The impact of scarcity on the online mobile shopping experience of consumers purchasing rare products using apps such as Etsy, eBay and Adidas

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ABSTRACT

Online shopping on mobile devices is becoming the most common form of shopping. This research proposes that consumer behaviour of online mobile shoppers is affected by the perceived scarcity of a rare product by measuring consumer emotion and satisfaction during an online shopping experience. Scarcity is a persuasive design principle (Cialdini, 1993) applied in user experience design to motivate and influence a user to act. This is evidenced in relevant literature and design research that studies online shopping experiences and the differences between those experiences. There are many examples of online shopping applications that demonstrate scarcity in the buying experience such as Amazon, eBay, Etsy, Adidas and many other ecommerce applications. There are few who create experiences for users that apply scarcity to the experience of shopping for a product that is already scarce. Many reports study online shopping experiences but few examine the application of scarcity on a product that is actually rare. This research argues that the user experiences a heightened level of satisfaction and emotion after a purchase when scarcity is applied in the UX design when shopping for an already rare product.

A user-centered design process including user research, iterative design and testing of the prototypes was used throughout this study. Two prototypes that apply scarcity in online shopping experiences were tested against a control prototype. Forty-two participants, 14 for each design participated in this study. One presents a lottery user experience, while the other includes an auction experience to buy the same rare product. The participants were asked to complete a post-test survey containing two scales measuring emotion and satisfaction.

Authors Keywords

Rare, Shopping Experience, Scarcity, Mobile, Online, Impact, Consumers

INTRODUCTION

There is a significant body of academic literature that looks at online shopping and the user behaviours surrounding scarcity within online shopping.

Three common themes were identified in the literature; online trust, navigation and consumer behaviour. This paper further examines how these factors influence a user's experience. There is a further need to identify the effects of scarcity on the user experience of online shopping for rare products as prior research only explores the effect of scarcity in general online shopping, which may produce discordant results.

The research question is the impact of scarcity on the online mobile shopping experience of consumers purchasing rare products using apps such as Etsy, eBay and Adidas.

The hypotheses this research question proposes are;

H1. Scarcity produces heightened satisfaction after the use of a lottery and auction style online shopping experience for rare products in comparison to the control shopping experience containing no application of scarcity.

H2. Users' emotions are heightened after the use of a lottery and auction style online shopping experience for rare products in comparison to the control shopping experience containing no application of scarcity.

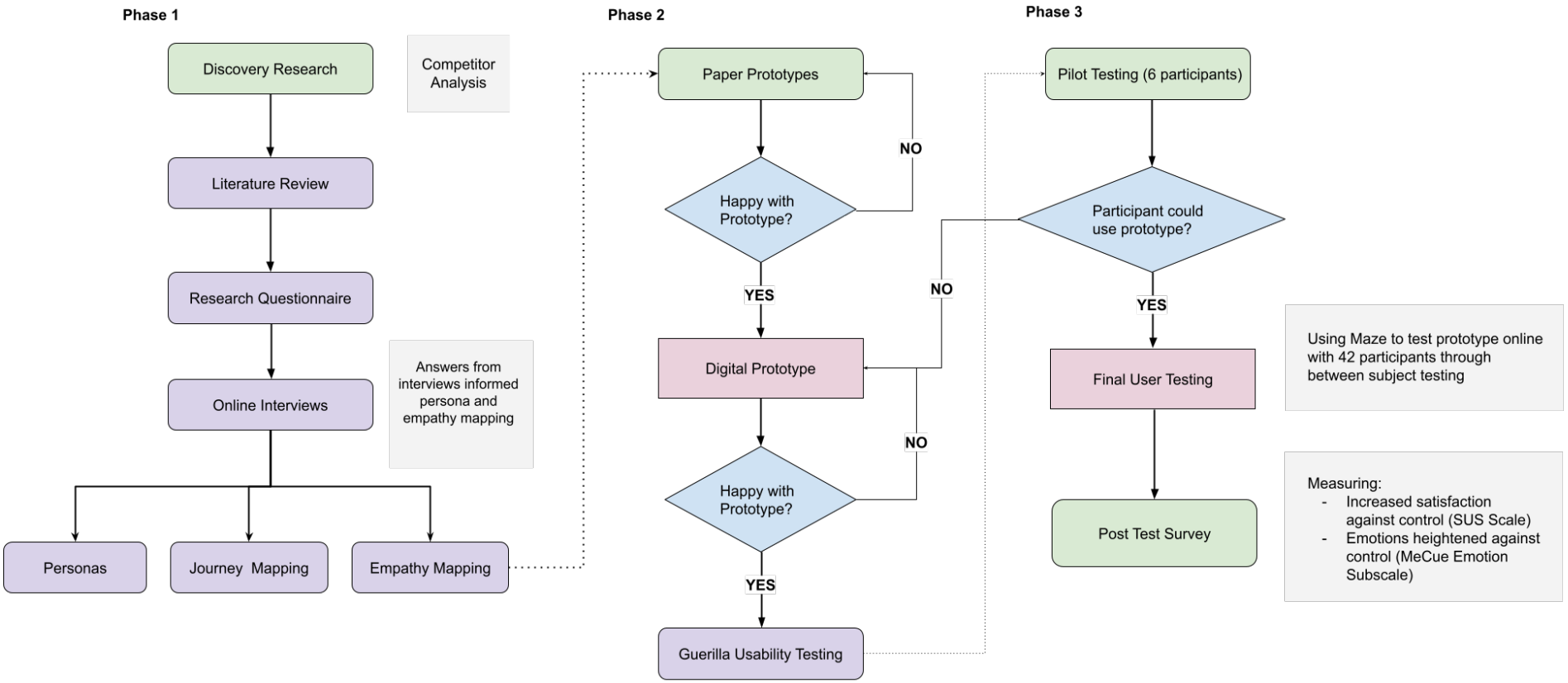


Fig. 1 Flowchart of Methodology process

THE PROCESS

To carry out the design research for this paper, the research question was examined in three phases. Phase one is focused on user research and requirements around this paper. Phase two, also known as the design phase, incorporates design, prototyping and testing, and phase three includes the final experiment, measurement analysis and results.

Phase one began with a research questionnaire involving 47 participants who specifically shop online. a state-of-the-art review including competitor analysis, and discovery interviews and lastly empathy maps , personas and journey maps based on the interview results including competitor analysis were also carried out.

Phase two of the methodology began with creating paper prototypes for each of the three prototypes, the control, lottery and auction shopping experiences. Followed by the creation of the initial digital wireframe using principles of scarcity across two of the three prototypes, guerilla usability testing on three participants followed by an iterative process in the creation of the high-fidelity designs.

Lastly, phase three started by carrying out pilot testing, final usability testing with a post-test survey including the MeCue Scale and The SUS Scale (Minge et al., 2017; Brooke, 1996) (Fig. 1). The data collection methods were usability testing and surveys.

STATE OF THE ART REVIEW

Competitor Analysis

There are many applications that apply scarcity as common practice such as Amazon, eBay, Depop, Etsy, Adidas, Zara, ASOS along with many others ecommerce applications but few that use scarcity to create experiences for users that apply scarcity in the context of shopping for rare products. An analytical state of the art review of relevant competitors was carried out to inform the design of the prototype, ensuring best practice design methods were used.

Adidas

Adidas, for example, use a lottery user experience to purchase limited supply trainers (Figure 2-4) which involves the user registering their details as if they were about to purchase the item. If chosen from the lottery, the app automatically takes the money for the item from the users account. The user has to agree to purchase the item before they know if they win the lottery draw.

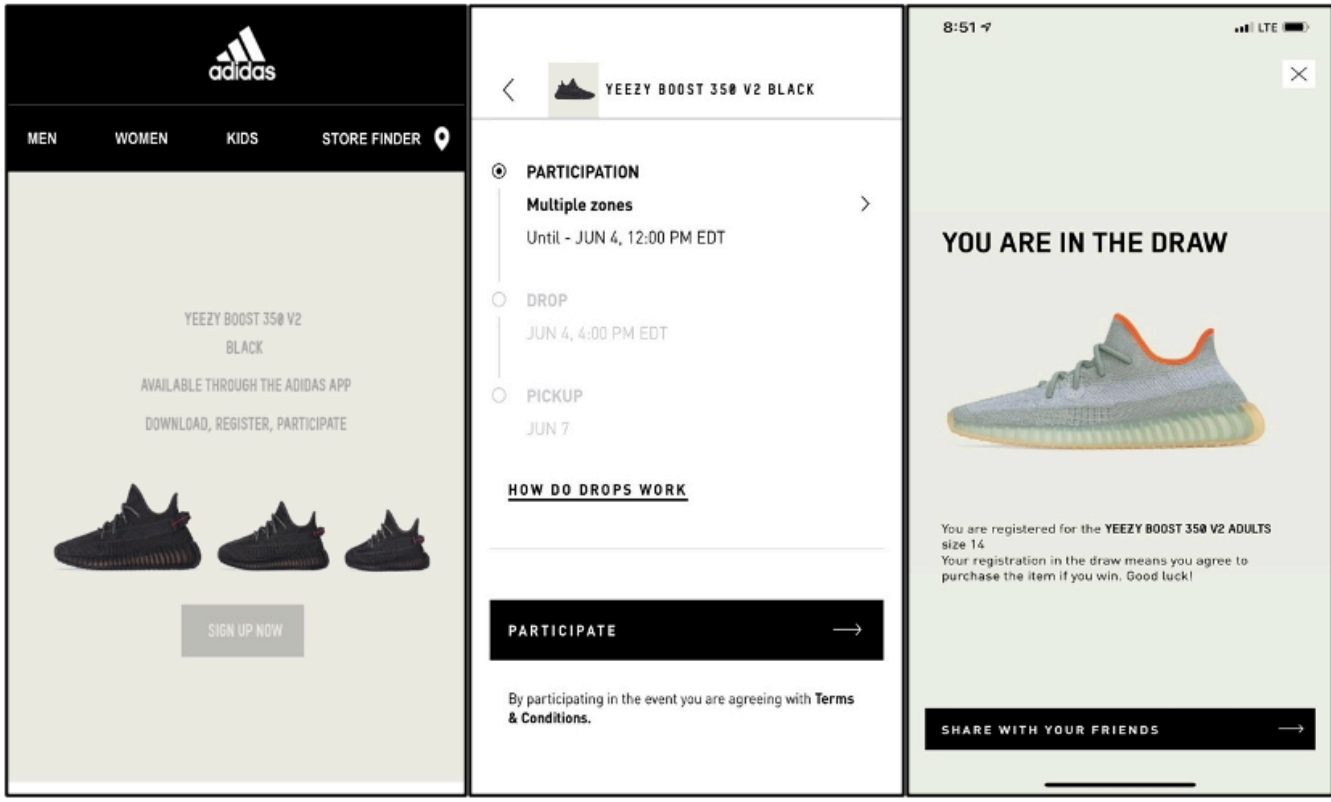
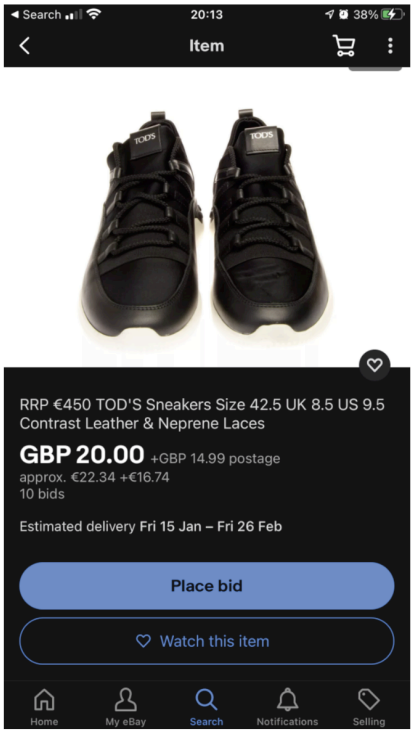


Fig. 2-4 Adidas App - Lottery

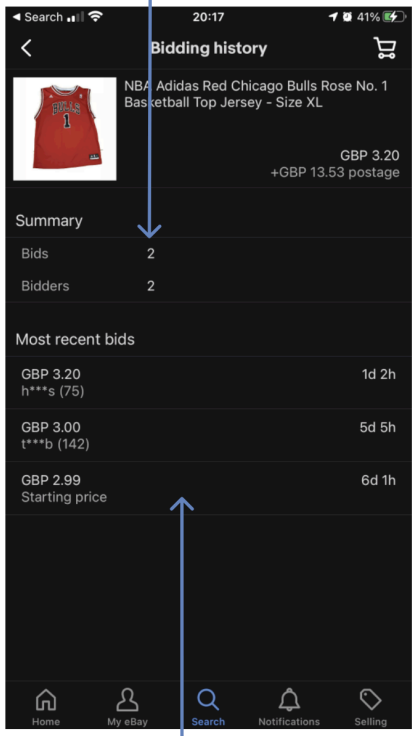
Screenshots from Adidas app showing the UX journey on how to enter the lottery draw to purchase the trainers.

How many bids on item to show the competition and scarcity

'Watch this item' adds heightened approach to language used



How many bids and bidders present for this item



Shows most recent bids to show your competitor and when they were placed

Shows 3 offers left, creating a sense of urgency

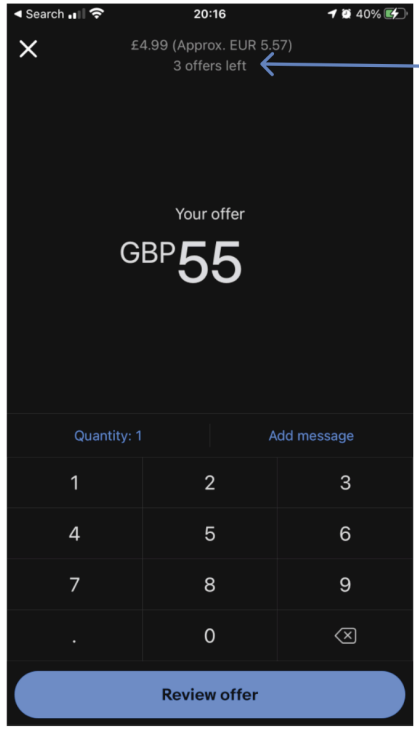


Fig. 5-7 eBay App - Auction

eBay

As seen above, Ebay use an auction style approach with an application of scarcity. The user places a bid or has the opportunity to watch the item.

Ebay shows the user the current bids that have been placed on the rare item for sale. This adds a heightened level of scarcity as the item is already rare with the added layer of scarcity design principles being used.

Ebay also applies time restraints when placing an offer on the rare item in question as well as how many offers there are left to place of the item in question

Etsy

Etsy on the other hand is not an auction or lottery style shopping experience. It does however apply scarcity to a rare product. Using Cialdini's (1993) persuasive design principles, Etsy have used stock availability to show the user how much or in this case how little stock is available. Something Etsy also uses is social proof to show scarcity telling users "Other people want this" (Fig. 8).

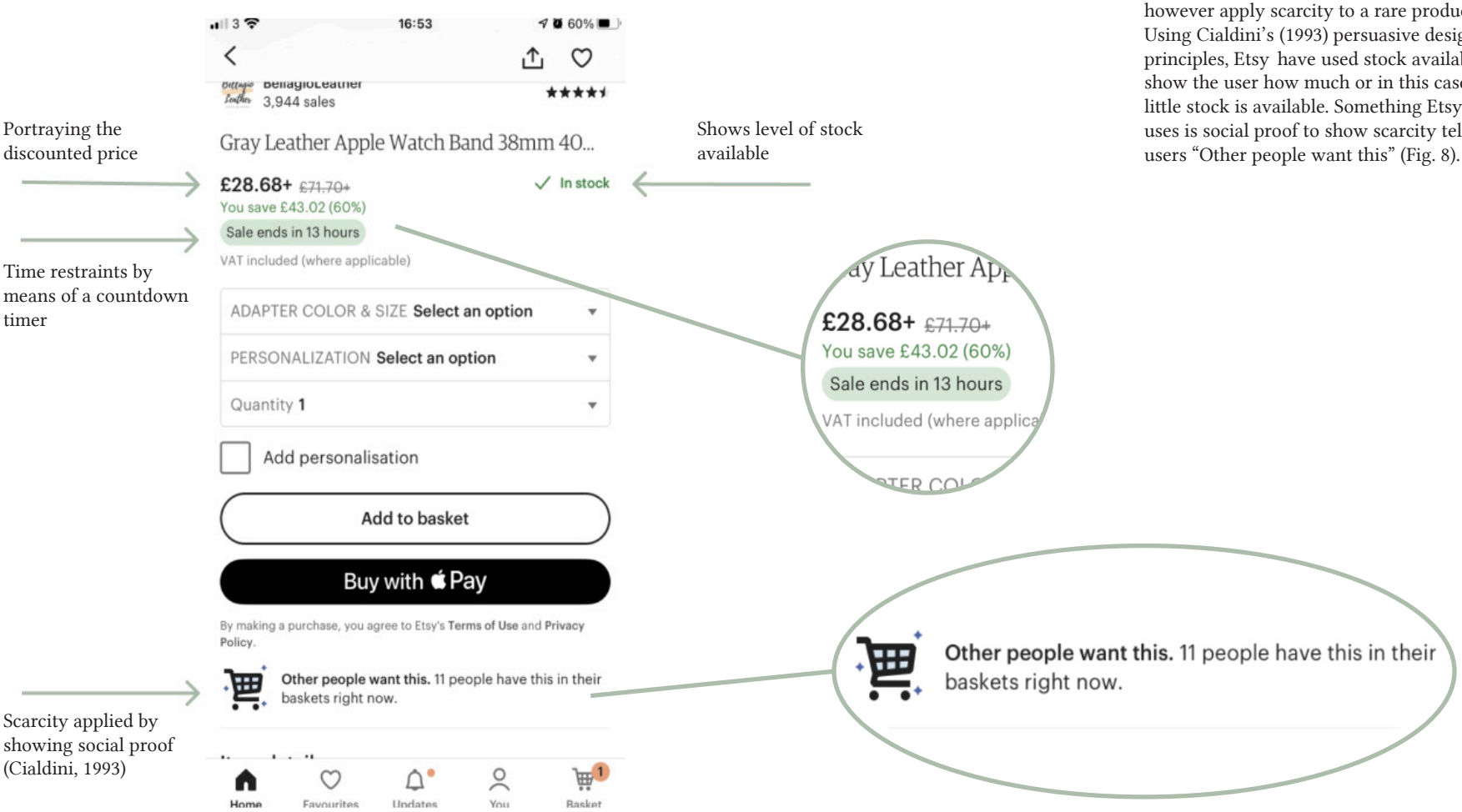


Fig. 8 Etsy App - Scarcity Application

Figures 9-13. Permission given from owner to share image. Image shows rare sneaker collection of collector 1.

FIELD STUDY

Discovery Interviews

Interviews are one of the most effective forms of qualitative data as they gain understanding into the behavior, knowledge and thought process of the interviewee through open-ended interview questions (DeBose, 2018).

To gain further understanding of a collector of rare items and their environment, Interviews of two collectors of rare items were carried out via email. One purchaser collects cameras. The other collector collects limited edition sneakers.

The first interview conducted was with the collector of sneakers. They have been a collector since 2015. They try their best to purchase online directly from the producers of the shoes, if they miss that opportunity, they use third party applications. This is informative for the design process as this research question is specifically looking at apps.

> **There's nothing guaranteed and it's a great feeling getting a successful email.**
>
> **- Collector 1**

Figure 14. Permission given from owner to share image. Image shows rare sneaker collection of collector 1.

For them, the process is anxious and exciting. They are familiar with the lottery style buying process which is important as this style of purchasing may not be familiar to the everyday online consumer. This participant in particular noted that they loved the feeling of getting the success email when they were chosen from the lottery user experience, or as they put it "putting my name in the virtual hat".

This purchaser does wear their rare collectables but when not in use they stay safe in their original boxes (Figure 14). They said the most expensive pair they have is a pair of Nike Air Yeezy 2 that they purchased for €250 in 2015, which are currently worth over a staggering €12,000. They still wear them.

Figure 15-16.

Permission given from owner to share images. Images show rare sneaker collection.

Figure 17. Permission given from owner to share image. Image shows rare camera collection.

Collector 2

Secondly, this collector collects rare cameras and has been doing so for over 20 years. Their most valuable camera is the first one they purchased as it holds sentimental value. Most of their purchases are through online stores but there are not many stores left in the world that specialise in rare cameras, noting they used to shop in a "great store" in Venezuela that they used to frequent growing up.

They noted they can feel uneasy during the process of purchasing a rare item as they have to take a chance that the condition will be good as well as the bidding wars that happen from time to time.

These are interesting observations as this research question aims to gain understanding of the emotional and satisfactory impact of these shoppers. It was noted that they have used auction style experiences in the past to purchase rare items.

Figure 18. Permission given from owner to share image. Image shows rare camera collection.

> **I feel uneasy during the shopping process. I never know if the item is going to be in good condition.**
>
> **- Collector 2**

Figure's 19-22. Permission given from owner to share images. Images show rare camera collection.

DESIGN

Personas

From the results of the discovery interviews, user personas, journey maps and empathy maps were created to further investigate the needs of the user. These personas were based on the participants of the interviews.

Two personas (Fig. 14 & 15) were created based on the interviews and the state-of-the-art review (O' Connor, 2011). Creating personas helped to build empathy for the user needs and wants, while at the same time informed design decisions for creating the prototypes (Friis & Siang, 2021) in this research.

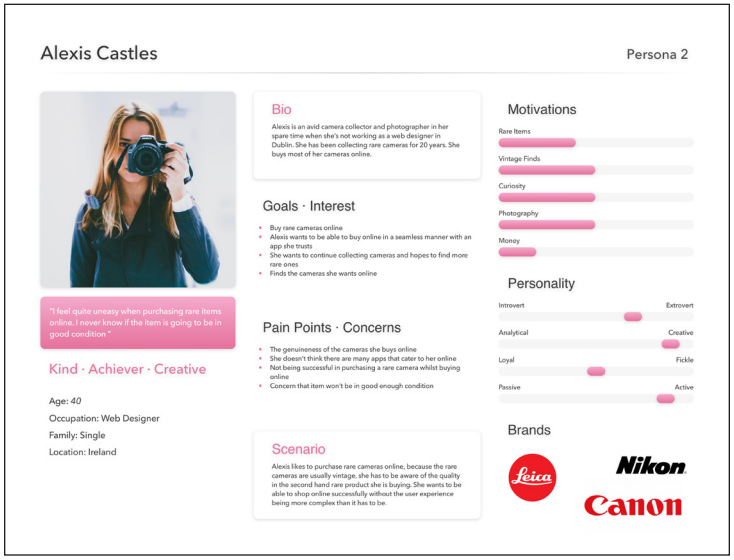


Figure 14 User Persona of collector 2 based on interview results

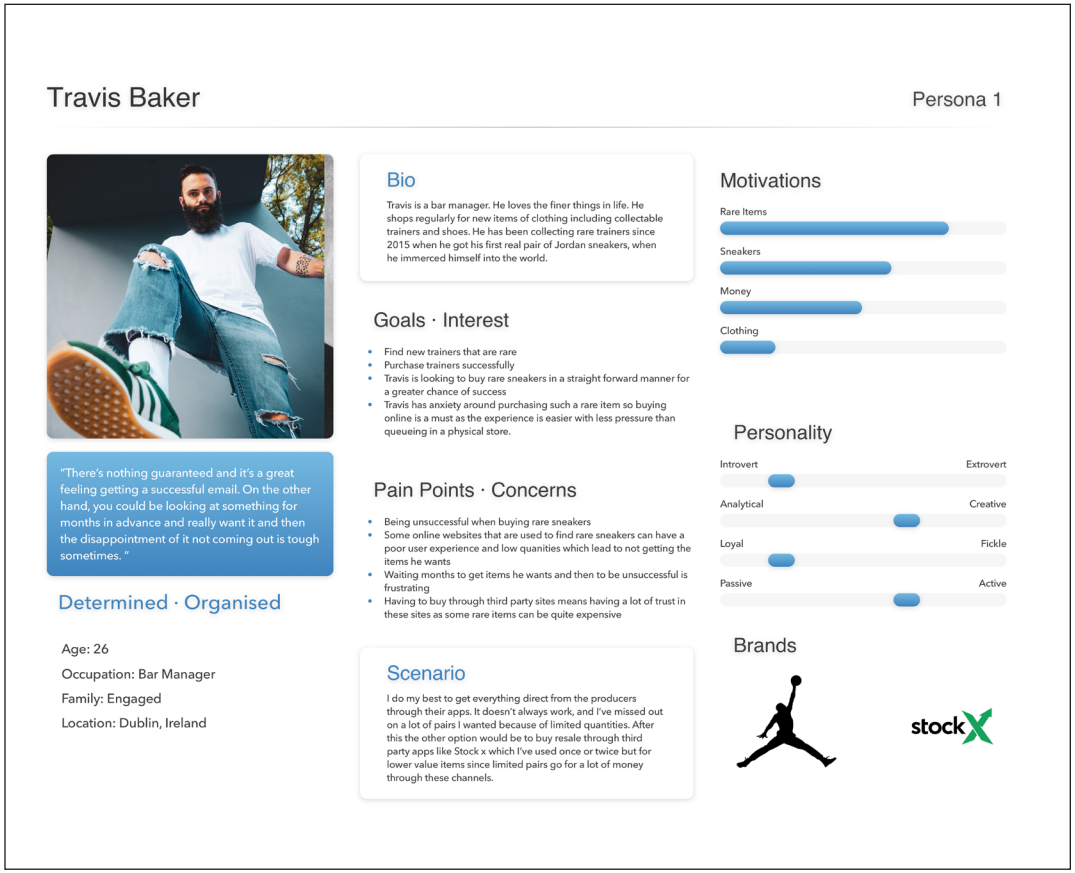


Figure 15 User Persona of collector 1 based on interview results

Figure 16. Journey Map based on interview results

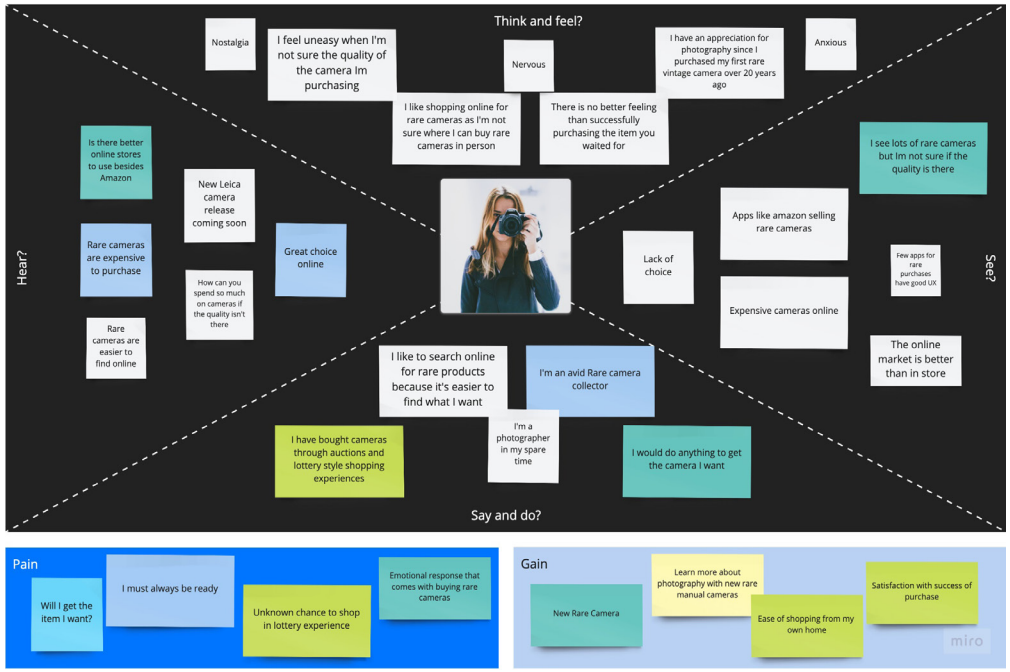


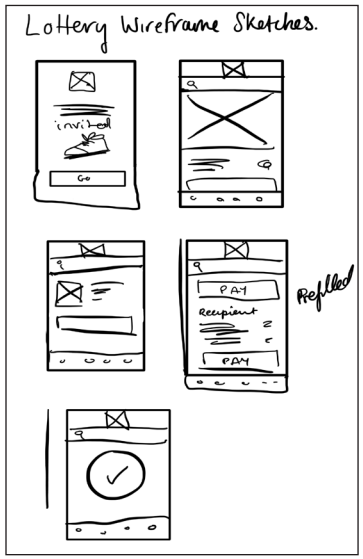
Figure 17. Empathy Map based on interview results

Empathy & Journey Mapping

To create a user scenario for the personas, empathy maps and customer journey maps were created to provide context (Fig 16 & 17). This was informed by the interview. Basing the empathy maps (Fig.17) on the interview, yields more in depth knowledge into the user and leads to avoidance of biases whilst designing as it is based on real data responses, creating a shared understanding of how these users experience their purchase of rare items (Gibbons, 2018).

The Customer Journey Map (Fig. 16) provides insights into a users' journey through the process of buying rare items, showing the pain points and feelings at each stage. Mapping helps shift the perspective from the researcher to the purchaser (IBM News Room - 2015-04-01 4 Out Of 5 Consumers Declare Brands Don't Know Them As An Individual, According to IBM and Econsultancy Study - United States, n.d.; Maškarić, n.d.).

From the user persona, paper prototypes were created to gain understanding of screens layouts and elements needed to create a successful prototype (Figure 18 &19).



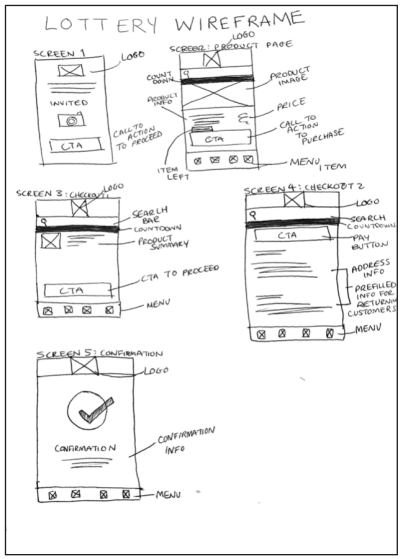
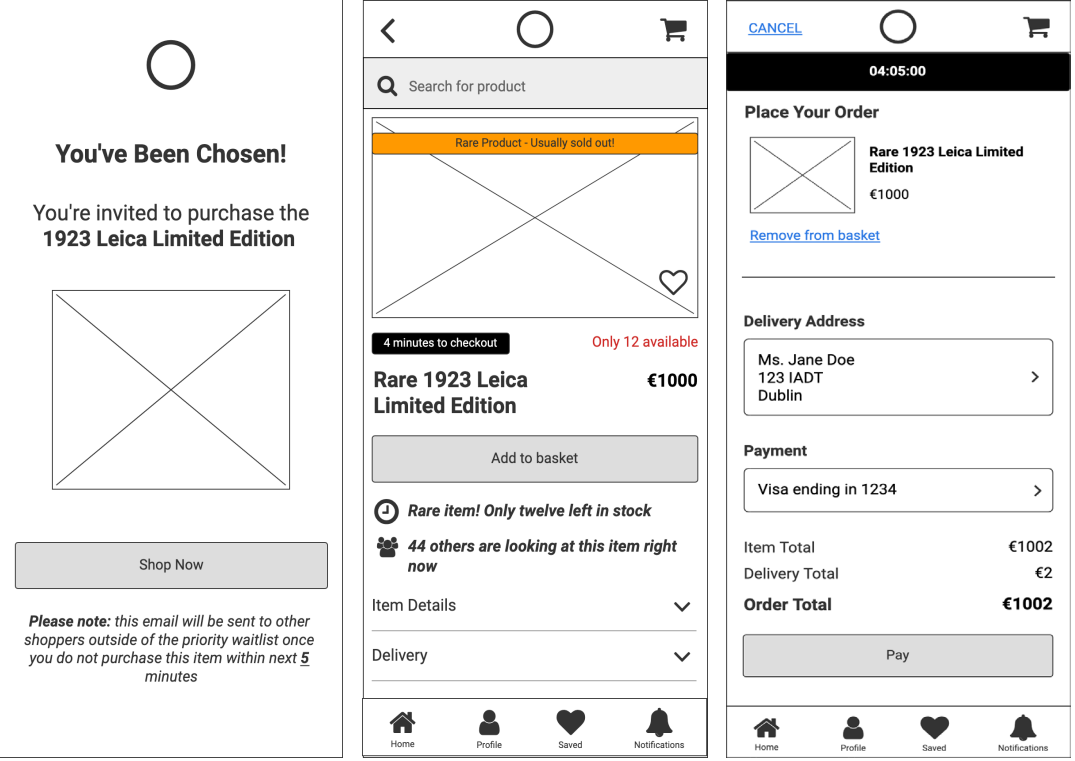


Figure 18 & 19. Versions of Low-Mid Fidelity paper prototypes were created to inform design decisions.



Figures 20-22. Versions of Mid Fidelity paper prototypes were created

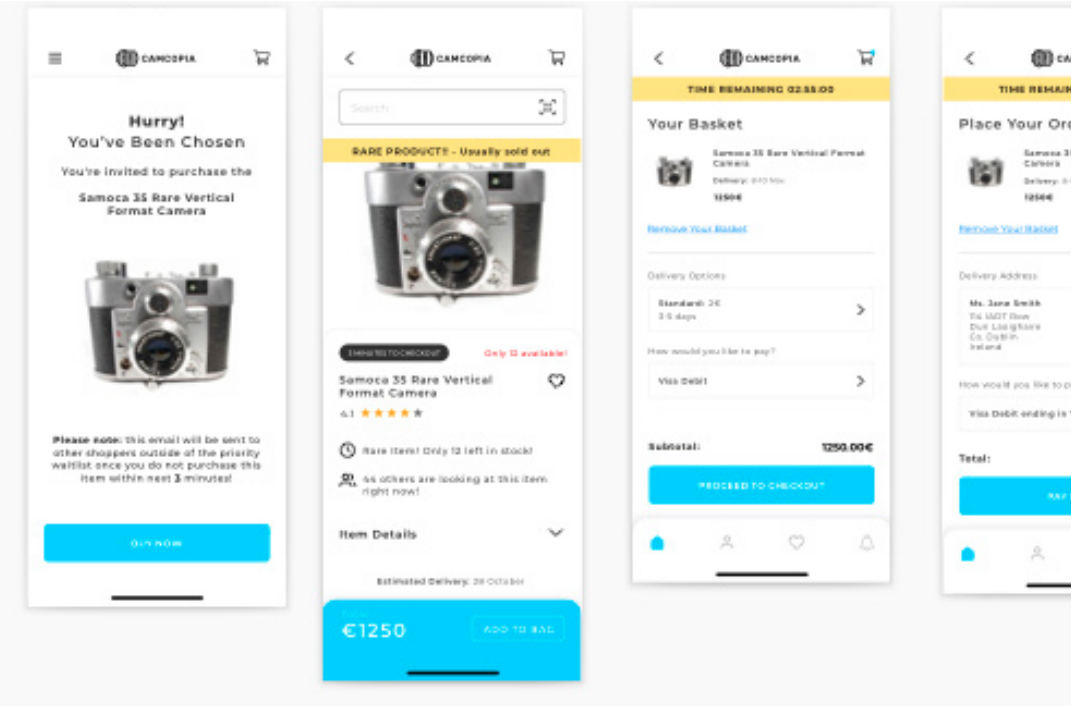
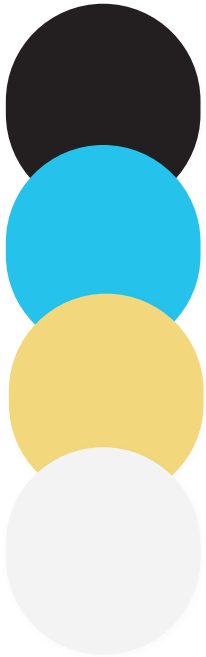


Figure 23. Close up of Final High Fidelity Prototype



This investigative research gave further insight into the user in order to develop the paper prototypes and begin the design.

Digital Prototypes

The digital prototypes were created using Balsamiq, a wireframe tool that allows quick and iterative wireframe designs to be implemented before creating a mid-fidelity prototype using Invision. The digital prototypes used icons and more detailed wording to create the tone of voice for the app (Gramcko, 2020). Once the digital prototypes were created in Balsamiq, a small group of testers were asked to click through the prototype in Invision to get a sense of understanding and test usability once again (Fig. 20-22)

UI Design

The design decisions were informed through best practice of Apple's Human Interface Guidelines (Human Interface Guidelines - Design - Apple Developer, n.d.) as well as Refactoring UI, a user interface design guide created by developers with user experience at the forefront of the decisions (Refactoring UI: The Book, n.d.). The context for the app was based on the interviews. The prototype presents an app that sells rare cameras and accessories. The logo for the prototype is developed from an icon of a camera lens (Fig. 24), with this the name "Camcopia" evolved for the online rare camera store, a camera utopia.

Colour for the app was informed from research based on the psychology of colour. Blue represents calm and secure (Elliot, 2015) which allows for the participants to feel secure in their online rare purchase helping to gain the users trust in the app.

CAMCOPIA

Figure 24. Close up of Final Logo for Camcopia

CONCLUSION & FUTURE WORKS

This research was carried out in the form of literature reviews, competitor analysis, research questionnaire, discovery interviews followed by personas, empathy maps and journeys informed by the interviews. This gave invaluable insight into the mind of a collector of rare items. By establishing a foundation of research before beginning the design phase, it allowed for more cohesive, informed design decisions as there was a basis of knowledge and understanding there before putting pen to paper.

Following the testing of the final digital prototype, no statistical significance was found between each of the 3 groups, control, lottery and auction as the Asymp. Sig. was more than .05. Thus, the null hypotheses were accepted and supported. Contrasting results may have been found if there had been more participants in each sample as each result would have more reliability. The SUS scale used in the control group has the highest overall ranking, thus corresponding to the highest score in the continuous variable (Pallant, 2020).

The Auction group had the lowest satisfaction and emotion across the three groups, whereas the control had the highest (Fig. 25) but statistically, the significance cannot be proven

Kruskal-Wallis Test - not significant

Ranks

	GROUP	N	Mean Rank
SUStotal2.5	CONTROL	14	25.64
	LOTTERY	15	20.67
	AUCTION	14	19.79
	Total	43	
MEcuetotal	CONTROL	14	23.43
	LOTTERY	15	22.00
	AUCTION	14	20.57
	Total	43	

Figure 25. No significance proven in the Kruskal-Wallis Test

There are some future works that could further help to investigate this research question. The designed prototypes could be coded to allow for more realistic representation of these shopping experiences.

There were a few inconsistencies in the prototypes. The scarcity principles employed in the final prototype are generally passive, in that the scarcity principles did not get in the users' way of buying the product, with the exception of the second auction bid. A stronger application of the loss aversion principle might also have helped to heighten the users' emotional response.

Lastly, the lack of qualitative data post testing. As seen in the results from the discovery interviews, qualitative data yields rich data, this could have led to greater insight.

REFERENCES

1. Aydin, A., & Girouard, A. (2018). Couch: Investigating the Relationship between Aesthetics and Persuasion in a Mobile Application. https://doi.org/10.20380/GI2018.20
2. Brooke, J. (1996). SUS: A "Quick and Dirty" Usability Scale. In Usability Evaluation In Industry (pp. 207–212). CRC Press. https://doi.org/10.1201/9781498710411-35
3. Cialdini, R. (1993). Influence: Science and Practice.
4. Constantinides, E. (2004). Influencing the online consumer's behavior: The Web experience. Internet Research, 14, 111–126. https://doi.org/10.1108/10662240410530835
5. DeBose, K. (2018). Research Guides: Research Methods Guide: Interview Research. https://guides.lib.vt.edu/researchmethods/interviews
6. eBay Inc. (2021). eBay (6.10.0) [Mobile App]. App Store. Retrieved from https://apps.apple.com/ie/app/ebay-shopping-buy-sell-save/id282614216
7. Elliot, A. J. (2015). Color and psychological functioning: A review of theoretical and empirical work. In Frontiers in Psychology (Vol. 6, Issue APR). Frontiers Media S.A. https://doi.org/10.3389/fpsyg.2015.00368
8. Etsy, Inc.. (2020). Etsy (5.69) [Mobile App]. App Store. Retrieved from https://apps.apple.com/us/app/etsy-custom-creative-goods/id477128284
9. Friis, R. D., & Siang, T. Y. (2021). Personas – A Simple Introduction | Interaction Design Foundation (IxDF). https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them

10. Gibbons, S. (2018, January 14). Empathy Mapping: The First Step in Design Thinking. https://www.nngroup.com/articles/empathy-mapping/

11. Gramcko, M. (2020). The impact of tone in Voice User Interfaces. UX Collective. https://uxdesign.cc/the-impact-of-tone-in-voice-user-interfaces-9df48f3a6522

12. Hillman, S., Neustaedter, C., Bowes, J., & Antle, A. (2012). Soft Trust and MCommerce Shopping Behaviours. Proceedings of the 14th International Conference on Human-Computer Interaction with Mobile Devices and Services, 113–122. https://doi.org/10.1145/2371574.2371593

13. Human Interface Guidelines - Design - Apple Developer. (n.d.). Retrieved March 26, 2021, from https://developer.apple.com/design/human-interface-guidelines/

14. IBM News room - 2015-04-01 4 Out Of 5 Consumers Declare Brands Don't Know Them As An Individual, According to IBM and Econsultancy Study - United States. (n.d.). Retrieved March 26, 2021, from https://www-03.ibm.com/press/us/en/pressrelease/46454.wss

15. Minge, M., Thuering, M., Wagner, I., & Kuhr, C. (2017). The meCUE Questionnaire: A Modular Tool for Measuring User Experience (Vol. 486). https://doi.org/10.1007/978-3-319-41685-4_11

16. Molina-Azorin, J. (2016). Mixed methods research: An opportunity to improve our studies and our research skills. European Journal of Management and Business Economics, 25, 37–38. https://doi.org/10.1016/j.redeen.2016.05.001

17. Mosunmola, A., Omotayo, A., & Mayowa, A. (2018). Assessing the Influence of Consumer Perceived Value, Trust and Attitude on Purchase Intention of Online Shopping. Proceedings of the 9th International Conference on E-Education, E-Business, E-Management and E-Learning, 40–47. https://doi.org/10.1145/3183586.3183594

18. O' Connor, K. (2011). Personas: The Foundation of a Great User Experience | UX Magazine. https://uxmag.com/articles/personas-the-foundation-of-a-great-user-experience

19. Pallant, J. (2020). SPSS survival manual: A step by step guide to data analysis using IBM SPSS. Routledge

20. Refactoring UI: The Book. (n.d.). Retrieved March 26, 2021, from https://refactoringui.com/book/

21. Runtastic GmbH (2021). Adidas (4.1). [Mobile App]. App Store. Retrieved from https://apps apple.com/us/app/adidas/id1266591536

22. Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales. In Journal of Personality and Social Psychology (Vol. 54, Issue 6).

23. Yi, C., Jiang, Z., & Zhou, M. (2014). The effects of social popularity and deal scarcity at different stages of online shopping.