CM6321

1989684
Dr Fernando Loizdes
Adopting Technologies
27 January 2022

Requirements, Prototyping and evaluation

Stakeholder identification and requirements

Stakeholders

End users - The main stakeholder for the application will be university students and post graduates aged 18-25. This is because these are the people who are most likely to have university books and are also the largest demographic for other online marketplaces like Depop.[1]

Product owner - The next most important stakeholder is the developer and product owner of the application (Me). My own personal experience with certain framework and languages in the past will effect the choices I make over designing the app and my personal bias on design choices will effect the final user interface of the app.

App store owners - Another important set of stakeholders are the companies that the application is sold through. The main app stores the app should be on are the apple app store and the android store. This is because together they cover 99.25% of mobile operating systems.[2] It will also be available online as a web application but there is much less regulation over this and no real stakeholders to be taken from it.

Shipping companies - Courier companies are another stakeholder for the application as books bought through it are likely to be sent using them. In 2020 the largest of these were Royal Mail, Hermes, and DHL.[3] (excluding Amazon as they do not offer consumer shipping) and so regulations from them will have to be considered.

Payment gateways - When payments are taken through the app the chosen provider of this will also be a stakeholder. The largest online payment company is PayPal with over 361 million active users,[4] however flutter does also have other native options like Razorpay and any rules they have on transaction will have to be thought about.

Third party services - The application will be written with a library called flutter and use third party services such as firebase for connections to the back end. As the app will use these for core functionality it will be vital to keep them in mind.

Persona - See appendix 1

Functional requirements*

	Requirement	Justification	Stakeholder
1	The user must be able to sign up to and into the app.	As the app connects real people and involves monetary transactions, users being associated with their accounts is vital, and it will allow for user details to be saved over multiple devices.	This mostly effects end users as it provides them with safety inside the app, and will allow communication between users. It also effects the product owner/ developer as it will have to be developed and banning malicious users will be done by the product owner/team behind the app.
2	The user must be able to post a listing of a book with a description, image, and price.	As the premise of the application is selling books being able to post listings with enough detail to accurately describe the book is important.	End users as it will provide them with the functionality of the app.
3	The user must be able to search the app for books.	Once there are more than a few listings on the app looking through all listings would be impractical and annoying and so being able to search for what you need is a necessity.	End users as they are the ones who will want to search for the books they need.

	Requirement	Justification	Stakeholder
4	The user must be able to message the original poster of a listing to discuss the sale and organise details.	Once someone finds a book they want to buy they will need to contact the creator of the listing to arrange the sale or ask questions about the book.	End users as they will be the people using this feature.
5	The user must be able to remove or edit posts.	People make mistakes and change their mind, if they want to re-list their post they need to be able to do that.	End users as it is part of the core functionality of the app.
6	The user must be shown books relevant to them such as on their course or nearby.	In 2013, 35% of sales on Amazon and 75% of what users watch on Netflix were from personalised recommendations.[6] This shows that showing users items relevant to them will make them more likely to make a purchase.	End user as it will help them find books they may want to buy and the product owner as it will increase sales thus increasing profit.
9	Users should be able to upload images of themselves for a profile picture.	As the app deals with financial transactions trust between users is important and studies show human imagery can increase trust.[7]	End users as it will increase trust and make the app feel more personal to them.
10	The user should be able to filter search results by fields such as price or distance.	This will make the app easier to use, increasing the likelihood a user will find a book they want and buy it.	End users as it will make overall use of the app easier for them.

	Requirement	Justification	Stakeholder
11	Users should be able to upload tracking numbers of books that have been posted.	Users can often feel worried when ordering products from strangers online and having tracking numbers would help put minds at ease.	End users as it makes the process more comfortable for them and the post companies as they are the ones providing the tracking numbers.
12	Users should be able to post reviews of the users after a sale is made.	This will again help users feel more comfortable buying from someone new and will also discourage malicious actions.	End users to help them find reliable people to buy from.

Non-functional requirements*

	Requirement	Justification	Stakeholder
1	The user must be able to navigate fluidly between pages and a constant design style for the user interface should be maintained throughout the app.	This is how the user will move between the pages of the app and be presented with information. It is therefore vital the app looks and feels good. If software is well designed it "*Will be widely appreciated and used by the intended audience*." [9]	The end user as it is them who will be interacting with the user interface, and also the product owner/developer as it is their job to design it well.

	Requirement	Justification	Stakeholder
2	A constant colour scheme should be maintained throughout the app.	This is for the same reason as the user interface, it helps provide a constant feel to the application. A study performed by the University of Winnipeg found that up to 90% of snap decisions about products are made on colour alone.[10]	Again this affects the end users as they will be the ones interacting with the app, and the product owner/ developer as they will need to design it.
3	User messages and other user data should be stored securely.	Only two out of ten consumers feel safe whilst shopping online[11] so keeping user data secure is important to help users trust the app.	This affects the end users as it helps them to feel safe, the developer of the application as they must make it secure, and the third part developers as the database will be stored in firebase.
4	The application should look and feel the same across all devices.	This is to provide a constant user experience which will help when moving across different devices.	This affects the end user as they are the ones who will benefit from this, and the developer as they should run tests to make sure this is followed.
5	Any user facing requests should be returned within 1 second.	Research shows that one second is the amount of time it takes for a users flow of thought to be interrupted.[8] Keeping the screen loading times within this time frame will mean the app feels fluid to use.	This affects the end user and the product owner as it helps provide a good user experience which in turn is likely to increase sales for the product owner. And the third party provide who hosts the database.

	Requirement	Justification	Stakeholder
5	The system will need to be able to keep up with user growth and not loose speed over time.	If the app slows down with user growth then the one second rule will no longer apply so it is important that scalability of the app is maintained.	This affects the product owner/ developer the most as the onus is on them to consider this. It is also relevant to Firebase as that is where web calls will be made which is what will take the most time in the app.
5	The application must comply with GDPR rules.	GDPR applies to all companies that collect data on any users inside of Europe[12] and as such to allow for growth outside of the U.K. this will need to be considered.	This is again the responsibility of the product owner/ developer as they are the ones collecting and storing the data.
7	When posts are deleted all data relating to them should be removed from the database.	This relates to the database not slowing down and also minimising costs as if the database became cluttered with old redundant posts it would cost more to host and be slower to search.	This concerns the product owner and developer as they are the one who will be paying for the storage, and to the end user as it could cause the app to slow down if the database became too full.
8	When a user deletes their account all information stored on them should be deleted.	This applies for the same reason as above, to keep the database clean, and helps assure users the app is keeping data responsibly.	This primarily relates to product owner and developer again to keep costs down, but also effects the end user.

	Requirement	Justification	Stakeholder
9	The app must follow the guidelines in the terms and conditions of the app stores it will be sold through.	If it doesn't follow the terms of service set out by app stores it will not be listed on them and as such no one will be able to get the app.	App store owners as it is the rules they set out and the product owner/ developer as they must ensure the application is made within those guidelines.
10	The app must follow the terms of service that are laid out by the third party software it uses.[5]	As with the app stores if the app doesn't follow the guidelines for services it uses it could be removed from them possibly even shutting down the app.	App store owners as it is the rules they set out and the product owner/ developer as they must ensure the application is made within those guidelines.

Data requirements*

ID	Name	Justificaition	Source
1	Users name	This is needed so that a user knows who they are talking to in messages.	This will be collected from a form when the user signs up.
2	User email	This is needed to assign a user an account so they can sign in, and to ensure each account is unique.	This will be collected from a form when the user signs up.
3	User password	This will allow the user to sign in to their account once they have signed up.	This will be collected from a form when the user signs up, or it can be changed later in the profile page.
4	User university course	This is so the application can show users books tailored to their course.	This will be collected from a form when the user signs up, or it can be changed later in the profile page.
5	User messages	To facilitate chat between two users the chat messages will have to be stored on my database.	These will be sent to the database from a chat screen.
6	Post Images	This is so that other users know what the books they are buying look like.	Images will be uploaded by the user through a new post page.

ID	Name	Justificaition	Source
7	Post Titles	So that posts have a title telling the buyer the name of the book.	This will be uploaded by the user through a new post page.
8	Post details	This allows the poster of a listing to describe the book they are selling to give a buyer a better idea of the condition and details of the book.	This will be written by the user through a new post page.
9	Post price	This is so that buyers can see how much a seller is asking for so they can decide if they want to message them or not.	This will be set by the user through a new post page.
10	User location	This will allow the app to show users books nearby them so they can buy locally saving on shipping costs.	This will be collected automatically from the users device when they sign in to the app.
11	User profile picture	This is so that users feel more trust towards the app and other sellers.	This will be taken when they sign up or can be changed in the profile page.
12	Post tracking details	This is so that buyers can be shown the tracking number after a seller has uploaded it.	This will be taken from a post sale page once a sale is made.

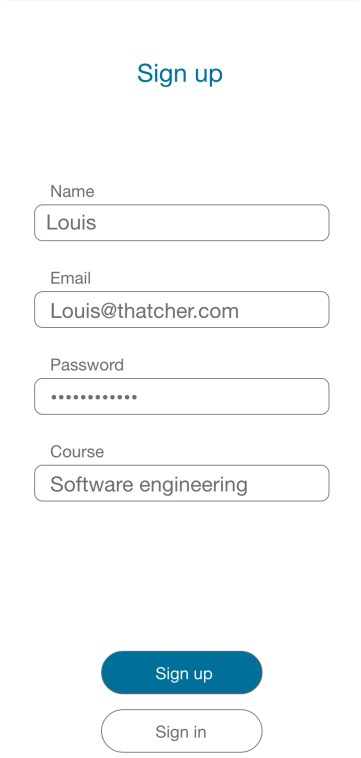
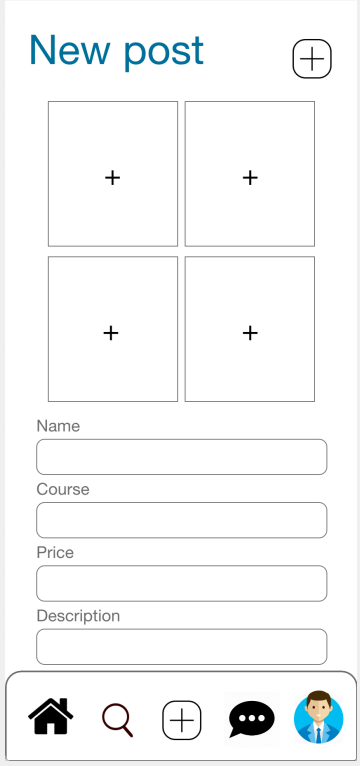
*A red cell means that I consider that requirement part of the MVP.

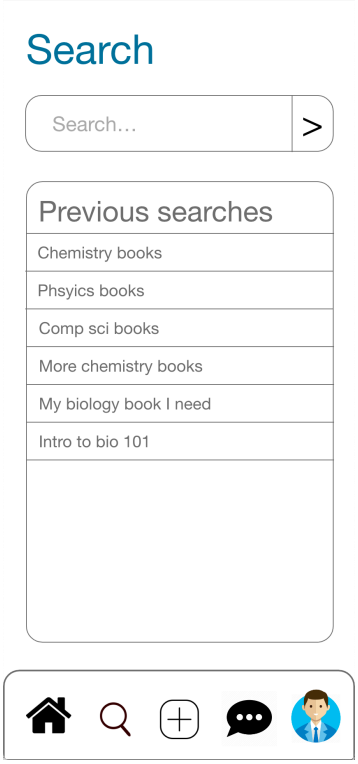
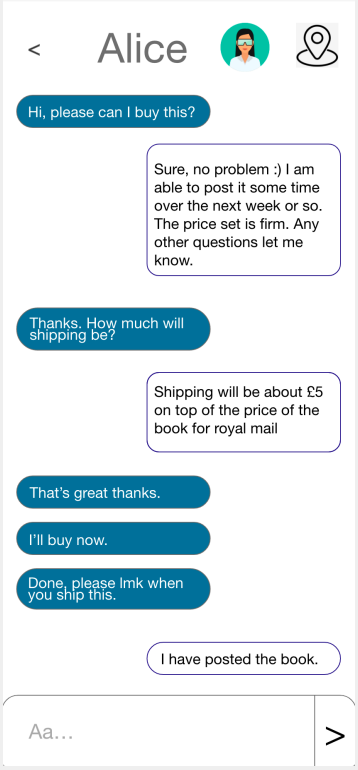
Medium fidelity prototype

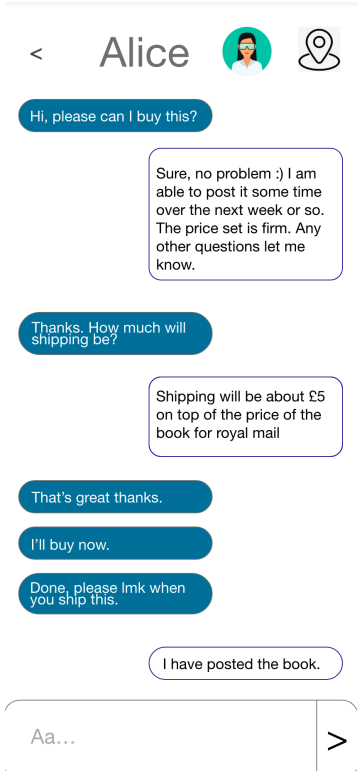
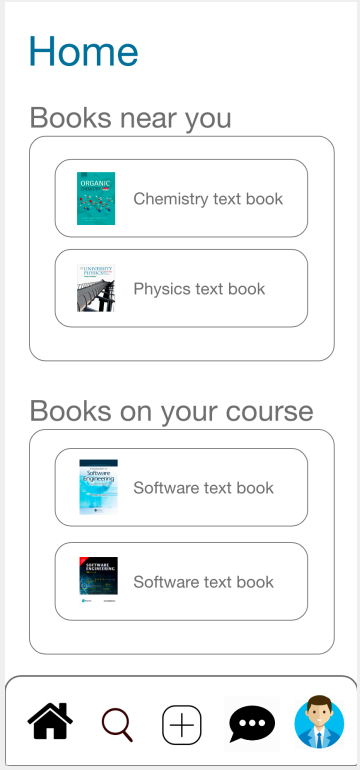
Link to the prototype:

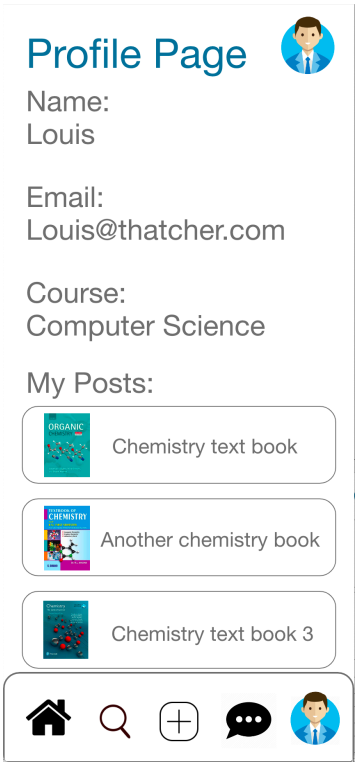
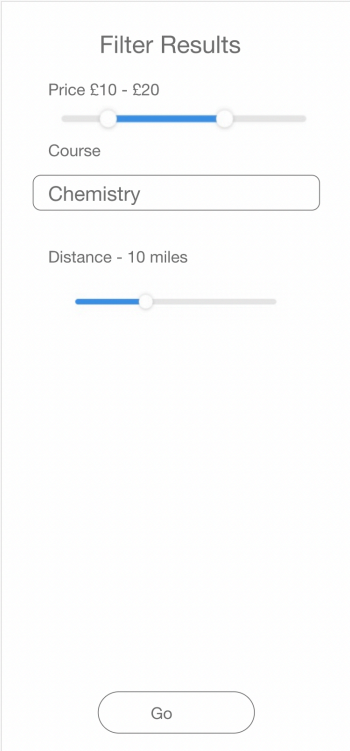
https://xd.adobe.com/view/8616a363-2615-4061-a82f-d1de5b27aeb7-d345/?fullscreen

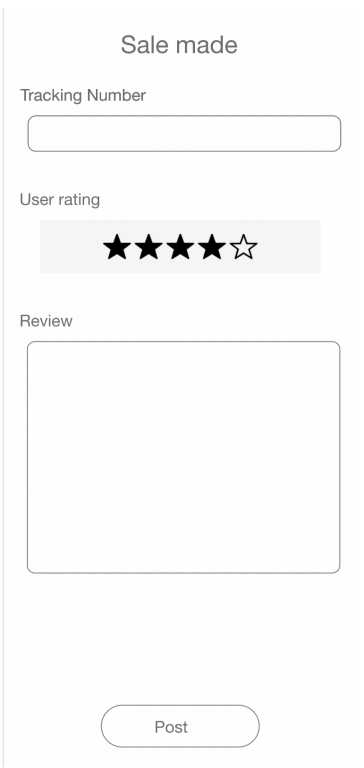
Requirements and features - Functional requirements:

Requirement	Example	Explanation
1		The sign up and sign in pages allow users to create an account or sign into an existing one. I chose this simple design as it has high contrast and is very simple aligning with the apple design principles.[18]
2		The new post page allows a user to upload new posts to the application with the necessary data that is needed for each post.

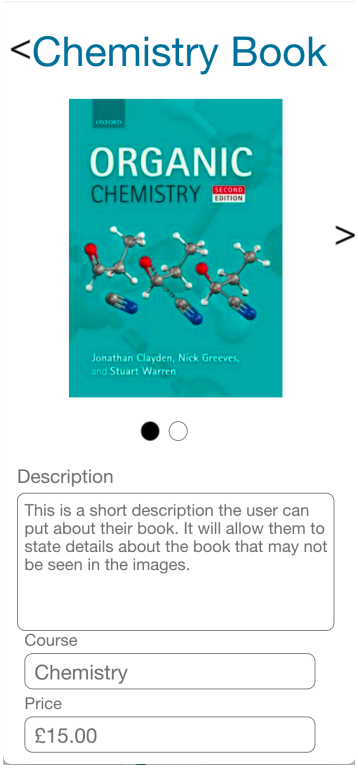
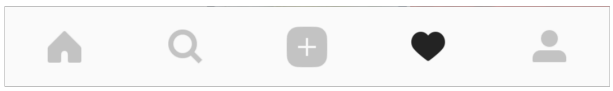
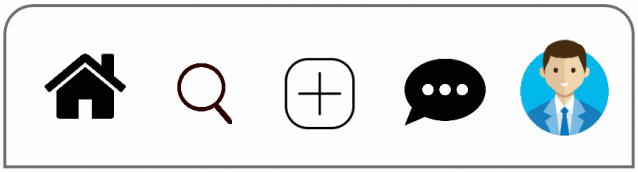
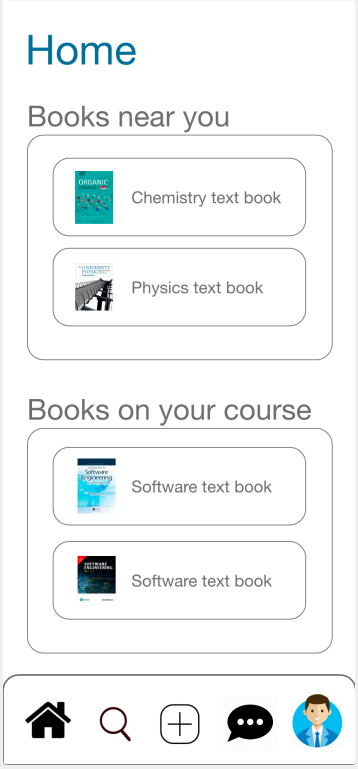
Requirement	Example	Explanation
3		The search page shows users recent searches and allows users to search for books. Previous searches are shown to fill the rest of the page.
4		The message screen allows users to talk to each other and is also where the shipping is confirmed and reviews are left by each user.

Requirement	Example	Explanation
5		On posts that are made by the user a bin icon is shown which will allow them to delete the post.
6		On the home page the user is shown books near them and books on their course.

Requirement	Example	Explanation
9		The user has a profile picture within the app which can be set from their profile page.
10		The search page has a filter feature which allows the user to set the different search settings they want.

Requirement	Example	Explanation
11, 12		From the messages page once a sale is made the user can upload tracking information and leave a review from the sale.

Non-functional requirements (where applicable)

Requirement	Example	Explanation
1		All the targets throughout the prototype are over the apple recommended 44x44pt. I chose to use a navbar along the bottom for navigation as it is the same with a lot of popular app like instagram or depop.  Instagram  Prototype
2		The app follows a constant and fairly simple blue, black and white colour scheme. I chose to do this as the apple design guidelines recommend a "limited color palette"[15] and all areas provide high contrast to the background. The prototype follows a similar layout too many other popular app such as depop and instagram using a Navbar at the bottom. This also follows the apple design principle of "prioritizing *simplicity" using "familiar, consistent interactions"*[14] I chose blue as it encourages trust between the user and software[25] and trust in the app is vital to success.

Evaluation

Ethics certificate:

Research and Innovation Services

This is to certify that

Louis Thatcher

has successfully completed

Research Integrity Training (Student)

on

29 January 2022

Ethics application - see appendix 2

Consent form:

CM6321

CONSENT FORM

Title of research project: Biblio

Name of Chief/Principal Investigator: Louis

	Please initial box
I understand that my participation is voluntary and I am free to withdraw at any time without giving a reason and without any adverse consequences. I understand that if I withdraw, information about me that has already been obtained may be kept by Cardiff University.	
I understand that data collected during the research project may be looked at by individuals from Cardiff University or from regulatory authorities, where it is relevant to my taking part in the research project. I give permission for these individuals to have access to my data.	
I understand who will have access to personal information provided, how the data will be stored and what will happen to the data at the end of the research project.	
I understand that after the research project, anonymised data may be made publicly available via a data repository and may be used for purposes not related to this research project. I understand that it will not be possible to identify me from this data that is seen and used by other researchers, for ethically approved research projects, on the understanding that confidentiality will be maintained.	
I understand that anonymised excerpts and/or verbatim quotes from my questionnaire may be used as part of the research publication.	
I understand how the findings and results of the research project will be written up and published.	
I agree to take part in this research project.	

Name of participant (print)	Date	Signature
Name of person taking consent (print)	Date	Signature
Role of person taking consent (print)		

THANK YOU FOR PARTICIPATING IN OUR RESEARCH

YOU WILL BE GIVEN A COPY OF THIS CONSENT FORM TO KEEP

Questionnaire

The company survey monkey performed research that found that a ten question survey will take users about five minutes to complete, but on a 30 question survey the response time for each question as much as halved. The completion rate also dropped between 5% and 20%.[16] Because of this I chose to design two questionnaires, the first one of these is only to judge the system usability and will use ten closed questions to get a rough idea of this. I chose to use the same questions as outlined in the template as this will provide me with the most accurate scored compared to the example results. The second questionnaire consists of 10 open and closed questions and will allow me to collect data more specific to my app. I chose ten questions as this should be enough to collect enough information on my prototype without loosing accuracy of data considering there are open questions and the participants are not being paid to take part. No one will answer both questionnaires to help stop any bias' across questions.

System usability

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. I found the various functions in this system were well integrated.
6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.

*questionnaire questions used are from https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html[17]

Overall app

1. How often do you use online market places such as depop or gumtree? (Open)
2. How intuitive did you find the app to use? (Scale)
    1. extremely unintuitive - unusable
    2. Very unintuitive - you could use the app but it took a long time to understand
    3. Okay - it didn't make sense at first but you soon picked it up
    4. Very good - most controls were immediately obvious but some didn't make sense
    5. Extremely good - all controls were immediately obvious
3. What feature did you like best about the application, why? (Open)
4. What feature did you like least about the application, why? (Open)
5. How fluid did you find the loading times of the app? (Scale)
    1. extremely slow - you were waiting for all features to load long enough to loose interest
    2. Very slow - all features took a long time to load but it did not make you want to quit the app
    3. Okay - most features took an acceptable time to load but it was useable

   4. Quite good - most features loaded fast enough for you to not be effected y it
   5. Very good - any loading times were quick enough to be forgettable
6. What did you think about the colour scheme used throughout the app? (Open)
7. Would you have any safety concerns using the app? (Open)
8. What percent of each sale do you think if fair for the app to take on each sale? (Open)
9. Do you feel any features are missing from the app that you would like to see? (Open)
10. Are there any features in the app you feel are redundant or take away from the final product? (Open)

Why these questions?

1. This will give me an idea of how much experience the user has with other similar applications so I can judge their answers against past experience.
2. This question gives me a general overview of the users thoughts on the app without being too specific or "putting words in the participants mouth." I chose to define the scale as it will ensure each participant is answering to this and not their own personal scale.
3. This open question will show me what features the application did well as recommended in best questionnaire practices by SurveySparrow.[22]
4. As with the question before this will tell me where my app is most lacking.
5. This will help me judge the usability of the app and how people feel about the loading times. Again the scale is provide to increase accuracy.
6. This open question will allow participants to provide their personal opinions on the design of the app.
7. This will highlight any safety concerns with the app that I may have missed or forgotten about whilst developing it.
8. This will help me decide the right amount to charge on each sale made though the app. The depop reviews show that the majority of bad reviews are due to the fees they charge and so allowing participants to say what they think is fair will provide a guide for me without suggesting an answer.[23]
9. This gives participants the opportunity to explain any features they think should be added. I decided not to ask about features I intended on incorporating but then was to able to as if they were told about them they would likely not think of new features I may have not considered.
10. This is the same as the question before and will show me where to focus with further development in the future.

Evaluation

Usability

The first check I performed for my system usability was by checking the SUS score. My application scored 87 points on average after gathering and processing data from ten participants. This indicated the system is very usable, with the average score a system gets being 68 and any applications over 80.3 being considered A grade.[24]

The next heuristics I used to check my usability against were the design guidelines laid out by Apple and Android. I did this as my app is primarily a mobile

application and so these are the guidelines that other developers on these platforms will follow, so complying with these will help ensure an intuitive user experience.

The apple human interface guidelines for IOS have three primary themes that should be followed, clarity, deference and depth.[18]

For an app to have good clarity text should be legible at every size, icons should be clear, negative space should highlight important features, and a focus on functionality should motivate design[18]. Apple state that text should be between 11pt and 30pt depending on the type of text it is.[19]

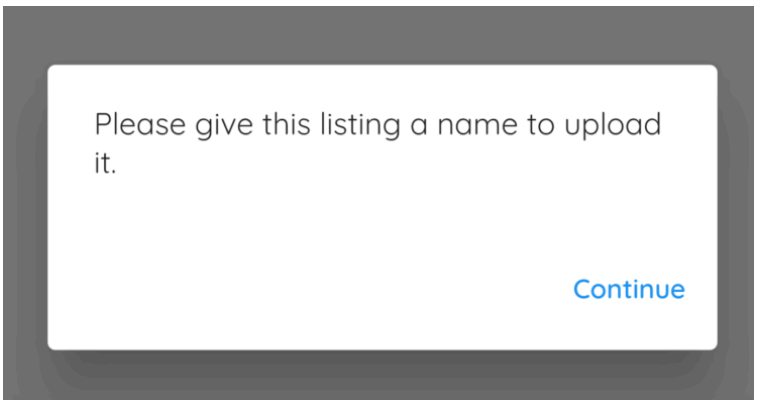
```
regularText = TextStyle( fontSize: 14.0, fontWeight: FontWeight.w600, color: Colors.black);

headingText = TextStyle( fontSize: 22.0, fontWeight: FontWeight.w800, color: Colors.black);

titleText = TextStyle( fontSize: 35, color: Color(0xff063a5e), fontWeight: FontWeight.bold);

subtitleText = TextStyle( fontSize: 18, fontWeight: FontWeight.w600, color: Colors.blueGrey);

secondSubtitleText = TextStyle( fontSize: 18, fontWeight: FontWeight.w600, color: Colors.black38);

fadedText = TextStyle( fontSize: 14.0, fontWeight: FontWeight.w600, color: Colors.blueGrey);

myMsg = TextStyle( fontSize: 16.0, fontWeight: FontWeight.w600, color: Colors.blueGrey);

otherMsg = TextStyle( fontSize: 16.0, fontWeight: FontWeight.w600, color: Colors.white);
```

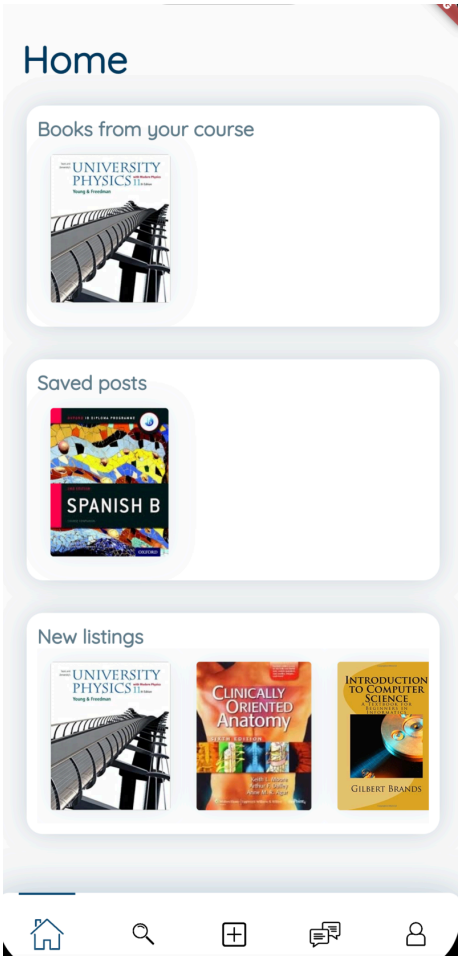
All the text within my app follows constants varying in size within the limits. However some of these do not line up with the recommended sizes outlined in specific and so going forwards these would be tweaked to align with that. All the icons in my app are high resolution (500px x 500px) and show clearly on all displays. From the start of development I also tried to ensure my screen were clutter free and only displayed vital information.

For an app to have deference in Apple's opinion it should have fluid motion and a crisp interface that fills the entire screen and has minimal use of gradients and bezels and drop shadows.[18]

The design in my app did end up using drop shadows to make certain areas within the screen more clear.

Finally for depth Apple state that apps should have distinct layers with realistic motion. This was accomplished by scrolling horizontally trough the main screens, by showing each section of the app outlined with a drop shadow, and using pop up





boxes when an error occurs.
Aesthetic integrity, Consistency, Direct manipulation, feedback, metaphors, and user control are the four main design principles Apple recommend. To comply with feedback and direct manipulation user interactions with the app provide direct feedback, such as in the form of a loading icon until the action is complete. In order to satisfy aesthetic integrity and consistency familiar icons have been used for all images and a constant, simple design scheme has been followed throughout.

As the app also works on android devices I decided to also check the usability against the android core app quality guidelines[20]. These are more structured than Apple's and contain recommendations for visual experience, functionality, privacy and google play.

the guidelines for visual experience state that there should be no back buttons as this is provided by the device on android. However as I was developing for both android and IOS I had to include these. In the future device specific screens which omit these for android should be introduced. However the app does support gesture navigation and preserves the users state as stated in the guidelines.

As my app is only designed for portrait use the user interface guidelines are not fully met here. I would also not include this in the app going forward as many popular apps do not landscape and the flow of the app would not translate very well to landscape due to letterboxing that would occur on text fields.

As my app does not play any media most of the functionality requirements are not relevant. However it does not run any background services and so satisfies that requirement.

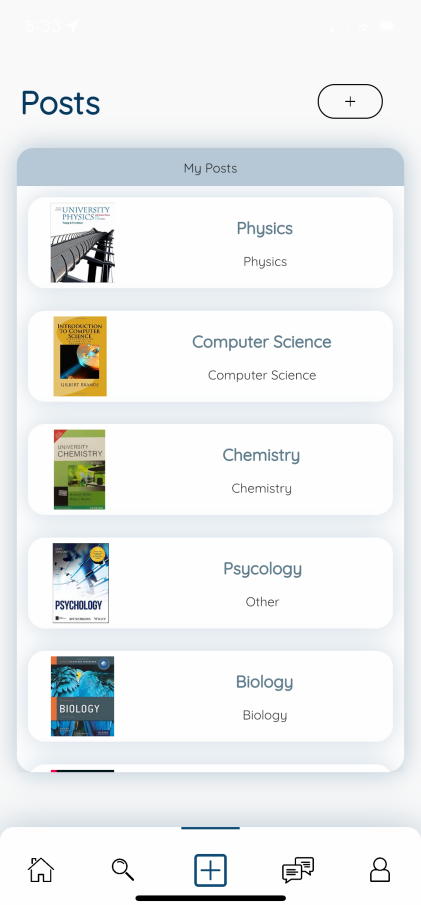
For performance and scalability, the prototype meets most of the requirements but does need some improvement. Although most crashes are now fixed it does still sometimes fail and so these should be looked at and fixed. However loading times were within the two second time limit and also show feedback incase they take longer. It also functions across all modern android SDKs. The rest of the android guidelines are about publishing and security and so do not apply to the usability of the app.

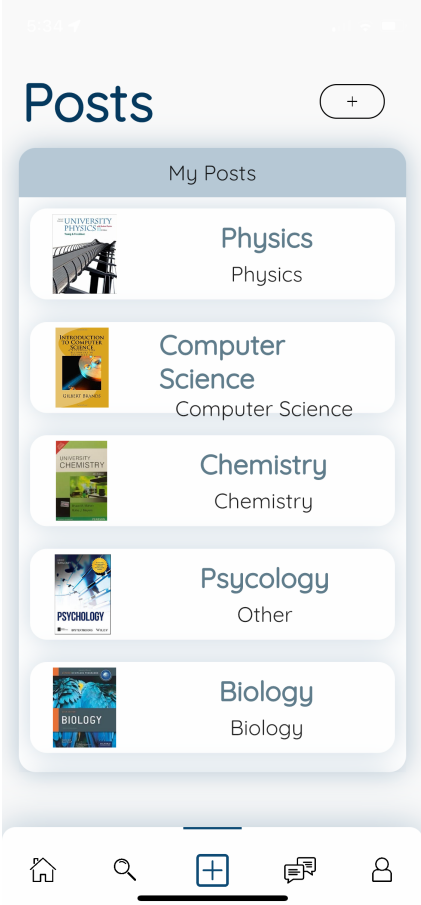
Accessibility

The flutter framework provides a set of guiltiness on accessibility the three main principles of which are large fonts, screen readers and sufficient contrast.[21] I chose

these as they are based on the framework which the app is built and so are most relevant.

The iOS and android screen readers work with most of my application, correctly announcing any text and labelled buttons throughout the app, however images such as the bottom nav bar are not tagged and so are just announced as image by the reader. Going forwards adding tags to these would help a lot with the accessibility for partially sighted people. The text also adjusts to the users text size setting in the device settings with minimal overflow also helping with accessibility for people with poor eyesight. However on the largest size text there can be some errors as shown below.





As Most of my app is white on a black background the colour contrast is very good throughout. The main titles have a contrast ratio of 11.83:1 on the white background which is well within the recommended 3.0:1[21] However some of the smaller lighter blue text only has a ratio of 4.37:1 which is slightly below the recommended 4.5:1.

The flutter accessibility checkout also covers active interactions, or all tappable buttons providing some form of feedback, contact switching, which is nothing changing on the screen while typing in information, a minimum tappable target size of 48x48 pixels, the ability to undo important actions and colour deficiency testing. My application does all of these except for being able to undo important actions as there is currently no option to undo a post delete for example.

References

1. Depop newsroom. 2022. *Facts and Figures* Available at: https://news.depop.com/who-we-are/facts-and-figures/ [Accessed: 28/01/2022]
2. Statcounter. 2021. *Mobile Operating System Market Share Worldwide* Available at: https://gs.statcounter.com/os-market-share/mobile/worldwide [Accessed: 28/01/2022]
3. Statista. 2020. *Market share of the leading courier service providers in the United Kingdom in 2020* Available at: https://www.statista.com/statistics/1245558/courier-service-providers-market-share-united-kingdom/ [Accessed: 28/01/2022].
4. Urosevic, M. 2021. *29+ INCREDIBLE PayPal Statistics to Know in 2021* Available at: https://spendmenot.com/blog/paypal-statistics/ [Accessed: 28/01/2022].
5. Firebase. 2022. *Terms of Service for Firebase Services* Available at: https://firebase.google.com/terms [Accessed: 28/01/2022]
6. MacKenzie, I, Meyer, C and Noble, S. 2013. *How retailers can keep up with consumers* Available at: https://www.mckinsey.com/industries/retail/our-insights/how-retailers-can-keep-up-with-consumers [Accessed: 28/01/2022].
7. Chopra, P. 2021. *Conversion Rate Optimization Solutions for Revenue Growth* Available at: https://vwo.com/blog/human-landing-page-increase-conversion-rate/ [Accessed: 28/01/2022]
8. Nielsen, J. 1993. *Response Times: The 3 Important Limits* Available at: https://www.nngroup.com/articles/response-times-3-important-limits/ [Accessed: 28/01/2022]
9. Guntupalli, R, C, C 2008. User Interface Design - methods and qualities of a good user interface,Masters thesis, Available at: https://www.diva-portal.org/smash/get/diva2:215020/FULLTEXT01.pdf [Accessed 28/01/2022]
10. Hall, R. 2022. *Understanding The Role & Impact That Color Plays In App Design* Available at:https://mindsea.com/color-theory/ [Accessed: 28/01/2022]
11. Businesswire. 2014. *International Survey Reveals Majority of People Don't Feel Safe When Shopping Online* Available at: https://www.20.com/news/home/20141125005210/en/International-Survey-Reveals-Majority-of-People-Don't-Feel-Safe-When-Shopping-Online#:~:text=Key%20statistics%3A,financial%20transactions%20online%20(8%25) [Accessed: 28/01/2022]
12. Businesswire. 2014. *International Survey Reveals Majority of People Don't Feel Safe When Shopping Online* Available at: https://www.20.com/news/home/20141125005210/en/International-Survey-Reveals-Majority-of-People-Don't-Feel-Safe-When-Shopping-Online#:~:text=Key%20statistics%3A,financial%20transactions%20online%20(8%25) [Accessed: 28/01/2022]
13. Apple. 2022. *User Interaction* Available at:https://developer.apple.com/design/human-interface-guidelines/accessibility/overview/user-interaction/#:~:text=Give%20all%20controls%20and%20interactive,them%20interact%20with%20your%20app. [Accessed: 28/01/2022]
14. Apple. 2022. *Best Practices for Inclusive Design* Available at:https://developer.apple.com/design/human-interface-guidelines/accessibility/overview/best-practices/ [Accessed: 28/01/2022]
15. Apple. 2022. *Color* Available at: https://developer.apple.com/design/human-interface-guidelines/ios/visual-design/color/ [Accessed: 29/01/2022]

16. Chudoba, B. 2022. *How long should a survey be?* Available at: https://www.surveymonkey.co.uk/curiosity/survey_completion_times/ [Accessed: 29/01/2022]
17. usability.gov. 2022. *System Usability Scale (SUS)* Available at: https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html [Accessed: 30/01/2022]
18. Apple, 2022. *iOS Design themes* Available at: https://developer.apple.com/design/human-interface-guidelines/ios/overview/themes/ [Accessed: 30/01/2022]
19. Apple, 2022. *Typography* Available at: https://developer.apple.com/design/human-interface-guidelines/ios/visual-design/typography/ [Accessed: 30/01/2022]
20. Android, 2021. *Core app quality* Available at: https://developer.apple.com/design/human-interface-guidelines/ios/visual-design/typography/ [Accessed: 30/01/2022]
21. Flutter, 2022. *Accessibility* Available at: https://docs.flutter.dev/development/accessibility-and-localization/accessibility [Accessed: 30/01/2022]
22. William, K. 2022. *Mobile App Surveys: Questions To Ask And Best Practices To Follow* Available at: https://surveysparrow.com/blog/mobile-app-surveys/ [Accessed: 30/01/2022]
23. Trustpilot. 2022. *Depop* Available at: https://uk.trustpilot.com/review/depop.com?stars=1 [Accessed: 30/01/2022]
24. Thomas, N. 2022. *How To Use The System Usability Scale (SUS) To Evaluate The Usability Of Your Website* Available at: https://usabilitygeek.com/how-to-use-the-system-usability-scale-sus-to-evaluate-the-usability-of-your-website/ [Accessed: 30/01/2022]

Appendix -

Persona

Name: Stewart Dent
Age: 19
Occupation: unemployed/student
Studies: Medicine
Living Situation: With three housemates in Cardiff
Hobbies, interests and likes: Reading, cycling, the pub, pryzm.
Dislikes: The price of new university books, shopping, hangovers.
Technical competence: knows how to use a phone and his laptop for basic every day tasks, but does not have any real interest in it.

Frustrations

- Having to wait for websites to load.
- There are currently no person to person marketplaces for books
- Any book selling companies do not let the user set the price
- Un-intuitive app design.
- Not being able to find what he is looking for.

Appreciates

- Responsive home pages
- Being recommended things that could help him
- Being shown things in the way he wants to see them.

Background

Stewart has recently moved into his new house with his flat mates from last year. His university have given him a list of books that he needs to buy for the course this year. He is also stuck with a lot of books from last year that are just taking up space in his room. He frequently uses his smartphone or computer for online shopping and selling on apps like Shpock and Depop and wished there was a place to sell his books this easily.

CM6321

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

SCHOOL OF COMPUTER SCIENCE AND INFORMATICS

APPLICATION FOR ETHICAL REVIEW

For Office Use Only	
SREC Reference:	Meeting/Review Date:

SECTION 1. GENERAL INFORMATION	
Application Type:	☐ Staff ☐ PGR student ☐ PGT/Masters Student ☐ Undergraduate
Research Project Title:	Biblio – book selling app
Short Title (where applicable):	Biblio
For Staff Projects	
Name of Chief/Principal Investigator:	
Contact details:	
Other members of research team:	
For Student Projects	
Name of Student:	Louis Thatcher
Contact details:	thatcherlg@cardiff.ac.uk
Name of Supervisor(s):	Dr Fernando Loizdes
Contact details:	LoizidesF@cardiff.ac.uk
Other members of research team:	

SECTION 2. SCREENING QUESTIONS			
		Yes	**No**
2.1	Is the research project categorised as 'Research' (as defined in the Cardiff University Policy on the Ethical Conduct of Research involving Human Participants, Human Material or Human Data (Ethics Policy))? *If **no** (i.e. the research project is a Service Evaluation or Audit), the Committee is not required to conduct a review of the proposal but may choose to do so. **Please contact Committee (comsc-ethics@cardiff.ac.uk) to seek advice before proceeding with this application.***	x	
2.2	Does the research project involve human participants, human material or human data (as defined in the Ethics Policy)? *If **no**, you are not required to submit the research proposal to this Committee. **Please do not continue with this application.***	x	
2.3	Does the research project require review by an external ethics committee (refer to Appendix 1 of the Ethics Policy)? Please note that this includes		x

	all research projects involving participants who lack the capacity to consent. *If **yes**, the research project should be submitted to the relevant external ethics committee for review and does not fall within the remit of this Committee. Please contact the Research Governance Team for further advice.* ***Please do not continue with this application.***		
2.4	Has the research project been ethically reviewed by another university or research institution (for example, where the Chief/Principal Investigator for the research project is based at another institution)? *If **yes,** please provide evidence of the review conducted (such as an outcome letter or communication) and the ethical review policy of the relevant institution or committee.* ***Please do not continue with this application.***		x
2.5	Is the research project exempt from ethical review under the University's framework for the 'Ethical Review of Research using Secondary Data and/or Publicly Available information only'? This framework allows certain research projects using only secondary data and/or publicly available information to proceed without ethical review by a SREC provided certain conditions are met. The framework is outlined in the Appendices of the Ethics Policy. For the avoidance of doubt, projects that involve the collection/use of data from social media platforms (or similar platforms) MUST be subject to ethical review. *If **yes**,* you are not required to submit the research proposal to this Committee. **Please do not continue with this application**. If in doubt, please seek advice from the committee (comsc-ethics@cardiff.ac.uk).		x
2.6	Does the research project fall within the scope of the UK Policy Framework for Health and Social Care Research? This Framework broadly applies to research taking place within, or involving, the health and social care systems. *If **yes**, you will need to apply to the Research Governance Team for Sponsorship using the Advanced Project Information Proforma (APIP) (available on the Cardiff University intranet). The Research Governance Team will advise you on the approvals that are required for the research project after it has conducted a review of the APIP and supporting documentation.* ***Please do not continue with this application until you have sought advice from the Research Governance Team.***		x
2.7	Does the research project involve the collection or use of Human Tissue (including, but not limited to, blood, saliva and bodily waste fluids)? *If **yes**, the research project should be submitted to the Human Tissue Act Compliance Team (HTACT) prior to submission to an ethics committee.* ***Please note that submission of a research protocol/proposal to HTACT is essential for all projects involving the collection or use of Human Tissue. Please do not continue with this application until you have sought advice from HTACT.***		x
2.8	Does the research project fall within the scope of the University's Security-sensitive Research Policy? This Policy broadly applies to		x

	research involving terrorism, extremism or radicalisation (or access to materials of such a nature). *If **yes**, you must register the research in accordance with the Policy and comply with the IT and security arrangements contained in the Policy.*		
2.9	Has the research project received appropriate peer/scientific review? (For student research projects, review by the research project supervisor is an acceptable form of scientific review) *If **no**, please obtain appropriate peer/scientific review before submitting the application to this Committee.*	x	
2.10	Have you and all other Cardiff University co-applicants/ /Supervisors/Members of the research team (as listed in Section 1) completed the University's Research Integrity Online Training Programme. *If **no**, you must complete the training before submitting the application to this Committee.*	x	
2.11	For student projects only - to be completed by the lead supervisor. As the lead supervisor for this proposal, provide a comment in support of the answers to 2.1 through 2.9 and that the School Research Ethics Committee is the appropriate committee to review the application.		
2.12	Will this project involve the explicit recruitment of participants by the research team?	x	
2.13	Will this project involve the explicit recruitment of participants via a Gatekeeper? *A Gatekeeper is someone external to the research team that will facilitate initial (and where relevant continual) access to potential research participants. Further guidance on Gatekeepers can be found in Ethics Policy.*		x
2.14	If the answer to 2.12 OR 2.13 is 'Yes':		
	Have you used the provided University templates for the Information Sheet and Consent form? *All applications are expected to use these templates. Links to these templates are provided at: https://www.cs.cf.ac.uk/ethics/*	x	
	Have you addressed and resolved each of the instructions/placeholders in [square brackets] in the Consent Form template? *Note that for new applications, the date should be the date of document creation and the version should be 1.0. This should be incremented along with a new date for each change and resubmission of documents.*	x	

	Have you removed anything not in accordance with the instructions/placeholders in [square brackets] from the content of the Consent Form? If Yes, explain what and why below. *Note that in almost all circumstances, any removals will not be considered as acceptable, EXCEPT for the "Participant ID no:" box if participation will be anonymous AND the initials and signatures if presented in an online, anonymous format. However, the participant will still need to confirm they consent to each point in the consent form before being able to participate. Refer to the Ethics Policy for guidance on Informed Consent and describe how this will be achieved below.*	x	
	Removed fields that did not apply to my specific case, I did not have an information sheet for example.		
	Have you read, followed, and removed the "INSTRUCTIONS FOR RESEARCHER" section from the Participant Information Sheet template?	x	
	Have you addressed and resolved each of the instructions/placeholders in [square brackets] in the Participant Information Sheet template? *Note that for new applications, the date should be the date of document creation and the version should be 1.0. This should be incremented along with a new date for each change and resubmission of documents.*		x
	Have you removed anything not in accordance with the instructions/placeholders in [square brackets] from the content of the Participant Information Sheet template? If Yes, explain what below. *Note that in almost all circumstances any removals will not be considered as acceptable.*		x
2.15	For student projects only - to be completed by the lead supervisor. As the lead supervisor for this proposal, provide a comment in support of the answers to 2.12, 2.13, and 2.14 and confirm that appropriate decisions have been made and instructions followed in the need for, and creation of a consent form and participant information sheet.		
If the research project involves the use of animals, please contact the Cardiff University Biological Standards Office bso@cardiff.ac.uk to seek further advice.			
SECTION 3. PROJECT SUMMARY			
3.1	Summarise the research project (including the purpose and its methodology) using language that would be understood by a lay person.		
I would like to conduct research into the usability and accessibility of my third year software development project.			
3.2	State the research question(s).		

System usability

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. I found the various functions in this system were well integrated.
6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.

Overall app

1. How often do you use online market places such as depop or gumtree?
2. How intuitive did you find the app to use?
    1. extremely unintuitive - unusable
    2. Very unintuitive - you could use the app but it took a long time to understand
    3. Okay - it didn't make sense at first but you soon picked it up
    4. Very good - most controls were immediately obvious but some didn't make sense
    5. Extremely good - all controls were immediately obvious
3. What feature did you like best about the application, why?
4. What feature did you like least about the application, why?
5. How fluid did you find the loading times of the app?
    1. extremely slow - you were waiting for all features to load long enough to loose interest
    2. Very slow - all features took a long time to load but it did not make you want to quit the app
    3. Okay - most features took an acceptable time to load but it was useable
    4. Quite good - most features loaded fast enough for you to not be effected y it
    5. Very good - any loading times were quick enough to be forgettable
6. What did you think about the colour scheme used throughout the app?
7. Would you have any safety concerns using the app?
8. What percent of each sale do you think if fair for the app to take on each sale?
9. Do you feel any features are missing from the app that you would like to see?
10. Are there any features in the app you feel are redundant or take away from the final product?

3.3	Estimated start date.
26/01/22	
3.4	Estimated end date (usually the end of data collection).
30/01/22	
3.5	Is the research project funded? *If **yes**, please name the funding body.*
no	
3.6	Are there any potential conflicts of interest? *If **yes**, please confirm the action you propose to take to address such conflicts.*

	Information and guidance on conflicts of interest is contained in the Research Integrity Online Training Programme and the Research Integrity and Governance Code of Practice.
no	
3.7	For student projects only - to be completed by the lead supervisor. As the lead supervisor for this proposal, provide a comment in support of appropriateness and completeness of the answers to this section.

SECTION 4. FULL REVIEW CRITERIA

Your answers to the questions in this Section 4 will help the Committee determine whether your project requires full or proportionate review.

If all 'No' boxes apply, your project may be considered for proportionate review.

If a 'Yes' box applies, your project will proceed to full review unless the School has approved an Ethics Protocol for that particular criterion. The list of the School's Ethics Protocols are provided at: https://www.cs.cf.ac.uk/ethics/. Where an Ethics Protocol applies, this is confirmed below. If you have complied with the Ethics Protocol, your project may be considered for proportionate review.

Please refer to the School's Ethics Procedure for details and approximate lead times for the proportionate and full review systems: https://www.cs.cf.ac.uk/ethics/.

		Yes	**No**
4.1	Will the research project be performed without the participants' prior consent? *Note, research projects involving the collection/access of data from social media is likely to fall into this category.*		x
	If you have answered 'Yes' to 4.1, have you complied with the School's Ethics Protocol for Research using online data without participants' prior consent?		
4.2	Does the research design include an element of deception, including covert research?		x
4.3	Will the research project involve children under the age of 18 or 'at risk' (vulnerable) adults or groups? *The Cardiff University Safeguarding Children and Adults at Risk: Policy and Guidance sets out examples of 'at risk' or 'vulnerable' adults.*		x
4.4	Does the research project include topics which may be considered highly sensitive for participants? *This includes sexual behaviour, illegal activities, political, religious or spiritual beliefs, race or ethnicity, experience of violence, abuse or exploitation, and mental health.*		x

4.5	Does the research project require access to records of a sensitive or confidential nature, including Special Category Data? *Special Category Data is defined in data protection legislation and currently includes information about an individual's: racial or ethnic origin; political opinions; religious beliefs; trade union membership; physical or mental health; sexual life or orientation; commission of offences or alleged offences; genetic data; and biometric data.*		x
4.6	Is permission of a gatekeeper required for initial or continued access to participants? *This includes participants in custody and care settings, or research in communities where access to research participants is not possible without the permission of another adult, such as another family member or a community leader.*		x
	If you have answered 'Yes' to 4.6, have you complied with the School's Ethics Protocol for Research needing a Gatekeeper?		
4.7	Does the research project involve intrusive or invasive procedures? *This includes the administration of substances, vigorous physical exercise, procedures involving pain or more than mild discomfort to participants (including the risk of psychological distress, discomfort or anxiety to participants).*		x
4.8	Does the research project involve visual or audio recordings where participants may be identified?		x
	If you have answered 'Yes' to 4.8, have you complied with the School's Ethics Protocol for Research involving visual or audio recordings?		
4.9	Does the research project involve the collection or use of human tissue?		x
4.10	Does the research project involve more than a minimal risk of harm to the safety and wellbeing of participants and/or the Researchers? *Please answer this question based on your assessment of the risks involved in this project. Further information about possible harm or potential risks to participants/researchers must be provided in Section 7 of this form.*		x
4.11	For student projects only - to be completed by the lead supervisor. As the lead supervisor for this proposal, provide a comment below in support of the answers of the answers to this section. For each question answered as 'Yes', provide a comment of support of <u>why the project necessitates</u> the answer needing to be 'Yes' and would not otherwise be feasible.		
SECTION 5. PARTICIPATION AND RECRUITMENT			
5.1	How will you identify and recruit participants to the research project? *Please note that wherever possible, potential participants should not be approached individually. Instead, 'broadcast' style communication such as mailing lists, social media posts, etc. should be used.*		

I will use social media along with email to send out undirected requests to my followers asking for participants for a survey, emailing anyone who takes part the questions.	
5.2	How many participants are you aiming to recruit? *If applicable, please include a breakdown of participants by type and number.*
Approximately ten for each questionnaire	
5.3	What are the inclusion and exclusion criteria for participants?
There are none as I want to collect feedback from all backgrounds. However due to recruitment being done through social media it will primarily reach people my age.	
5.4	Will the research project involve participants that are Cardiff University staff or students or clients of the University (or the place in which you may otherwise work)? *If applicable, please provide details.*
Yes, other Cardiff university students may choose to take part.	
5.5	For student projects only - to be completed by the lead supervisor. As the lead supervisor for this proposal, provide a comment in support of appropriateness and completeness of the answers to this section.
SECTION 6. CONSENT PROCEDURES	
6.1	Will informed consent be obtained from participants? If so, how? *Please include who will be taking consent, how consent will be recorded, when participants will be provided with information about the research project, and how long potential participants will be given to decide whether to take part.*
Yes, with a consent form before the start of the questionnaire.	
6.2	Will participants be offered any incentives to take part in the research project?
no	
6.3	If a questionnaire is to be used, will you give participants the option of omitting questions they do not wish to answer?
no	
6.4	Will participants be informed that their participation is voluntary and that they may withdraw at any time and for any reason?
yes	
6.5	Have you provided a detailed, lay summary of ALL tasks participants are expected to do AND how long each of these will take in Section 4 of the Participant Information Sheet template?
no	
6.6	For student projects only - to be completed by the lead supervisor. As the lead supervisor for this proposal, provide a comment in support of appropriateness and completeness of the answers to this section.

SECTION 7. POSSIBLE HARM TO PARTICIPANTS/RESEARCHERS	
7.1	Is there a risk of the participants experiencing physical, emotional or psychological harm or distress? *If yes, please provide details of how ethical issues will be handled and how any risks will be minimised. Please consider whether the research project includes topics which could be considered as highly sensitive for participants.*
no	
7.2	Is there a risk of the Researcher(s) experiencing physical, emotional or psychological harm or distress? *If yes, please provide details of how ethical issues will be handled and how any risks will be minimised.*
no	
7.3	For student projects only - to be completed by the lead supervisor. As the lead supervisor for this proposal, provide a comment in support of appropriateness and completeness of the answers to this section.
SECTION 8. DATA MANAGEMENT, CONFIDENTIALITY AND DATA PROTECTION	
8.1	How, and by whom, will data be collected?
Via emails sent out by me	
8.2	Will you be accessing or collecting Personal Data (identifiable personal information) as part of the research project? If yes, please confirm what data will be accessed and/or collected (including details of the information participants are asked to provide on a written consent form) and by who. For EACH piece of data, provide an explicit justification for why this is strictly necessary, linking back to the research questions in 3.2, and why the research will not be feasible without it. *Note: If your project involves Personal Data, you are advised to review the University's GDPR Guidance for Researchers and to check whether your project requires, or would benefit from, the completion of a Data Protection Impact Assessment (DPIA). It is not the role of the SREC to review or advise on DPIA's, but if you have completed one, please confirm this below. For further advice, please refer to the 'DPIA' intranet page or contact complianceandrisk@cardiff.ac.uk.*
no	

Data	Collected/Accessed by	Justification for needing the data

8.3	How long will you retain the Personal Data collected in connection with the research project? Please also explain any data deletion arrangements. *Note: Research records and data must be retained for the period specified in Section 2.9 ('Research Project Conduct') of the University's Research Records Retention Schedule. If identifiable information is being collected, researchers must ensure that this is limited to the information necessary to achieve the relevant purpose (data minimisation). The University expects raw data containing identifiable information (questionnaires and audio tapes for example) to be retained for the full retention period unless: (1) the identifiable information is not required to support the research or to demonstrate good research conduct;* ***and*** *(2) stringent measures have been taken to verify and ensure the integrity of any anonymised or pseudonymised records/data produced from the raw data. Where (1)* ***and*** *(2) apply, the researcher* ***must*** *take the necessary steps to remove the personal data. Consent Forms must be retained for the full retention period.* *Please note that where UG and PGT projects do not contribute to a publication or wider research project, research records and data may be held for a shorter period. Please refer to the guidance notes in Section 2.9 of the University's Research Records Retention Schedule for further detail.*
No personal data is collected	
8.4	What efforts will be made to anonymise the data collected (where possible)?
Only first names are being taken for the questionnaire via the consent form so all data will be anonymous within the results.	
8.5	Are you proposing to utilise 'public task' as the lawful basis for processing Personal Data for the purposes of the research project (as recommended in the University's GDPR Guidance for Researchers)? *If no, please explain why and what alternative lawful basis you propose to use.*
No, I am not collecting personal data so this does not apply.	
8.6	Have you utilised/incorporated into your Participant Information Sheet the following sections from the University's template Participant Information Sheet: *'What will happen to my Personal Data'* and *'What happens to the data at the end of the research project?'* *If* ***no****, please explain why this has not been used and how you have otherwise ensured that the relevant data protection/privacy information has been provided to participants.*
No as I do not have an information sheet	
8.7	For how long will the collected anonymised data be retained? Please also explain any data deletion arrangements. *Note: Anonymised research data must be retained for the period specified in Section 2.9 ('Research Project Conduct') of the University's Research Records Retention Schedule. Please note that where UG and PGT projects* ***do not*** *contribute to a publication or wider research project, research records and data may be held for a shorter period. Please refer to the guidance notes in Section 2.9 of the University's Research Records Retention Schedule for further detail.*

One month after the data is collected, it will then be deleted by deleting any emails relating to the results.	
8.8	Who will have access to the data?
Only me	
8.9	Will the data be shared in any way, for example through deposit in a data repository, with third parties, or a transcription service?
No	
8.10	What anonymised demographic, sensitive, or confidential data will be collected from or about participants, (e.g., Age, Sex, Gender, Employment status, etc.) including data concerning sensitive or confidential topics outlined in criteria 4.4 and 4.5? For EACH piece of data, provide an explicit justification for why this is strictly necessary, linking back to the research questions in 3.2, and why the research will not be feasible without it.

Data	Collected/Accessed By	Justification for needing the data
None		

8.11	If the data collection involves the use of audio or video recording of participants, provide an explicit justification for why this is strictly necessary over alternative methods of data capture and why the research will not be feasible without it.
N/A	
8.12	For student projects only - to be completed by the lead supervisor. As the lead supervisor for this proposal, provide a comment below in support of the appropriateness and completeness of the answers to this section.

SECTION 9. OTHER ETHICAL CONSIDERATIONS

Please outline any other ethical considerations raised by the research project and how you intend to address these. You are obliged to bring to the attention of the SREC any ethical issues not covered in this Ethics Review Application Proforma.

No other ethical concerns

SECTION 10. SUPPORTING DOCUMENTS

I have attached the following documents in support of this application – marked with an X.

All documents should be provided as files. Web links will NOT be accepted.