded based on the following tasks completed by the participants:

1. Open the app and navigate to the main menu.
2. Find a brunch spot close to where you are at.
3. Find something that you would like to eat at that brunch spot.
4. Take a picture of a restaurant menu and determine what's safe to eat.
5. Leave a review for the Tim Hortons B.L.T sandwich you ate.

Findings & Design Implications

"Overall makes a lot of sense." [1]

App Navigation - Good: In general, users found it easy to navigate the app. In 83% of the users tested, there were little to no issues with navigation to specific parts of the app. The app was generally intuitive, which was one of the pieces of feedback common to many of the tests performed.

Findings & Design Implications

"Okay **so it explains that most of these are good,** I would want to avoid the kakimayo and carbonara udon because **it's got definitely things that I want to avoid.**" [1]
"Oh so this is based off of what the user selects" [on the severity screen, milk in the prototype case] "so **it's mostly giving thumbs down for milk, which is good!**" [1]
"Because of these hands, which I assume ... **this means good** [gestures at thumbs up] ... **this means be careful** [gestures at open palm] ... and **this means absolutely not** [gestures at thumbs down]" [3]

Intuitive Colors - Good: 100% of the users tested found it easy to identify which items were lactose-free and which ones were not, in both the camera menu screen and the map menu screen. It was mostly intuitive, with green representing lactose-free and yellow/red representing possibly lactose-containing foods.

Findings & Design Implications

"Something I noticed is that, on this menu, there's no [...] yellow, there's only red and green. Which, again, [...] is kind of confusing. I guess that's one of the main things, is that **I don't understand the distinction between yellow and red.**" [6]

Documentation Visibility - Medium Severity: 33% of users tested had a hard time understanding exactly what is different between the yellow and red colors for the map menu screen. We have existing documentation for this issue, but none of the participants used it. The button for the documentation may not be visible enough. This may be solvable through a popup display indicating to press the button if the symbols are unclear, or through an overlay similar to that in the camera menu screen.

Findings & Design Implications

"Something I noticed is that, on this menu, **there's no [...] yellow, there's only red and green**. Which, again, [...] is **kind of confusing**. I guess that's one of the main things, is that I don't understand the distinction between yellow and red." [6]

Menu Inconsistency - Medium Severity: Despite the colors used in the menu screens being generally intuitive, an issue found was an inconsistency between the map menu screen and the camera menu screen, particularly with the yellow color. The issue is that the camera menu lacks the yellow that is used in the map menu. 16% of users found this inconsistency confusing. This could be fixed in future iterations by adding yellow to the camera menu screen to make it consistent with the map menu screen.

Findings & Design Implications

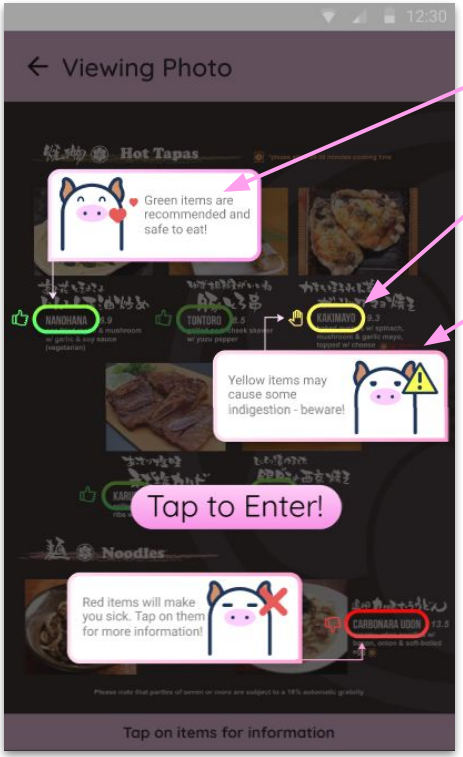
"**I'm confused** as to what to do ... [gesturing at gray text] **that's hard to read**"
"I did read it but **it was just more effort** [...] it was **too light text** and **I didn't really notice there was text** there at first." [3]

Text Visibility - High Severity: 33% of users tested found it difficult to use the camera menu screen, specifically finding the instructional text difficult to read. Visibility of the text was inhibited by the color scheme, since the text was light gray on a white background. This problem could be remedied by choosing a color scheme with more contrast. For example, a future iteration could use black text instead of light gray text.

Implemented Changes

BEFORE

AFTER



1) Overlay instruction text is darker
2) Menu features three colours like the menus in other parts of the app
3) Additional popup clarifies the difference between yellow and red rated food items.

Problems Fixed:

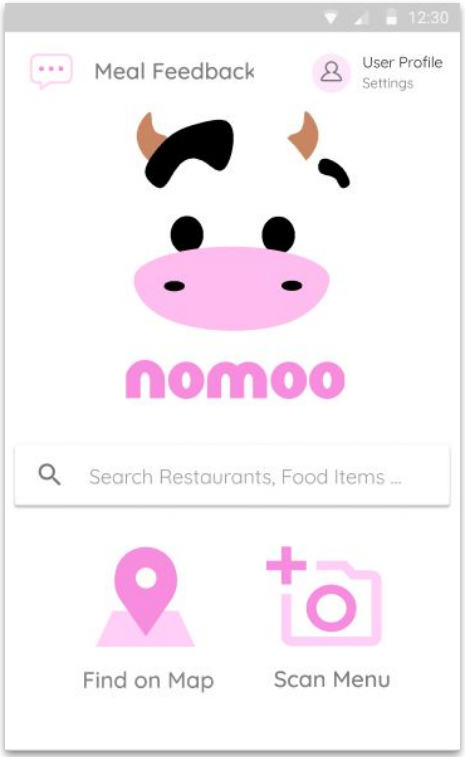
- Menu Inconsistency
- Text Visibility

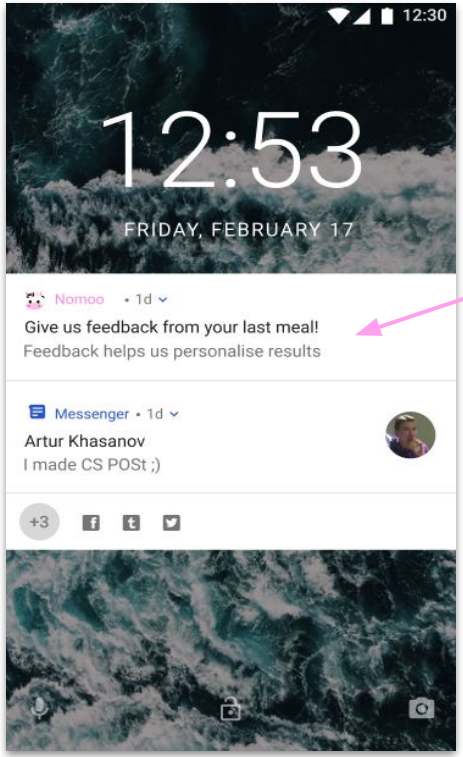
Findings & Design Implications

Feedback Documentation - Medium Severity: The feedback system used in the app is meant to both update the system's database for lactose intolerance categories, and the user's specific profile and recommendations. The former is a consistent standard for app feedback systems, but the latter is not. When one user was asked about the purpose of the feedback system, they could not identify that it enhances the user recommendations. Users may not know that the feedback system updates their profile, and are possibly less likely to use it because of this. This issue could be solved by providing documentation on what the feedback system does for the user in the main screen.

Implemented Changes

BEFORE





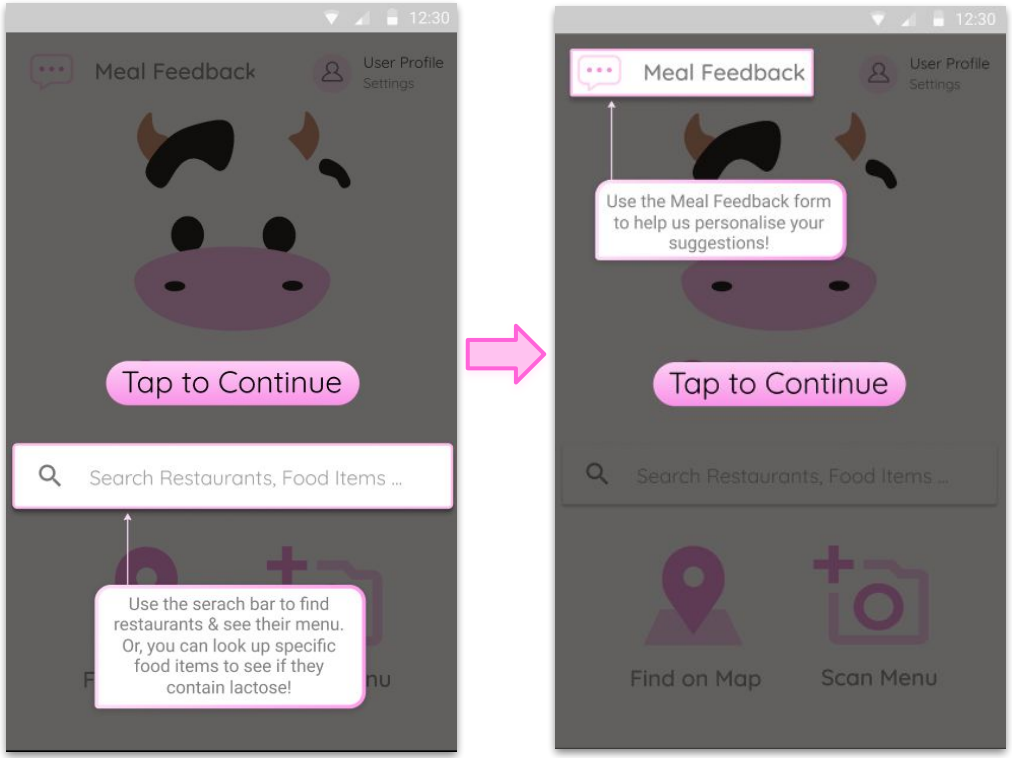
After users sign up, they are taken directly to the home screen, where there is no documentation regarding the app's features.

A notification sent by NoMoo indicates to users that the feedback form is used to personalise suggestions.

However, users who access the feedback form directly from the home screen inside the app are not told what their feedback is used for, and may thus avoid the feature entirely.

Implemented Changes

AFTER



Now, the first time users enter the app, they receive a brief tutorial which highlights all the features of the app in order and explains their purpose.

Problems Fixed:

- Feedback Documentation

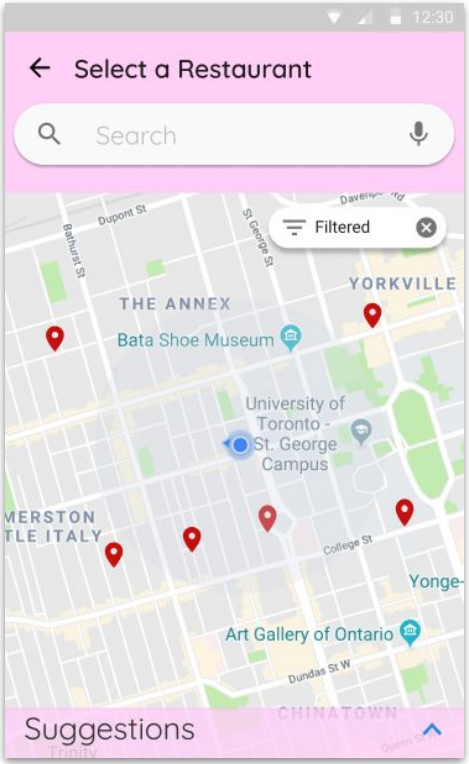
Findings & Design Implications

"I guess one area of **confusion** was the **filter**. Cause I noticed there was an 'x' on the filter screen, which makes me think that that cancels all the filters, but [...]**usually when I see an 'x' on the filter, that's one specific tag, but in this case, it was the whole set of features that I was filtering**. So that was kind of confusing, **I wasn't sure, if I clicked 'x', what would happen**. And also, because of the 'x', **I didn't immediately recognize that the filter thing was a drop down menu**, [...] which was kind of confusing." [6]

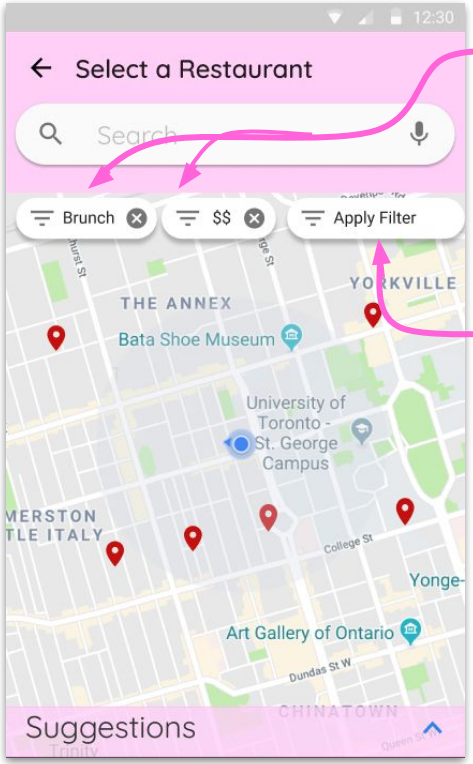
Intuitiveness of Filter - Medium Severity: 17% of users tested found the filter display confusing when it was applied. Since the filter did not specify what was currently being filtered, and instead had a single filter button, it was not clear what pressing the 'x' button would do, whether it would clear all filters or allow the user to choose which filters to clear. To solve this, a potential solution is to implement different filter displays for each different filter type.

Implemented Changes

BEFORE



AFTER



1) Each filter option has its own tag, with its own (X) so that users can undo filters individually.
2) The "Apply Filter" button stays on the map, so users can continue to add new filters on top of the existing ones.

Problems Fixed:

- Visibility of specific filter status

Research Limitations

1. Prototype Quality

Figma was used to design the high-fidelity prototype. There were some limitations of this software, such as not being able to “pinch and zoom” a map. Also, Figma is slow when used on an actual phone, which made testing confusing, as users did not know whether their gestures/actions had been registered by the prototype.

Research Limitations

2a. Test Execution

The testing script was not kept standard, which may affect results and user perceptions. Initially, the testing script offered too much guidance in the form of key words used by the app.

Research Limitations

2b. Test Execution

The second set of tests were each performed with just one researcher, who was responsible for facilitating the test and observing the user. Because of the dual responsibilities, the tester may have not been as observant during testing. We overcame this partially by recording videos of the tests.

Finally, the tests were performed on hardware that responded poorly to the software that was running the prototype, stilting the execution by making screen response very slow.

Research Limitations

3. Participants Evaluated

Because the sample size of lactose-intolerant individuals was small, it was difficult to determine how useful the lactose information the app presented and requested from the users would be.

Example: In the the sign up form of the prototype, questions regarding the lactose-severity of the user are asked. It would have been useful to collect more data on how effective and accurate the lactose scale was for lactose-intolerant users.

Research Limitations

4. Generalizations

It would have been more effective to study a larger age demographic since majority of participants were students from the ages of 18-25 who were technologically literate. It may be difficult to generalize our findings to a larger demographic of lactose-intolerance individuals who do not fit into this demographic.

Reflections

Although there were research limitations, NoMoo still holds merit in how it can help lactose-intolerant users navigate smoothly through their restaurant choices:

- Users generally found it easy to navigate through the prototype.
- Using symbols and colours that fit into the heuristic of standards were generally well received.
    - This implies that using icons like a green thumbs up to convey a safe meal to the user is one way to accomodate for any generalizations or limitations since they are easily recognizable.

However despite this, some of the assumptions of the NoMoo prototype have changed.

Reflections

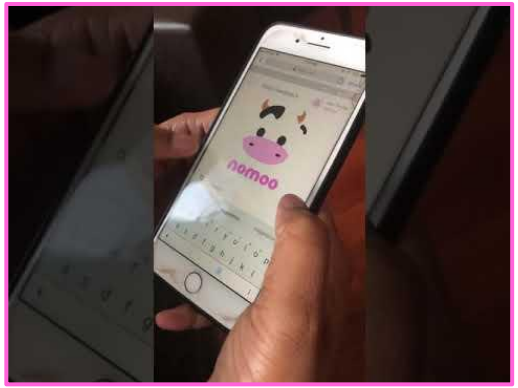
Assumption #1: The lactose options provided in the post sign-up survey were clear enough for users to convey their lactose severity to the app.

Some users were not satisfied by the lactose options provided in the post sign-up survey. For example, one user was confused as to which lactose options to circle.

Reflections

Assumption #2: Users would rely on the map to find potential restaurants, and only use the search bar on the home screen to look for a specific restaurant by name.

Most participants instinctively used the search bar on the home screen and expected to be able to filter their options with the search bar. Thus, we revised our assumption and as a result decided to expand the functionalities of the search bar.



Test 4: User instinctively uses search bar when asked to find a brunch restaurant.

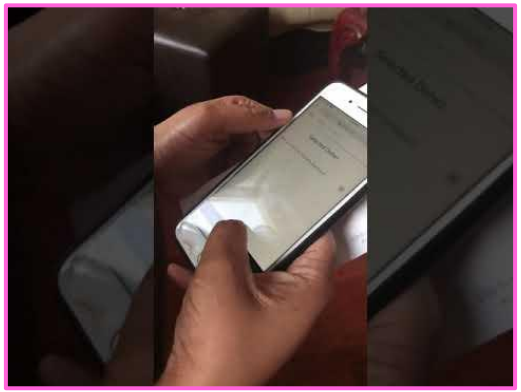
Reflections

Assumption #3: Users would trust the lactose severity ratings given for the items on the restaurants' menus.

2 out of the 6 participants had doubts about how the the app chose the lactose severity ratings for specific dishes. In particular, one user was not completely convinced that the app could make *tailored* ratings for each specific user, citing that users experience symptoms differently.

Effectiveness of NoMoo

Overall, users found it easy to navigate through the prototype, suggesting that the layout of the app was effective at keeping participants engaged.

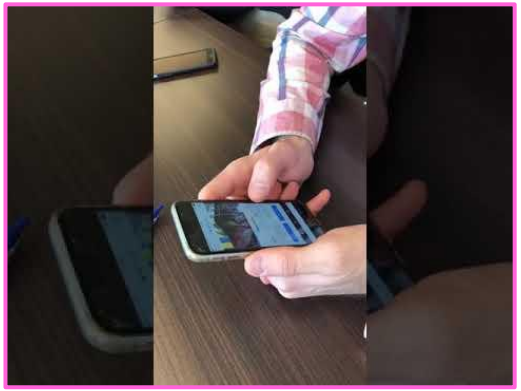


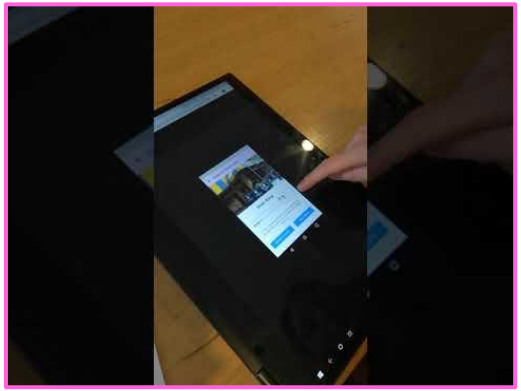
Test 1 (left): User successfully uses the "Scan Menu" feature & interacts with augmented reality menu.

Test 4 (right): User quickly & easily fills out feedback form in the app.

Effectiveness of NoMoo

Users also interpreted symbols within the app easily & correctly, indicating that the language of the app matches users' mental models.





Test 1 (left): User describes the information presented on the Restaurant Information Screen.

Test 3 (right): User explains their perception of the symbols in the menu.

Effectiveness of NoMoo

"I think **I probably would [use the app]**, specifically for just searching up food items, because I already use other apps for that, but for other food issues, but **there's nothing really for lactose intolerance yet that has a decent database of food items.**" [3]
"That's **pretty cool** [...] This would allow me to **get a better understanding**."" [1]
"Yeah, **I'd definitely use the app** [...] like when I'm going out or ordering food..." [4]

Furthermore, many of the users expressed that they would use the app in their own lives, suggesting the premise of the idea and the motives of NoMoo aligned with our target audience.

Effectiveness of NoMoo

For next steps, NoMoo will have to work on giving users a sense of trust and confidence in the app.

Some users doubted if the rating system was accurate. If users are not confident in how NoMoo suggests which dishes are safe to consume, then it will be rendered as an ineffective app for its target audience.

Appendix A: Links to Video User Testing

The following is a link to all the clips of usability testing, listed in the order that they were presented in the report:

https://www.youtube.com/playlist?list=PLGAUfcCVTtFWKJEsjQuAirQxoLStqYWZs

Appendix B: Raw Data Findings

Pre-Study Questionnaire (Brief Overview of Questions)

Q1: How old are you?
Q2: Where do you live?
Q3: What is your occupation?
Q4: Are you lactose-intolerant?
Q4a: If yes, how severe is your intolerance?
Q5: Do you care for or is someone in your family lactose intolerant?
A6: Do you often eat out with someone who is lactose-intolerant?
Q7: How often do you eat out?
Q8: With whom do you usually go out to eat with?
Q9: Before going out to eat, how often do you check the reviews for a restaurant?
Q10: Before going out to eat, how often do you look at the menu beforehand? (e.g. On the restaurant's website)
Q11: how important is it to you that a restaurant has lactose-free or dairy-free dishes?
Q12: Do you own a smartphone?

Appendix B: Raw Data Findings

Pre-Study Questionnaire Form (Complete)

Name_____Signature_____

Pre-Study Questionnaire

Basic Information

1. How old are you?
   Under 18 18-25 26-45 46-65 66 or older
2. Where do you live?
   Toronto GTA (Vaughan, Richmond Hill, etc.) Other: _____
3. What is your occupation? Select all that apply.
   Full-time worker Part-time worker Student Retired Other

Lactose-Intolerance

4. Are you lactose intolerant? Yes No Not sure
   (a) If yes, how severe is your intolerance?
   - ☐ Extremely intolerant – cannot digest anything with lactose
   - ☐ Moderately intolerant – cannot digest any cheeses but can digest butter and other low-lactose dairy products
   - ☐ Mildly intolerant – can digest some but not all cheeses
   - ☐ Sensitive – can digest nearly everything but milk
   - ☐ Not sure
5. Do you care for or is someone in your family lactose intolerant? Yes No
6. Do you often eat out with someone who is lactose intolerant? Yes No

Dining Out

7. How often do you go out to eat?
   Almost never A few times a month Almost always
   A few times a year A few times a week
8. With whom do you usually go out to eat with? Circle all that apply.
   Family Friends Coworkers/Clients/Business Partners Others
9. Before going out to eat, how often do you check the reviews for a restaurant?
   Almost always Often Sometimes Rarely Almost never
10. Before going out to eat, how often do you look at the menu beforehand (ex. On the restaurant's website?)
    Almost always Often Sometimes Rarely Almost never
11. How important is it to you that a restaurant has lactose-free or dairy-free dishes?
    Not at all important 1 2 3 4 5 Very important

Prior Experience with Mobile Applications

12. Do you own a smartphone? Yes No
    If yes:
    (a) Do you regularly use an app that has a map feature (ex. Google Maps)? Yes No
    (b) Do you regularly use an app that has a camera feature (ex. Snapchat)? Yes No
    (c) Do you regularly use any apps to help you decide what restaurant to eat at (i.e., apps that provide reviews, give recommendations, show photos of the menu or food items, ex. Yelp)? Yes No
    (d) Do you regularly use any apps to check the ingredient, nutrition, or allergy information of foods? Yes No

Appendix B: Raw Data Findings

Pre-Study Questionnaire Results (Part 1)

Participant #	Facilitator Name	Q1 (Age)	Q2 (Residence)	Q3 (Occupation)	Q4 (Lactose intolerance)
1	Murad	18-25	Toronto	Student	Yes; Mildly Intolerant
2	Vannie	18-25	Toronto	Student	Yes; sensitive
3	Fizza	26-45	GTA	Full-time worker	Yes, sensitive
4	Chris	18-25	Toronto	Student	Yes, sensitive
5	Thomas	18-25	Toronto	Student, Part-Time worker	Yes, moderate
6	Evgeniya	18-25	Toronto	Student	Yes; extremely

Appendix B: Raw Data Findings

Pre-Study Questionnaire Results (Part 2)

Participant #	Q5	Q6	Q7 (Dining out)	Q8	Q9	Q10
1	Yes	Yes	A few times a week	Friends	Often	Sometimes
2	No	No	A few times a month	Family, friends, coworkers	Often	Often
3	No	No	A few times a week	Family, friends, coworkers	Sometimes	Sometimes
4	No	Yes	Almost always	Others: Alone	Sometimes	Almost Never
5	No	No	A few times a year	Family, Friends	Often	Often
6	No	Yes	A few times a week	Friends	Almost never	Almost never

Appendix B: Raw Data Findings

Pre-Study Questionnaire Results (Part 3)

Participant #	Q11	Q12	Q12(a)	Q12(b)	Q12(c)	Q12(d)
1	2	yes	yes	yes	yes	no
2	2	yes	yes	yes	yes	no
3	2	yes	yes	yes	No	no
4	1		Yes	Yes	No	No
5	1	Yes	Yes	Yes	No	No
6	3	Yes	Yes	Yes	No	Yes

Appendix B: Raw Data Findings

Usability Testing Observations (Part 1)

	Tried to sign up	Used search bar on home screen	Used search bar in map	Used filter in map	Used suggestions tab in map	Tapped on red location icon	Found OverEasy menu
Murad	skipped	yes	no	no	no	yes	Yes, but only after asking if there is something suitable on the menu
Thomas	No	No	No	Yes	No	Yes	Yes, but only after being reminded of the scenario
Chris	skipped	yes	no	yes	no	yes	yes
Evie	No; skipped	No	No	No	Yes; navigated to Over Easy from here	No, tried on unfiltered map but popup didn't appear	Yes
Vannie	Skipped	Yes	No	No	No	Yes	Yes

Appendix B: Raw Data Findings

Usability Testing Observations (Part 2)

	Use info icon in menu	Understood hand symbols in menu	Found scan menu	Tapped on items in augmented menu
Murad	no	Yes, understood meaning exactly	yes	yes, but tried to zoom first. Said that she wished zooming was a feature
Thomas	No	Understood general meaning, but was unclear how we calculated the threshold between red and yellow. Seemed to not trust an app making the decision of what could give mild symptoms and what could give severe symptoms.	Yes	Did not immediately tap. Tried to read the text on the menu. Was frustrated that the overlay covered menu text, as they thought we only gave a recommendation and not specific information. After asked to find specific information on the menu items, the user tapped on the icons.
Chris	no	Didn't fully understand difference between yellow palms & red thumbs down	yes, after reminder of scenario (went to map first to try to search the restaurant)	said it wasn't necessary to understand which were safe, but did just to try it
Evie	No	Yes, understood their meaning exactly	Yes	Yes
Vannie	No	Yes, understood their meaning exactly	No	No - but verbally said what she thought each item meant (e.g. green = safe to eat)

Appendix B: Raw Data Findings

Usability Testing Observations (Part 3)

	Found review screen from home page	Found review screen via notification	Filled out review properly	Tried to tap on settings/User Account
Murad	Yes.	No, but was never on the lock screen in the first place	yes	No
Thomas	Yes.	No	Yes	No
Chris	yes	no	yes	no
Evie	Yes	No	Yes	No
Vannie	Yes	No	Yes	No

Appendix B: Raw Data Findings

Usability Testing Observations (Fizza)

Scenario 1:

- Find on Map; Tried pinching, but scrolled too. "It seems to think I'm at Spadina which is not quite the case so I'm gonna hit back and I'm gonna go Search my restaurant..and I typed in a restaurant and the keyboard is not working."
- Was trying to type a specific nearby breakfast place "Chorus" (based on the map location, i.e. the Spadina area) but said "the problem is that map was showing a little further and not allowing me to go very far." - Explained again that this wasn't an actual app and just a prototype.
- "So what I would do is I would go on the map and I would, assuming that it was Chorus I would try to look for similar things based of off Chorus and I would look around to see the price because we're on a budget."
- DID NOT USE FILTERS AT ALL
- Tapped on Back
- Eventually opened the Over Easy info page, read aloud, "2 $$ signs so not too pricey, some lactose-free options which is a 2/3 on the scale here." (So looked like he understood most of the content on that page)
- Tapped on View Menu
- "Oh wow, so we have waffle dog which is down and contains milk, ham and steak..oh that's pretty cool."
- Kept scrolling down the menu. Showed understanding about the thumbs up/down, "Oh so this is based off of what the user selects" [on the severity screen, milk in the prototype case] "so it's mostly giving thumbs down for milk, which is good!"
- Tried to check more restaurants on the map but found out they were all Over Easy
- When asked if they were able to decide if Over Easy had something for him to eat, participant said he never decides like that, might look at options to see what he's really feeling like, but tend to see all their menu, the EXACT PRICE to help him decide, and would talk to the server. "But I have a better idea of what they have available."

Appendix B: Raw Data Findings

Usability Testing Observations (Fizza)

Scenario 2:

- Went straight to Scan Menu
- Read the overlay instructions thoroughly
- Saw the augmented menu, and went back to paper menu to say
- Okay so it explains that most of these are good, I would want to avoid the kakimayo and carbonara udon because it's got definitely things that I want to avoid."
- Went back to augmented menu, tapped on the green/red to read more info on both and said out loud the ingredients listed on the unsafe options and said "which is important" [to know].
- "THIS WOULD ALLOW ME TO GET A BETTER UNDERSTANDING."

Scenario 3:

- Right away tapped on meal feedback
- Did everything as expected.
- Was NoMoo helpful… "I don't know if it was or wasn't." (Might not have understood the scenario properly). Still tapped on the switch a couple of times.
- When nothing happened, Hit Submit.
- "And it says thank you for the feedback"

Appendix C: References

Quote References

[1]: Test #1

[2]: Test #2

[3]: Test #3

[4]: Test #4

[5]: Test #5

[6]: Test #6

Icon References

Icons used in this presentation were made by Freepik from www.flaticon.com.

Appendix D: Assignment Attribution

The usability testing was conducted by all members of the group. The write-up and slides for the report were primarily done by Vannie Kopalakrishnan, Evgeniya Gorobets and Christopher Wong. Edits were provided by Murad Akhundov. The design layout for the slides was primarily done by Fizza Akhzar with additional edits done by Vannie Kopalakrishnan. Changes to the prototype after the second round of testing was done by Evgeniya Gorobets and Thomas MacDonald. The poster was completed by Fizza Akhzar with edits done by Vannie Kopalakrishnan, Thomas MacDonald, and Evgeniya Gorobets.