Assignment 3: Hi-Fidelity Prototype

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INTRODUCTION

It is a common thing for university students to require housing in the city in which they attend post-secondary education and it is also a common thing for local landlords to have housing options available for rent in these cities. The problem lies in the disconnect between the two, where incoming students new to the city are not aware of their housing options, and landlords, who have no affiliation with the university, are in search of tenants for their rental housing units.

"Student housing," the intersection of these two categories, refers to housing units that target students as their desired tenants, with the intention of housing students during the duration of their stays in the city while they attend school. Our work focuses on using human-computer interaction to help university students living in Kingston find housing easily for their unique circumstances. First and foremost, our work promotes reflection upon the unique and diverse needs of university students, such as transportation, roommate concerns, and budgetary requirements. Additionally, our work promotes reflection on Kingston's local housing market, particularly around the Queen's University campus area and downtown. This critical area, which is usually within walking or brief bussing distance to the university, where many students need to go each day, is the hotspot and main focus of our work due to its reputation as the center of Kingston's student housing scene.

With great variation on prices, property size, living conditions, parking availability, number of bedrooms, number of bathrooms, proximity to campus, proximity to local student hotspots (for example, libraries, nightlife, and restaurants) and more factors unaddressed here, there is a wide variety of factors that a student looking for housing in Kingston will need to consider and be aware of. However, there is no singular source of information that compiles all of this information together for students' easy reference and comparison. We aim to change this. Our work focuses on bridging the gap between university students and finding satisfactory student housing.

RELATED WORK

There have been countless projects that attempt to solve the problem of finding suitable housing that fits one's needs. Researchers have used various methods to build applications to help users find housing that meets their criteria, such as predictive algorithms [3, 13], screening systems [15], considering nearby transportation systems [2], evaluating user experiences [11], and understanding cultural contexts [4]. The results of these papers have assisted us in the development of our project. These projects have been tested in a wide variety of demographic contexts, which will also greatly assist us in narrowing our scope down to only focus on off-campus housing for Queen's University students. While the projects above provide great insight on the numerous methods used to approach the issue of finding housing and others to rent with, our team has been strongly inspired with the approaches related to understanding who is responsible for making the search for housing simpler [10], centralizing housing information [5], and determining the housing preferences of users [1].

One research project based in Ireland attempts to address possible solutions to their national housing crisis by proposing alternative housing action groups and tools utilizing human-computer interactions to simplify the process of finding suitable living conditions [10]. Next, a project based in Wuhan approached this type of problem in a university setting by introducing a unified database for all the buildings connected to the university [5]. It was documented that a centralized database focused on streamlining building information assisted in the optimization and increase of efficiency and ease of use in accessing housing/building information. Finally, another project based in the Santa Clara County attempted address the housing issue using a mobile interface by providing users with applications in order to determine their housing preferences based on their responses [1].

There have also been projects that do not attempt to solve the housing problem but rather bring attention to it through social commentary [14]. Utilizing human-computer interaction to model how the value of a specific house

during the 2008 American housing crisis is entirely dictated by the market, this interactive digital demo demonstrates how livable houses become uninhabitable as a result of human-assigned values. Being somewhat applicable to our research topic, this article delves deeper into the philosophical side of housing, whereas we aim to provide a more practical solution.

Our team has taken note of these approaches when designing our project. There is not one defined domain or application that centralizes housing information for student properties in Kingston, and no institution is responsible for providing one. Additionally, while students are expected to find their own living space while in Kingston, many of the most commonly used applications often do not provide students with ways to find housing that perfectly meets their preferences. The main differences between these projects and our application mainly lies in who will be using it. As such, our application will be tailored specifically towards Queen's University students in order to provide them with relevant information to help them make housing decisions and facilitate their search process.

PROBLEM DESCRIPTION AND DESIGN CONCEPT

Every year at Queen's University, hundreds of students go through the process of trying to find suitable housing for the upcoming school year. This is an inevitable task that everyone must experience, from undergraduate students who may have no experience and are not sure what they should be looking for, to graduate students who have experience, but may find themselves hopping from house to house in order to find something more comfortable and affordable. Through interviewing a wide range of students (and through our own experiences), we have come to better understand the issues that they face.

The major issue that was brought up by everyone in the interview process was a lack of useful information about a house, or that information being difficult to find. Upon examining a central location for housing information to be shared, such as Facebook marketplace, it can be noted that a lot of the posts that advertise housing do not follow a shared format. This is because, depending on the community they are posting in, when a user makes a post they may only be prompted for text and an image. This gives the user the freedom to communicate too much, or not enough, information about the house, and in any order they want, resulting in confused users trying to navigate through dozens of posts, none of which tell them exactly what they need to know.

Another issue that was brought up by many of the interviewed students was that there was not enough information about the landlord available to them. The quality of a landlord is one of the most important aspects to think about when looking for housing and yet there are so few ways of being able to know this. The main way this information can be communicated is simply through word of mouth because no online housing forum offers any sort of metric that judges a landlord's quality. This is somewhat understandable, however it can cause users to feel uneasy or concerned about renting a certain house.

These issues both stem from the fact that current ways in which students look for housing restrict them from knowing the full details of the house they are interested in. This means our design concept should be an alternative way for students to look for housing, that tells them everything they need to know about the house they are interested in. The application will present this to them in a clear and easy to understand way, providing a user experience that satisfies a user to the fullest. For example, the user interface will be designed so that the user is given chunks of important information, rather than one large text bubble (like how Facebook marketplace presents it).

As we continue to make our prototypes, we will check in with our target users and ask for feedback and criticism, in order to better understand how we can make our prototype the best it can be.

USER CHARACTERIZATION

Our primary target users are Queen's University students within the age range of 18-25. This demographic includes both undergraduate and graduate students, providing us with a unique opportunity to tailor our interface to meet the needs of a diverse yet specialized user base. Our users' experience with housing searches varies widely, from complete novices to those more skilled in the rental market. The diversity in this group is more than just age and rental experience but also in religious beliefs, cultures, academics, economic backgrounds, and genders. According to the Queen's University 2022-23 Enrollment Report, the student body comprises 28,142 individuals, including 4,037 international students from over 94 countries and 781 indigenous students[11]. This diversity requires a user-friendly interface that accommodates a wide range of user needs and preferences.

Our research has revealed significant challenges faced by students in the housing search process, highlighting the necessity for a platform that effectively addresses and fixes these issues. Students have reported difficulties in finding affordable housing near campus, dealing with unreliable landlords, and accessing comprehensive property information. One first-year student expressed their struggle with the high living costs, saying, "I've been house searching since the first semester reading week and the cheapest place I found was $900, which is beyond my budget. All the houses I can afford are over 40 minutes away by bus." Similarly, another student expressed concerns about the availability of quality housing options, stating, "I have not started my housing search for the next school year so I am a bit concerned that once I do, all the good housing options will not be available for me and I will be stuck with a place that maybe doesn't have the best

landlord and is not of high quality." These interviews have been pivotal in our understanding of the student housing dilemma, highlighting the importance of developing a platform tailored to the diverse needs of Queen's University students.

To better conceptualize our ideal user, we introduce a persona: meet Jay, an 18-year-old first-year international student from Italy, navigating the complexities of finding off-campus housing in Canada for the first time. Jay embodies the challenges faced by many international and first-year students, such as understanding unfamiliar housing contracts and overcoming the language barrier. These obstacles show the need for a multilingual platform that is intuitive and supportive. Jay seeks a community where they can connect with peers from similar backgrounds, highlighting the importance of social integration features in our system. Our design strategy prioritizes creating an interface that is not just easy to use but also embraces cultural diversity and inclusivity, aiming to ease students like Jay into their new living and academic settings more seamlessly.

Our iterative design process, which is influenced by continuous feedback from users like Jay, sharpens our focus on these identified needs. The resulting project is not just a tool for finding a place to live; it's a solution designed to ease the transition into university life in Kingston. tailored to the diverse population of Queen's student body.

This targeted approach stems from insights gained through direct engagement with our user base, which highlighted the need for a system that not only facilitates the housing search process but also fosters a supportive community among users. By narrowing our focus to this specific demographic, we can tailor our system's features and interface to accommodate the wide range of user abilities and preferences identified, ensuring our design is both inclusive and effective.

USAGE SCENARIOS

Scenario 1

The main user will be named Gerold. A first-year student advancing into second year, looking for a house with their three friends.

Background and Motivations

After living in Kingston for a year, Gerold knows what they need to live during the school year, however, they still require assistance finding where to get it. Having lived at home with his parents before residence, he has never rented a place before. After registering as a student and logging in, navigating to the map they will start to look for places that meet their expectations. Using the multitude of information on the map, and the filters to choose what is applicable to them, Gerald finds many potential places that are suitable for them. Clicking on one of the potential houses, they will be redirected to another screen with a large amount of information about the house in addition to publicly available reviews to make a decision to better aid the decision.

Benefits & Differences From Existing Applications

The map is the main advantage in this use case. The visual representation of the different amenities in town will help Gerold create a better informed decision about how they will live for the next year. Understanding the layout of the town, having clearly readable and apparent bus routes and paths to campus to town, directed towards students will enhance the user experience. Other applications like Facebook Marketplace or Kijiji do not provide a seamless single-tab experience for Gerold, forcing dozens of tabs to gather all the information that will be provided.

Scenario 2

Our example persona will be named Tyko. A recent highschool graduate attempting to find a place to rent for their first year at Queen's University, with little knowledge of Kingston's layout.

Background & Motivations

Likely not accepted into residence for their first year of university, Tyko will already be stressed and nervous, placing a large amount of strain on their mind. Having only visited the campus once for a tour, they have never had the experience of living in town. This will make their research of what is necessary for their living insanely tough to find. Opening the program, Tyko will skip registration to save on cognitive load, and get straight into the home page, with 3 clear descriptions of houses laid out in from of them, and stars to easily denote their quality. Tyko will being to look into each of these houses to see if any of them are a fit for them.

Benefits & Differences With Existing Applications

The property information page layout will be an invaluable asset for Tyko. Without any prior information about where to even start, the streamlined user experience that we will provide eases the cognitive load that will be placed on them during the perilous times. Having direct access to not only all the information required for a new tenant, but having it be in a user experience friendly way will benefit them. Our product will help alleviate the pain and confusion paired with the situation that other platforms cannot provide with their cluttered and unfocused experiences.

Scenario 3

A 3rd year student, Alexis, currently living in a rental property, attempting to swap houses due to poor living conditions.

Background and Motivations

After 3 years of experiencing the market Alexis knows their preferences for living location. The main draw then will be the robust review system. In order to avoid the previous inconsistencies they have experienced with

landlords and rentals in the past, they will refer to the review of previous tenants to make a better informed decision. After logging in and registering, they will navigate to the map find the house they are moving out of, and write a review to get published and a scoring to give the landlord. Then using reviews published by other previous tenants using the sharply coloured icons indicating user satisfaction, they will investigate the areas they will have previously known to be suitable for living, using the advanced searching features on the map to provide expert level speed. Finding a house for them with the credibility to not repeat the same mistakes

Benefits & Differences With Existing Applications

Existing applications like Facebook marketplace sport very poor authenticity guarantees. Creating environments with false listings and inflated quality. With emphasis on tenant feedback, our project will create a sense of professionalism that Alexis can rely on for a higher-quality experience.

ITERATIVE PROTOTYPING

Low-fidelity prototype

We generated our low-fidelity prototype during weeks 5 to 7 using rapid prototyping methodologies. This involved sketching numerous notable frames of our application and then selecting the frames we considered to be the most understandable. In this prototype, we prioritized clear visual design and establishing the main functionalities of the system by implementing simple layout designs that users in our target group would most likely be familiar with. Our team also made sure to start with a strong prototype through the implementation of notable design laws (i.e. Hick's Law, Fitt's Law, the Gestalt principles, etc.) to have a good foundation for further improvements. Regarding its functionalities and design, it consisted of the bare minimum. This was useful for iterative prototyping but showed issues in clarity once we tested it. This lack of clarity led to common issues like users being unsure of where to go, what they could do with the application, what the pins meant on the map, and how to change the language for better accessibility.

As a result, it was sometimes hard for students in our user group who didn't know anything about the system to understand how it worked. The main areas of concern for our prototype were the homepage and the map (Figures 1, 2), and the lack of browsing tools.

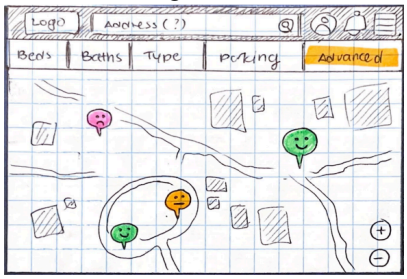

Figure 1. Low-fi prototype of the map. The pins meanings were unclear without a legend.

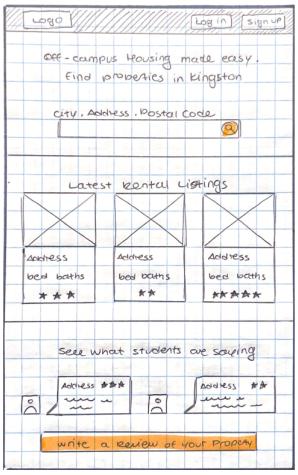

Figure 2. Low-fi prototype of the homepage, lacking context of the application.

Mid-fidelity prototype

Our development process during weeks 7 to 9 was spent adding visual stability and trying different compositions of pages. Our mid-fidelity prototype was composed using Draw.io, rather than Figma, due to it not being finalized in layouts and possible functionalities. When making the mid-fi prototype, we utilized the Gestalt principles of design and began to use Miller's Law to reduce the cognitive load on users. The most notable differences between the mid-fi and low-fi prototypes were the addition of the dropdown and notification menus (i.e. features we were not able to express in our low-fi prototype), a User Settings page, and modifications to Saved Listings.

The dropdown and notification menus could be accessed on the header bar at the top of every page (Figure 4). These menus provided users with information on listings they were interested in, any new messages they may have received, the ability to edit their profile and settings (including the ability to change languages), and log out. Using the Law of Common Fate, Fitt's Law, and recognizable symbols, we believed it was easier for users to access the pages we presumed to be of the most interest. The Saved Listings page was redesigned with the help of Miller's Law to focus on chunking information so that the user can comfortably scroll through it (Figure 3), rather than seeing all the listings at once. We then introduced an intuitive Settings page where the user could easily access all their preferences and utilities, a feature that was not present in the previous prototype (Figure 5).

While the dropdown menu did add some clarity of possible functionalities, users still encountered issues such as how to specifically find properties and other students, and how to make the application more accessible. Our team hoped that our mid-fi prototype would fix these issues from our low-fidelity prototype, but we realized we had to address some ideas and the assumptions we were having (i.e. assuming that students would know how to use the app).

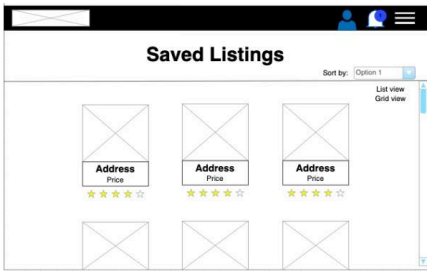

Figure 3. Mid-fidelity Saved Listings page, using Miller's Law.

Figure 4. Mid-fidelity layout of the dropdown menu.

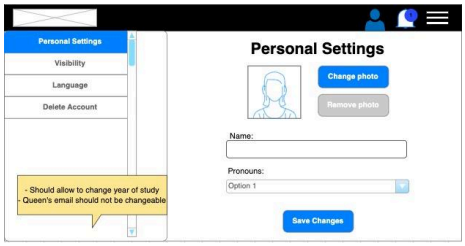

Figure 5. Mid-fidelity Settings page.

High-fidelity prototype

The main points of feedback that we needed to address during weeks 9 to 11 were: clearer navigation abilities, a section explaining how our application works, clearer map pins, and the ability to change housing preferences and the application's language more easily. The high-fidelity prototype was developed using Figma (and Procreate for any custom visual features like our logo and map pins). It is mostly functional, only missing a few features that are not closely tied to the main goals of our system (e.g. a Contact page, the report feature, etc.). In terms of limitations, no images were used in the high-fi prototype since we wanted to focus on the layout rather than the content, and some conditionals could not be implemented (e.g. the user should only be able to access property reviews or find other students if they are logged in). Finally, we visualize that a map feature, similar to Google Maps, would be implemented in the final application's map functionality.

Our prototype introduces an "About Us" section and buttons on the top of every page that allow users to change languages quickly through the flag icon (that is also accessed by the dropdown menu when a user is logged in) and navigate to the homepage, map, and student search (Figure 6). The "About Us" page button is one of the first things users see on the landing page and it was made to provide clear context of our application.

Figure 6. High-fi prototype of the Navbar.

A student search functionality was introduced based on users' desire for this feature. Students can adjust filters relevant to their housing needs to find others who share their preferences. The addition of this feature has made the application more successful in meeting student needs and is much more tailored to our target user base (Figure 7).

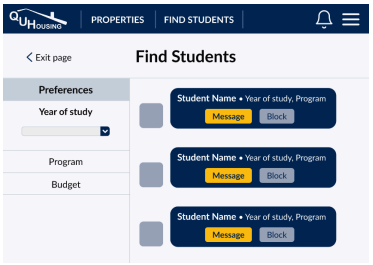

Figure 7. High-fi prototype of the Student Search page.

Finally, some smaller details that were not present in our previous prototypes were implemented within the Settings, Map, and Registration pages. More specifically, users can now set their housing preferences within the Settings page to filter out any properties or students that do not align with the user's requests (Figure 9). On the map page, a legend for the pins has been set that users can refer to when browsing available properties by clicking on the informational button, compared to our map in previous prototypes that lacked a legend. Additionally, an input description was implemented when users are registering for an account to demonstrate that the application is made to cater to our target group (Figure 8).

Our high-fidelity prototype was developed using a desktop interface as it is the most familiar format for testing user experiences. Given more time, we would have developed a mobile interface as well since students are often comfortable using them. In conclusion, our prototype has made strong use of design/cognitive laws and has taken all the feedback received into consideration.

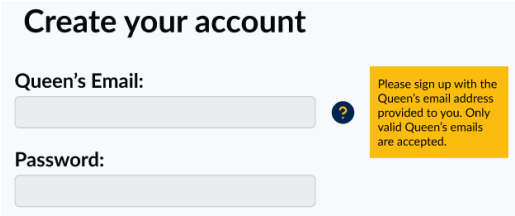

Figure 8. Input description on the Registration page.

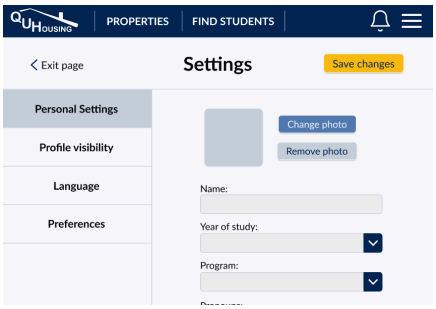

Figure 9. High-fi prototype of the Settings page, with the introduction of housing preferences.

HI-FI DESIGN

Our interactive Figma is accessible through the following link:
https://www.figma.com/proto/TJI7tSvdXPI8tO1Y5Ucwga/CISC325---Group8?type=design&node-id=25-1034&t=1tsiAwmkGoiVLs3-1&scaling=scale-down&page-id=0%3A1&starting-point-node-id=25%3A1034&mode=design
We employ a number of design principles and laws in our high-fidelity design. Below are a number of laws and principles we utilized in our high-fidelity prototype and how they make our design more effective:

Consistent Style and Colour Psychology

Our interactive high-fidelity design uses a unified and complementary colour scheme containing the Queen's University colour palette, as well as black and grey. This decision was made so that our user base of Queen's University students will feel a sense of familiarity and exclusivity, as well as for the purpose of better visual contrast (Figure 10).

Figure 10. QUHousing Colour Scheme.

Hick's Law

Found throughout our application, one notable example of where we implement the use of Hick's Law would be on the "Latest Rental Listings" section of our Homepage. We used Hick's Law when presenting the user with options of the latest listings they might be interested in, only displaying three options so as to not overwhelm the user with choice (Figure 11).

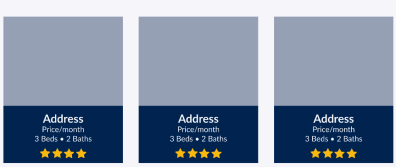

Figure 11. "Latest Rental Listings" section on the Homepage.

Laws of Proximity and Similarity

We use the law of proximity to indicate that certain elements present throughout our application belong together. For example, the listings shown in Figure 11 are grouped in the same space to indicate that they are all recent listings. Another instance occurs on the Property Reviews page, where reviews are grouped together on the left section of the page to indicate their commonality. We also intentionally designed certain elements to have similar formats, colours and alignments. One example of this can be seen through the chat messages on the Messaging page (Figure 12). Messages belonging to the sender and recipient are all distinctly coloured and aligned to help the user differentiate them.

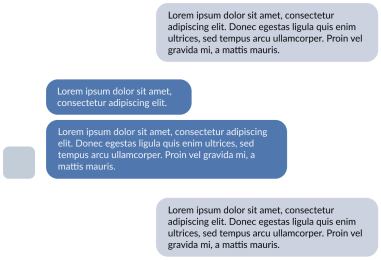

Figure 12. Example message exchange on the Messaging page.

Law of Common Region

This law is demonstrated through the left side bar on our Messaging page, where we have grouped all active chats together, indicating that selecting any chat does the same action.

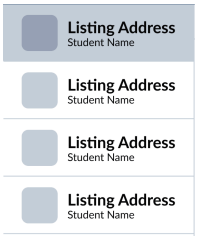

Figure 13. Active chats section on the Messaging page.

Law of Isolation

The law of isolation is used throughout our application at various locations, but it is most prominently shown on the Login and Registration pages. On the Login and Registration pages, the "Log In"/"Register" buttons stand out with a bright yellow accent colour as the primary call to action on that page and the main button to press to proceed. Isolating the button and emphasizing it with our accent colour helps guide the user's next move.

Von Restorff Effect and Fitt's Law

We grouped relevant functions for the user on the right side of the Property Information page so the user can quickly move their mouse to easily select their desired option (Figure 14). Important actions the user can do are emphasized through the Von Restorff Effect, as shown through our use of colour emphasis on certain action buttons present on the Property Information page, Saved Listings page, as well as the Messaging page. The red "Report listing" option is the best example of this, as it stands out from the other options due to our deliberate decision to make the text and icon red.

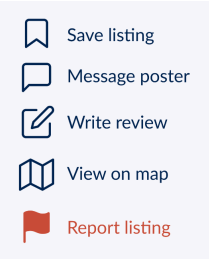

Figure 14. Report function on the Property Information page.

Social Proof

We have implemented a star rating system throughout many pages of our application (Homepage, Property Information Page, Property Reviews page, Saved Listings, etc.) so that users can see the ratings of other users to help make their own decisions about whether or not they would consider a property. This rating system is commonly found in online applications and should be intuitive and recognizable to most users.

Engineering for Errors

On our application's Login and Registration pages, we have implemented error checking that shows up when the text inputs become outlined in red upon an invalid entry, and displays the corresponding problem message. An example can be seen when a user types in an invalid email address or the wrong password on the Login page. Similar checks occur on the Registration page to help the user double-check that they are correctly registering the password they intend to (Figure 15).

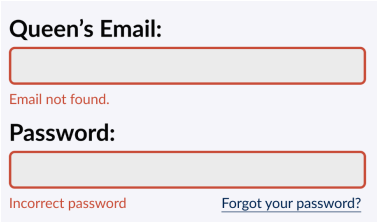

Figure 15. Error checking on the Login page.

Visual Cues

We make good use of icons and visual cues throughout our entire application, such as on our Property Information page (star icons for ratings, bookmark icon for saving a listing, speech bubble icon for messaging, pen and paper icon for writing reviews, map icon for viewing the map, and a flag icon for reporting a property) and Messaging page (an airplane icon for "Send" and a trash can icon for "delete."). Recognizable icons are used on the map as markers to signify student satisfaction associated with the property in question.

Curiosity

The prime example of employing users' curiosity occurs on our Map page, where users may intuitively click on the aforementioned property markers to show additional information about the property. This declutters the UI and allows users to interactively obtain information about only the properties they are interested in, streamlining their decision-making process.

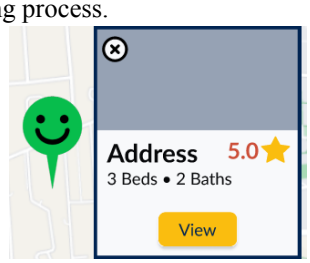

Figure 16. Popup that appears if a user interacts with a pin.

Law of Common Fate

We utilize the law of common fate in the image carousel on the Property Information page. The images behind the center are dimmed to focus on the center photo and encourage the user to view the next image (Figure 17).

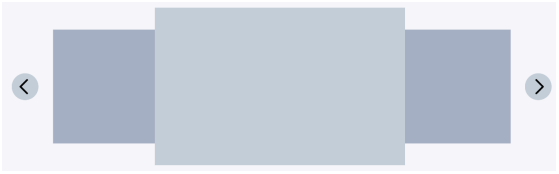

Figure 17. Image carousel on the Property Information page.

Transfer Effect

We employed the use of the transfer effect on the colours we used for our property markers on the Map page. The application's map markers display emoticons commonly recognized. For example, "good" listings are a green smiley, "average" listings are a yellow neutral face, and "bad" listings are a red sad face. These colours map to traffic light colours (green means "go," yellow means "wait," red means "stop") which allows for easy and intuitive transferring of knowledge from the real world to usage of our site.

Good Chunking

At any given moment while browsing the Saved Listings page, the user can only see six listings at any given time, making for good chunking and allowing users to process information quicker, as they are presented with fewer options at a time.

USER EVALUATION

Method

The study was split into three categories, the first of which focused on in-person interviews which emulated laboratory tests. The second group conducted online interviews with a shared screen to record actions, and the final group was an online, fully asynchronous testing group with a questionnaire to gather the required data.

Group 1 - In-Person Lab Testing

This group was gathered from asking for participation from 1st years currently living in residence who have recently gone through the experience of renting for the first time. In total, there were five participants in this section. Each participant was seated at a computer with one group

member being a speaker, and another group member being a silent recorder of information. The method for data collection was a combination of verbal questions asked to the participant during and after they were tasked with exploring the prototype, verbal descriptions of their thoughts as they completed tasks and visual inspection of their actions. We collected two efficiency metrics, time taken per task and total mouse travel distance per task. In addition to these efficiency metrics, we also counted the number of errors that each person made per task, defined as unwanted action, in order to test the error handling of the prototype. The main tasks given to each participant were: "find a house that you like", "figure out whether you would like to live in that house", "write a review for this property", and "navigate to this given menu", covering all major functionalities of the website. Once all the functionalities were covered and the metrics were recorded, the users would answer some simple questions, such as:
Were you ever confused about where to locate something, and, if so, what point was that? Was there ever a time when you were frustrated with the model? Is there any particular feeling that the language in the prototype evoked? What was the most useful feature of the system to you personally? While simple, these questions assisted the quality of our user evaluation greatly, as they informed us how positive or negative a user felt after interacting with the high fidelity prototype.

Group 2 - Online Interview Lab Testing

There were a total of four people gathered to do online interviews. The group was gathered by the same means as the first group, however due to the given circumstances they were not able to appear for an in-person interview. Because of this, we were not always able to collect as much data compared to the first group. For example, mouse travel time was a statistic we could only calculate during in person testing, so this was a metric that we unfortunately could not use. We adapted to this by focusing more on the areas that we could monitor. During the online interviews, the participants shared their screens, meaning we could still measure variables such as time taken per task and errors per task. Additionally, we would ask additional questions, such as "how quickly were you able to find the menu/area of the screen that you were looking for?", in order to account for the metrics that we lost.

Group 3 - Unsupervised Online Questionnaire

The third data collection method was an asynchronous testing and questionnaire approach. In order to get as much information as possible, we sent out the link to groups of people known to have attended university and have rented non-university funded properties. With less of a focus on individual applicability to our target audience, we focused on getting more participants (totalling to 24) to participate in the survey. The questionnaire was built to gather information on the general quality of user experience of the prototype to the general public. With a pre screening section to test knowledge beforehand, and a post testing section to understand how our prototype impacted understanding of the topic. The questionnaire consisted of statements that the user would answer on a scale from 1 to 5, where 1 indicates a strong disagreement with the statement, and a 5 indicates that the user strongly agrees with the statement. The early questions were set up to give background on each person filling out the questionnaire, for example, users were given the statement "I have used websites such as Facebook Marketplace and Kijiji". This allows us to discern how a user with no experience uses the prototype compared to someone with lots of experience. After they followed a set of instructions on how to interact with the prototype, the users were tasked to fill out more of the questionnaire, with questions that were designed to gauge how the user felt about different aspects of the prototype, such as functionalities, interface, or overall user experience. This part of the questionnaire was to discern the confidence of each user when it came to decision making through the prototype, the effect that the prototype had on the cognitive load of a user, and general user emotions.

Findings

From the first two groups, we were able to conclude that our prototype has some issues that must be fixed before the product is fully finalized. Our main concern was the speed at which information was gathered from the site. The lab experiments revealed that even the simple task of navigating from one page to another took over 8 seconds to find the corresponding tabs. This was attributed to the lack of "direction" that our mid fidelity prototype had. This could lead to a sluggish user experience that destroys credibility. We remedied this issue with bright contrasting colours, and proper spacing in an attempt to add signifiers that better highlight the affordance of our intended actions. This change ended up reducing the average time from 8 seconds to 4 seconds, a drastic change. This also led us to reform the taskbar and, more importantly, the user settings because it was taking up a large amount of cognitive load, the users were opening and closing the menus repeatedly when it was not necessary for the action. This reduced overall speed as well. We chose to hide it behind a menu in order to limit the possible actions that the user has to help streamline the process.

With 12 out of 24 students on the questionnaire saying that the map of Kingston was their favourite feature and 4 out of 5 in-person testings saying that their favourite feature was the review system, it became clear to us that these were our best and most novel services provided by our prototype. Some students expressed excitement over these features, saying "I did not know that this was so close to the grocery store, I like this place a lot more now", and "I wish I had this when I was looking for housing". This reassured us that our target audience would greatly benefit from these features.

While observing the participants, we witnessed a lot of them attempting to interact with textboxes in an attempt to find more information about each of the rental properties, when there was no such corresponding action. This seemed to result from the aforementioned lack of signifiers and contrasting colours. We also found that there were many instances of the user attempting an action, and waiting for a second expecting some user feedback. Due to the nature of this being a prototype, this is an issue that we will have to live with for now, and eventually fix in a full-fledged release where we are using more sophisticated software for web development.

Recommendations

When asked what additional features that they wanted from the map, many participants said they wished for increased filters on the map, for example, being able to show only the houses that are within a certain distance to campus. As previously stated, the map was one of the most popular features of the prototype, so any additional attributes that make it better are greatly welcomed, and this recommendation will be implemented in a future release.
When asked about other features they wished they had seen within the broad scope of the prototype, three participants said that they would appreciate a roommate finding system in which you are able to find like minded roommates. This would take more work compared to simply adding a filter, and so while it could be added at some point, it is not a current priority.

As previously mentioned, the prototype suffers from some input lag severely dampening the credibility of our program, which was pointed out by some of the users. This is an issue that we are planning to address later, once we have shifted development to other software. There were many other minor recommendations that we received that we plan to implement during this stage as well, such as more visual indicators of user input, such as adding loading wheels when a user clicks a link, in order to remove the confusion caused by a lack of input confirmation. We were also given some direction on how to improve the overall user experience, by adding some visual constraints, such as more contrasting colours between interactable and non interactable fields. This will create better affordance, by subtly guiding the user towards the aspects that they should be interacting with, encouraging users' curiosity and urge to explore the website without getting confused.

REFLECTION

Key Lessons Learnt

Initially, our project was heavily inspired by existing research and the identified gap in the market for a centralized, student-focused housing solution. As we progressed, it became evident that understanding and incorporating real-time user feedback would be critical to our success. This iterative process led to a series of high-level takeaways that informed our design decisions.

From the Irish collaborative housing project, we learned the importance of community engagement and the role of technology in facilitating communication among stakeholders. This taught us the value of creating a platform that not only serves as a housing search tool but also fosters a sense of community among users, allowing them to share experiences and advice. However, the Wuhan University case study revealed the challenges of managing a centralized housing information system. It reminded us of the need for a robust, user-friendly system that could effectively cater to the many needs of Queen’s University students seeking housing.

Through the process of developing and evaluating our HiFi prototype for our project, we learned the critical role of user feedback in the iterative design process. Engaging with our target audience early on, we were able to learn both their positive reactions and constructive criticism. This feedback loop was the key in refining our prototype, allowing us to continuously adjust and improve the user interface and experience based on direct input.

Some of the major actions taken in response to paper prototype user feedback involved the incorporation of more intuitive navigation cues and enhancing the application's feedback mechanisms. Users initially found it challenging to locate specific functionalities, which led to a redesign focusing on simplifying the user interface and having visual signifiers to guide user interactions effectively. For example, the implementation of a clearer and more accessible map functionality, as indicated by user recommendations. This showed our commitment to responding to user needs. The addition of a roommate-finding system emerged from user suggestions, demonstrating our project's adaptability and responsiveness to user input.

Limitations

Despite our thorough design and testing process, several limitations remain that could impact the effectiveness and reach of our project. One significant limitation is our testing group. Throughout the development phases, from the proposal to the high-fidelity prototype, we engaged with a diverse group of users, including first-year students unfamiliar with the local rental market, international students facing unique challenges such as language barriers, and experienced renters seeking improved living conditions. The diversity played a crucial role in identifying a wide variety of needs and preferences. However, given the wide range of Queen's University students' backgrounds, needs, and preferences, there's always a possibility that our solution may not fully cater to every single potential user's unique circumstances. This limitation shows the need for continuous user engagement and iterative design improvements.

Additionally, the limitations of our paper prototype during the low-fidelity testing phase presented challenges in fully

capturing user interactions and feedback. The static nature of paper prototypes, while valuable for early conceptual feedback, limited our ability to test dynamic interactions and more complex functionalities that could significantly impact the user experience. For instance, users were unable to interact with the map feature in a manner that truly reflects its intended functionality, potentially getting biased feedback about the usability and usefulness of the map feature.

Future Work

Looking ahead, our project opens several paths for future enhancements and expansions. One area of focus would be to Incorporate a Roommate Finding System. This new addition would allow users to input their preferences, habits, and interests to be matched with potential roommates who share similar living styles and values. For instance, a student could specify their study habits, sleeping patterns, hobbies, and preferences regarding pets or smoking, ensuring a cohesive living environment. The functionality would extend to allowing users to browse profiles, initiate conversations, and potentially meet before making a housing decision together. By facilitating these connections, the platform not only simplifies the search for suitable housing but also fosters a sense of community and belonging among students, greatly enhancing their overall experience and satisfaction with their living arrangements.

On the legal front, our platform aims to offer Legal and Negotiation Support Services, directly tackling the complexities and challenges students often face when entering lease agreements. This component of the project would provide access to resources such as guides on understanding leasing terminology, legal advice on student rights and responsibilities, and personalized tips for negotiating lease terms. The goal is to empower students with knowledge and confidence to advocate for fair and equitable housing arrangements. For example, a student unfamiliar with local housing laws could use this service to review a lease agreement before signing, ensuring they fully understand their obligations and rights. This addition to the platform not only addresses a critical need for legal support among students but also enhances their confidence in making informed housing decisions, ultimately ensuring a more secure and positive housing experience.

Based on user feedback, we're planning focused improvements to enhance interaction and exploration on our platform. Some key updates include refining feedback mechanisms with intuitive notifications and icons, ensuring actions are clearly communicated. We'll simplify visual elements, using specific colors for actionable items to improve usability and decrease cognitive load. Simplifying map filters will make finding information easier without overwhelming users. These strategic enhancements aim to create a smoother, more engaging user experience, directly addressing our users' needs and preferences from our most recent testing group.

Reflecting on what we could do differently if starting the project again with unlimited resources, our approach would focus on three main areas: extensive user research, advanced technological integration, and a broader community feature. From the start, we would invest a lot of time in user research, engaging with a wider and more diverse range of students to capture a larger spectrum of housing needs and preferences. This would ensure our platform’s features and services more precisely reflect the actual requirements of our user base.

Additionally, with ample resources, we would look to add technology, such as AI and machine learning, it could offer personalized housing and roommate recommendations, predict housing trends, and even forecast future availability, making the search process more efficient and tailored to individual needs. Another development to make use of the unlimited resources would be to create a better community feature within the platform. We could make a virtual space where users not only search for housing and roommates but also share experiences, and advice. This community-driven approach can lead to a supportive environment, in which the people feel encouraged to contribute by adding value and developing a sense of belongingness among them. Integrating this with AI, we could develop a system that intelligently suggests community discussions, advice, or resources based on the user's current search activities and preferences.

Conclusion

Reflecting on the evolution from our initial proposal to the final HiFi project, our journey shows more than just the development of a digital solution for student housing challenges; it shows a learning and adaptation process. Initially, we aimed to create a centralized platform for Queen's University students, streamlining their search for suitable accommodations. Our proposal was ambitious, looking to bridge gaps identified through research and interviews, including the inconsistency in rental information presentation and the absence of landlord reviews.

As we progressed, our project changed significantly, driven by feedback from our target user group and guided by principles of human-computer interaction. This evolution was not just in the technological aspects but also in our understanding of the user experience, emphasizing ease of use, accessibility, and community engagement. The development process highlighted the importance of continuous user engagement, leading us to integrate features like multilingual support, direct messaging for community building, and extensive landlord and property reviews to foster trust and transparency.

Our final product, as detailed in our HiFi report, is not just a tool for finding housing but a platform designed with a

deep understanding of the users' diverse needs, creating a sense of community among Queen's University students. From this reflection, it is evident that our initial idea has now transformed into a prototype that is not only practical but also aligns with our users' needs. Hence, it proves the value of user-centered design in solving real-world problems by laying a solid foundation for future improvements and additions.

For designers, engineers, or researchers looking to build upon our work or draw inspiration from it, the key takeaway would be the importance of integrating user feedback into every stage of development. Our journey highlights the impact of an iterative design process, where user input directly shapes the development. This approach not only ensures that the final product meets actual user needs but also promotes innovation by identifying and filling gaps in existing solutions. We encourage future projects to prioritize user engagement, using technology not just to solve practical problems but to enhance the overall student living experience by fostering a sense of community and belonging.

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