University of Toronto
Faculty of Applied Science & Engineering
MIE240
Fantuan Project Report: Phase 1

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We, Maria Chzhen, Shreya Perumal, and Rain Tang, hereby declare that the work presented in this report is our own original creation. All sources of information and data from the works of others have been fully acknowledged and cited. This report has not been submitted, in whole or in part, for any other degree or examination at this or any other institution. By signing below, we confirm that the contents of this document reflect our research and findings to the best of our knowledge.

Executive Summary

This report documents the "Understand" phase of the human factors engineering project, focusing on how University of Toronto students interact with the Fantuan food delivery application. The objective was to conduct a Hierarchical Task Analysis (HTA) on two critical functions—Selecting a Restaurant and Checking Out—to identify potential usability issues.

Data collection techniques

1. Observation (Screen-recordings) – to witness real-time interactions with the Fantuan app, capturing navigation paths, points of confusion, and moments where participants required additional clarification. All participants completed consent forms before participation.
2. Questionnaire – to capture demographic information and explore how users typically select, order, and evaluate food delivery services. This also allowed the team to gauge motivations, app usage frequency, and expectations from Fantuan.

Findings

1. Filtering and sorting: Participants prioritized cuisine type, price, and delivery time, highlighting the need for straightforward and accessible filtering tools.
2. Overwhelming interface: Some found the interface cluttered, suggesting the need for more intuitive layouts and visually prominent guidance. Cluttered displays also made offers appear misleading.
3. Checkout process: Users appreciated seamless payment methods and clear cost breakdowns but noted confusion around applying promotional codes.

Implications and Next Steps

The HTA delineated both physical interactions (e.g., scrolling, tapping) and cognitive processes (e.g., deciding on restaurant criteria, verifying order details). These insights emphasize a need for improved information design, such as upfront filters, streamlined processes, and simplified transaction flows. These findings will guide the Create phase, where the group will prototype design solutions and conduct additional user testing.

1. Introduction

1.1 Background and Purpose

Fantuan is a food-delivery platform that allows users to browse restaurants, select menu items, and place orders for delivery. The human factors team is examining how University of Toronto students interact with Fantuan in order to identify potential usability gaps and propose design implications for an improved user experience.

This report presents the findings of the Understand phase (Phase 1) for the Fantuan application. The core goal of this phase is to develop a Hierarchical Task Analysis (HTA) through various data collection means for two key functions on Fantuan; 1) Selecting a Restaurant; 2) Checkout.

By breaking down these functions into a step-by-step task structure, the group aim to uncover how users navigate Fantuan, what information they require, and where potential pain points may lie. The group elaborated on the choice of scope and the importance of covering these functions in section 2.1 (Scope and Goals).

1.2 Report Focus and Structure

The report is structured as follows:

1	Introduction	The introduction contains information on the background and purpose of the report, as well as the report structure.
2	Methodology	Description of scope, data collection, and analysis approaches. The group extensively used 2 data collection techniques: observation and questionnaires.
3	Hierarchical Task Analysis	Graphical HTA diagrams and accompanying textual explanations.
4	Findings and Insights	Key insights, implications for design, and suitability of HTA.
5	Discussion & Conclusion	Practical issues, challenges, and limitations faced during the process. Importance of the team's work and next steps.
6	Appendices and References	Supplementary materials, raw data, and draft analysis products (that are not essential to the main argument).

2. Methodology

2.1 Scope and Goals

The goal of Phase 1 was to capture how University of Toronto students (with no restrictions on prior Fantuan and delivery app usage) interact with the Fantuan platform, focusing on two core functions with enough complexity to reveal detailed usability insights:

1) Selecting a restaurant: Encompasses browsing and filtering restaurants, viewing menus, and deciding what to order. The task given to users was to "Find a low-cost Japanese restaurant that will deliver in under 30 minutes". It struck a balance between being simple to remember while still requiring users to use various functionalities within the app.
2) Checking out an order: Covers verifying items and completing the checkout flow.

These functions represent fundamental user goals that directly influence whether the user can efficiently accomplish what Fantuan is designed for—ordering meals. These recurring tasks are central to Fantuan's value proposition and involve multiple steps and decision points. An HTA of these tasks offers a foundation for identifying critical user needs and pain points.

2.2 Data Collection Methods

To ensure the Hierarchical Task Analysis was grounded in real-world behaviour, two data collection techniques adapted from "A Guide to Task Analysis" [1] were employed:

1) Observation.

Purpose: Capture live user interactions while completing tasks on the Fantuan app.

Reaching the target audience: To ensure reliable insights from the target user group—University of Toronto students—participants were selected from Robarts Commons, a high-traffic study area frequented by students from various academic and demographic backgrounds. The group collected five responses.

Platform: Participants were asked to screen-record their experience of selecting a restaurant and proceeding to checkout on Fantuan. The screen-recordings were done using each device's

screen-record feature (no external apps needed) and provided direct insight into navigation paths and any difficulties encountered.

Post-task survey: After participants uploaded their screen-recordings to the questionnaire, mandatory follow-up questions to clarify their thought processes, challenges, or unexpected behaviours were asked (Appendices C and D).

2) Questionnaire.

Purpose: The survey was designed to help the group gather demographic information and understand user interaction patterns in their context, as well as expectations and pain points when using food delivery apps, particularly Fantuan. It was completed before and after the observation activity.

Platform: The questionnaire was hosted on Google Forms.

Survey content: Participants first completed a survey that gathered demographic information, food delivery habits, and their prior experience with Fantuan. If they had never used Fantuan, they proceeded to the next step, where they were assigned the tasks to complete within the app while screen-recording their interaction (for later evaluation).

2.3 Justification of Methodology

Before participating in the data collection activities, all individuals were asked to fill out a consent form (Appendix B), ensuring that they understood the nature of the study, how their data would be used, and that their participation was voluntary. It was also clearly communicated that participants would not need to share sensitive information during checkout.

The pre-activity questions (Appendix A) allowed the group to assess participants' familiarity with food delivery apps and identify key behaviours, like how often they use these services, their motivations for ordering food, and what they prioritize. This information provided context for analyzing how different users approach the ordering process and what factors influence their decision-making.

Additionally, segmenting participants based on their prior experience with Fantuan showed the comparison of experienced users' perceptions and expectations with the challenges faced by first-time users.

Although five responses may seem like a small sample size, it is sufficient for this study's phase as it aims to conduct an in-depth qualitative analysis rather than a broad statistical survey. Based on usability studies, even a handful of participants can reveal critical usability issues, as most major problems tend to surface within the first few users [2]. Additionally, a larger population sample was not possible due to time constraints. The small sample allowed the study to focus on individual user journeys, analyze patterns in real-time interactions beyond numerical survey results, and identify specific challenges encountered while navigating Fantuan's interface.

The observational activity offered direct evidence of actual user flow through Fantuan, capturing real-time issues and decision-making processes. The online survey provided quantitative and qualitative context about participants' backgrounds and typical usage patterns.

2.4 Analysis Approach

To analyze user patterns, each participant's screen recording was analyzed to note navigation paths, interaction times, and points of confusion. After that, for the task decomposition, the group identified overarching user goals (select restaurant, checkout) and iteratively broke them into subgoals and tasks. As the stopping rule, the group halted decomposition once further detail did not change design implications (i.e. when subtasks became too granular to gain further insight). The findings from this phase informed the HTA, breaking down the step-by-step structure of ordering food through Fantuan and highlighting areas for UX enhancement.

3. Hierarchical Task Analysis

3.1 HTA 1 - Function 1: Selecting a Restaurant

In Figure 1, it can be seen that multiple pathways can be taken to arrive at step 2, as supported by survey feedback (Appendix D). This makes the flow of the app confusing as there are many

ways to arrive at the same point. Steps 2 and 3, however, were very simple and easy to follow. Neither had too many additional pathways.

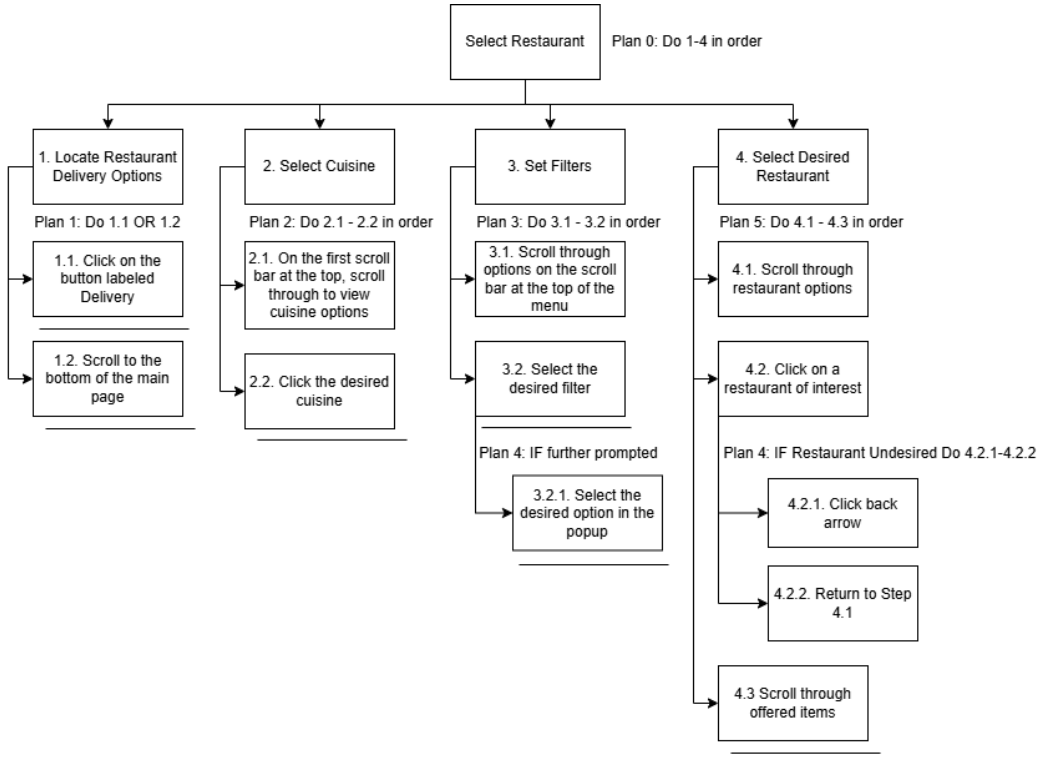

Figure 1: Hierarchical Task Analysis of Function 1 (Selecting a Restaurant)

Participants spent the least amount of time specifying the cuisine type and selecting the price filter as they were easy to navigate, as evidenced by the recordings and feedback (Appendix C and D). During Step 4, participants visually scanned through their filtered options to select one of interest. This process was quick and straightforward since each listing included key restaurant details such as time and price point. However, the provided information was sometimes misleading. For example, offers that initially attracted participants often turned out to be for particular items or required membership status, resulting in participants frequently returning to the previous page to find another restaurant.

3.2 HTA 2 - Function 2: Checking out an order

In Figure 2, it can seen that Steps 1 & 3 are very simple, straightforward processes completed with ease. In contrast, Step 2 consists of multiple subtasks and is much more complex, making for a major hindrance to a streamlined user experience.

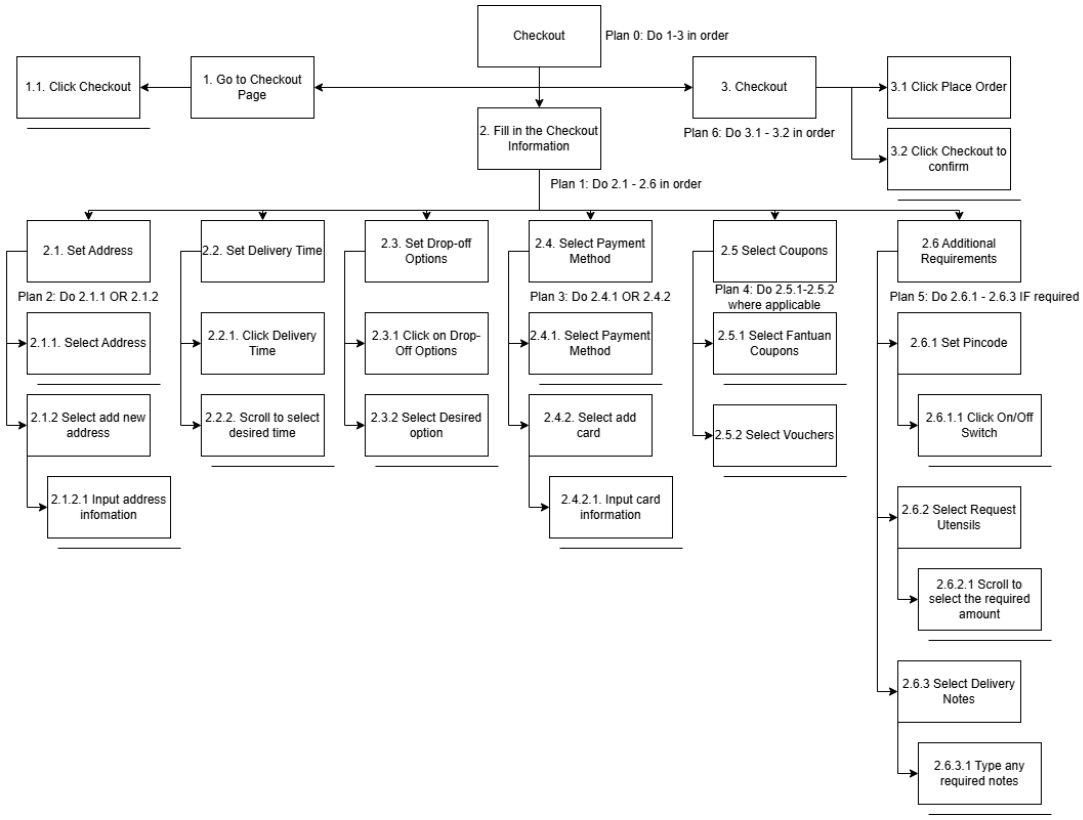

Figure 2: Hierarchical Task Analysis of Function 2 (Checking out an order)

In Step 2, participants were asked to complete the payment and delivery information required to process an order. As evidenced by the recordings, this step took participants the longest and was the most intricate (Appendix C and D). Participants often neglected subtasks of Step 2 such as pincode, utensil requests, and delivery notes due to ambiguity. Additionally, the availability and use of vouchers/coupons were difficult to understand. Often, participants would receive a notification of an available coupon/voucher which they weren't able to use for unknown reasons. Differentiating between vouchers and coupons proved to be a major challenge as well.

4. Findings and Insights

4.1 Primary Observations and Implications

Several user behaviours that could have major implications for human factors-oriented app design were observed.

For example, while selecting a restaurant (Figure 1), several participants filtered restaurants primarily by cuisine and price, emphasizing the importance of a clear and intuitive filter system. It is important to ensure that filtering and sorting options are visible and easily accessible, potentially with default “popular near you” settings to reduce cognitive load.

Additionally, several users noted the app was somewhat overwhelming to use (Refer to Appendix D, Figures D11 and D17 for more detailed feedback). It is essential to make sure the app is easy to use and look at to expedite decision-making and not be distracting to its own users.

4.2 Suitability of HTA in this context

Hierarchical Task Analysis proved sufficiently comprehensive for capturing Fantuan’s interaction flow. It helped identify physical actions completed by users, such as tapping menus, scrolling, and filtering, as well as the more cognitive steps, including evaluating restaurant information, deciding which items to order, and verifying accuracy during checkout.

While HTA did not explicitly capture error recovery steps or advanced mental models (e.g., changing one’s mind mid-way), these can be addressed in a complementary cognitive task analysis if needed for deeper insights.

5. Discussion

5.1 Difficulties and Challenges

Throughout the data collection process, the group faced several challenges. Recruiting participants proved to be one of the main difficulties, as many students were busy studying or hesitant to take time out of their schedule to participate in the survey and observational study. Some were reluctant to screen-record their interaction, possibly due to privacy concerns or

unfamiliarity with the process. Additionally, the sample size was constrained by time limitations, making it difficult to gather a broader range of perspectives.

Another challenge was ensuring participants completed their assigned tasks correctly. Some users may not have fully engaged with the Fantuan app, skipped steps, or made errors that could impact the consistency of the results. It was also difficult to ensure that first-time users understood the tasks without providing too much guidance, as excessive instructions could interfere with natural interactions with the app.

Despite these challenges, the data collection yielded rich qualitative insights suitable for this project. Further iterations and additional participants could refine the HTA and validate design implications.

5.2 Conclusion

In this Understand phase, a Hierarchical Task Analysis (HTA) was developed for two central Fantuan functions—Selecting a Restaurant and Checking Out—using real-world user data collected via surveys, observations, and screen recordings. The HTA diagrams, combined with qualitative analysis of user behaviour, pinpointed critical steps and decision points in Fantuan's workflow. These findings not only fulfill the project requirements for a detailed task breakdown but also yield design insights that will inform the Create phase.

The next steps for Phase 2 include incorporating identified improvements (e.g., clearer filtering, highlighted payment methods) into low-fidelity prototypes for the upcoming Create phase that addresses these identified issues. Further user testing will be conducted with additional participants to validate the observations and refine the design recommendations.

This document provides a comprehensive yet concise account of the methodology, findings, and implications of the team's HTA for Fantuan. It introduces and justifies the project scope for any future readers who may not be intimately familiar with your work. This report serves as an effective record and basis for subsequent project phases.

6. References

[1] B. Kirwan and L. K. Ainsworth, *A Guide to Task Analysis*. CRC Press, 1992. doi: https://doi.org/10.1201/b16826.

[2] J. Nielsen and T. K. Landauer, "A mathematical model of the finding of usability problems," *Proceedings of the SIGCHI conference on Human factors in computing systems - CHI '93*, pp. 206–213, 1993, doi: https://doi.org/10.1145/169059.169166.

7. Appendices

Appendix A: User questionnaire.

The link to the questionnaire:
https://docs.google.com/forms/d/e/1FAIpQLSec0vGMw-IuwnFg0TMFTX8QVUdp8yW3M2Y5OZUwmpP1OKiWSg/viewform?usp=sharing

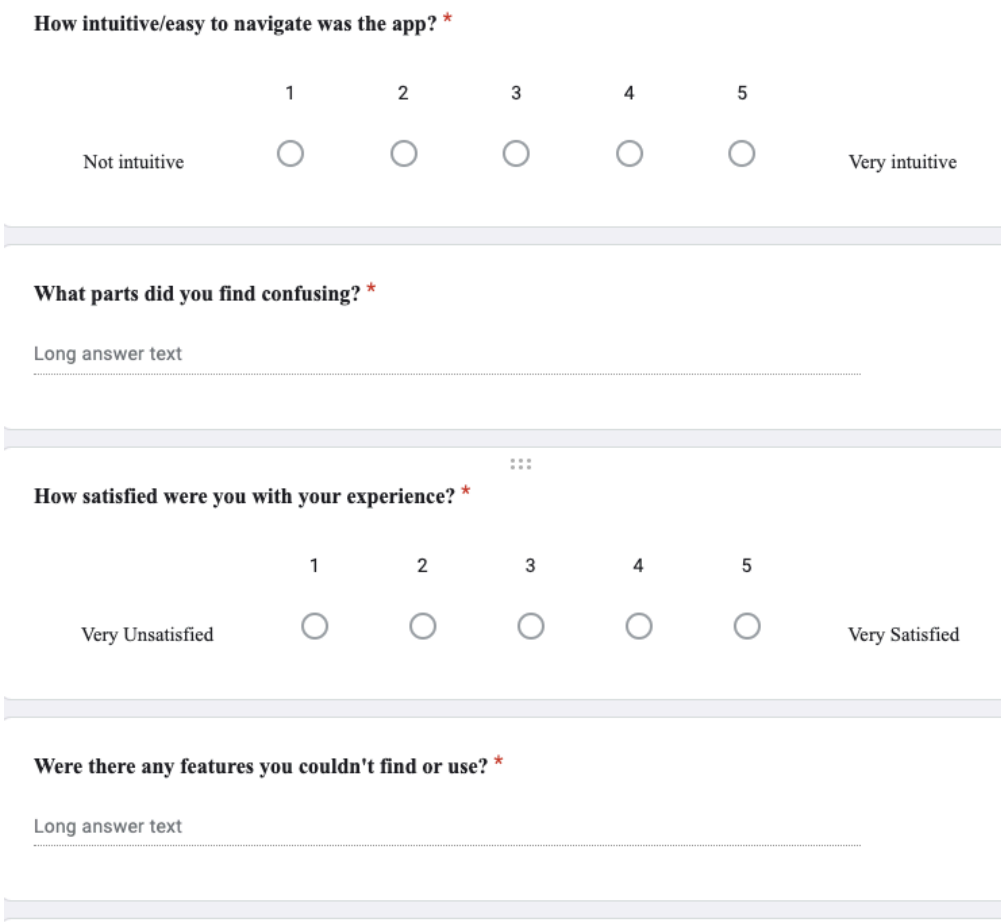

Figure A1. Part 1 of Post-task survey, which integrated both ratings and longer answers.

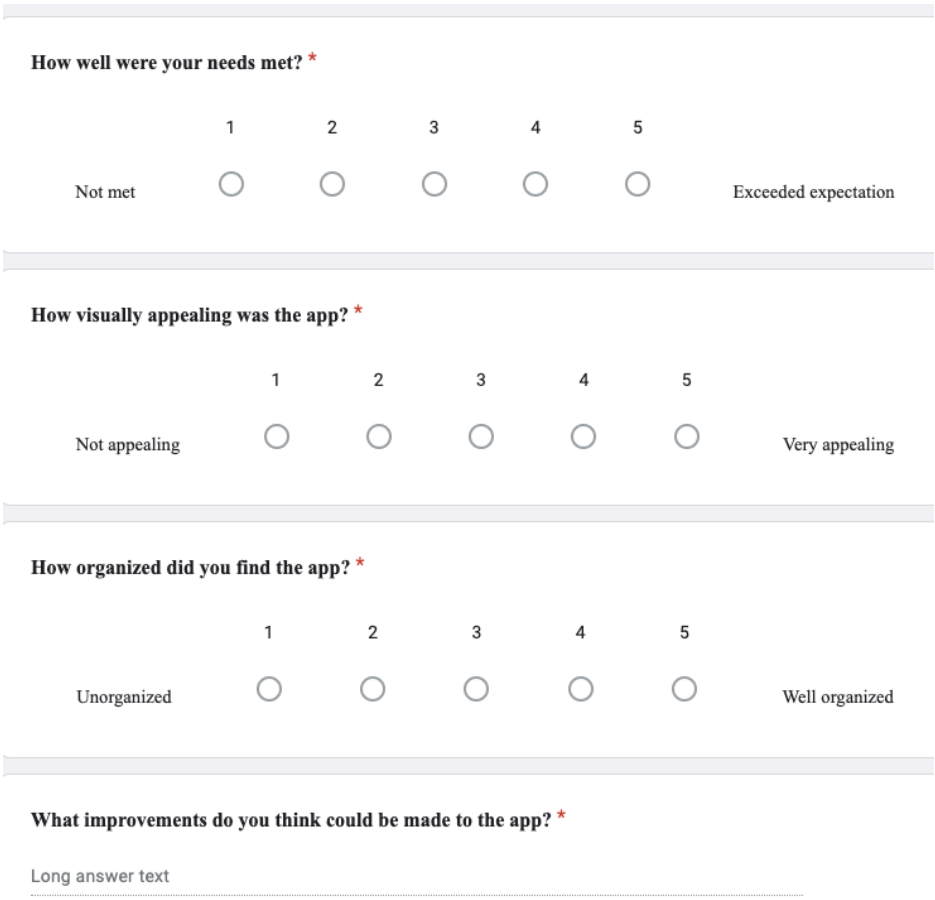

Figure A2. Part 2 of Post-task survey, which integrated both ratings and longer answers.

Appendix B: Consent.

The participants were asked to sign the consent form using google form as presented in Figure B1 and Figure B2, the full consent form (Figure B3 and Figure B4) was displayed to participants.

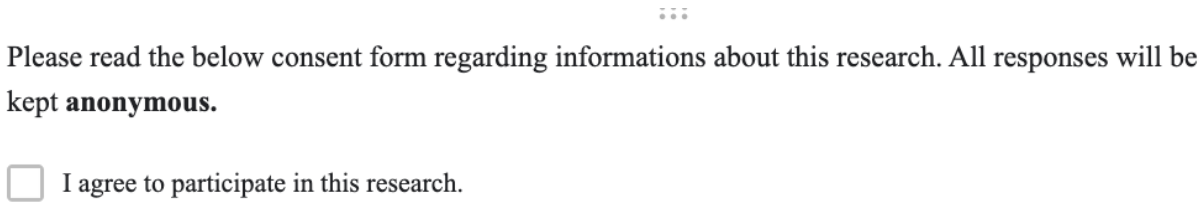

Figure B1. Users clicked on a checkbox to participate in the research.

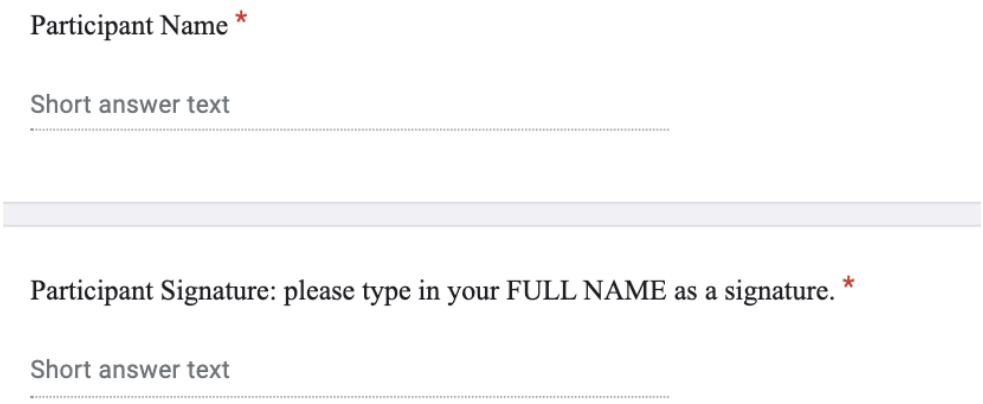

Figure B2. Participants signed with their full names to participate in the research.

University of Toronto - MIE240
Participant Consent Form

Title of Study: User Experience Research on Fantuan App
Course: MIE240
Researchers: Rain Tang, Shreya Perumal, Maria Chzhen
Contact: rainq.tang@mail.utoronto.ca

Introduction
You are invited to participate in a research study conducted by second-year engineering students at the University of Toronto. The purpose of this study is to explore user experiences with the Fantuan App, identify potential flaws, and suggest improvements. Your participation will involve answering a survey and, if unfamiliar with the app, engaging in certain activities using Fantuan.

Participation Requirements

- Participants must be at least 18 years old.
- No prior experience with the Fantuan App is required.
- Participation is voluntary, and you may withdraw at any time without consequences.

Procedures
If you agree to participate, you will be asked to:

1. Complete a short survey about your experience with the Fantuan App.
2. If you are unfamiliar with Fantuan, you may be asked to perform specific tasks within the app.
3. Provide feedback on usability, functionality, and overall experience.
4. Your screen activity during the tasks may be recorded for research purposes, but no personal video or audio recordings of you will be taken.

Risks and Benefits

- There are no foreseeable risks associated with participating in this study.
- Your feedback may contribute to improvements in the Fantuan App and provide valuable insights for academic research.

Confidentiality

- All responses will be kept **anonymous** and used solely for academic purposes.
- Data collected will not include personally identifiable information.
- Only the research team will have access to the responses.
- Screen recordings will be used solely for analysis of app interactions and will not be shared publicly.

Figure B3. Consent form, page 1.

Voluntary Participation
Participation in this study is completely voluntary. You may decline to answer any question or withdraw at any time without penalty.

Questions?
If you have any questions or concerns about the study, you may contact the research team at rainq.tang@mail.utoronto.ca or speak with one of the group members.

Consent Statement
By signing below, you acknowledge that you have read and understood the above information, and you agree to participate in this research study.

Participant Name: _____

Participant Signature: _____

Date: _____

Figure B4. Consent form, page 2.

Appendix C: Screen-recording link

https://drive.google.com/drive/folders/1yzrJXw_rpxKDGLAWZRnWdeV8g3aqtfutvQLtlrzMIEV2WkhsgoDFS4TGozd6BDUyXC_FuHWh?usp=sharing

Appendix D: Survey response statistics.

Part 1. Pre-activity questions.

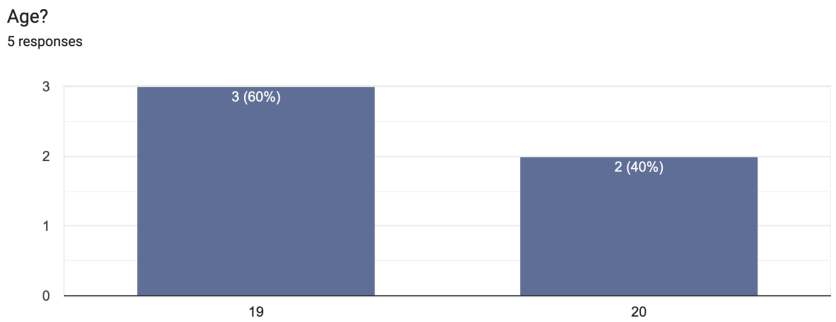

Figure D1. Ages of the survey participants.

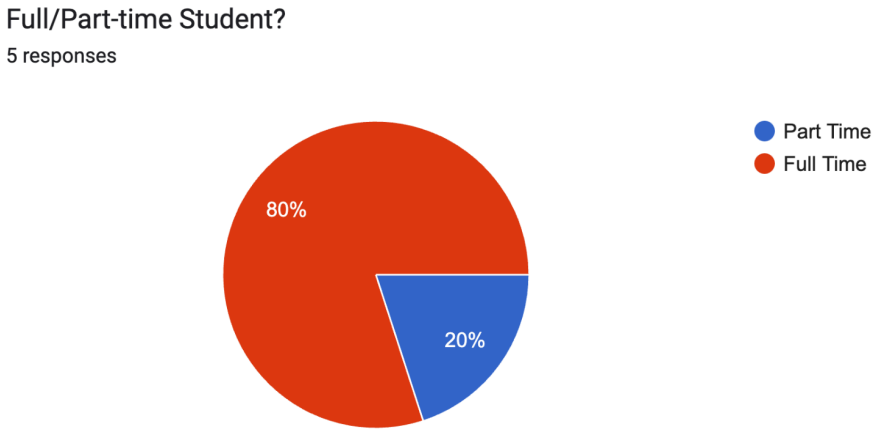

Figure D2. Full/Part-time student status of the survey participants.

Figure D3. How often survey participants cook for themselves.

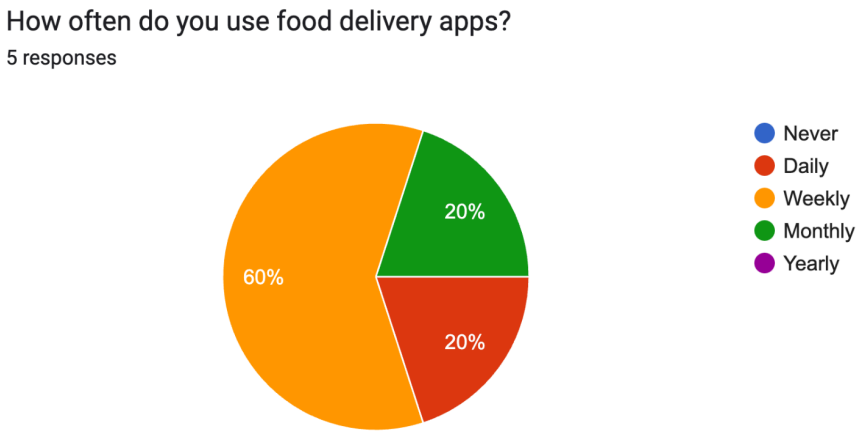

Figure D4. How often survey participants use food delivery apps.

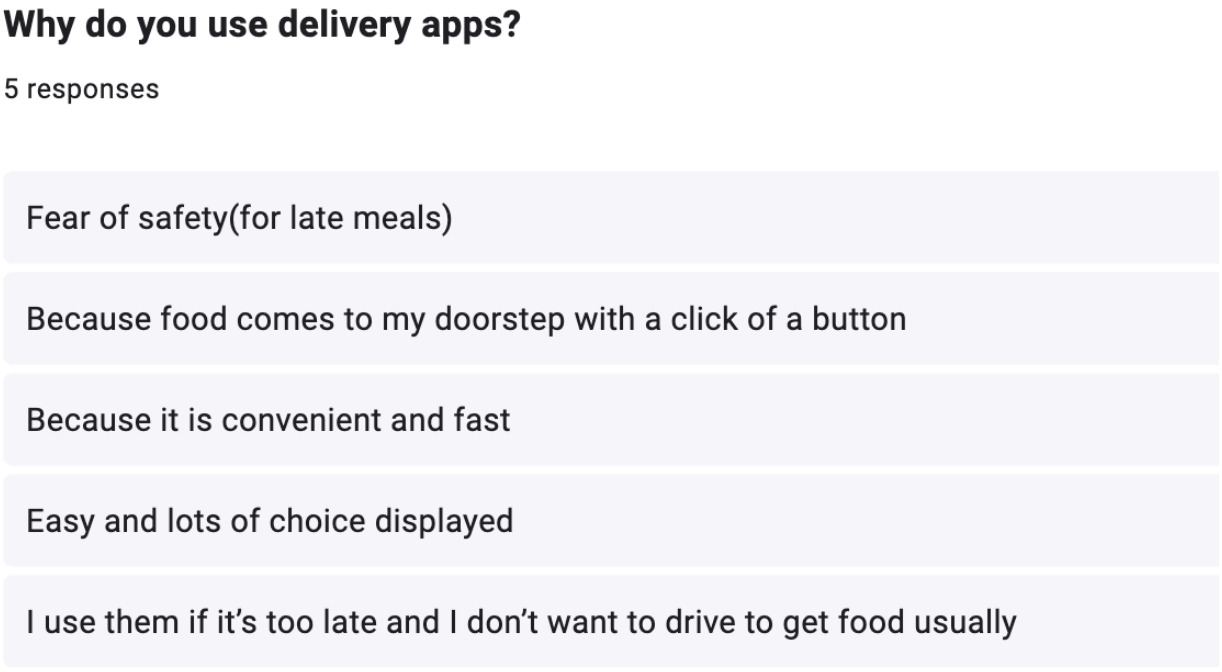

Figure D5. Why survey participants use food delivery apps.

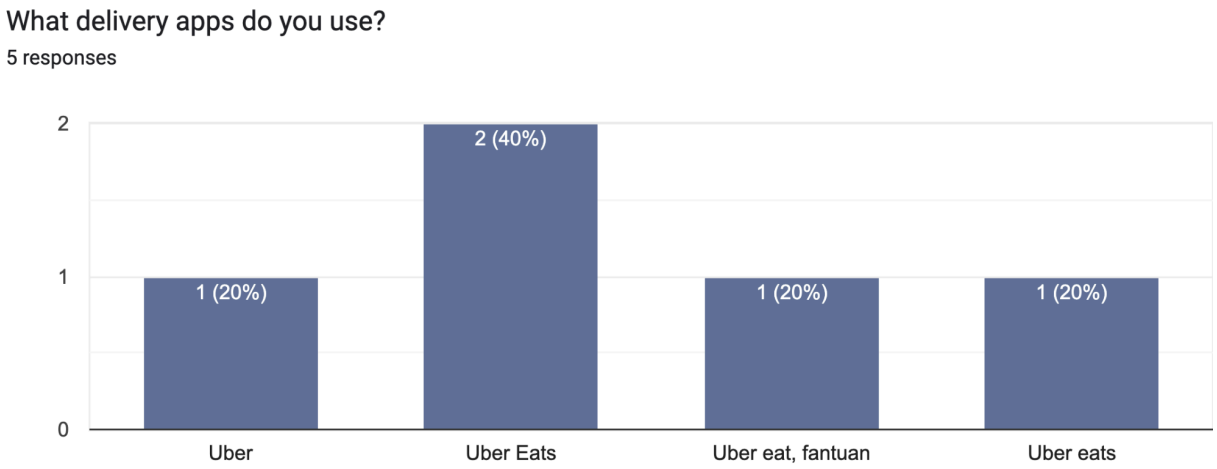

Figure D6. Which delivery apps survey participants use.

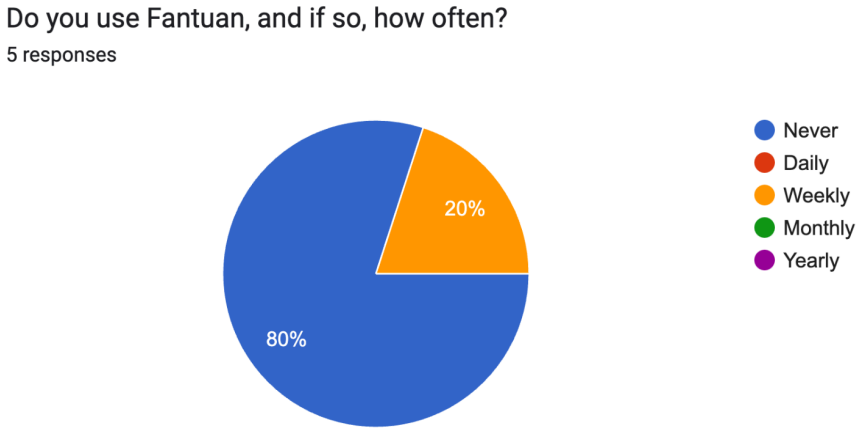

Figure D7. How often survey participants have used Fantuan.

Feedback about the app (if applicable):

2 responses

The app is decent, just doesn't compare to apps such as DoorDash and uber

Ez to use and not too expensive, but slow to deliver

Figure D8. User feedback.

What are specific features you look for in a delivery app?

5 responses

Low price, frequent deals

Readability, accessibility, recommendations, filters etc

better food recommendations, customer support, and customer reviews

Lot of choices, cheap delivery fee

ease of use, lots of restaurant options, low delivery prices

Figure D9. What features survey participants look for in a delivery app.

Part 2: Post-activity questions.

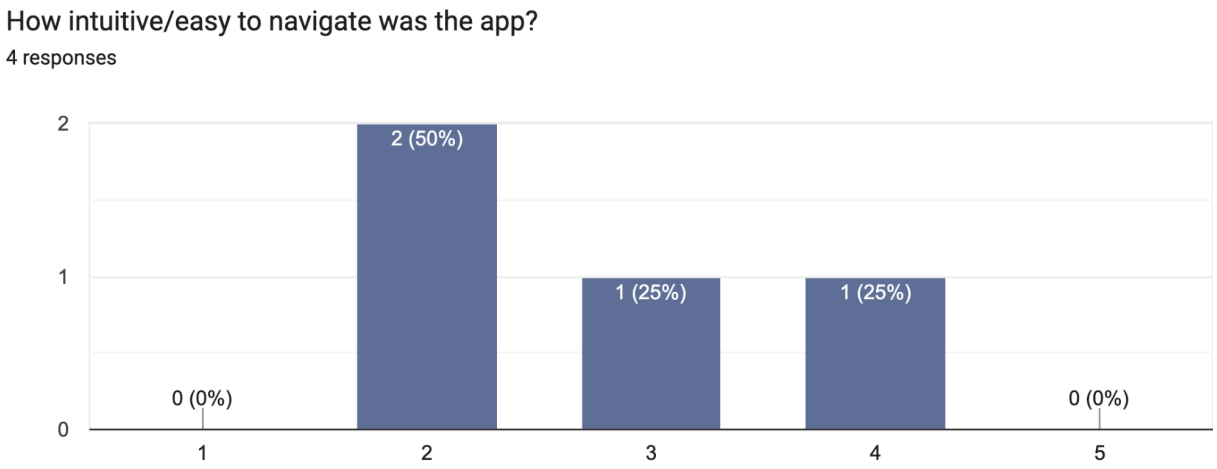

Figure D10. How intuitive/easy to navigate the users found the app.

What parts did you find confusing?

4 responses

The tabs, coupons, and more. If felt like a wholesaler(ali-express)

Everything seemed a little crowded

As a first time user, there is no tutorial introducing any functions or pages, and the home page contains too much information, there are too many ads and colours that are distracting. In addition, when clicking into the stores, the actual deliver time differs from the time shown on the overview page.

I just found that there's a lot going on with this app. Lots of offers flashing at you makes it super distracting

Figure D11. Parts of the app users found confusing.

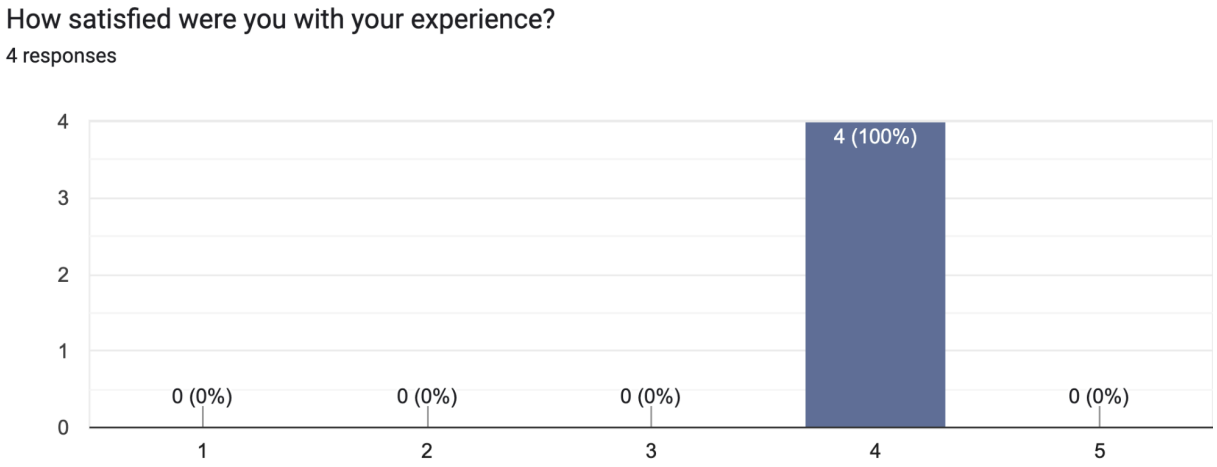

Figure D12. User satisfaction scores.

Were there any features you couldn't find or use?

4 responses

Coupons
No, everything was there.
It was difficult to find the filter options like sorting the nearest stores. Also, it encouraged me to click the coupon option, but after several confirmations, told me that it is a VIP member only.
no

Figure D13. Features that users couldn’t find/use.

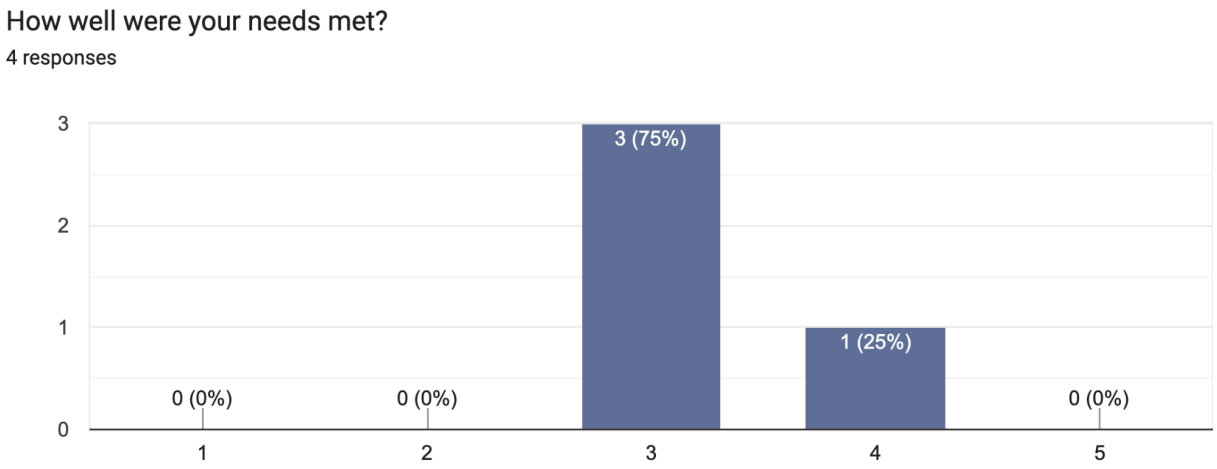

Figure D14. How well the user needs were met.

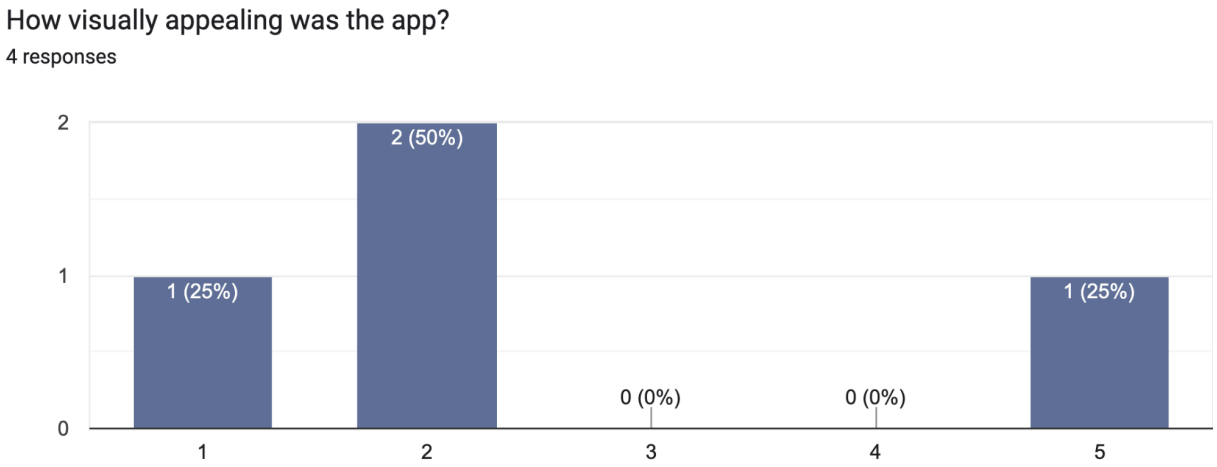

Figure D15. How visually appealing participants found the app to be.

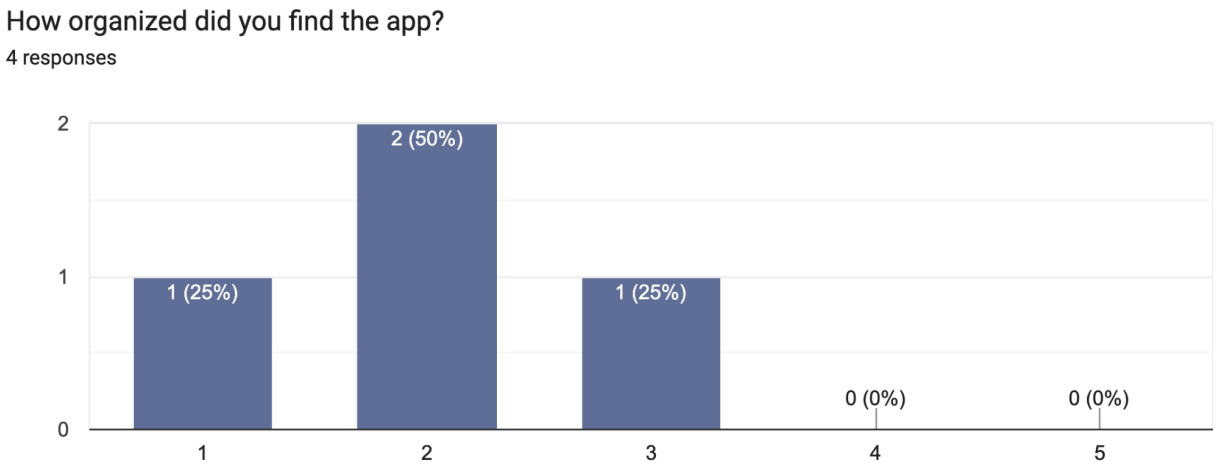

Figure D16. How organized the users found the app to be.

What improvements do you think could be made to the app?

4 responses

More user-friendly

The app seemed to be crowded, the organization can be better, and I feel like the icons on the screen were a bit small.

I would want a user tutorial, and also to customize the tip amount paid to the delivery person.

Definitely would say less is more so maybe a more simplified design?? also would say that a drop down menu of different kinds of cuisines to browse could be good, some sort of filter

Figure D17. Improvements proposed by the users.