Evaluation Plan and Report – Sublease Search

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INTRODUCTION

The system that we are creating is not designed to solve an existing problem, but instead it is to streamline an outdated form of subleasing. Currently the only way that someone can sublease their apartment is through services such as Facebook or going directly to a private company that owns the apartment complex. Avenues such as Facebook are not specifically designed for these kinds of functions. There is a lot of noise and unwanted topics that make searching for apartments very inefficient. Going to companies is very efficient, but for many college students, these prices are typically way higher than they would be if the apartment was owned by a private landlord. Our system is basically a dedicated place where subleases can be posted and organized much more cleanly to help make subleasing much more efficient and hassle-free.

USER REQUIREMENTS

The user requirements for this tool was the need for a designated interface specifically for searching for or posting subleasings. The system needs to offer a general form for users to set up a profile, allow those looking for a posting to sort the listings by specific details (such as location, price), and offering a platform for direct messaging between the subtenant and the subleaser.

To gauge the effectiveness of this tool, individual think aloud sessions were conducted by which users had to voice their initial reactions while using the tool. The investigators took notes during these sessions and later convened to categorize the notes into categories. The number of comments under each category was used as a metric for analysis. Ideally, the participants for this study would be college students ranging in age from 18-24 and would come from diverse backgrounds. This study does not look into race or ethnicity as a variable.

Conducting think aloud sessions was ideal for this study considering the time constraints and the type of information needed. Overall, the investigators wanted insight on features that were viable for the tool and the weaknesses of the tool compared to existing systems. For example, participants mentioned that the user verification in our tool is not robust, which is a deterrent for using the tool. Originally, this aspect of a system was not considered by the designers of the tool. Other user requirements this tool needs based on the user studies is having more functionality with the listings page in terms of filtering. Additionally, users experienced low situation awareness due to lack of instructions and incomplete feature functionality. Many negative comments expressed during these sessions tie back to the incomplete implementation of the tool. Ideally, sessions conducted with a more complete tool would allow the designers to understand how to make a better tool.

INITIAL DESIGNS

Low-Fidelity Prototype

The low-fidelity prototype for this tool had two general paths: subtenant and subletter.

Subtenant View

The users that are looking to find a sublease have to fill out a form that gathers their preferences

of their sublease and user information. Once completed, the user is given a list of subleases based on this form that can be sorted and filtered. This list offers the option to message possible

subletters and "favorite" listings so that the user can keep track of listings they like.

Subletter View

The users that want to post a listing also have to fill out a form that gathers information about the listing and the user. Once completed, the user gets a confirmation and then has to wait for a response from possible subtenants.

High-Fidelity Prototype

The High-Fidelity Prototype is very similar to the low-fidelity prototype in its organization and flow. This prototype was developed using Powerpoint. The aspects added to the prototype include a "My Listings" view, a login page for existing users, a "My Profile" page, and a "Favorites" page. The "My Listings" view is for the subletter and appears once the user adds a new apartment listing. The login button was added so that returning users could look at listings and save them to their profile. Additionally, listings can be favorited from the primary listings page. This enables users to save and filter through their favorite listings in one single, organized location.

IMPLEMENTATION DETAILS

Using web development tools such as JavaScript, React, and Bootstrap, our team has successfully implemented several of the features outlined in our previous high fidelity prototype.

Website Layout

All system page routing has been successfully implemented. That is, page and form navigation has been established, enabling users to navigate the site in a way that aligns with our high fidelity prototype. Specifically, a menu bar was implemented that allows users to seamlessly navigate the tool (shown in Part 3).

Forms and Error Handling

Another feature that our team developed is error handling within the profile creation and listing forms component of the application. An example of this is preventing the user from progressing through the forms if they have failed to provide all required information. Users are also prompted to re-enter their password if the "confirm password" text box does not match the initial input. Most of the validation was written solely with Javascript but some needed the use of packages and manipulation using regular expressions. Specifically, the npm package "Validator" has enabled us to validate phone numbers and regular expressions were used to check the formats of the email inputs. Once an error is detected, the system will prompt the user to make the appropriate corrections.

The ability to upload photos of one's apartment has also been successfully integrated into our system using the "react-images-upload" package. Only valid JPG or PNG files are accepted with this mechanism, preventing the user from uploading invalid file types. The package itself prevents the user from picking an unsupported file type.

Messaging Platform

A basic messaging system has been implemented using websocket. Since there is no backend for this application, we were unable to implement 2-way messaging. For demo purposes, we have shown how conversations would appear on the left side and made it so that you are able to "send" messages that will appear on your screen. Our initial messenger design was inspired by the widely used Facebook Messenger, but since we were unable to implement 2-way messaging our design has been scaled down.

Data Rendering

The "Listings" and "My Listings" pages were condensed into a single Listings page. This design choice was chosen due to time constraints and the lack of backend. Without the backend, we were not able to distinguish between listings that are made by the user (subleaser view) and listings that are viable options for the user (subtenant view). For demo purposes, we just have a template listings page that offers some functionality that is desired for the final product. Specifically, the current website offers minimal sort functionality that users can utilize to filter through the listings.

Styling

The React Bootstrap package has given us the flexibility to stylize our interface in a way that

very closely resembles our previous high-fidelity prototype. Our group has opted to move forward with a light, cool-toned color scheme. Our color palette has been restricted to 4 colors as to prevent any user distraction and eye strain.

Backend

The Coronavirus remote work situation, time constraints and a lack of backend engineering experience has prevented our group from implementing some of the features we had initially set out to realize from our high fidelity prototype. Most notably, our system does not contain backend functionality at this point in time. Our group had initially intended to connect our web application to some sort of backend database, such as Firebase, where listings, messages, and user credentials could be stored. Despite not having a completed backend, our current Sublist implementation serves as a thorough proof-of-concept and is eligible for additional server-side functionality at a later time.

EVALUATION

Population

Due to COVID-19, we were unable to perform a larger study and were only able to evaluate our systems by performing think-alouds with the individuals we are currently living with. Our ideal population for our study would be college students between the age of 18-24 years old. Due to our current living situations, our participants were young adults between the ages of 20-27 years old. The majority of the participants are college students, but our population also included college graduates.

Hypotheses

Our primary hypothesis is that our tool Sublist would provide a more efficient and less stressful tool for bringing together people who are searching for a subtenant and those who are searching for a sublease. The NULL hypothesis of the primary hypothesis is that Sublist is not a more efficient and less stressful tool in the process of renting out or finding a short-term lease.

Our secondary hypothesis is that users would be able to find subtenants or subleases they are interested in faster because our tool has more specific requirements for posting a listing and the ability to filter to find listings that match users specifications. The NULL hypothesis of the secondary hypothesis is that by having more specific requirements for posting a listing and by having a filter option for those searching for a listing it would take longer for users to find subtenants or subleases.

Study Conditions

Our participants were each evaluated individually. Since we did think-alouds for our study, we did not manipulate an independent variable for different participants. We instead studied the usability of our tool and its comparability to other existing tools. To do this, we categorized the feedback we received to understand what users would want changed in the next development phase of this system.

Participant Procedure

During this study participants sat down individually with an investigator. Participants were given background and told that we were conducting a study on college age students' interaction with a tool created to streamline the subleasing process. Each participant was given a computer that had our tool Sublist loaded. Participants were asked to use the tool as if they were posting a sublease or looking for a sublease and to talk about any concerns they have with the tool, as well as to compare the tool to any other similar tools they were familiar with. Investigators then wrote down the comments to be later categorized. After the participants finished using the tool, they were once again prompted to compare it to similar tools. They were then thanked for participating in the study. We ensured the reliability of the study by having specific talking prompts that each investigator mentioned at the beginning and end of the think-aloud and by ensuring that all participants went through the sign-up process as a user posting an available sublease and as a user looking for a sublease. We ensured the validity of the experiment by expressing to our participants that they should speak freely about any concerns they

had with the tool. We ensured ecological validity by having the participants use the tool on a computer in the same manner that the fully functional tool would be used.

Metrics

Our primary metric was comments based on how our tool compares to other similar tools. We will measure this by comparing how many comments we have about why our tool provides a better experience than other similar tools to how many comments we have that say the opposite.

Our secondary metrics were comments about the usability of the website that were grouped into styling, mapping, quality of instructions, quality of navigation, and quality of input categories. These metrics will be measured by comparing the quantity of positive and negative comments of these groups to evaluate the system.

RESULTS

Working towards creating a full-fledged tool that would ideally replace existing sublease matching tools and conducting the evaluation study revealed limitations of the proposed system. Each participant expressed both positive and negative sentiments towards the implementation of the tool. Overall, there were 18 positive sentiments and 36 negative sentiments, totaling to 54 comments from the participants.

Most of the positive comments from the participants fell under the category called "Good Mappings". An example note from this category is "Likes the add to favorites button/favorites page". The participant understood the purpose of the feature and how other pages would need to be accessed to utilize the feature without the intervention of the investigator.

The three main categories for negative sentiments were "Vague Instructions", "Unclear Navigation", and "Bad Styling". Examples of reportings from these categories are that the forms were not descriptive enough, there was no logout button, and some components were not placed logically.

A category that gave insight on if the tool would be a viable tool for sublease matching is the category called "Security". Competing systems such as the Facebook Marketplace tool for sublease searching can be time-consuming and can require some overhead. However, since the tool is integrated into a robust framework that offers some security in terms of profile verification, Facebook Marketplace can give users more comfort and reliability compared to a stand-alone application.

The product presented to the participants for the study can be considered more of a work in progress towards a subleasing tool. As a result, participants voiced many critiques that the designers intended to fix but were not able to in the alloted time. Some such critiques are providing more clear instructions, login functionality, fine-tuning the styling, and offering more features to filter the listings. Additionally, participants tended to feel confused about certain functionalities such as inputting information for a listing and not seeing it on the listings page. Since a backend was not incorporated into the tool yet, many functionalities were not built yet.

DISCUSSION

Our primary hypothesis stated that the website compared to other tools of subleasing and sublisting sites would provide a more efficient and less stressful tool for bringing together people who are searching for a subtenant and those who are searching for a sublease. The results mostly support the primary hypothesis because it was seen that participants understood each feature when going through the study which lessens the stress when looking for a specific feature. There were many comments about "good mapping" and "good page flow", meaning that users were able to easily navigate through the website and many of the features had an anticipated action. Although the site had "good mapping", some users may have thought that the tool compared to others did not provide enough "security" and may be an "inconvenience of using a new system". Other marketplace sites, like Facebook, provide verification that ensures that the website is safe from the users view. As a novel system, users of Sublease Search would need to create an account to use this system which would be less efficient than using an already existing account on a social

media platform that offers a marketplace. These results show that Sublease Search could be better by implementing better security features and allowing for popular sites such as Google or Facebook login to make the site more efficient.

Our secondary hypothesis stated that users would be able to find subtenants or subleases they are interested in faster because our tool has more specific requirements for posting a listing and the ability to filter to find listings that match users specifications. The results do not necessarily support the secondary hypothesis because participants often commented on the filtering options, but also that it had improved. It was said that the site "needs more comprehensive listings" as in sorting the listings from price and distance. As for now, the site only allows filtering with complex names. Implementing sorting by price and distance would let users find their desired subleases faster. However, many stated that the website had "good mapping". In this situation, many liked how there was a favorites page that allows for all interested listings to be in one place for the individual. The results show that Sublease Search would be faster in searching for subtenants or subleases if the sorting feature was implemented.

The aspects of the project that worked out as we anticipated were the forms and most of the user portal. The aspects that worked include login, profile creation, finding a listing, and posting a listing, the profile page, and favorites page.

Unfortunately, the aspects of the project that worked out differently than we anticipated were the messaging and listing pages. We had initially planned to implement a messaging platform, but due to time constraints, the backend was not created which prevents us from adding this functionality. Because the backend was not implemented, the listings page does not display listings preferences for either subleasers or subtenants and the sorting feature could not be fully implemented with different filtering options.

CONCLUSION AND FUTURE WORK

Ultimately, the COVID-19 situation has severely limited the number of participants we have had access to during this study. That said, the most notable modification we would have made to our research would be accessing a larger participant pool. Doing so would have enabled us to collect more valuable user opinions during think-aloud sessions, giving us a better idea of the "general consensus" on the application and frequently-expressed concerns.

Our study's think-aloud approach was relatively effective given our short timeframe. That is, the think-aloud approach provided us with some great insight into the minds of our users and their interactions with our system. However, given the opportunity to revise our study, we would've preferred to combine this approach with some more quantifiable techniques. One early idea we had during the evaluation design phase was to log the amount of time it takes for users to accomplish their goals within the application. More specifically, we would've liked to examine the time it takes, from login, for a user to find a relevant apartment listing that they would be interested in. This technique was not included in our study due to time constraints, however it may be worth evaluating in later semesters.

Given an additional *year* of evaluation time, our group would ideally like to explore how regularly users return to the Sublist system and check up on new potential listings. This would give our group some better insight on the longevity of the system, and potentially help us segway into further research (related to features that promote user activity).

Overall study participants have suggested that Sublist, in its current form, contains features preferable to other similar platforms, such as Facebook Marketplace. Conversely, participants have also noted that the system lacks certain elements that may expedite system navigation and tasks. Examples of such elements include the absence of advanced filtering, a notification system, and intuitive instructions. We believe that Sublist in its current state serves as a thorough proof-of-concept, and with the previously-

described modifications and some server-side development, can absolutely be considered a viable market application.

APPENDICES

Categories of comments from the participants with their respective sentiments (negative or positive) and counts.

Category	Sentiment	Count
Bad mapping	Negative	1
Bad Styling	Negative	6
Inconvenience of using new system	Negative	3
Inflexible inputs for forms	Negative	3
Needs more comprehensive listings	Negative	3
Other	Negative	2
Security	Negative	2
Unclear Navigation	Negative	6
Vague inputs	Negative	3
Vague Instructions	Negative	7
Good error handling	Positive	2
Good mapping	Positive	8
Good page flow	Positive	2
Good Styling	Positive	5
More organized compared to other tools	Positive	1
Total		54
Positive counts		18
Negative counts		36