



Securing the Collectable's Market

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the exposition is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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30/10/2019

Abstract

The collectables market has changed greatly since the introduction of digital platforms such as eBay. As demand and accessibility increases so does the profit third party organisation can gain from the exploiting the community. As a result, keeping pace in fields where authenticity is important has become increasingly difficult. Collectable products gain value from their scarcity and the cultural practices within the collector community. In a space where trade between users is just as important as retail purchases, authenticating a stranger's possessions and establishing trust between buyers and sellers is essential. Through extensive consultation with collector communities, the research proposes a new application that uses Blockchain technology to determine the authenticity of popular collectables called 'Funko Pop vinyls'.

The Blockchain ensures a permanent record can be maintained for each collectable. This is accompanied by other technologies including NFC and OCR integration. By allowing anyone in the community to verify a products origin, it will be harder to sell unofficial products to collectors. Using the proposed '*Vinyl Chain*' app users can authenticate products within the collectables market and have greater confidence when trading with fellow collectors. Moving forward the design seeks to engage with other fields where authenticity is currently difficult to identify. Products like Vintage Wines depend heavily on their point of origin and securing the market has a pivotal role in maintaining resell value and protecting all kinds of consumers.

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Figure 0.1 - Funko Pop vinyls Collection

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Introduction

Collectables, toys and games aren't something that haven't changed much in the physical realm in a long time but as the world enters the digital revolution the ways people interact with leisure items such as these has evolved. I personally love to collect all kinds of products and in this research, I wanted to delve deeper into why people do this as a practice. My passion for collectables drove me to research the field but I let my findings drive the projects direction and outcomes into something that fit into the world. Friends, family and online communities had already taught me just how differently everyone behaves regarding collecting and this incentivised me to really understand why people act this way. Collecting is seen as just a hobby to a lot of people but collectors take part in this practice for a variety of different reasons, no two collectors are the same just as no two collectables are exactly alike.

The first step to delving deep into the field of collectables was to understand the major reasons it's a practice in the first place. Understanding the historical and psychological context of collecting using primarily secondary research was important to understand the

field. I also used this to define past, current and future products and technology within the field to help define the broad aspects of collectables. The ways the modern world is influencing the field was also a key part in uncovering the ways I could really develop something innovative in the space. Collectables can be quite traditional in a sense where nostalgia plays a huge part in the reasons people collect products. However, in the modern world products are losing their physicality as augmented and virtual reality continue to revolutionise the space especially in a gaming environment.

Following this I delved deeper into the field with more focused primary research amongst the communities in the physical and digital space. This helped me discover current collecting practices and I used this understanding to find a place to intervene in the space. Through a series of interviews with collectors and collectables' designers I was able to understand the different major problems users in the field are actively facing. Most of these issues revolved around security and authenticity with their products due to the increasing accessibility of the digital market. The online marketplace has made collecting

easier for people because their access to products has increased dramatically but it also poses a great deal of risk when buying from sellers hidden behind a username. The very first focus of the project was to combine the physical and digital worlds in the field of collectables using augmented reality. After discussing the issues with security and the dangers of trading with anonymous users in the different collector communities, the goals shifted. They changed to become more focused on security and helping users authenticate products they may buy from online retailers, resellers or even other users.

Various design methods were established early on to iterate a design outcome with the aid of the relevant communities. Through research, sketching, prototyping and app development I took steps to actively intervene in the field and develop a design that would benefit all kinds of collectors. Once I presented a design proposition to a variety of people in the communities I then began working on an accessible solution. The user's current collecting values were established as key factors to the outcome's innovation early in the research. An application seemed like a powerful way to develop my design because of its widespread integration with how people currently track their collections. I used these methods to develop an early prototype so that I

could engage with the community and create a powerful user experience. The methods undertaken have been key in properly developing the design to fit the current collecting culture.

After using design methods on early prototypes, I then moved on to developing the final outcomes through more than a dozen major iterations. To give the entire project a stronger presence in the community I first established a colour palette and key branding elements. The design then pushed forward into developing a series of wireframe prototypes on Adobe XD to be viewed on a mobile phone and further tested with users. After several major iterations I established simple user engagements and corrected the flow of the application. This was important to not overwhelm users with the underlying technology incorporated in the outcome. After this I proceeded to develop the product on Android Studio, the industry standard development platform for android applications. This allowed me to incorporate functional elements into the final design to make it easier to show collectors and potential clients.

Every minor touch-up to the design was followed by testing the app with small sample groups and posting images onto the online communities for further feedback. I conducted further research and

user-testing during the iterative phases which helped me understand how people interact with their smartphones. The app had a lot of information to convey so keeping potential users in the loop helped me develop a powerful user experience. Collecting can have a lot of nuances and unless assistive tools make a collector's life easier, they will ignore its presence in the world and find other solutions. Simplifying and enhancing the processes they already have, such as storing certificates and taking extensive photos of products helped keep them engaged in the project. Most users that tested the app had a positive response to the design and discussed new things to implement into the design. Things like incorporating marketplace and social elements as well as other potential products that could benefit from the outcome.

My goal throughout the research has been to secure the online marketplace in ways that give more power to the community. Vinyl Chain is my final developed android application. It allows users to securely

store information using Blockchain technology. This is all done whilst incorporating information such as product serials and evidence of vaulting their Funko Pop vinyls to secure their value using NFC Tags. The more dedicated collectors often require this information to safely trade with all different kinds of sellers in the future meaning that everyone gets something different out of it. This transparency of information facilitates more trust in the community because people can more easily distinguish between real and fake products. Creating a link between physical products and the online platform through NFC Tags has enabled digital security to work in all kinds of ways that previous forms of authentication haven't been able to. The Vinyl Chain app has also been designed in such a way that it can fit different products in the future. In the future this platform aims to facilitate the buying and selling of vintage wines, computer parts, collectable shoes and any other products with a reliance on authenticity.



Chapter 1

Field of Practice - Collectables

Collecting is a practice that is unique. While it is extremely common and the reasons why people do it are never black and white, everyone has their own reasons. Amateur collecting is rarely a practical activity and the practice most often takes the form of a simple hobby for people to pursue. Collectables are often defined as a product people collect and affiliate with a collection because of a discernible style or reference. Something that isn't like anything else in brand, style or form wouldn't inherently be a collectable however the collector ultimately decides whether it belongs in a group. Collectables come in many forms, cards, coins, plastic and metal products and ceramics or china.

The History of Collectables

Humans have acquired impractical luxury products for a very long time. Such a long time that a 'collection of interesting pebbles found in an 80,000-year-old cave in France' (Belk, 2013) may be its earliest record and shows that it has a long history. The period from about 1550 to 1700 is one which 'European culture was marked by an intense fascination of the marvellous' (Belk, 2013). They had

this curiosity because during this time the Europeans reached Asia and the Americas, and the flow of goods and knowledge enticed them to collect due to the very exotic nature of these new things in their lives. This informed the possible characteristics of what a collector from this time might have referred to as a collectable. Ultimately assembling a collection of things is most often subjective.

The list according to Belk proceeds as follows:

1. 'Novelty or rarity.
2. The foreign or exotic.
3. The strange and bizarre.
4. The unusually large and the unusually small.
5. Demonstrations of supreme technical skill or virtuosity; the triumph over difficult problems and the achievement of the seemingly impossible.
6. Vividness and verisimilitude.
7. The transcendent and the sublime.
8. The surprising and unexpected.' (Belk, 2013)

All these attributes draw attention to unique qualities of a given product or thing and ultimately rarity is what makes them worth collecting to whoever might do so. In contrast Pearce (2012, p. 225) claims that the most important trait of a collection is that 'each item must be different from all others in some way discernible to the collector.' Collectables can have a plethora of different defining characteristics, but a collection can have no two

products the same, this is known as the 'no-two-alike' (Pearce, 2012) principle with the only exception being a difference in perspective and understanding that the collector might have that the audience doesn't. For example, even if two objects seem completely identical to a third party, they might have distinctly different emotional qualities for the collector, thus defining them as subjectively non-identical.

The Psychology of Collecting

Another defining aspect of collectables is understanding the reasons why people want to collect things. Historically acquiring items has been for survival in ancient times and in modern times it often fits into the practicality of improving the user's life. However, collecting things for the singular purpose of forming a collection is rarely a practical activity and Pearce (2012, p. 222) argues that collecting is a completely 'voluntary activity' for pleasure and a form of play. Some people collect things for the purpose of monetary gain as a part of their day to day jobs but for most it simply gives them pleasure. Much like in history when a collection of things like pebbles or sticks didn't have any direct usefulness there is proof to show that humans collected them anyway. This shouldn't be the only reason people collect however as there are hundreds of viable explanations. Some use it as a social

activity and others to boast a certain historical social status or wealth such as a 'wealthy female informant's collection of monogrammed silver spoons inherited from her husband's mother indicates that it served as a mnemonic device conveying the importance of family name (through the monogram), wealth, and social position.' (Belk, 1988) The reason people collect and what it means is constantly changing as the world enters a new technological era. Major shifts such as social media and the availability of smartphones is changing values in society and the way people interact. Collectables can be a very social activity and now people are collecting physical things less often because of the availability of digital collectables, even though this dynamic is changing the reasons people collect things often remains the same.

Another large component of collecting is the arrangement and display of the collection. This process is 'creative in nature' (Campbell, 2005) and can be viewed as a basic form of art. The way the collector seeks to display and communicate their collection can have its own defining characteristics for the value of the set and inspires them to fill in any gaps they identify. However, how components of the collection piece together remains subjective. They can decide whether their collection of a product is complete or if they need to pursue more components. Especially with specifically collectable products the collection is always expanding at the pace of the designer, but the consumer can choose to control how they view it in

their own personal way. For example, there might be a range of products such as Star Wars but there are different versions of each product. They can decide if they want to pursue the entire range, there aren't often predetermined guidelines, the goal is almost always created by the collector. Even though there are no objective guidelines there are a series of social ones, things like monetary value, the concept of maintaining value by not damaging a product and basic rarity principles. These don't define the collectables and consumers but can often influence the motive behind their purchases as these social behaviours are quite well known especially among dedicated collectors.



Figure 1.1 - Camberwell Sunday Market by Aerometrex, 2015

The Communities

Most of the communities present in the collectables world today use social media as a simple platform to buy, sell and trade their unique products. Before this, the most common way people hunted down the missing pieces to their collections was through antique fairs, auctions and public markets like the Camberwell Sunday Market as seen in Figure 1.1. (Aerometrex, 2015). Belk (1995, p. 479) states that for a collector Investment is the primary motivation. The action of hunting down what they want to complete their set through an investment of their time and money is the most important part. For certain things, more specifically where the collectables' integrity and condition

are important, buying online is unpredictable and lacks certainty for the outcome but it is a quick and efficient way to fill the gaps of their collection.

Coin collecting is something that has been around for a long time and ever since it became popular, mints have gone out of their way to produce unique one-off coins for collectors. These are highly rare coins that can have completely new designs specifically for collectors and are worth a great deal of money, especially in a completed collection. Sometimes a mint will even misprint coins and quickly correct their issue but not before the misprints reach the public. Mistakes like these can create

valuable coins for highly dedicated individuals because of their rarity. Even though they were originally mistakes they are still official, and the community subjectively creates their worth. The mint noticed the growth of coin collectors and currently makes special limited-edition coins that aren't for circulation but are special collectors' items, these are even more valuable since they aren't circulated and therefore, they're in perfect condition. With this comes a lot of questions in the community

about how to determine a coin's authenticity and condition because of their importance. Collectables are intrinsically linked to their monetary value which is what makes this important to most collectors. Newman (2019, p. 9) notes that across literature authenticity encapsulates what is genuine, real, and/or true. The difference in quality between a real and fake product can be all the difference for the overall cost, and if the product will increase in value over time.



Figure 1.2 - Night King Funko Pop vinyl

Another example of a popular collectable with a strong associated community are Funko Pop vinyls (see Fig. 1.2). These are a very large set of small collectable toys that have a discernible style that ties them all together no matter how different the franchise they belong to. This is a good example of a product that is designed specifically to be collected. What sets Funko Pop vinyls apart from other popular toys is that 'the figures themselves do not move, so they might not be as fun to play with as other toys with more points of movement.' (The Harvey Centre, 2018) This is because they are distinctly marketed to adults as a collectable product, their boxes are also made in such a way that they stack together nicely and visually connect to each other in such a way that it presents itself as a collection when placed in groups. Large companies like Funko, the developers of Funko Pop vinyls use communities such as Facebook to grow their range. Things like 'make-your-own' competitions and signing days from designers and celebrities help to bolster their new releases and upcoming products.

Signing products has always been a large part of the collectable's realm but now in this interconnected world it is far more accessible to a larger number of people. Signing has always

posed an interesting question in the context of collecting because of some of the social standards that are in place. Damaging products almost always decreases its value and is often considered a mistake however signatures, done with permanent ink has become an exception. Most people consider a signature to increase something's value but not every collector will view it in the same way. Some will only buy something if it has the designer or artists signature on the item, but a lot of people will appreciate even an actor or voice actor that has portrayed the character using their signature. Certificates of authenticity exist to confirm a signature's authenticity, but digital signatures are growing in popularity, they are far more difficult to fake and don't make an irreversible mark on a physical product. Unless someone can prove a signature's authenticity it's as good as worthless to the rest of the community.



Figure 1.3 - Football Cards

Collectables and the Digital Space

A large zone of collectables that have combined both the physical and digital realms in the past are 'Trading Card Games'. Baseball cards, Football cards (see Fig. 1.3), Pokémon cards and even Yu-Gi-Oh are all collections that can be used to play against other players. The manufacturers of these use a more typical identifier of rarity to make more sought-after cards, they produce less of the more conventionally stronger cards, ones that help the user win the game. This has been the easiest collectable product to transfer into the digital realm since they can use online transactions to create the same economy digitally. Trading cards

are often just a 2D image that has already been printed, this means they can take the digital database they already own and then transfer the information into a video game. The cards already have rarities in their physical economy and once all this data has been converted, they can essentially remake the game in a digital landscape that's more accessible. Magic the gathering card packs currently have codes that enable a free digital pack, but this system keeps the two mediums separate because the specific cards don't directly convert. This has removed some social elements of the games themselves and especially the tradeability of the cards since

a lot of these platforms don't allow trading between players. By being able to limit trading the developers can ensure players need to continue spending money to enhance their collections instead of collaborating in their community.

Two major examples of interventions into the convergence of the material and digital spaces are Amiibos (see Fig. 1.4) and Skylanders. These are very similar in a lot of ways; both interact with a video game to provide in-game rewards however they have a significant difference. The Skylanders debuted in 2011 and Amiibos debuted in 2014 meaning that the technology they used was vastly different. Skylanders use something called RFID chips and Robertson (2012) says that the game can be quite hard to complete with only a small set

of Skylanders which helps market them to the public. Amiibos use an NFC tag (see Fig. 1.5) and 'open a whole range of potential new game-play experiences' (Seppala, 2014). Simply put, Skylanders works with a singular series whereas Amiibos function within Nintendo's entire entourage. With the new technology instead of just giving information to the game, the Amiibos have the added ability of



Figure 1.5 - NFC Tag



Figure 1.4 - Amiibos



Figure 1.6 - Playing Pokemon Go along the River Thames
by IBTimes UK / The Pokemon Company, 2016

storing information after the user is done with the video game. This means that the collection is enhanced through user generated content whereas sharing and trading with others doesn't just offer the physical product anymore, but the ability to personalise it.

When merging the game space with the real world a recent example of a collecting phenomenon that makes use of digital platforms is the obsession with the mobile video game Pokémon Go. Pokémon Go is a game where players use augmented reality to see virtual collectable creatures in real world locations as demonstrated by a player on the River Thames in Figure 1.6 (IBTimes UK / The

Pokemon Company, 2016). However, to achieve the games objective to 'catch 'em all' [1] the player needs to travel to lots of different places in their local neighbourhood and around the world. But to understand what makes Pokémon themselves a collectable you must consider their roots. The creator of the Pokémon franchise, Satoshi Tajiri 'loved bug-hunting as a kid' (Lopez, 2016). He used his inspiration of collecting insects as a basis for a video game that would later become the highest grossing media franchise in the world. In the game Pokémon, the player sets off on a journey to collect every single Pokémon in the game and complete its crowning achievement. In Pokémon Go the goal is the same but the new

mobile platform makes it far easier to boast or trade your collection with others and keep the digital creatures with the player as they go about their daily lives. Niantic, the developers of Pokémon Go then discovered the last piece of the puzzle to really capitalise on the collecting incentive built within Pokémon, creating real world effort and commitment. In the original game's players would collect their monsters on their Game boys in the comfort of their own homes, but part of the enjoyment is the investment in collecting. It is one of the first games to create genuine investment for collectors using Augmented Reality (For more information on AR, see Appendix A).

There are also digital collectables on a Blockchain called ECOMI Collect. Today 'digital collectables, artworks and intellectual property are now fully protected' (Skellern, 2018) which means that they can never be copied, giving them value in the online marketplace. Using Blockchain technology to secure physical objects is becoming more common in food supply chains because RFID tagging is now 'less expensive and more effective' (Costa et al., 2012). Since this can track transactions made on the Blockchain companies can secure the entire supply system in a transparent way so that the consumer safely receives their produce. Blockchain then crosses over into other product

streams since it can be used in a very similar way that proves the quality and authenticity of collectables because it 'tracks their history and therefore confirms their place of origin. Using a Blockchain decentralised ledger, it can show the end user that the collectable they are buying is authentic. Opposed to Certificates of Authenticity they are all created and given out in different ways not all of which are completely secure because they are so easy to fake. Untrustworthy parties can forge a signature and stamp on a Certificate of Authenticity and because they are physical pieces of paper, they are extremely difficult to track back to an official origin. With the blockchain, a certificate can be entered into the blockchain and even if it is edited a record of its original contents will always exist, this provides a strong level of security and makes it difficult for untrustworthy manufacturers or other large bodies from forging documentation for a product.

Companies seek to govern what makes collectables valuable through control over their supply chain however the meaning of any specific collection is ultimately defined by the collector. They decide whether two pieces in their collection are alike, marvellous or just give them joy. Collecting is a form of leisure and play and for many, a social activity. With the introduction of

social media and the digital medium the entire field is evolving. Socially, more accessible technology has enhanced the way people interact with collectables. Creatively it's more about words on a page than organising things on a shelf, it's all about the list of ownership someone has rather than why they have them and the connection they have with their collectables. Video games make this even more interactive in the digital space, no modern video game ends at the game over

screen, there is always at least one secondary objective, usually a set of achievements or goals and fundamentally these are there for the player to collect. Only once they obtain them all can the player say they've truly finished the game. Collectables are unique because they are so subjective, the patterns found help to define the field and understand the general ways it interacts with the world.

Chapter 2

Context and Application

Collectables are a very broad subject and even though collectors examined through this research collect lots of different things in many different ways there are still patterns amongst them. The way these products are designed and distributed, the reasons people collect and what makes a product increase or decrease in value all remain very similar. It is also important to note that everyone is still different in the way they do things even though similarities emerge when they start talking to one another in their respective online and offline communities. During this chapter the research conducted informal interviews, used cultural probes within online communities and made other observations at marketplaces and fairs. Through all this a variety of different information was gathered in conjunction with the field research to help piece together the identities of collectors and other stakeholders in the field. Through this understanding it has begun to formulate possible areas to intervene within a design context.

The Collector

A key stakeholder when it comes to collectables is the consumer themselves (see Fig. 2.1). When the research delved into online communities of collectors and contrasted them with the communities that preferred markets and fairs, it discovered that it's rare to find a dedicated collector who doesn't engage with both. The more casual consumers often use one or the other because they aren't so invested in finishing a collection, they just use whatever they find easiest or enjoy the most. The research finds evidence of coin collectors that are on the hunt to complete their collections at fairs. These same users have notifications set up on their phones and other devices for online marketplaces and regularly listen to Podcasts about their favourite topics to stay in touch with the world they have immersed themselves in. Hunting in the past has been very social for dedicated collectors and it's even easier to do now with the addition of newer technologies, however neither the physical nor online marketplace alone seems to give them the complete satisfaction they are after. One is always missing something but in unison they are quite effective. Because of the introduction of online sales platforms Ellis (2008, p. 3) says that sometimes collectables are cheaper when offered for sale in their own market

because on this platform they don't have the added rarity. This makes it easier due to the improvement to accessibility for collectors but there will always be missing components to their collection that can only be found by looking everywhere. This has helped shaped the way people collect because of new technologies and made the market much larger and more dynamic than it has been in the past.

Another thing that is important to understand is to know why people collect but the reason for this may be quite diverse depending on the person. There are many things that influence this reason and draw people to collectables including a person's childhood, friendship groups, financial gain and even if the person needs something to be passionate about. These things have been identified as the four main reasons people collect things for collectables that have the primary focus of being a part of a collection. The exceptions are products like Pokémon and trading card games where winning the games associated with the products may be more important to the user rather than the act of collecting. Many of the interviewees expressed nostalgia for the things they've collected, some love older coins because of the history they have, and others love

collecting characters from childhood TV shows or movies. Orth and Gal (2012, p. 668) say this is because consumers are reliving the original emotions triggered by remembering affect-laden personal experiences. However, some people love to collect because it gives them something to discuss within their social groups. This hobby that they've developed together gives them a reason to go hunting for specific products together and enjoy the social aspects of their lives. In some cases, it was discovered that these sorts of similar interests can help build a relationship as well, shared interests between friends and even partners

can create lasting bonds. Many people identified as being less busy when they enter later stages in their life and collectables provide a hobby that allows the user to develop an undiscovered passion into something creative that they can be proud of for years to come. Lastly a lot of people collect almost exclusively because they think something will increase in value over time. This doesn't always mean that they will have the intention of selling their collection but the knowledge that its more valuable than when they bought it can be enough to drive their passion for collecting.



Figure 2.1 - The Collector

The Designer

There are lots of designers in the field of product and industrial design that develop collectables and it takes a large team to produce a series of collectables even though it might appear as a simple process. The designers are a key stakeholder because they are the bridge between what collectors want and the products that are made. Firstly, many collectables are based off trademarked characters and need to be licensed from whoever owns the intellectual property. It is also good to note that the starting concept artwork for the product is very important. 'Artists play with

ideas digitally to give a sense of what one or more of the figures in a series might look like' (Rasmus, 2018). Which allows them to ensure that everything in a collection has a similar style. After all this work, they need to go through extensive modelling and manufacturing processes and advertising before they can become successful.

The research talked to two designers from Moose toys, Ben and David. Ben worked on a series called Shopkins as shown in Figure 2.2 (WorthPoint, 2019) and David focused on a series called Pikmi Pops as visible in Figure 2.3 (Moose Toys, 2019), to my surprise Shopkins had higher sales than Lego at one point in time. Shopkins are an extremely simple, colourful and small plastic collectable that takes on the appearance of general grocery items like fruits, vegetables, butter etc. Pikmi Pops are a range of plush toys that have a different theme every year, the current one being donuts. A large percentage of girls' marketed toys have a collectable appeal to them and come in blind boxes. A blind box is a product that has its identity hidden to the user, it could be anything from a selection of the range and is essentially a gamble of getting either a common product or a rarer one. Ben mentioned that the company especially during



Figure 2.2 - Shopkins Collection
280 by WorthPoint, 2019

their record sales point put a lot of emphasis into pumping out as many new lines of Shopkins into the market as they possibly could.

In conjunction with what Ben said Shopkins is an 'entry with a foothold in the animation world' (Bowman, 2017) which has largely helped its success. He states Moose Toys had the mindset that Shopkins would 'take over the world' (For the summary of the interview with Ben, see appendix B). With Pikmi Pops David exclaims that they are designed around themes that are currently trending in the marketplace at the time. Children tend to switch their interests at the drop of a hat and designing for them requires

understanding of the current trends and switching product lines as fast as children change their minds. He also describes that the media, nostalgia and pop culture in the background of collectables, especially toys, has a huge effect on its success. Without something to bolster their marketing campaigns children might not be interested enough in the product to create a collection and instead will choose something else that they can relate to a movie or TV series (For the summary of the interview with David, see appendix B).

Alongside mass manufactured collectables exists another more niche designer that develops singular collectable products of their own



Figure 2.3 - Pikmi Pops DoughMi Scented Doughnut Plush Toys by Moose Toys, 2019

design or an edited more well-known one. These are sometimes for collections alongside more official products where the collectors feel there is a gap, however they are often for other reasons like a unique product that looks like the user. For insight into this the research talked to a designer called Jessica who edits Funko Pop vinyls and customises them to look like her customers, or whatever it is they want. As seen in Figure 2.4 (IsilyGoodArt, 2019) a common practice of this is wedding cake toppers for couples who have huge Funko Pop vinyl collections and want to add a more personal product into it. Jessica uses sanding and carving tools to edit an existing Funko Pop vinyl of her choosing then she uses epoxy sculpt to add any extra details she might want. With a final

coat of paint and a photoshopped package design she can provide a product her customers are happy with. If there is demand for it, people can charge whatever they deem to be the value of their labour. With official products their value is mostly based on their rarity in the market, with unique unofficial purchases the quality and craftsmanship of the outcome helps to determine its value. When it comes to one-off products from independent designers the skills and reputation of the designer are the most important component when determining its value to the collector since the market has far less demand for it than official products do. Add the accessibility of online marketplaces and communities and what would be someone's hobby can turn into a profitable business.



Figure 2.4 - Custom Wedding Cake Toppers (funko pop) by IsilyGoodArt, 2019

The Importance of Authenticity

With so much demand in a space with limited releases it opens the area to fake products being secretly added into the market. The Pop Collectors Alliance (2018) recommends that When using eBay to hunt for Funko Pop vinyls, collectors should carefully review the sellers' feedback and ratings. This is because many people sell fake products using these basic marketplace platforms to enter them into the market. These markets are so accessible that by selling products at a cheaper price they can trick uneducated buyers into purchasing something unauthentic. Authenticity is important because it affects the quality and value of the collectable consumers are buying. A major frustration in the collectable's community is when fake products are entered into the market and people unknowingly purchase them for a largely inflated price. The research conducted several discussions with collectors in the community and even though it's rarely impossible to identify a fake product it does take a lot of practice and knowledge in the field to do so. Newer collectors often rely on the communities and more knowledgeable collectors to avoid buying fake products and a lot of the time the seller is just someone who doesn't know they own a fake. One user put it quite simply by saying that if you're buying a product for \$1000 and it is a fake then you essentially

just lost \$980, this is because the standard price for a Funko Pop vinyl is around \$20, and a fake can never really exceed this amount in the market (For a summary of the responses regarding authenticity, see appendix C). However, some more seasoned collectors will knowingly buy a fake at a cheaper price to fill the gaps in their collection until they can replace it with the real version in the future. Another point that was brought forward is that fake products are generally of a poorer quality in the materials, have simpler forms and lower quality printing and many collectors believe this has a negative impact on the entire standard of collectable products. Users in the communities have recognised a slow decline in the quality of the official products to most likely compete with the cost and manufacturing speeds of their competitors. Evidently since the products remain the same price at a lower quality, this damages the reputation of the official company and reduces the faith of its audience.

Dedicated collectors using today's accessible technology will often flip things such as coins or Funko Pop vinyls on eBay and Facebook by using the interest and demand present in the community already. Flipping a product means with their knowledge they can buy for a good price then sell it at a rate

where they turn a profit. Funko Pop vinyls and other specifically collectable products come into a very similar realm of buying and selling. Companies produce these products with changing market value in mind and develop limited release versions of products called 'chase pops' (Popcultcha Help Desk, 2018). Chase pops have the slightest variations but much like a specially made coin at the mint they are extremely rare and worth far more than they retail for. To turn a profit lots of dedicated collectors find 'vaulted' (Mortimore, 2018) Funko Pop vinyls. Mortimore (2018) describes that a product becomes vaulted once an item has been removed from production for good and will never be made by the official brand ever again. These products become highly exclusive because there is a limited number in circulation and then sell for a price far above the retail price years down the track. Dedicated collectors will vault as many of their products as possible and then re-sell them on eBay for a largely inflated price. Another reason collectables like Funko Pop vinyls are so popular is their retail price at \$19 each, which is cheap in relation to other largely popular collectable products. Even though hundreds of Funko Pop vinyls can be expensive, slowly collecting them over a long period of time can seem quite insignificant to a collector's bank account. For a lot of people, collecting is about

slowly building up the collection. One collector expressed that the thrill of finding a coin they've never seen before was often the highlight of their week. Many users share the same experience with Funko Pop vinyls, finding something extremely rare on a store shelf that no one else noticed would make their whole day and give them a story to tell about their collection for years to come.

The research hasn't encountered anyone that didn't value an official product more than a copy which stands to reason that the brand and its reputation is also extremely important. A collectables' market value is determined by supply and demand' (Wayforth, 2019) and the demand for an unofficial product is extremely low because of the current social culture. This means that fake items lose value since there isn't enough want for the product unless it's made by the original developer of the series. After discussing the importance of it being made by the original manufacturer, the values and opinions expressed by collectors indicate that buying or selling copycat products is a social taboo. It's important to them that the creators don't have their intellectual property stolen and by not purchasing from third party sellers they can drop the copycats' sales and decrease their presence in the market. However, personalised, one-off designs do not have the same social taboo because

they do not attempt to clone existing products to turn a profit, instead they are singular products of their own design that do not try to sell themselves off as something else.

Another large component of collectables to users is the different ways they can personalise them. Collectors often have a deep emotional connection with the objects in their collection and the digital space creates a lot of opportunity to further this. Social norms prevent any physical personalisation of something that may increase in value for future

generations because it may alter its worth to other users. Through different technologies such as digital customisation and virtual and augmented reality collecting can be enhanced in new ways. With programs like Google Blocks as seen in Figure 2.4 (Zotomayor, 2017) allowing less technologically savvy users to 'easily create beautiful, 3D objects in no time' (Betters, 2017) there is plenty of opportunity in the field to really allow users to customise their collectables and truly make them one-offs. This sort of technology



Figure 2.4 - 3D Modelling with Google Blocks by Zotomayor, 2017

will provide most with a way to personalise all the things they've worked so hard to find and really help represent the collector in the digital space. This provides the research with opportunity to develop a product that uses this change to enhance the entire experience without changing the physical form of any highly valuable products. Collectors can both personalise and socialise with their own creations while still indulging in the growing market of collectables and hunting for the newest official products designers have created.

Considering the frustration of the communities regarding fake products in the market there's opportunity to create something that helps the newer collectors as well as the more experienced ones. It is rarely impossible to identify a fake product over a real one and with the assistance of official databases and veteran collectors a platform can be developed to help the market become less saturated with unauthentic entries. There are already technologies that have been implemented in different areas for a long time now and could easily transfer into the field of collectables. Collectables had their value increase

largely due to the accessibility of selling platforms in the world but in the same way this increases the risk. Digital technologies like Blockchain and NFC allow for ways to counteract online risk and this hasn't been implemented in the collectables field yet, so it provides opportunity to the design project.

Collectable products have undergone some major changes over the past decade. Many collectables and toys are still being sold for high values, accessibility to buying and selling platforms has increased the supply and demand for these products. No two people collect for the same reason, some are driven by passion, some by money and others love to compete with their friends. New strides in technology, especially in augmented reality may be able to further explore the different ways people collect and interact with each other. It will also bring new experiences in ways that have never been possible before. New technology has the potential to allow customisation, change the ways people interact with personal products, and protect their valuable items. This is the direction collectables are heading that provides plenty of design opportunity in the field.

Chapter 3

Design Methods

The values of collectors and the ways design provides something that interacts with them well is crucial. Collectables are very subjective and to really understand how to properly design for the field, research and prototyping are all participatory design methods that have been used with the target audience during every stage of the design process, especially when iterating the outcome. The research has divided these methods into four major areas; research including cultural probes, surveys, interviews and secondary research using scholarly articles and other websites. Visualisation using brainstorming, mood boards, 3D scanning, modelling, journey mapping and sketching. Prototyping through electronics prototyping and app development methods and lastly, user-testing to engage collectors and other users in a way that informs the design. These all benefit the design in different ways and create a closed loop workflow, that returns to the users after every iteration to help it inform the outcome.

Understanding the Field through Research

An early stage in the design process to help understand the users in the field used secondary research, such as books, online articles and videos. The secondary research informed the project about some of the general things to understand about collectors and its history. Understanding the historical context is important to recognise the fundamentals of human nature and psychology regarding collectables. It gives the core values that are constant in the field and by comparing this with the current values gained through primary research a better understanding of the collector has formed. It has also proven useful when researching current products and technologies present in the world that may benefit the field. Products like Amiibos and Skylanders intervene in the space in new ways, the research needs to understand this to ensure the design is innovative. Things like RFID and NFC are used in these products and aren't common among collectables, but online articles show just how effective it could be when intervening with the space. This is the same with Blockchain technology, it is quickly growing in supply chain traceability and the research shows just how smoothly this can translate into the field of collectables. Online searches are the fastest way to obtain current information in the field and provide

a large range of results. Google Scholar with specific key words provide academic articles, searching for specific games gives good precedent information and different collectables' forums give valuable user data. All of these are continuously occurring throughout every stage of the design process, especially when the project takes a new direction.

To help the research understand key values of collectors, cultural probes and online surveys were conducted amongst key communities including several for Funko Pop vinyls, one for coin collectors and a few for different digital collectables. Cultural probes 'provide some insights into user needs and perceptions as well as a method for ensuring the early, active, involvement of users in the whole design process.' (Cheverst et al., 2003) The research requested a daily photo of a collectable or group of collectables from participants in Facebook communities and an explanation as to why they chose them (For a summary of the responses from the cultural probes, see appendix C). It has provided information and insight into not only the collectors' lives but the time they've invested into their collections and the reasons they collect. The request had to remain succinct to

get enough responses and since that makes the results broad it was used to derive contrasts between the different community's existing in the field and to understand their more general values. By understanding the culture in the different communities, it helped the research to understand important taboos and nuances to avoid any major mistakes in the design process. Through surveys

this broad understanding has been developed further by asking more personal questions to users in an anonymous space. As shown in Figure 3.1 it has been valuable to be able to compare answers between different people in a list to help highlight trends for the project to focus on (For full survey results, See appendix D).

Why do you like collecting collectables and other things?

9 responses

- I like to be able to show I have love for something
- Because it's characters I like, I like the look of the item.
- Nostalgia
- tools
- Not necessarily 'like' but I have a hoarding problem
- I don't
- A sense of satisfaction in attempting to complete a collection. Also interested in collecting items that may increase in value as a collection.
- They hold there value better
- Because it's fun for me.

Figure 3.1 - List of Survey Responses to understand why people collect

Interviewing Collectors and Designers

The research next conducted formal and informal in-person and online interviews to understand the designers in the field and how they fit into the underlying culture. Interviews played a key role in understanding collectable's designers, the deeper values of users as well as important political, social and marketing factors. Research can easily pin down hard facts and generalised values and understandings but interviewing in the local community made everything come together much more concrete within the context. When investigating various marketplaces and conventions around Melbourne, collectors were questioned about their attitudes towards their collections and the places they gather to hunt for collectables. Most people at these places said that collecting was a passion of theirs and not only gave them a hobby but was a fun way to spend time with friends who have similar interests. Learning about what really engages collectors and being able to ask follow-up questions easily in informal interviews helped direct the conversation into something more focused. Two major places researched were Supanova and Oz-Comicon, these attract people from all over Australia as well as designers and artists for collectables. They also have celebrities signing products for collectors. The topic of

signatures on products that socially maintain high value from remaining untouched was discussed at these major conventions. It informed the research that even though socially, damaging a product reduces its value, there are exceptions and with these nuances comes a whole range of new issues and problems in the community. When very specific things increase the value of a product, people will go to all sorts of lengths to actively exploit the systems in place such as forging Certificates of Authenticity (For more information on C.O.A's, see appendix A).

Two designers from Moose Toys were also interviewed which helped to understand the complete design process. This includes many of the underlying attributes that help collectable products sell such as things like associated TV shows, promotional campaigns and important manufacturing processes. Moose Toys is a company that designs children's toys, they have a large range and develop things such as girls' collectable plastic toys as well as plush toys and small robotic products for kids. Ben conducted the design license approvals at the company and David works as a designer on a few products in their range. It gave the project a lot more scope on the things that are required to design a successful range of toys

and along with other secondary research on the design process has helped define the limitations on what

is possible to achieve in the given the time frame.

Early Visualisation of the Concept

To help guide the design some visualisation methods used were sketching, brainstorming graphic designs, using mood boards and journey mapping. Sketching and developing lots of graphic designs are useful for developing 2D interfaces such as apps and web pages. Sketching is useful because it was used to brainstorm app layout ideas quickly and help visualise the designs to the users to get their feedback before time was wasted on more complex programs. A web developer, Tufts (2014) states that sketching helps discover potential issues and solutions early, prior to the development stages preventing

a great deal of the issues before too much time has been invested. By brainstorming the graphical design on computerised software to the collectors in simple ways first as shown in Figure 3.2, less time was wasted trying to do this on more complicated platforms that would have taken many times longer to show the same thing. Mood boards were also helpful to brainstorm these designs because they helped the project define what it wanted to achieve. It developed a theme based heavily on pop culture, things like nostalgic comic books and older sci-fi films that collectables reference often. From this it developed a

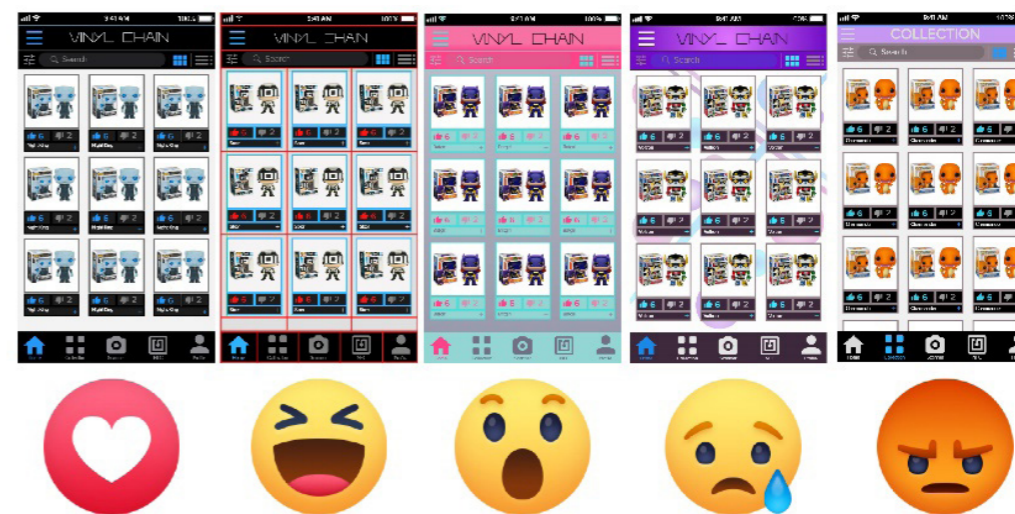


Figure 3.2 - App styles Poll

palette filled with washed out blues and reds mixed in with other bright colours that streak through to give it a more technological and futuristic feel. With this set up before brainstorming it helps keep the design consistent in its colour and style throughout the project.

Another visualisation tool used to help get feedback from users was journey mapping (see Fig. 3.3). Once the concept had been created not only did journey mapping return useful feedback to help improve

the design, it helped the research properly analyse and flesh out the design. Things like the self-regulating system implemented in the application had many gaps in the way it functioned and could easily be exploited. The visualisation of the system helped to close the gaps with practical solutions and simplify the entire process to make it easier to understand and convey to others for feedback. As a visualisation tool it helped clean up the entire concept and ensure it wasn't overly complicated.

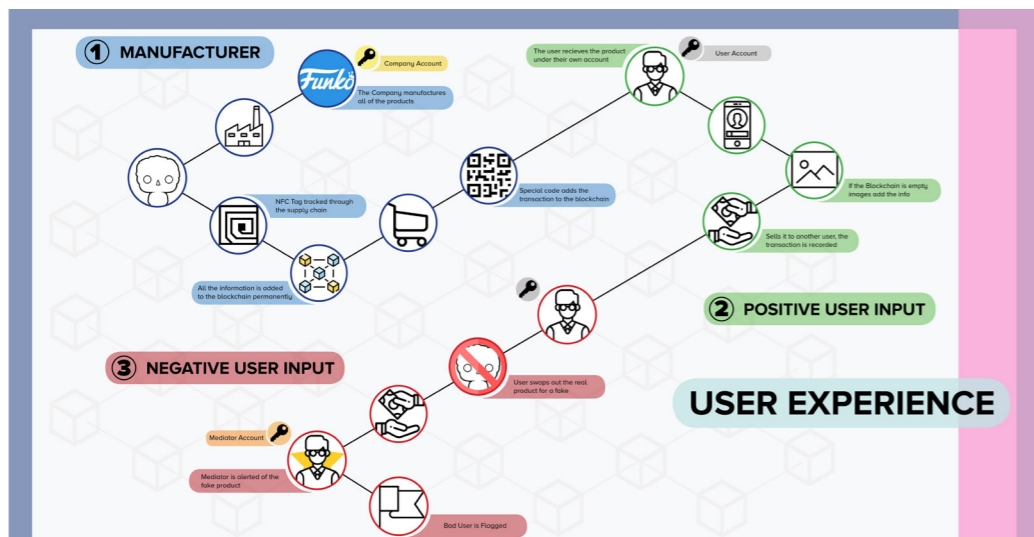


Figure 3.3 - User Experience Journey Map

Early Prototypes in the Design Process

Later in the design, 3D scanning and CAD modelling helped to understand the form of Funko Pop vinyls better and develop early prototypes to show collectors. 3D scanning (see Fig. 3.4) helped the research understand the product better but also test out some of the new technology available in the field. Augmented Reality is becoming more mainstream and is really helping tie together the material and digital mediums. It fits a product into

the real world using a phone camera, it gives a more tangible experience to something that would otherwise be difficult to visualise in a designated space, such as a shelf or among a collection. The research used 3D scanning in conjunction with 3D modelling to test the possibilities of augmented and virtual reality. After scanning in several Funko Pop vinyls it proceeded to edit them in a digital space and then move on to prototyping them so that it could

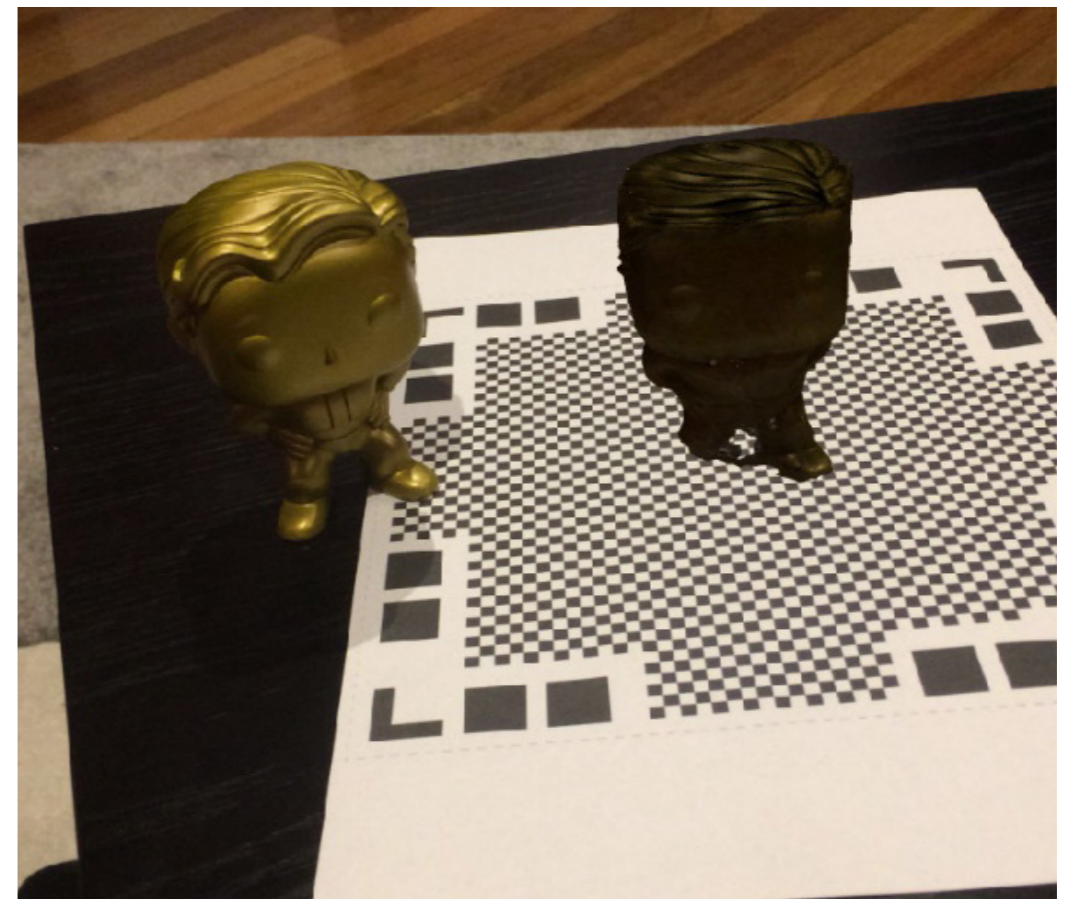


Figure 3.4 - 3D Scanned Product

gauge opinions in the community. As seen in Figure 3.5 Rapid prototyping tools such as 3D printing were used to bring some of the customised models from 3D scans (see Fig. 3.6) to life to give people a more tangible product to judge. Sass and Oxman (2006, p. 328) mention that rapid prototyping also supports the creative process of designers to produce variations of a single artefact which means not only can they present the complexity of their proposed design but easily produce its variations. This gave the research invaluable insight into what the collectors want, and even though some enjoyed the idea it wasn't innovative enough to prompt a major response.

This concept turned out to be a saturated area without much interest in the community. This sort of design has been attempted before in different ways but doesn't

interest anyone that collects due to monetary motivations which is one of the many reasons the field has grown so much. People didn't value these possibilities because they are uninterested in editing collectable products and would much rather pay someone who is talented in the area to do it for them. At this stage the design focus shifted from an Augmented Reality collection app to an app designed to secure a collection's value. Since the research has already engaged the community, when discussing the importance of authenticity with collectors it received more responses than it previously had. It is likely that this isn't because it had asked questions before but because it now understood the community which meant it eventually started asking the right questions, ones that prompted more responses.



Figure 3.5 - 3D Prints



Figure 3.6 - Funko Pop vinyl setup for initial 3D Scan

Securing the Collectable's Market

After changing direction, the design focused more on designing for authenticity and along with utilising new technologies it began to engage in live prototyping with simple materials. The project began prototyping and editing existing products. Developing the form in quick and cheap materials meant that lots of aesthetic components wouldn't be missing in the final design. Several cardboard mock-ups (see Fig. 3.7) of Funko Pop vinyl boxes were developed to understand the possibilities and limitations of creating a secure and low-fi package using watermarks. By developing scannable variables different OCR tools were tested in their ability to analyse and secure the product (For more information on OCR, see Appendix A). Simple open source OCR tools were able to easily recognise text in images and other research showed proof of more complex programs being able to recognise even the slightest change in colour for singular pixels.

The project researched NFC tags and its uses and went through different iterations of testing to discover its limitations. It can only hold a single very pixelated and almost unrecognisable image or series of text on the average and cheap 540-byte NTAG215 model.

Seeing how much data it can hold and talking to collectors to understand what types of things they might want to store on them was important. Collectables revolve heavily around imagery because of the value found in their form and aesthetics. Because of the tiny storage capacity of NFC tags, potentially only small messages, URL's and blockchain addresses may be viable and images may have to be stored another way.

App development helped the design further engage with its users and create an outcome to tailor the concept to their everyday lives. The research used different Adobe products such as Adobe Photoshop and Adobe XD (see Fig. 3.8) and adapted sketches and user feedback to create an uncomplicated user experience. It is conducting rigorous user-testing on an application that is in development shown in Figure 3.9, this is important because it is providing valuable insight into the current habits of its target audience. Simple gestures like swiping left and right must be incorporated in a seamless way. The users thought the app worked this way even though it didn't and understanding how they comprehend the app visually has benefited the outcome. Ensuring the flow and design elements are easy to understand and use are increasingly important in a world where apps

Figure 3.7 - Cardboard Mock-up

are commonplace. Feedback wasn't limited to collectors only and input from more critical people in the field shed different perspectives on the entire concept. The discussion helped improve the app aesthetically and technically by rectifying

technological issues collectors may not understand. Everything needs to be tested because if something like the app can't explain its function on its own, then it can't deliver the design properly.

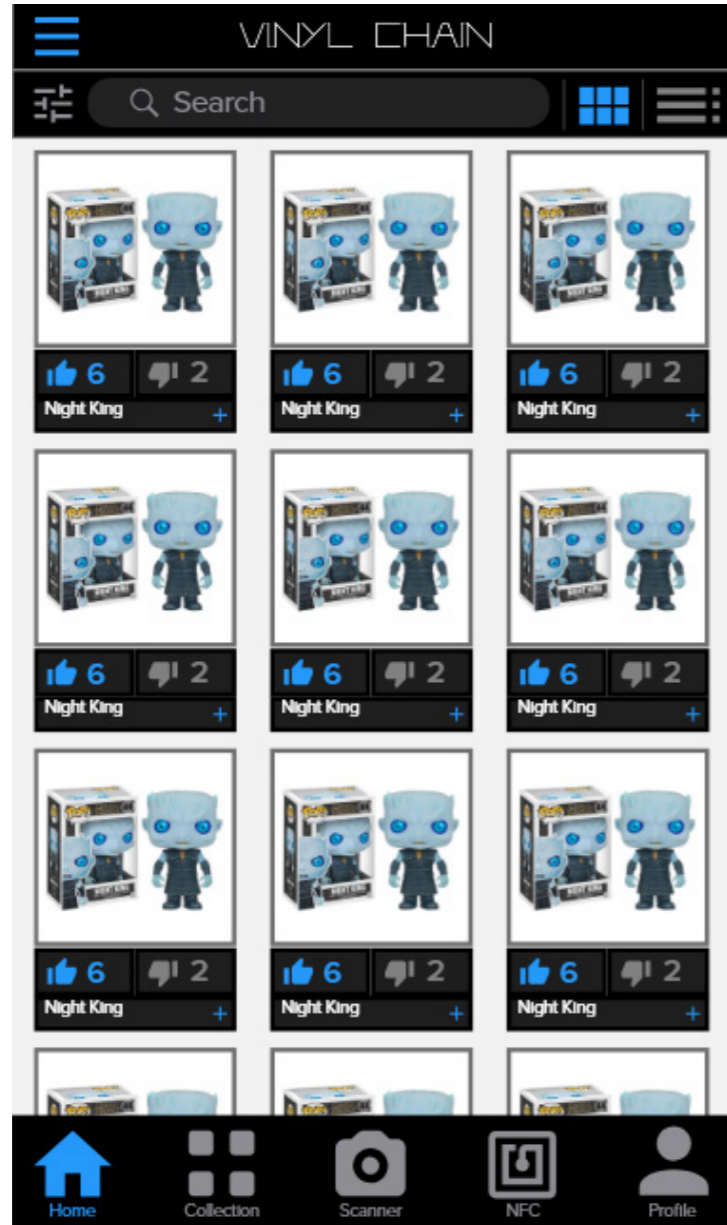


Figure 3.9 - Vinyl Chain App Design

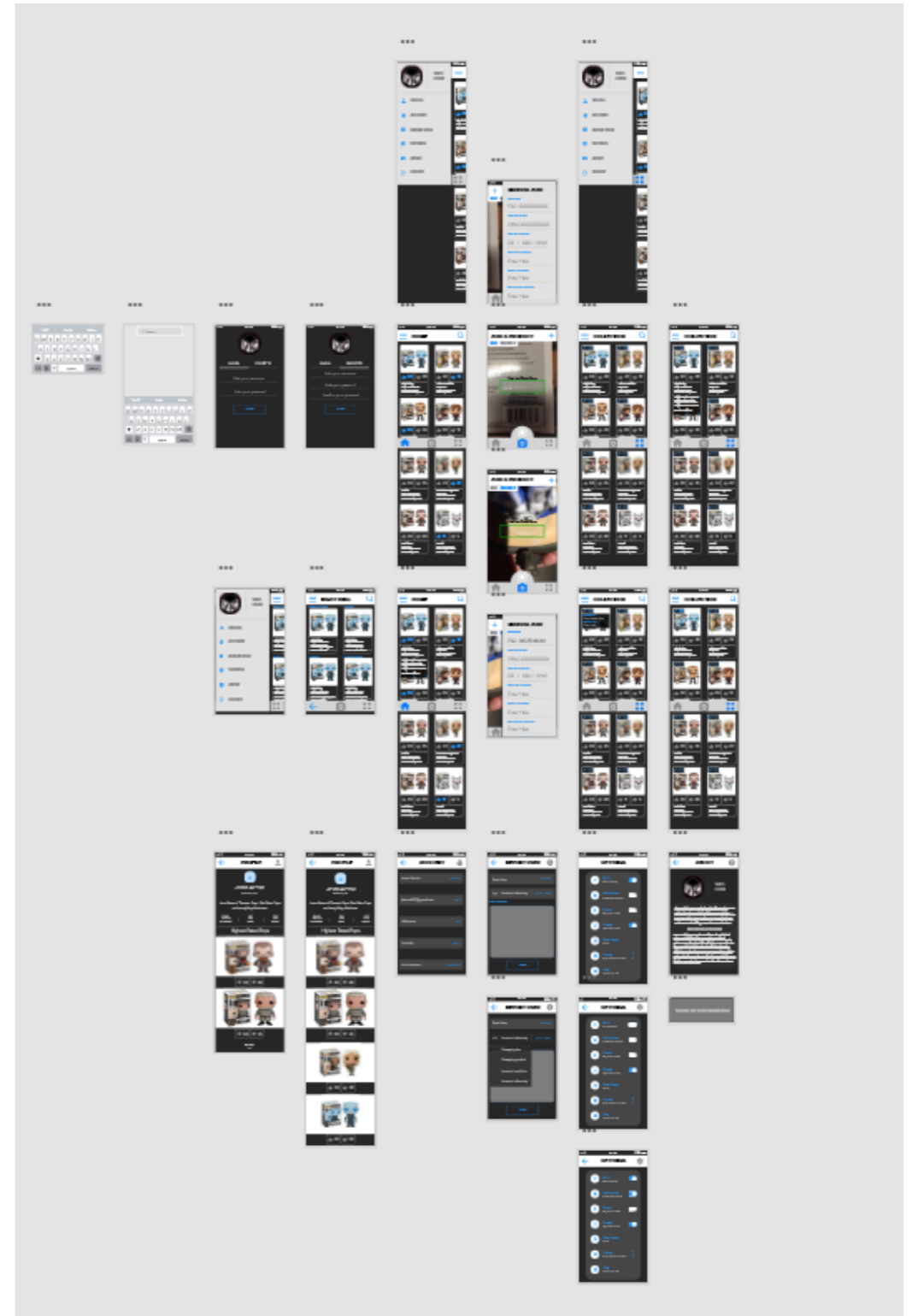


Figure 3.8 - Adobe XD First App

Returning to the Collectors

User-testing is a largely impactful stage for the design but if it isn't utilised properly it will cause the downfall of any outcomes that are produced. Assuming someone will like something isn't accurate and if the design doesn't properly interface with its audience it risks ignoring the collecting culture that could prevent its success. It is being used as a stage in-between every iteration for every method throughout the process. While the next iteration of developing a prototype is underway user-testing is conducted simultaneously to ensure the next stage better meets the needs of the user. Even though marketing is helpful, 'if your product helps people achieve their goal, they will love it, they will continue to use it, and they will recommend it to others' (Cengija, 2014). A recommendation from friends and family is the fastest and most effective way to spread word about collectables. When people collect, they love to show peers their collection and in what way they've made it different. The only way to achieve this effect is to satisfy the very core of why the designers' product means something to them, either by creating that reason or appealing to something they already love about collecting. This can only truly be achieved through rigorous user-testing. The

research conducted these tests by talking to collectors, other designers and posting images onto the online communities and other forums. By discussing every iteration with the end user whilst simultaneously prototyping, the research has learnt how interested the users are in the design and which aspects of it they want to see taken further to help direct it into the future.

Research, electronics prototyping, and app development will be conducted in the future stages of the design process as the design takes on a more detailed form. Firstly, there will be more app prototyping to complete the design and test for major risks and failures when the system is completely functional. To reach the outcome there will be more complex app development to allow users to interact with it from the app store in a more professional environment. To add onto this there will be more research conducted into companies like Funko and Moose and the ways the project can interface with them to reach a solution more grounded in industry. Then, with even more research, further live prototyping in the ways different technologies interact with other products currently in the world will allow the design to broaden its scope into different types of collectables.

To completely flesh out the final product there will be blockchain testing with public servers and open source systems to have the entire system working in harmony. To get confidence from the users and other stakeholders, the final product must be completely functional from the user interface all the way to the

underlying technology. Trust in the concept is important to maintain the integrity of the design and if it can provide reason for lots of users to adopt the system it has the potential to become an outcome intrinsically linked to product security in the field.

Chapter 4

Design Development

The Design and development of the project was influenced heavily by user-testing and participant interviews. Preliminary design work was done including designing graphic elements and other branding aspects to encapsulate the project. Following this a total of four iterative prototypes were developed and tested using the Adobe XD platform to help produce the overall user interface. Adobe XD included wireframe app development to properly establish the user experience through a series of design repetitions. User-testing after these steps helped to move forward the design in a way where the user-experience maintained correspondence with its target audience. A functional prototype app (see Fig. 4.1) was then developed within Android studio and iteratively tested with the intended users to repair any issues introduced using the new program. Afterwards more investigation and experimentation were done to engage with Blockchain technology to enable its user interface for the final design.



Figure 4.1 - Final App Prototype

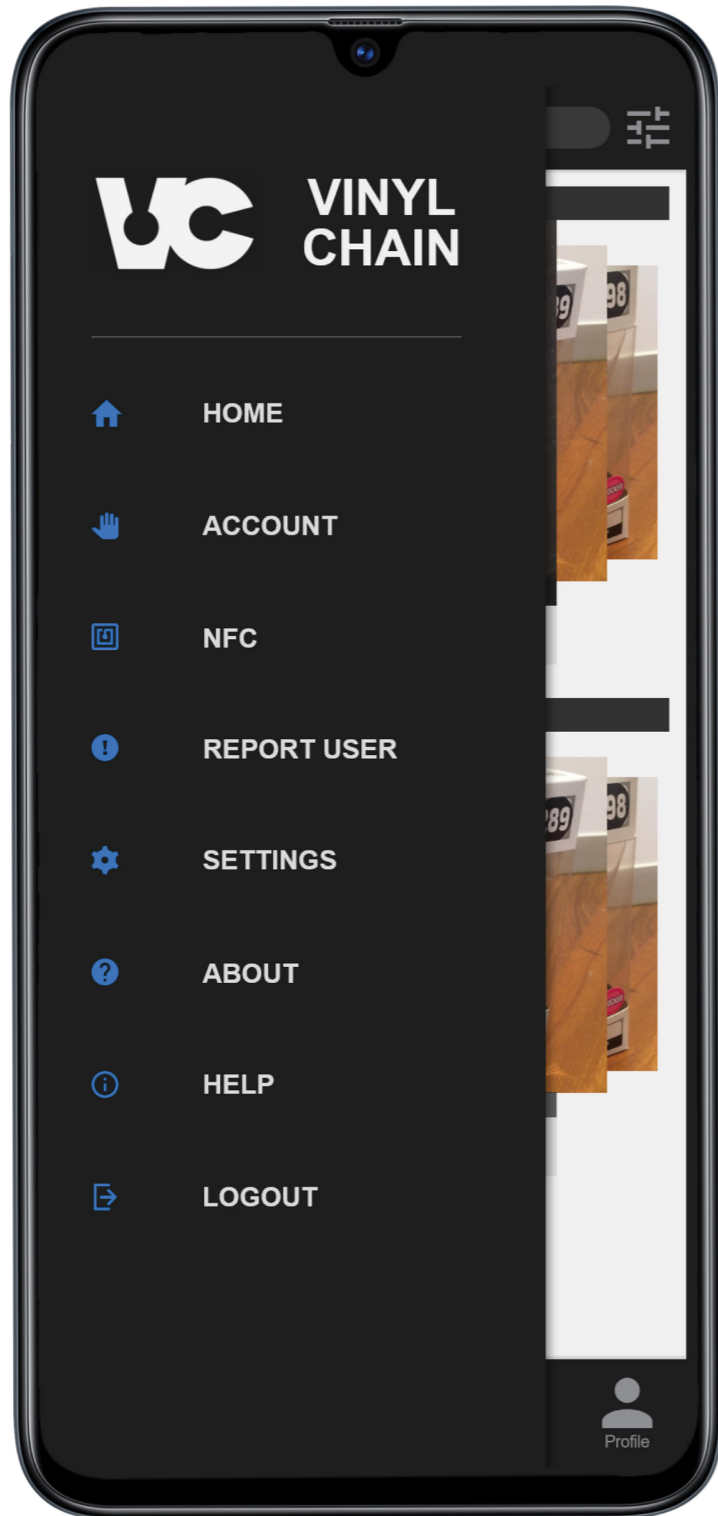


Figure 4.2 - App Navigation Drawer

Branding

To help the project stand out in the field of collectables as a useful tool it was important to brand it. To do this properly it needed its own defining colour palette to tie everything together. To fit the technological tones of the project a dark theme was utilised in conjunction with some bright blue icons to draw the user's attention to navigational tools (see Fig. 4.2). This helped the overall hierarchy between the branding elements of the design being mostly white and interactive elements, most often blue. It also added a splash of colour

to other branding elements where distinguishing between interactive features and design aesthetics was less important, such as posters, decals and presentation slides.

To help create a logo to encapsulate the design, the research started with a brainstorm of the word security (see Fig. 4.3). It used this to find associative words and ideas that could be incorporated into the outcome. Some key words that stood out were locks, keys and walls, these were used to develop the

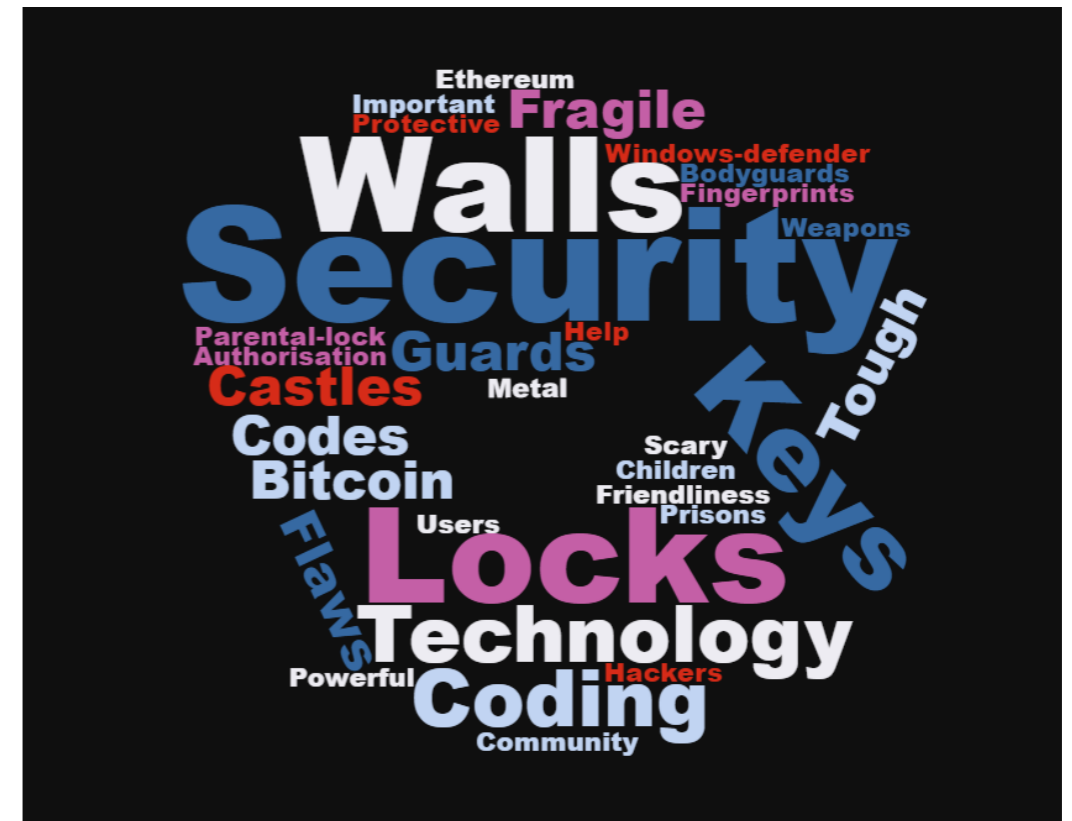


Figure 4.3 - Security Word Cloud

final logo (see Fig. 4.4). Some other considerations also had to be made to fit the final product as well. The logo's size had to be kept within the space of a square so it could easily transfer into the app interface. This was important because mobile phones have a very specific orientation, they are most often used in the portrait position which is the opposite to a TV or monitor. By keeping the overall design square, it became easily transferrable between mediums such as projectors, websites and the app itself. Simplicity was key for the app's design, by minimising the colours and keeping everything in a dark colour palette, the logo easily fit into the final app design. Both letters had design similarities to allow simple animation for the outcome. Most applications have a small animation during startup screens called a splash screen and by keeping this in mind during the design process it could later be animated for implementation.

The logo was then animated to help create a professional and polished feel about the entire project. The animation consisted of the letters being joined and aligned by the keyholes on the V and C (see Fig. 4.5) at the beginning to create a different form. There is a bright glow in the centre of the design (see Fig. 4.6) which then allows the key to 'unlock', the C then rolls to the right to create the final logo. This is helpful not just to create a professional feel

but to also represent the purpose of the application. This makes it clear the product is concerned security and by showing the animation at the start of presentations to potential clients and when opening the application, it steers the audience's thinking towards security. Keeping the animation short is also quite important so as not to frustrate potential users with a lengthy wait.



Figure 4.4 - Vinyl Chain Logo



Figure 4.5 - Start Animation



Figure 4.6 - Animation glow

Adobe XD Iterations

The research developed four major wireframe app iterations in Adobe XD to flesh out the apps design and resolve the user experience issues before moving onto more complex prototyping methods. Wireframing is the act of laying out basic elements and shapes of an app rapidly to help convey the theme before spending the extra time to make the prototype functional. What this allowed the research to do was quickly brainstorm different app styles using the predetermined colours and elements. After this the research made a series of pages (see Fig. 4.7), tested their usability

on the phone and then fixed up any mistakes or inconsistencies. Everything looks different on a smaller screen and it proved difficult to get it right the first or even the tenth time. Returning to the initial brainstorm during this process was helpful to maintain the theme of security throughout the application's pages. The design themes of cyber-security platforms such as anti-virus software better suited the app's style and by using different backgrounds with a technological feel it helped steer the design towards the security theme. It ended up overcomplicating the entire design (see Fig. 4.8)

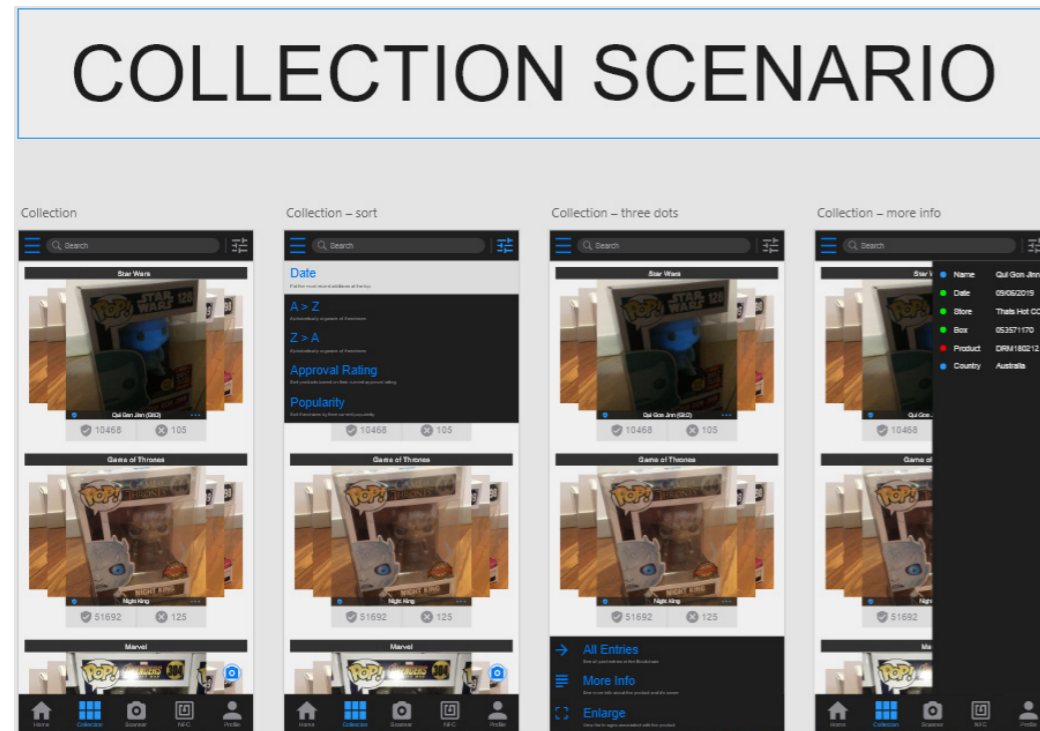


Figure 4.7 - Series of Pages

because there was too much detail aesthetically and this made the app feel daunting and unwelcoming. The research then began to use simpler colours and shapes as well as more recognisable icons. The dark theme on its own helped to give the desired technological feel, like a coding

interface that commonly contrasts bright colours on a black screen. Once the Adobe XD prototype was developed to a stage that was easier to comprehend it was then given to users in the collectables community to test different user scenarios.

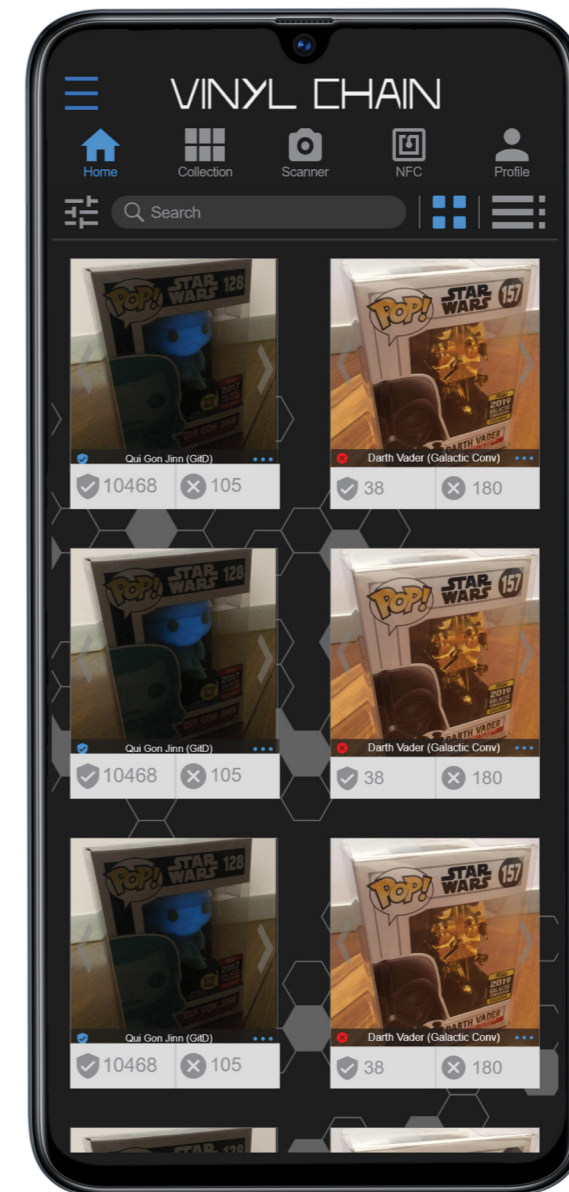


Figure 4.8 - Overcomplicated Design

Iteration 1

This Iteration was user-tested with four individual users at Oz Comic-con in Melbourne, two were casual collectors and two were more dedicated collectors (For more information on this user-test, see Appendix E).

The first Adobe XD iteration was a complete mock-up of all the app's individual functions. The most valuable ones were the interactions with the Blockchain and the functionality of the OCR tools when scanning in products. This first iteration (see Fig. 4.9) included every detail the research required to fulfill the designs purpose of helping users avoid fake products. Through observation of user interactions, it was clear that buttons often took multiple attempts to properly activate and the testers weren't using the app

as the research had initially intended. They also squinted at images often because they mentioned that images are a defining factor in identifying fake Funko Pop vinyls. It was useful and functional to the research but for users it was very difficult to understand and overwhelmed them with its crowded interface containing too much information to digest. The app's content also made it difficult for anyone to read the information on the screen because it was so small and enlarging pages constantly was annoying. The content had now been established as evident from the positive responses of the testing group so redefining the user experience and flow of the application then became the focus for the second semester.

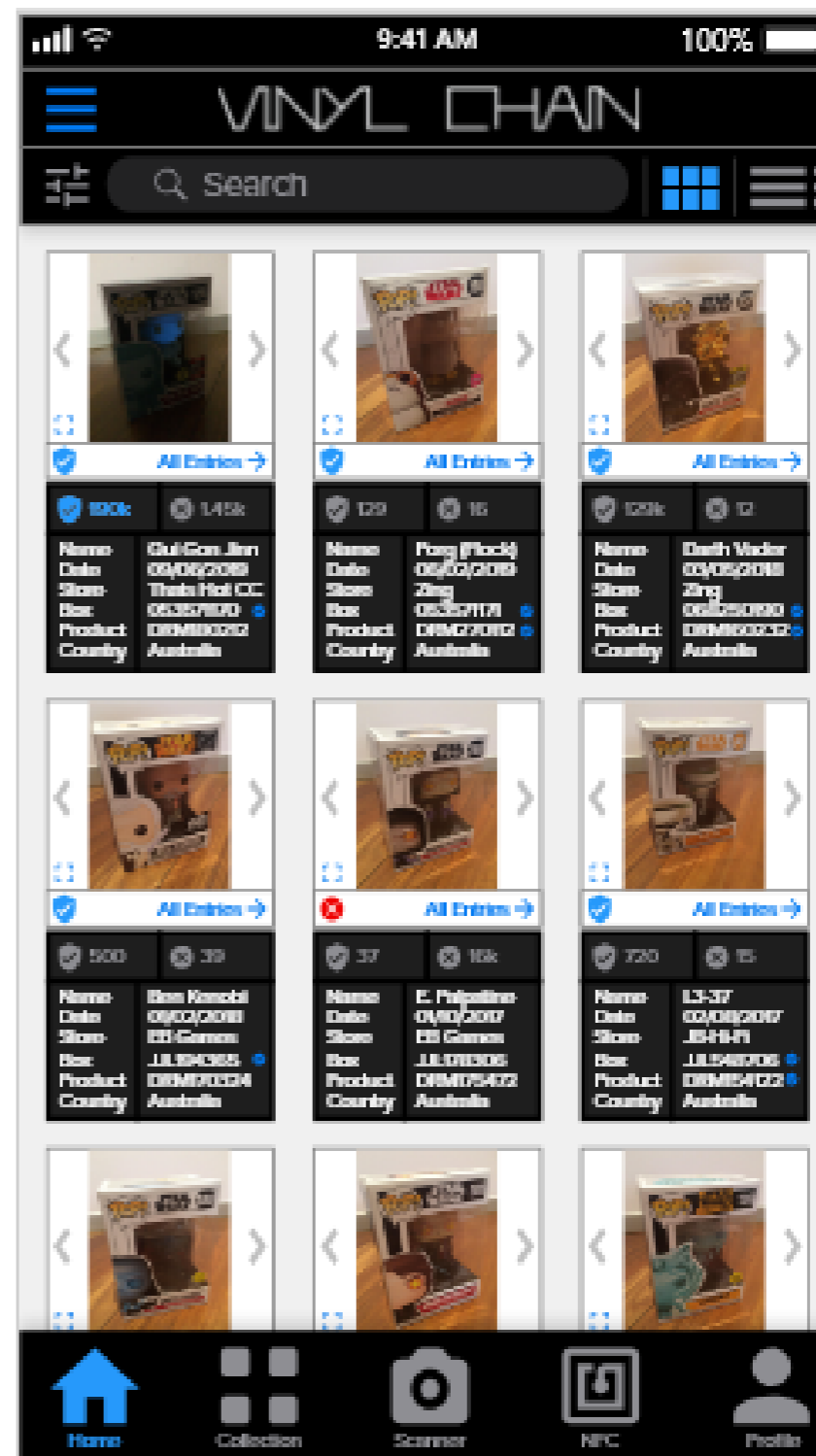


Figure 4.9 - Adobe XD iteration 1

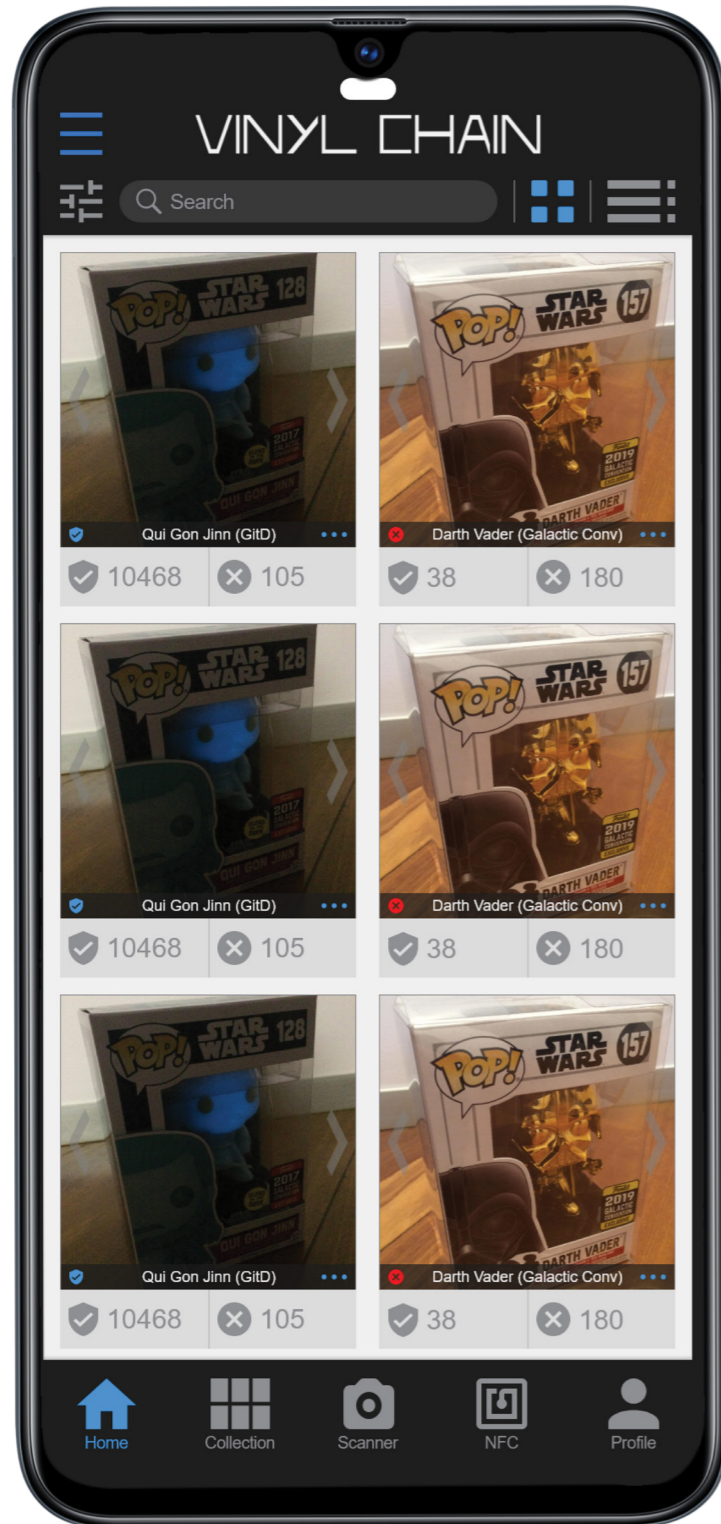


Figure 4.10 - Adobe XD iteration 2

Iteration 2.1

The following iteration was user-tested in a group discussion with five participants with no significant interest in collecting interest to establish a less daunting design aesthetic (For more information on this user-test, see Appendix E).

This adobe XD iteration was mostly geared towards improving upon the user interface. By removing the number of images on the screen by a significant amount it allowed users to see them better while being less distracted by additional information. This design aimed to achieve a simple flow through the design's features, and this

influenced how the application's UI was revamped. It was discovered that images have a large influence on how collectors establish all kinds of fake collectables in the marketplace. Making sure images were large and obvious became important to the design. With this revision it is easy for any user to see a poorly made fake product quicker and give them a much better chance of identifying a higher quality bootleg product as well. User testers also responded well to the app's new layout (see Fig. 4.10), reporting that the purpose of the app was clear however in some circumstances with testers, explanation was still required.

Iteration 2.2

Following on from the user-testing further enhancements and iterative design work was done to improve upon the aesthetic qualities of the outcome.

Another key issue with the design was having mostly small icons that were difficult to see, hard to tap on the first try or a combination of the two. The research began developing on a larger screen at this stage which helped alleviated some of these issues, but it also became obvious that the app wouldn't be exclusive to large screens. Almost everyone has a smartphone in the digital age but not everyone has the same brand, screen size or processing power so developing a functional prototype for all types of phones is important.

Following this the research attempted a variety of different

design iterations to make the app's purpose more evident. After researching a variety of different ways security is implemented as a theme into other designs, such as antivirus applications and websites, a series of designs inspired by this were developed (see Fig. 4.11). These themes were adapted into more of a technological feel, heavily focused on dark background and bright icons. This translated quite well into a security theme, evident from user feedback, but the complex backgrounds were too complicated for a basic app interface. Further research into app design showed that current design guidelines promote simple user interfaces, Google Design (2019) states that Android Auto, chose to keep graphics simple for a stronger sense of hierarchy.

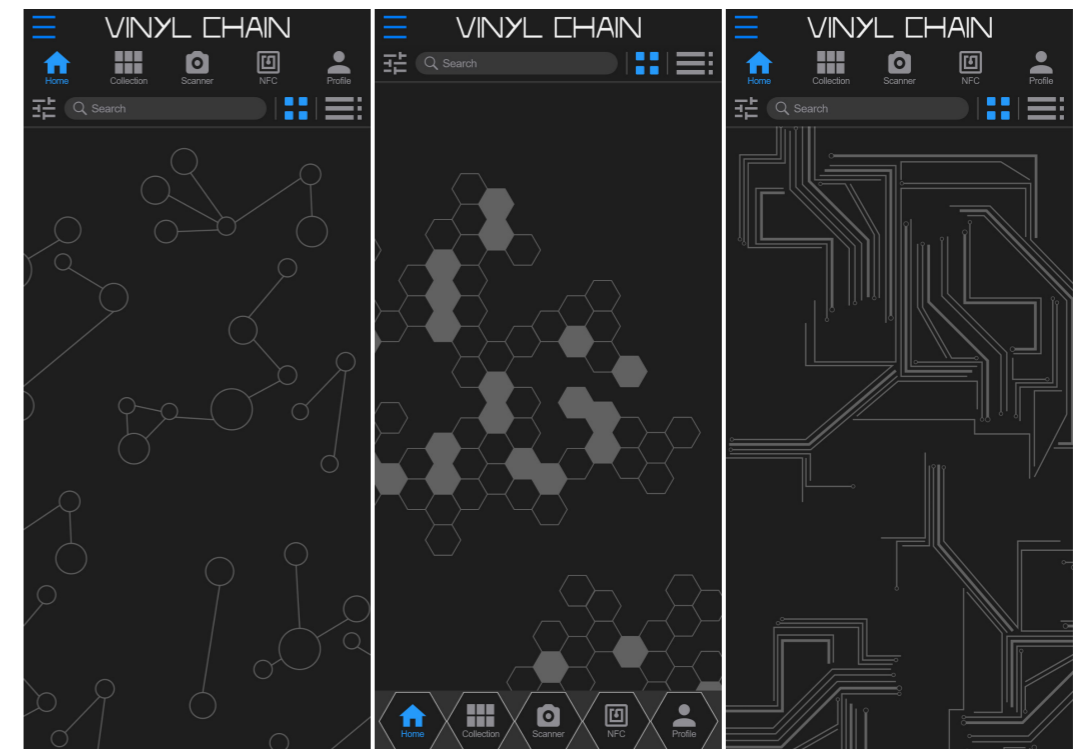


Figure 4.11 - Adobe XD background designs

Iteration 3

This iteration was tested with Two employees from a collectable's store and two customers found here. One user had a strong interest in Funko Pop vinyls specifically. The users were taken through a series of user scenarios, they were given vague instructions and then gave feedback based on their experience, including an account of what was unclear in the user journey (For more information on this user-test, see Appendix E).

The third major iteration of the design focused more on the user experience as well as the main user interface. It greatly altered all the key icons on the screen and organised them in different ways to make more sense to the user. To enable a more social user experience, the people tab was added to the home section in the top right-hand corner (see Fig. 4.12) so that users could see what their friends or other community members had recently added to their collections. It also added a products section adjacent, to help people organise what they're looking for by their favourite Funko Pop vinyl series. The research suggested that searching amongst millions of products wouldn't play out as intended in practice and needed to be further refined inside the app so users would only see what interested them specifically.

To assist navigation the grid pattern has instead been replaced by multiple image carousels. The overall app UI is showing less products on screen at any given time, so this became an easier way for people to find what they are looking for. User engagements on Facebook during this iteration informed the research that removing the top and bottom bars would create more space. One of the top bars was removed and to make it even cleaner, both the top and bottom bars disappear when scrolling through the application. Simple engagements like these also avoid frustrating misclicks as evident from the positive response from the online communities and hands-on tests in future app iterations.

Understanding good Android Practice and understandable GUI (Graphic User Interface) design was important to develop something users can pick up and use without extra

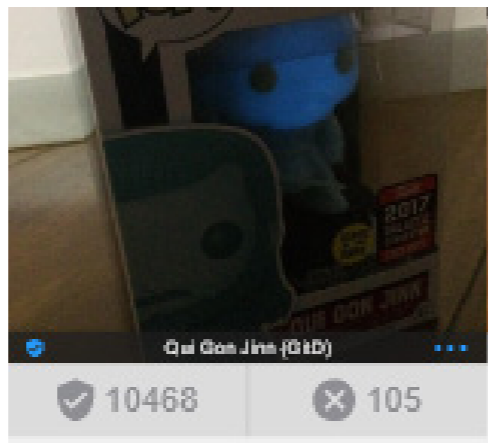


Figure 4.13 - 3 Dots Icon

explanation. Common discoveries in the hands-on user-testing included the misunderstanding of standard application tropes such as swiping and double tapping for different functions. A key example is when

users were asked to find out more information on a product, every user went to tap the image instead of the 3 dots indicator (see Fig. 4.13) when no further instruction was given.

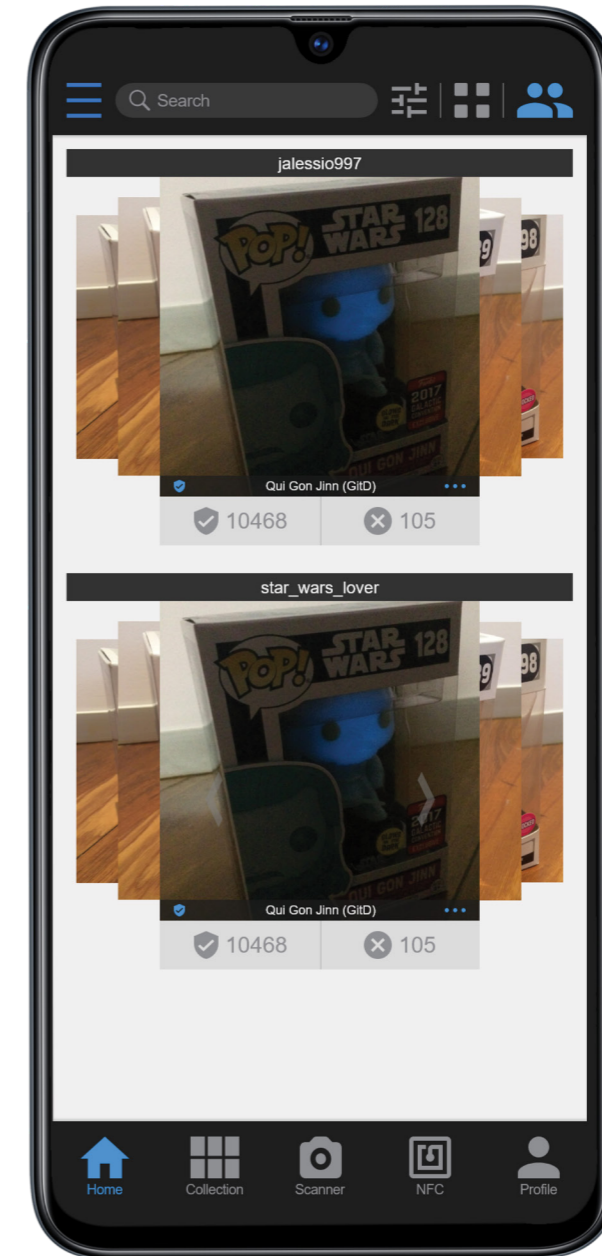


Figure 4.12 - Adobe XD iteration 3

Iteration 4

The final Iteration on adobe XD corrected any remaining issues before the research moved onto developing the product inside of Android Studio. Things like removing the 3 dots from below the image (see Fig. 4.14) was crucial into developing something that wasn't frustrating. The icon was very difficult to tap accurately users felt it wasn't placed in the right context. The design was adapted to become even simpler to navigate through the user scenarios.

Instead of tapping the dots during the user-testing, people were instinctively tapping the image or double tapping it for different functions because of its hierarchical presence. Removing them altogether

and making everything flow together in a much more logical way made navigation simpler. It also further consolidated the user interface and removed any useless buttons, such as removing the home button that was split into the people and product tabs. Now it just has the products the account owner wants to see and the key information they are interested in.

To see more information on a product, a user simply taps the image then taps one of the options that fills the screen. The interactive objects are now the largest as seen in Fig. 4.15 which means that on a smaller screen it won't be difficult to tap the navigational elements.

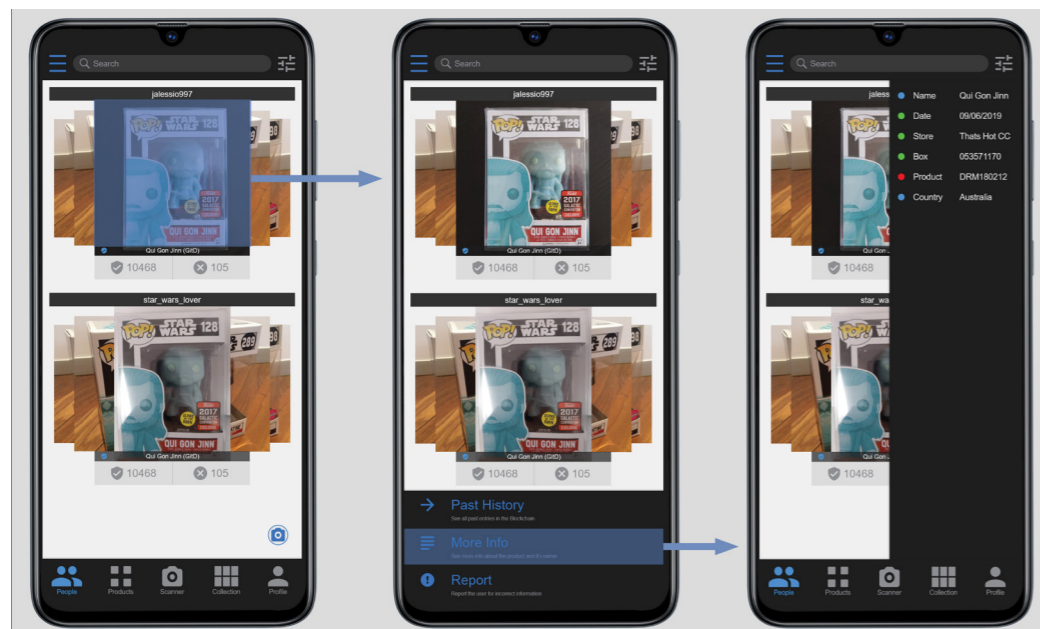


Figure 4.15 - Tappable interactive elements

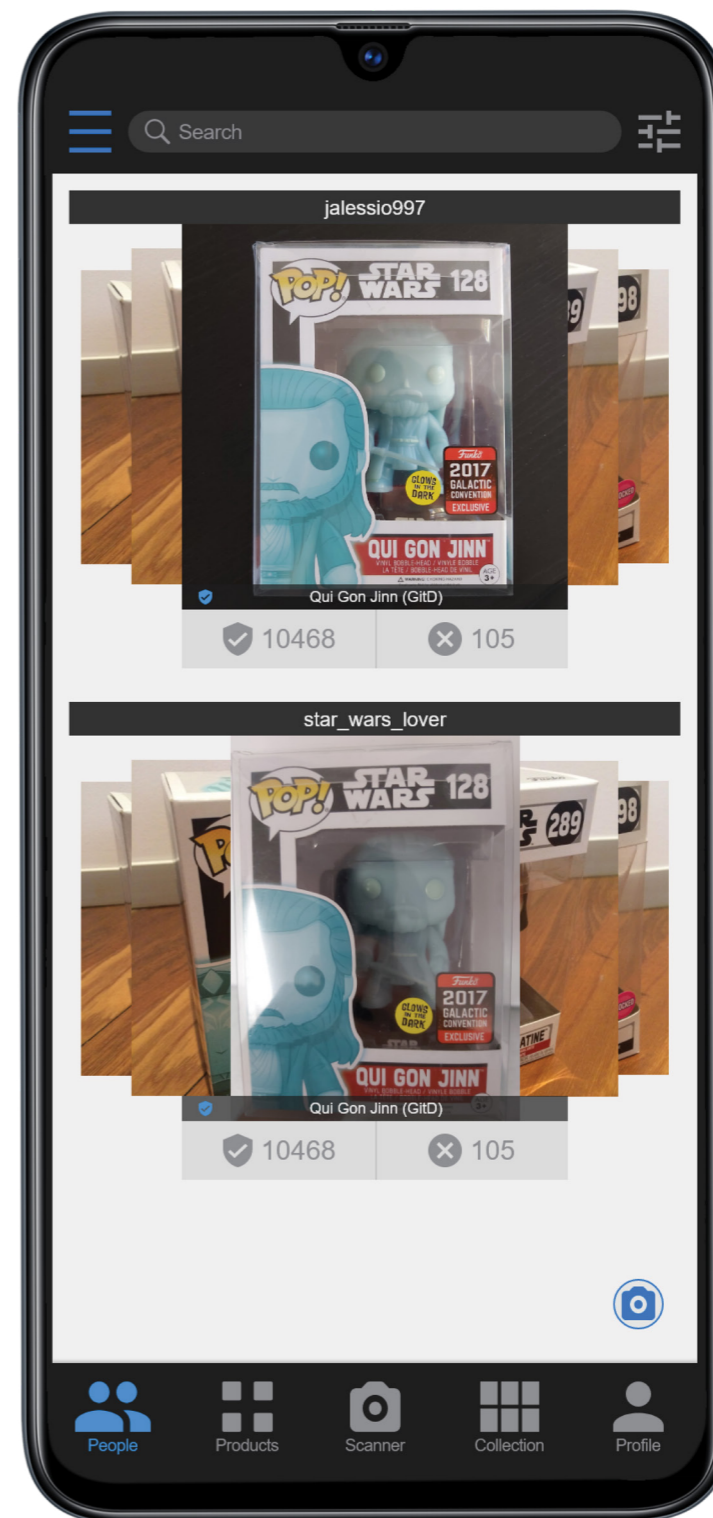


Figure 4.14 - Adobe XD Final Iteration

During the previous scenario's users were also instinctively tapping background boxes instead of minor icons placed on the screen. Designing for natural user instincts and standardised app progression was what drove the project to develop the final Adobe XD design before moving on to app development

within Android Studio. The user interface transformed from a more web driven interface that uses drop down menus into an application system with pop-up menus (see Fig. 4.16). These make the flow of the application a lot clearer especially considering it follows standard android guidelines.

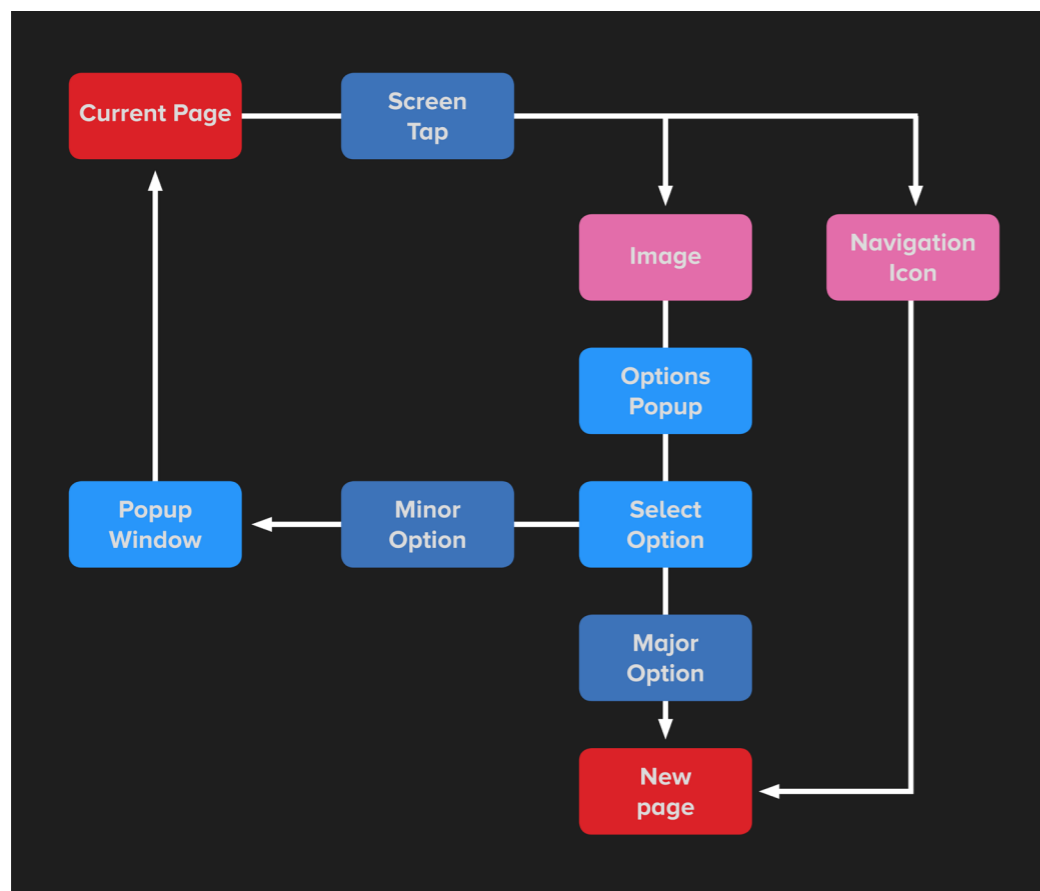


Figure 4.16 - User Journey Flow Diagram

Android Studio

The product was then developed inside of Android Studio so that A functional app could be constructed and tested on a range of devices. One of the most useful aspects of using a powerful tool like Android Studio is that it automatically redistributes its information for different screen sizes meaning the app will be usable on a range of different smartphones. However, the platforms increased capabilities don't allow a direct transfer from Adobe XD and the app was rebuilt from scratch within the new platform. By wireframing beforehand, it allowed the research to draw from the predetermined design and copy over relevant information while still leaving room for potential changes. Some design elements from Adobe XD didn't work on the new platform but it gave the research enough of an overall concept that it could solve the problem without wasting extra time. This stage in the design process took far longer to complete than the Adobe XD iterations but

since the design had been developed on a simpler platform first, less time was wasted designing the overall aesthetic. Even though the UI and design of the app had been thought out this had to become the last stage in the development process because coding the functionality would alter it after every minor change. After the foundational Android concepts such as Activities and Fragments were understood the first step was to develop the overall navigation for the application. Creating the buttons and menus and making sure they linked to one another was important to enable a real experience for future user-testing. After this, another functional element such as OCR was incorporated into the app, shortly followed by image sliders and other standard UI so people could view key aspects of the outcome. Lastly the UI was built to closely match the Adobe XD design and make the app easier to use

Rebuilding the UI

When it comes to app development there are numerous barriers to transferring design elements directly into a different workspace that allows for coding important functions for the design, lots of new

concepts need to be considered and utilised. Any interactive elements needed to be completely remade and only static elements could be brought over and used in the final product. Things like backgrounds and logos

can be taken across as images and incorporated but they needed to be kept in a specific format, so they work on different phone screen sizes and resolutions, luckily adobe XD does that already.

When rebuilding the design in a place like Android Studio there are many benefits to building the UI in a way that makes it quicker in the long

run by making future editing easier. Coding was done not only for screen interactions but for design elements, things like coding in variable values for colours and text field parameters meant that a single line of code can later be edited to alter how something appears on every page of the app. For example, it is possible to assign RGB values to names, this meant that if the research changed

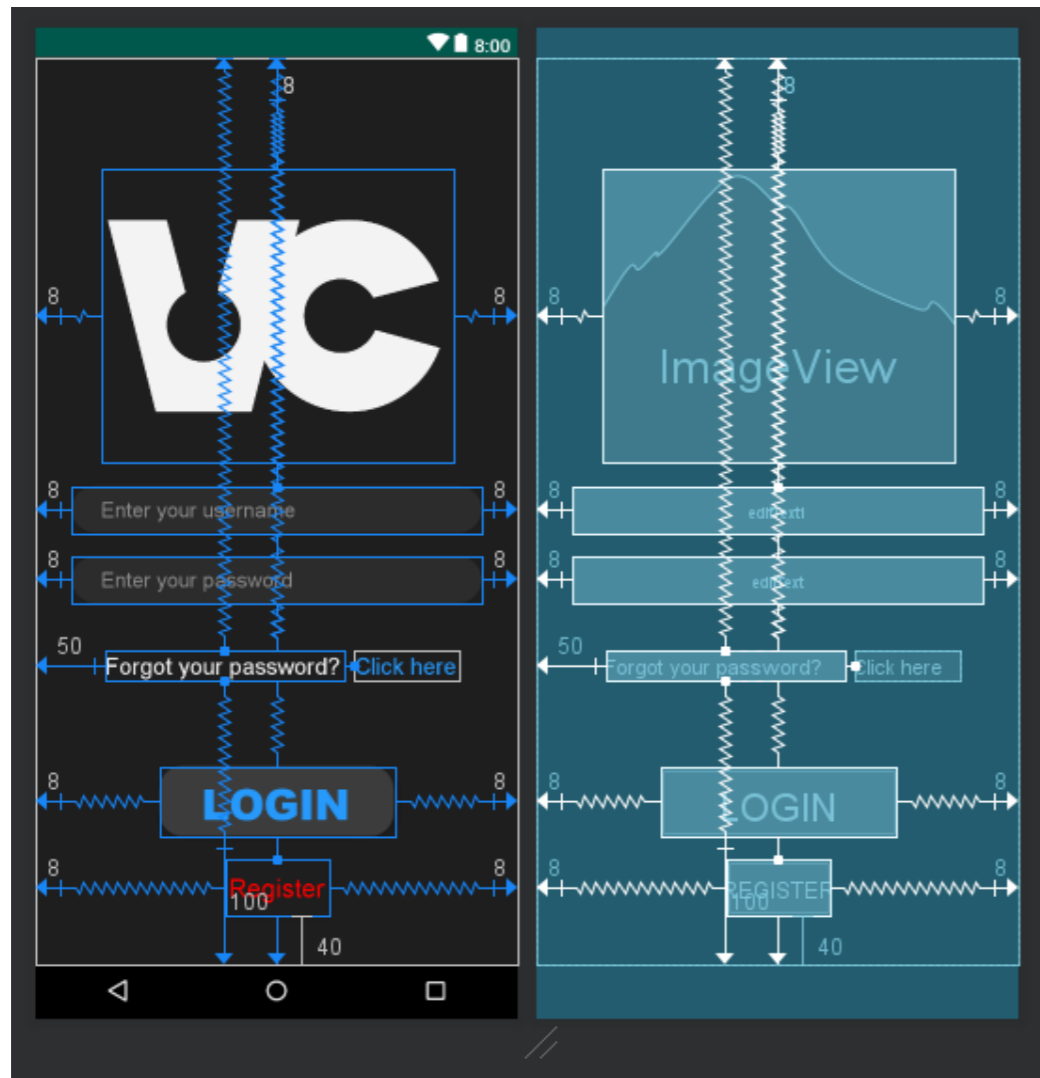


Figure 4.17 - Constraints in Android Studio

something in the overall colour pallet then it would cascade across the entire application. This helped to maintain consistency across the entire application and created the possibility to easily update design changes during development.

The layout files were all coded in a language called XML (For more information on XML Layouts, see Appendix A) and the interactive elements were coded in a language called Java (For more information on Java Code, see appendix A). When working with images in adobe XD it was as simple as dragging and dropping them onto the screen and opening showing them on a phone with specific dimensions specified in adobe XD. Because a real android application will be viewed on screens with different capabilities, every single

element on the page must be coded in a specific way. The main concept of this is something called constraints (see Fig. 4.17). This establishes links between the different elements on the page in ways defined by the XML coding language so that it appears the same on lots of different devices. In this example the logo is linked to the text boxes which is linked to the button, linked to the bottom of the page and so on. These distances are measured in a unit called DP, Muttett (2014) describes that in Android Studio we define values in DPs (density independent pixels) which is one of the many techniques to ensure optimal results when Android re-sizes screens to fit a target device. This keeps everything arranged how the designer intends for it and removes inconsistency across platforms.

‘Good Practice’ in Android

During development of the application the research delved into communities and forums of professional Android Developers to gain assistance with the project. They mostly assisted the research with finding bugs in code and analysing strings of errors to fix issues during app development. They never gave the research code,

but the most important lessons were understanding the logic and concepts behind app development. At its core, understanding how things work, regardless of the code it takes is the most important step. This alone certainly catalysed the process and made progress faster because of the increased understanding.

Buttons

Another key element of any app or coded interface are buttons (For more information on Buttons, see Appendix A). One of the simplest buttons in the application is the one that brings the user from the login screen to the main page (see Fig. 4.18). The code (see Fig. 4.19) essentially sets a listener to button presses which redirects the user to a specific activity, the activity then opens the page and initialises whatever other components are required in the next interface. To string together the user journeys defined during the Adobe XD iterations the

app needed to consist of multiple different types of pop-up menus with button presses to help them move between the different pages in the user scenario. For a pop-up the button took a developed XML page and placed it above the current one to give the user more options.

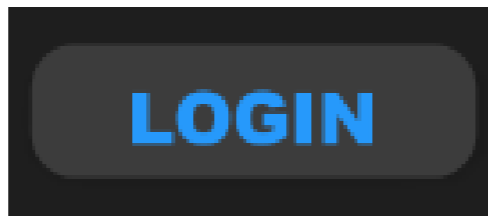


Figure 4.18 - Login Button

```

9  import android.widget.Button;
10
11  public class MainActivity extends AppCompatActivity {
12
13      Button registerButton;
14      Button loginButton2;
15
16
17      @Override
18      protected void onCreate(Bundle savedInstanceState) {
19          super.onCreate(savedInstanceState);
20          setContentView(R.layout.activity_main);
21          registerButton = findViewById(R.id.registerBtn);
22          loginButton2 = findViewById(R.id.loginBtn);
23
24
25
26          registerButton.setOnClickListener((view) - {
27
28              Intent intent = new Intent( packageContext: MainActivity.this, LoginActivity.class);
29              startActivity(intent);
30          });
31
32
33
34
35          loginButton2.setOnClickListener((view) - {
36
37              Intent intent = new Intent( packageContext: MainActivity.this, BottomNavigation.class);
38              startActivity(intent);
39          });
40
41
42

```

Figure 4.19 - Standard Button code

```

protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    registerButton = findViewById(R.id.registerBtn);
    loginButton2 = findViewById(R.id.loginBtn);
}

```

Figure 4.20 - Setting the Layout XML file

Activities

Activities are a core concept of app development for android devices. In the context of the design they are essentially the code backbone of any given page. They establish back-end code that transmits and receives data, plays videos, link to UI elements to do different things and essentially run anything interactive in the application.

At the very beginning of any activity several lines of code essentially establish what the user

is looking at, this normally involves opening an XML layout (see Fig. 4.20). Once this is the current view it may do something else within the space (see Fig. 4.21), but it often mainly establishes things called methods that are called upon whenever someone does something inside the page. However, this isn't limited to just a single page, sometimes an activity can be used for multiple different layouts and be called upon for something from any of them.

```

super.onCreate(savedInstanceState);
setContentView(R.layout.activity_bottom_navigation);

Toolbar toolbar = findViewById(R.id.toolbar);
setSupportActionBar(toolbar);
getSupportActionBar().setTitle("Home");

BottomNavigationView navView = findViewById(R.id.nav_view);
navView.setOnNavigationItemSelectedListener(this);
drawer = findViewById(R.id.container);

NavigationView navigationView = findViewById(R.id.main_nav_view);
navigationView.setNavigationItemSelectedListener(this);

navigationView.setCheckedItem(R.id.nav_home);

```

Figure 4.21 - Initialising the new layout's components

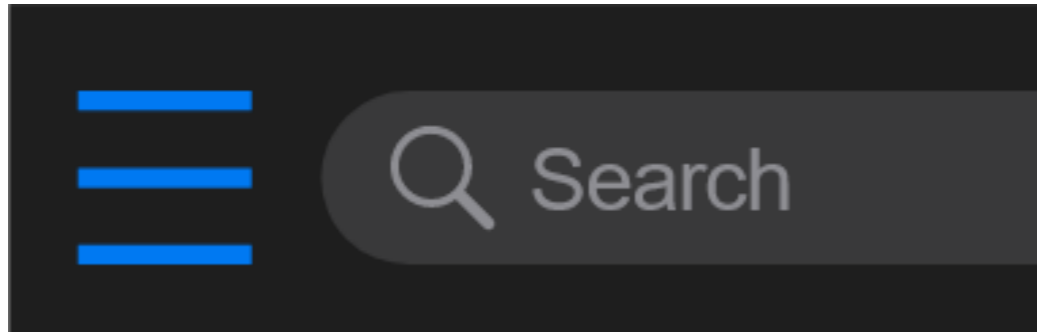


Figure 4.22 - Hamburger Icon

Navigation

Establishing the navigation elements of the design took a long time not necessarily because of the coding difficulty but because of the logic involved. Most applications have a single navigation element such as a navigation drawer, a menu that opens from the side normally from clicking a hamburger icon (see Fig. 4.22). However, the design included both a navigation drawer and a bottom navigation bar which includes its main views. This is commonly seen in social media apps as their main navigation element. To include both in the one design (see Fig. 4.23) a strong sense of logic had to be attained as to how it would function in a code-oriented manner.

To solve this problem the activity and layout for the bottom navigation bar had to be included within the navigation drawer's menu. The bottom navigation menu had to change during development because Android doesn't support more than five menu items for the specific

activity. To correct this bad practice NFC capabilities were moved to the navigation drawer because users can access it by tapping their phone against an NFC Tag and don't need it clogging up the main user interface.

The bottom navigation bar uses something called fragments to display its different objects. They don't use their own activity, but the layout is placed inside a container that the main activity controls. The research attempted to use fragments with the navigation drawer as well but to get the logic to flow properly it had to call upon individual activities for each menu item instead. In the end the login button leads to the home activity, which can then call upon any navigation drawer activity or bottom navigation menu item at any given time (see Fig. 4.24).

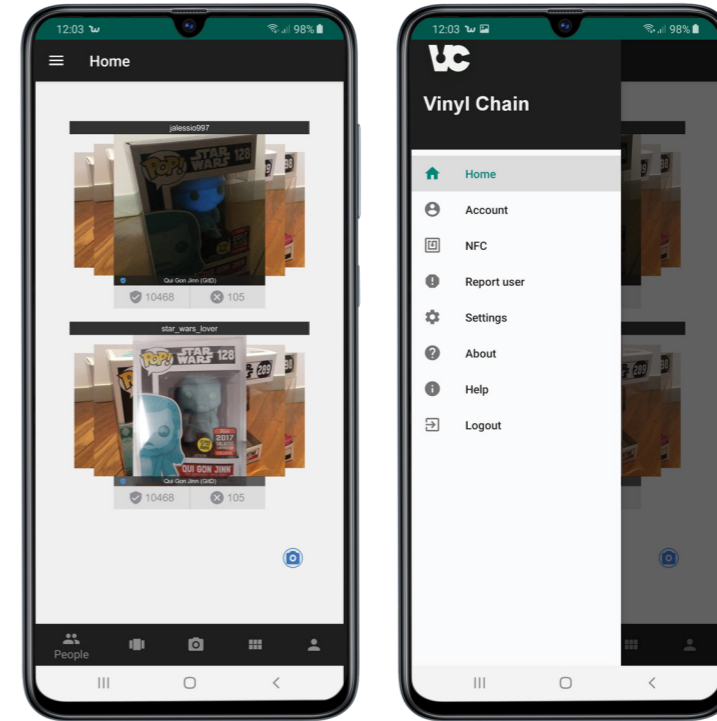


Figure 4.23 - Bottom Navigation and Navigation Drawer

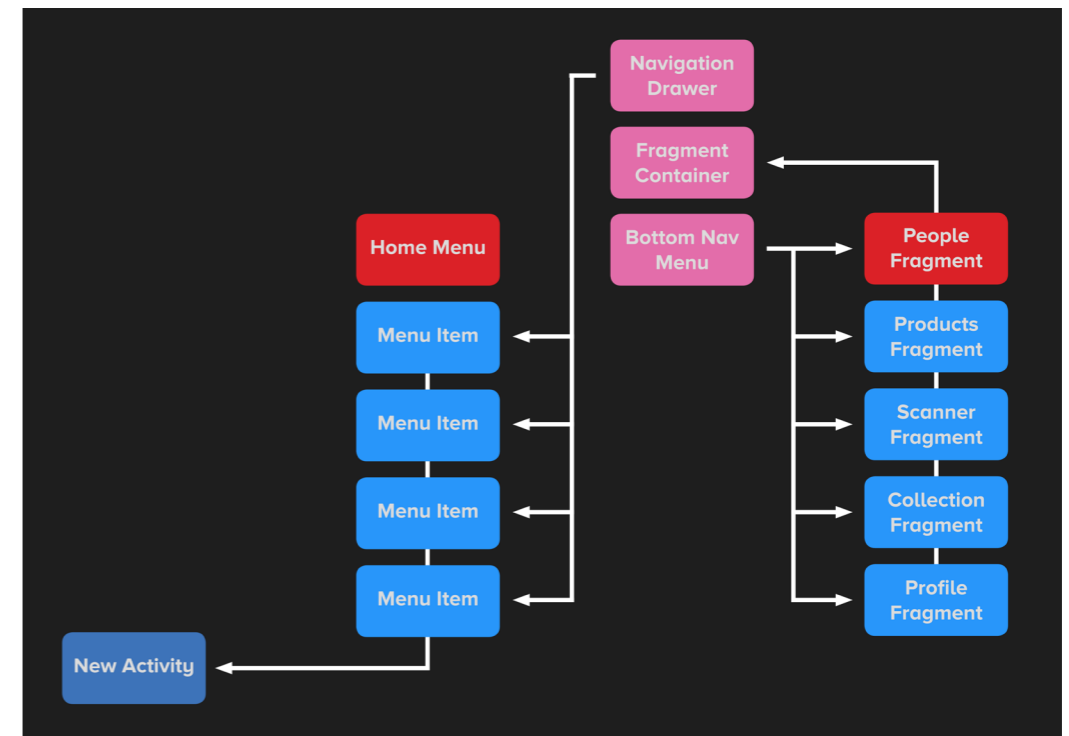


Figure 4.24 - Navigation Menus Flow Diagram

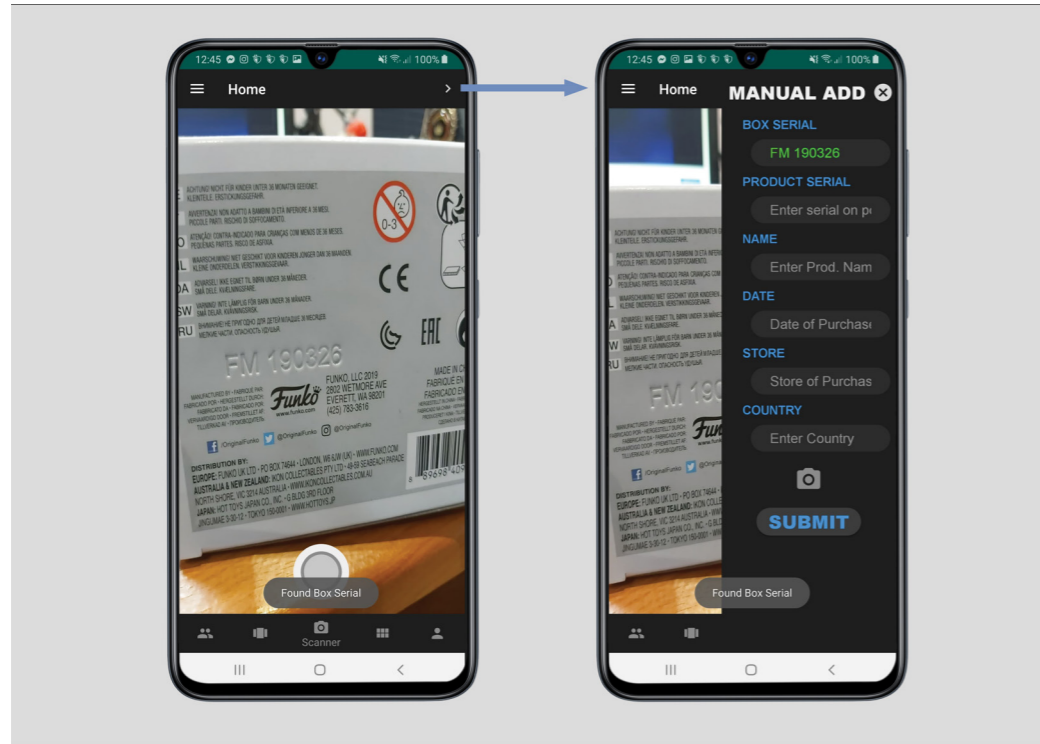


Figure 4.25 - Green Text from Camera Recognition

OCR

The next major element of the design was incorporating the functional elements of OCR (Optical Camera Recognition). This is used to gain data points from the Funko Pop Vinyl product and enter it into a user's collection quickly and securely. The main concept is that anything the user enters manually will be visible as potentially false and anything they enter with OCR will be visible as camera recognised (see Fig. 4.25). This makes it more difficult to enter fake products into the market without users being more aware of the dangers.

In Android studio there is a plethora of available resources called libraries, when imported into the application it adds a variety of inbuilt methods to the developer's disposal. OCR is a well-documented and widely used technology in the modern day and because of this there are many different libraries to choose from. The industry standard library is called Google Vision which Unadkat (2018) says uses a model that's trained on a large dataset of images, like the models used to power Google Photos. During testing the research found it to be able to read text that's blurry

on the screen and be very accurate with the output (see Fig. 4.26). By incorporating this into the app it was able to analyse information on the box of a product and enter it into the application almost seamlessly.

The lines of code following the OCR tool mostly just use statements to check if it's a certain character length and if it contains specific characters. Funko Pop Vinyl's have three individual types of serial codes, they are all date stamps for the manufacture of the



Figure 4.26 - OCR on Funko Pop Vinyl

product. They either start with the letters 'FAC', 'JIL' or 'DRM' (see Fig. 4.27), however machine learning can be used to distinguish between the box and the product in the application since they sometimes have the same serial code. In the application once it finds a string of text that contains these specific instances it can then input it into the application (see Fig. 4.28) and change indicators to show that the user entered the information with OCR. In the end it will allow users to hover around a product and gather all its data points and even pull key information off simple store receipts. By doing this they can very quickly and effectively fill out their collection with all the information required to make Vinyl Chain a secure place.

This tool is also very versatile since it can go across many mediums. When applied to different types of products a very similar approach can be applied. The data points and



Figure 4.27 - Bottom of Funko Pop Box

their types will need to be altered for collectable shoes, or vintage wines but then they would be applied in very much the same way. For example, by pulling the year and location a wine

was brewed off the label or pulling off a product skin from a shoe box. It is very adaptable and can be changed to suit the communities needs to secure their valuables.

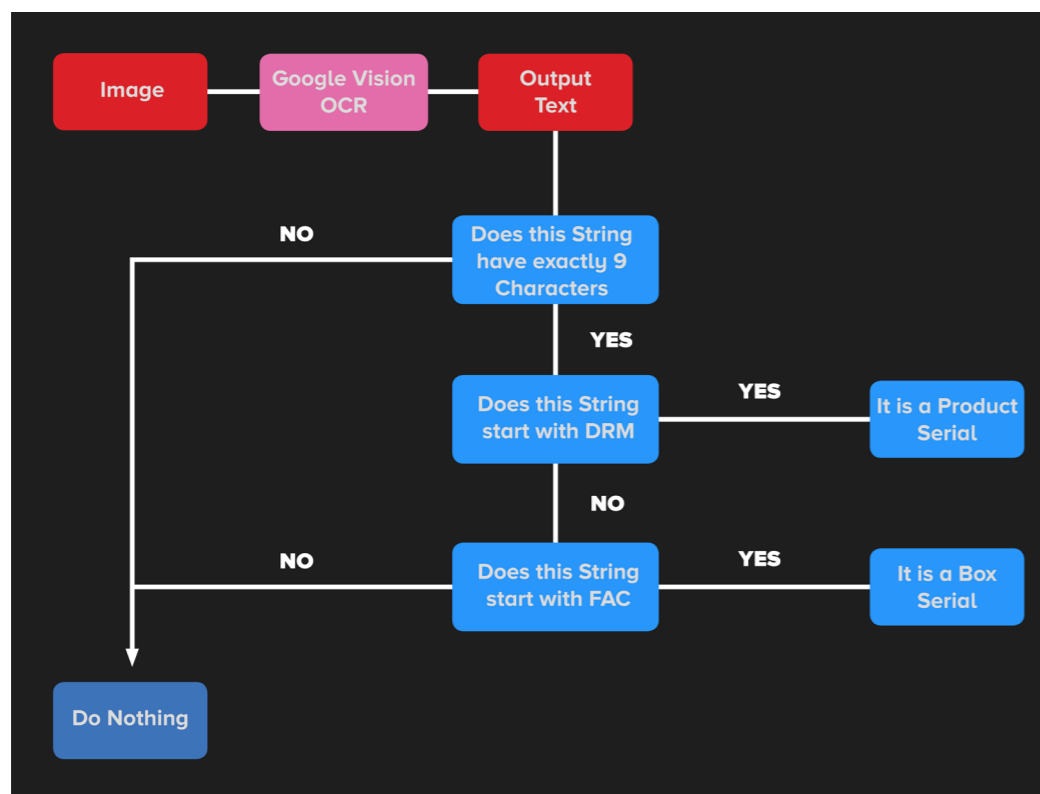


Figure 4.28 - OCR processing logic

Image Sliders

Lastly to enable the apps more aesthetic functions image sliders were introduced using a standard Android template. This enables users to quickly swipe through any images and information already in the app seamlessly to enhance the entire experience. This simply takes any images stored on the Blockchain and places them on a carousel like that

of other apps (see Fig. 4.29). A key example of its use within the design was to add the information and images associated with an OCR scan to a database and then pull from that. Collectors can then visually see what someone has added to their collection on a different page or potentially on a different device.

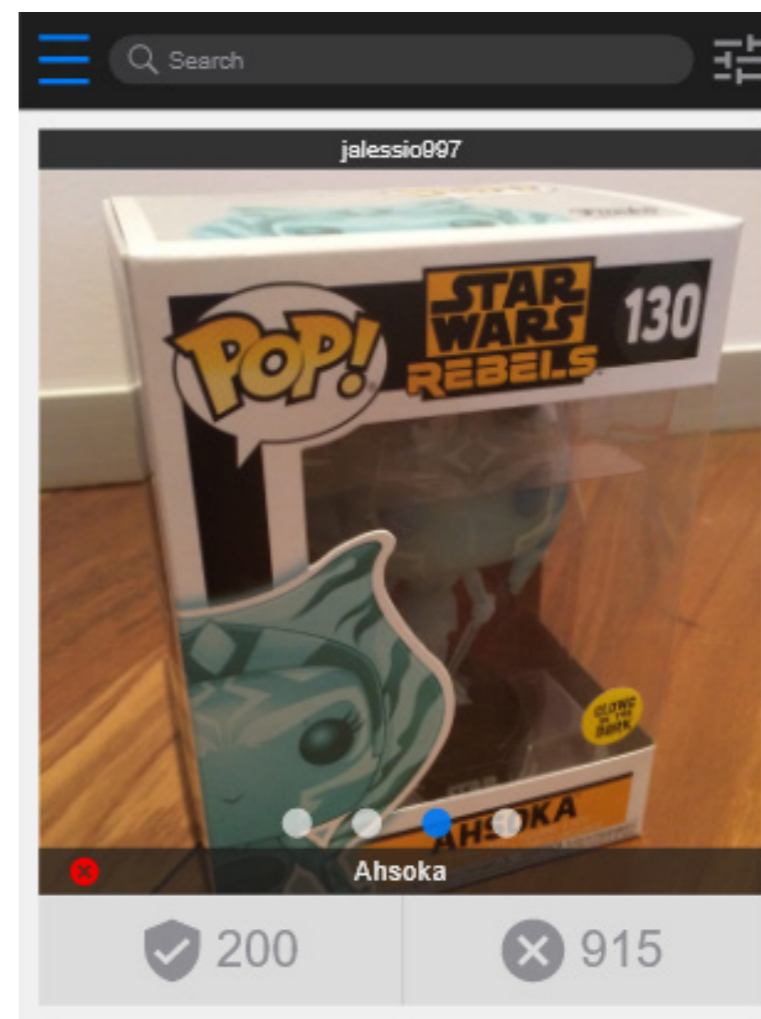


Figure 4.29 - New Image Slider

Blockchain Technology

The final stage in the product's development was the implementation of Blockchain technology to complete the design's purpose in the real world. For the app to function properly it needed to utilise Blockchain which is essentially a decentralised ledger. At its core a Blockchain is simply another, larger sum of code applied to the application. Users can see every previous transaction of a product recorded on the app by navigating to the relevant page. By being decentralised it helps secure the system, it isn't stored on a company server but rather copies itself across the devices of its users, this means that it needs to authenticate itself in multiple places and no one can edit anything added to the Blockchain. This is a crucial element of the design and it was often tested and demoed alongside any final outcomes to prove the possibilities the product has to offer to all sorts of collectors. In the end the blockchain technology is essentially invisible and the only way to show it to potential clients is through the application pages that would allow viewing of this record (see Fig. 4.30).

The Blockchain code hasn't been incorporated into the application at this stage but will later be implemented. For it to truly exist the application needs to be adopted by

thousands of people and become a large part of a products life cycle. For it to become a part of the application all the data the app calls upon needs to be initially kept on a server, like any typical database. Then once enough users have adopted the technology it can be slowly migrated to their devices in waves as more people add to their collections. In the end, once hundreds of thousands of people use the product the entire database can be stored amongst the devices running the platform. A single product can be stored on the devices of multiple users at any given time (see Fig. 4.31). This means that no one can edit any data and it must authenticate in multiple places every time something is added.

Throughout every stage in the design process, user-testing has been at the core of creating a powerful user experience that draws collectors into the final product. Blockchain and modern technology can be quite daunting so by properly engaging with users through a visually appealing package it can help them easily secure their collectables. The outcome was slowly developed through an iterative process that often returned to previous iterations to correct current errors. Changes were made to the Adobe XD prototypes to further comply with android practice that was developed within Android Studio. In conjunction with the communities and

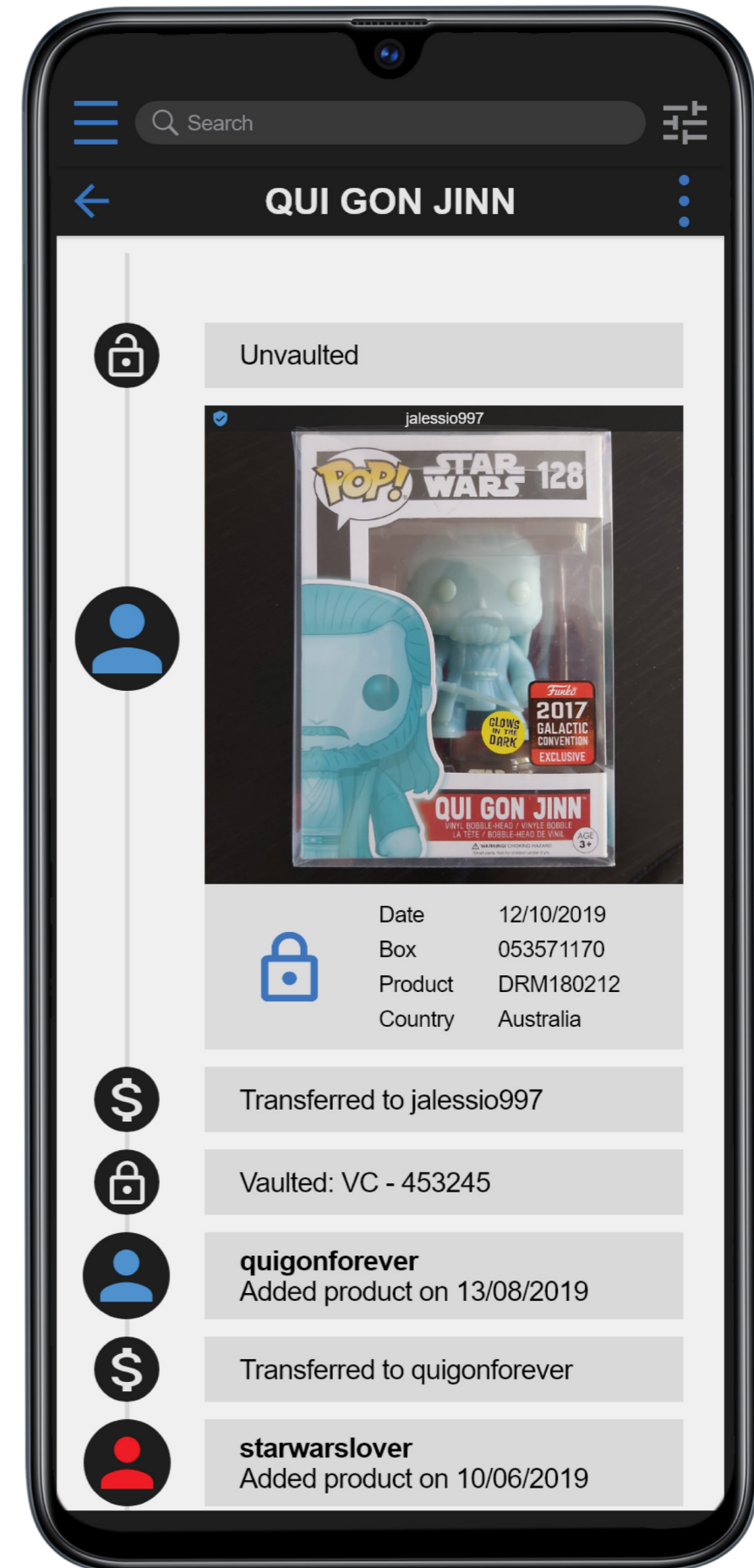


Figure 4.30 - Blockchain on the app

other feedback the research focused on the overall user experience and the best ways to communicate with the world. Following the app's completion, time will be dedicated to expanding the ways it can interact with the world by adding different types of products into the application and expanding

its target audience. Many different functional elements and technologies are being placed in a single design and a seamless flow couldn't be ignored. In the end, it must be easy to use, understand, navigate and fulfill its purpose without confusing collectors with its technical underpinnings.

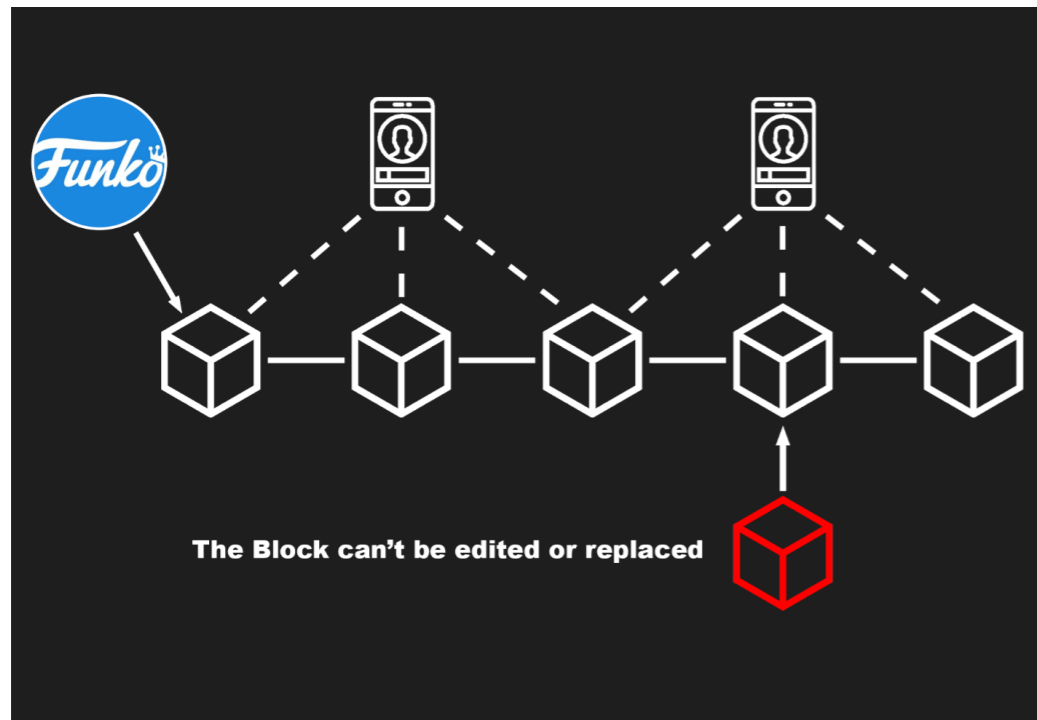


Figure 4.31 - Blockchain the decentralised ledger

Chapter 5

Methods of Testing, Evaluation and Validation

Many different parties have assisted with testing and evaluating the design at intervals during the design process. Different parties involved with testing the design includes online and offline communities of collectors, retailers of collectable products, professional android developers from online forums and even those uninvolved with the field. Designers of all kinds also gave feedback on the project, including creatives that design collectables as well as those that create furniture, automotive and electronic prototypes. Several collectors interviewed at Oz Comic-con during the early stages of the design stated that if they were more devoted to collecting then they would use the app, but it didn't benefit them enough otherwise. The product continued to develop to include as many kinds of collectors as possible so everyone could benefit from it. Everyone has adopted different habits and approaches to collecting and adhering to them is more valuable to the community than trying to change the established culture and rituals. The social culture that surrounds collectable products ultimately determines their worth so keeping things like this in consideration is valuable. Some users don't care about the security or authenticity of their products but the people they trade with often do. The users the research engaged with also expressed their interest in other collectables being adopted into the design and this furthered the research and the designs goals.

Feedback from Online Communities

Online communities are present throughout Facebook and they use this platform to buy and sell their collectable products. This proved valuable to the research because the outcome seeks to assist the users that currently use these platforms to find the missing products in their collections. Different topics

were discussed with the online communities including how they identify fake products (see Fig. 5.1) and what their thoughts on the design concept were in general. Whenever a new iteration was developed on Adobe XD there would be a wave of user-testing and engagement in person but also images posted on Facebook to gauge opinions on the aesthetic

one on the left DRM161124, on the right DRM161222
Is the right one a fake or not? looks super dodgy to me but maybe im imagining things?
thanks in advance



Jason Tran and Ploy Rose 11 Comments

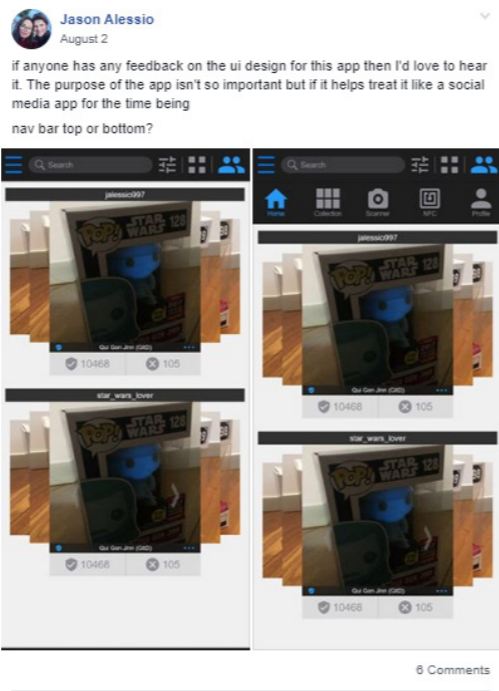
Like Comment

James Rundell They look the same The stickers would indicate they were made at separate dates
Like · Reply · 1w

Colin Chan replied · 6 Replies

Jason Tran Right one is fake, left pop is legit. Borders too thick on right 9'ez
Like · Reply · 1w

Figure 5.1 - Facebook Post



Jason Alessio August 2

if anyone has any feedback on the ui design for this app then I'd love to hear it. The purpose of the app isn't so important but if it helps treat it like a social media app for the time being
nav bar top or bottom?

Andrew Gorton Not too bad bro, nav bar at the top keeps it neat and tidy and out of the way but convenient enough to get to. Theme is very Android-esque though
Like · Reply · 10w

Kaitlyn Windsor Bottom, aesthetically speaking I like the look of it having the "border" and not the big section at the top
Like · Reply · 10w

James Rundell Bottom
Like · Reply · 10w

6 Comments

Like Comment

Figure 5.2 - Aesthetic Comments

design (see Fig. 5.2). This includes the way elements are arranged on the page and their understanding on the project based on the application pages put in front of them (see Fig. 5.3). This was often met with a variety of different responses, including comments describing difficulty with understanding the images and also discussions recommending particular features that are important to the collectors in the space. This informed the

research of the more minor details to be considered when the in-person user-testing discussed the larger flaws in the design. One major design change that came from the online communities was the navigation bar disappearing when scrolling. This was especially well received mostly because it's a common feature of lots of modern app designs and people are more likely to use something that is familiar to them.

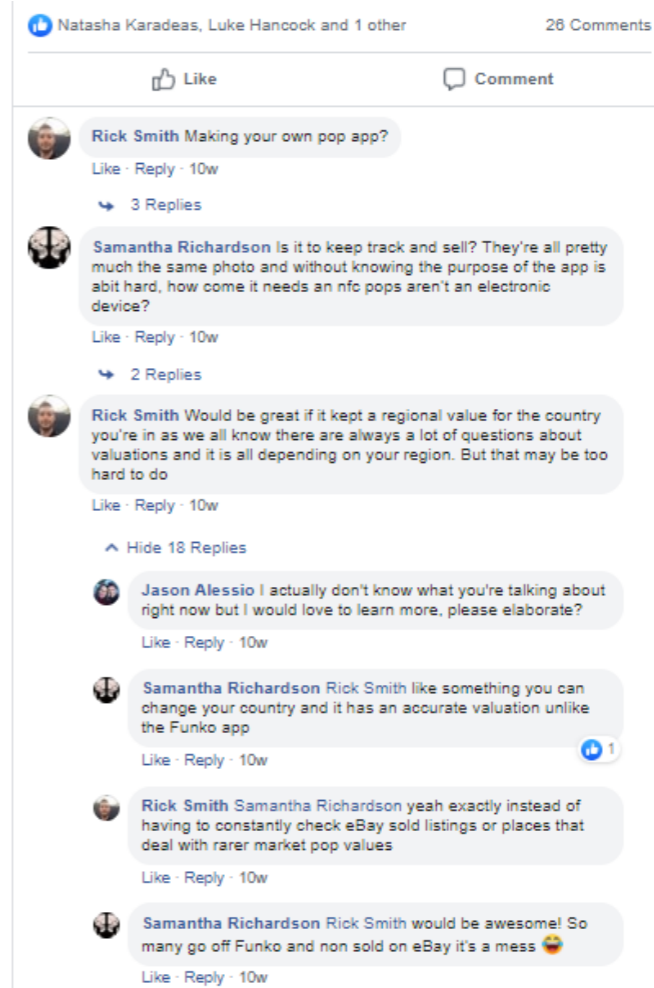


Figure 5.3 - Facebook Comments

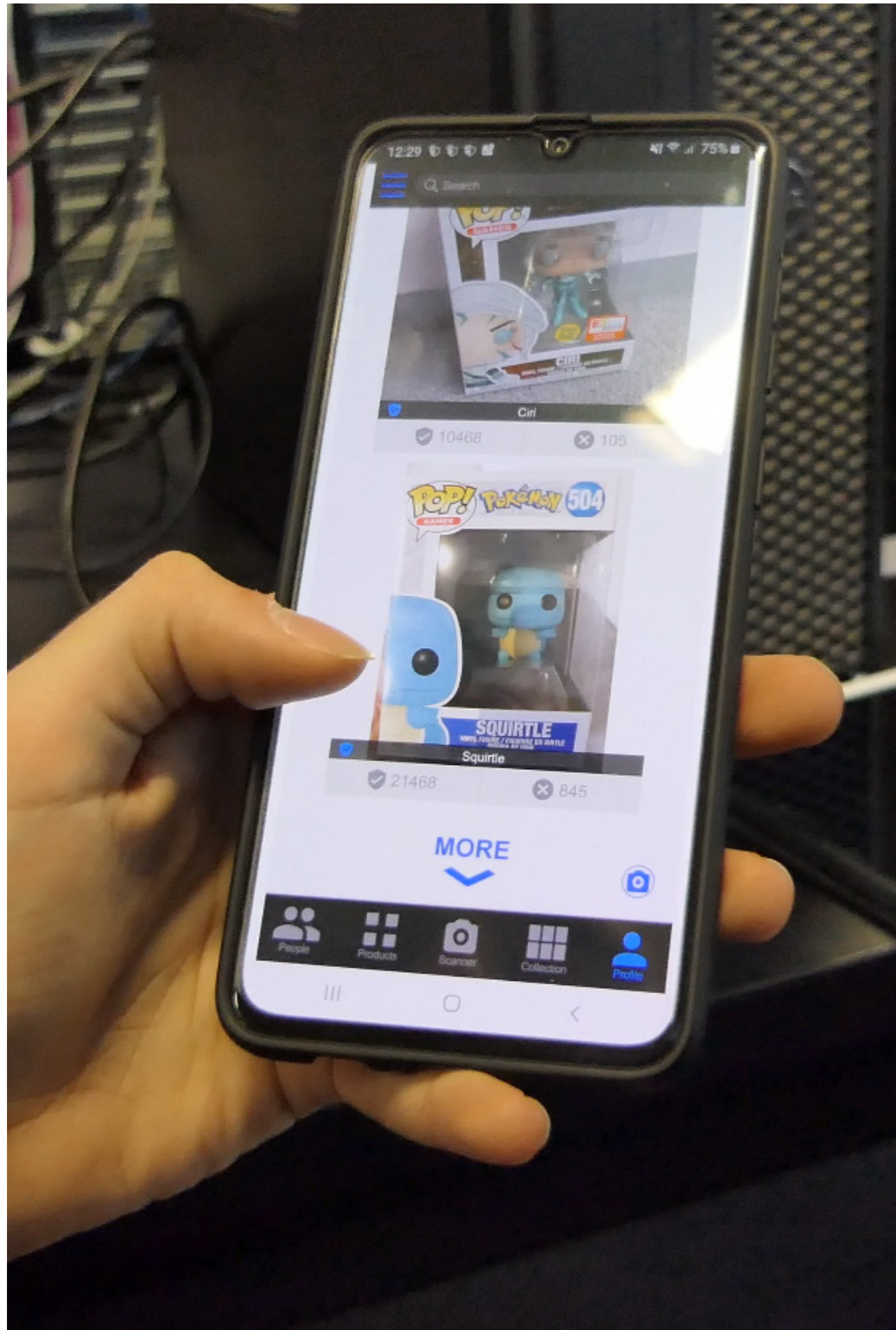


Figure 5.4 - User-Testing the Adobe XD App

Hands-on User-Testing

When discussing the project with everyday collectors in person, the research often found them searching for new products at conventions and collectables' retail stores. They were often interested in discussing the project (see Fig. 5.4) and unlike some of the users in online communities had never been confronted with the project before. This presented different feedback considering they hadn't seen previous iterations. The employees of stores such as Zing and Eb Games were always interested to hear more about the project and

often gave insight into the people that frequented their store. They shared not only their own experiences but the experiences of other collectors they had met and gave a unique look into the social aspects of collecting they could visibly see from other people. There were four key testing groups throughout the user-testing process, and they all informed the design of different integral design changes. (For more information on any of these user-tests, see Appendix E)

- The first testing group consisted of formal interviews with four collectors found at Oz-Comicon hunting for, or selling Funko Pop vinyls. These were all individual tests where a discussion took place regarding the overall design concept (see Fig. 5.5). They were mostly pleased with the concept however they found the UI too confusing and overwhelming. It had a lot of small images and large slabs of text populating the app pages and the users had to squint to read what was on the page. The flow of the application was also very jagged and interactive elements were too small and difficult to tap on. Further discussion took place however and the testing group voiced their opinion to see other functionalities in the product, such as buying and selling on the platform. The initial research showed the importance people derive from seeing a monetary value on their growing collection, often in comparison to what they initially paid for it.
- The second testing group consisted of a group discussion with five different participants (see Fig. 5.6) without a major interest in the field of collectables who lent their assistance in creating a cleaner user interface. Collectables already have all sorts of different supporting apps, but this focus group took the discussion out of that space temporarily and focused on more general app design. This allowed the research to clean the app UI, remove unnecessary buttons and make images easier to navigate for anyone using the application. This translated into a more positive user-testing experience when discussing the project with collectors in the next stages of the design's development.

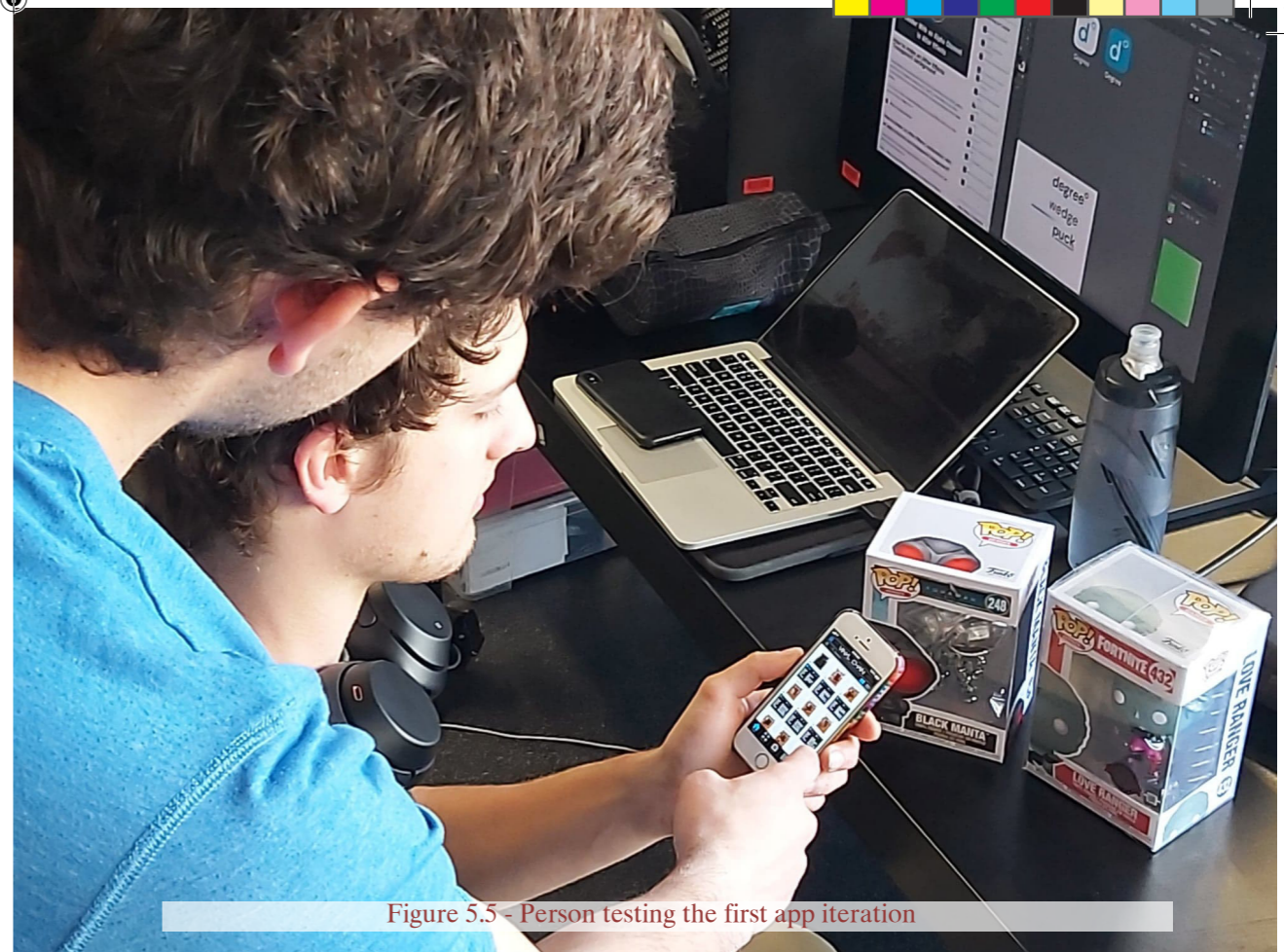


Figure 5.5 - Person testing the first app iteration



Figure 5.6 - Group discussion with app



Figure 5.7 - App discussion with customers in a Collectable's store

- The third testing group was made up of two collectable's store employees and two customers roaming the store looking at Funko Pop vinyls. These were all individual tests and consisted of asking them to follow a set of vague instructions to find their way throughout the application (see Fig. 5.7). This was targeted to improving the user experience through simple user scenarios as well as the overall flow. Some interactive elements were still too small to understand and use, however the discussion engaged common app practices people are used to. The hierarchy of the product was corrected in such a way that improved the overall GUI and made further user-testing clear to anyone engaging with the outcome. This testing group also sparked further discussion into the other possibilities the design could have within the field. The collectors expressed their interests in other types of collectables being incorporated into the product such as Hot Toys and modern footwear because the issue doesn't just affect Funko Pop vinyls.
- The fourth testing group consisted of three interviews at Pax in Melbourne with different employees of collectables stores. Pax Australia is an event held every year for developers to allow the public to test different video and tabletop games being released in the coming months. Games have a large variety of collectable merchandise and wherever the games are featured, collectable add-ons are sure to follow. These questions were surrounding the use of Blockchain technology and the privacy concerns when using a system that keeps permanent records. Everyone tested had no issue with including the country of origin however any monetary values and their inclusion could pose problems. Many of them disclaimed that the current world being influenced so heavily by social media means that information is rarely hidden. However, showing potential buyers a financial history of a product could be detrimental to those trying to turn a profit. This was a unanimous consensus across this small testing group and across online communities where it has been further discussed.

Major Design Changes

One of the key changes to the UI's design from the user-testing was enlarging any interactive elements on the screen (see Fig. 5.8). Previously buttons and other usable elements had been tiny and didn't fit the hierarchy of the Adobe XD prototype. Material Design (2019) mentions that one way to help users navigate is by designing clear layouts with distinct calls to action. By enlarging anything usable it made it clearer to users on how to proceed when following the user scenarios.

A difference of perspective is important to gain valuable feedback into the shortcomings of the design especially since the user experience is the defining trait for an app's potential success in the market. This especially came when the design engaged with testers that might not enjoy collecting but still use a variety of different applications in their everyday lives. The user experience focuses on "structuring all its components and elements appropriately to create the user flow" (Thinkwik, 2018). One major way to adhere to app users is to incorporate native elements into the flow of the design. An author of Smashing Magazine, Babich (2018) illustrates that "Users become familiar with the interaction patterns of each OS, and anything that contradicts the guidelines will create friction"

which will make it harder for them to enjoy the experience the designer is providing. However, the design still needs to be selective about what to implement when testing the outcome with users. The main criticism about the app was that people have a variety of different natural instincts when it comes to navigating applications. Tropes such as tapping once or twice to enlarge an image started to play a huge part in developing something already familiar to the user while keeping it useful and innovative at the same time. This is where the design had to use its own judgement to edit the user interface and develop the product into something people could not only understand when first picking up the device but easily learn newly introduced nuances. If users get frustrated with the outcome, then it will be unable to serve its purpose to assist the collectables market in a user-friendly way.

The feedback during some of the user-testing phases highlighted the connectiveness of the community and how much they interact with one another regarding their collecting habits. Their sharing and boasting rituals have become a key part of collecting as a whole and even though the design helped give them something to boast about it didn't initially let them do any form of communication with others on the

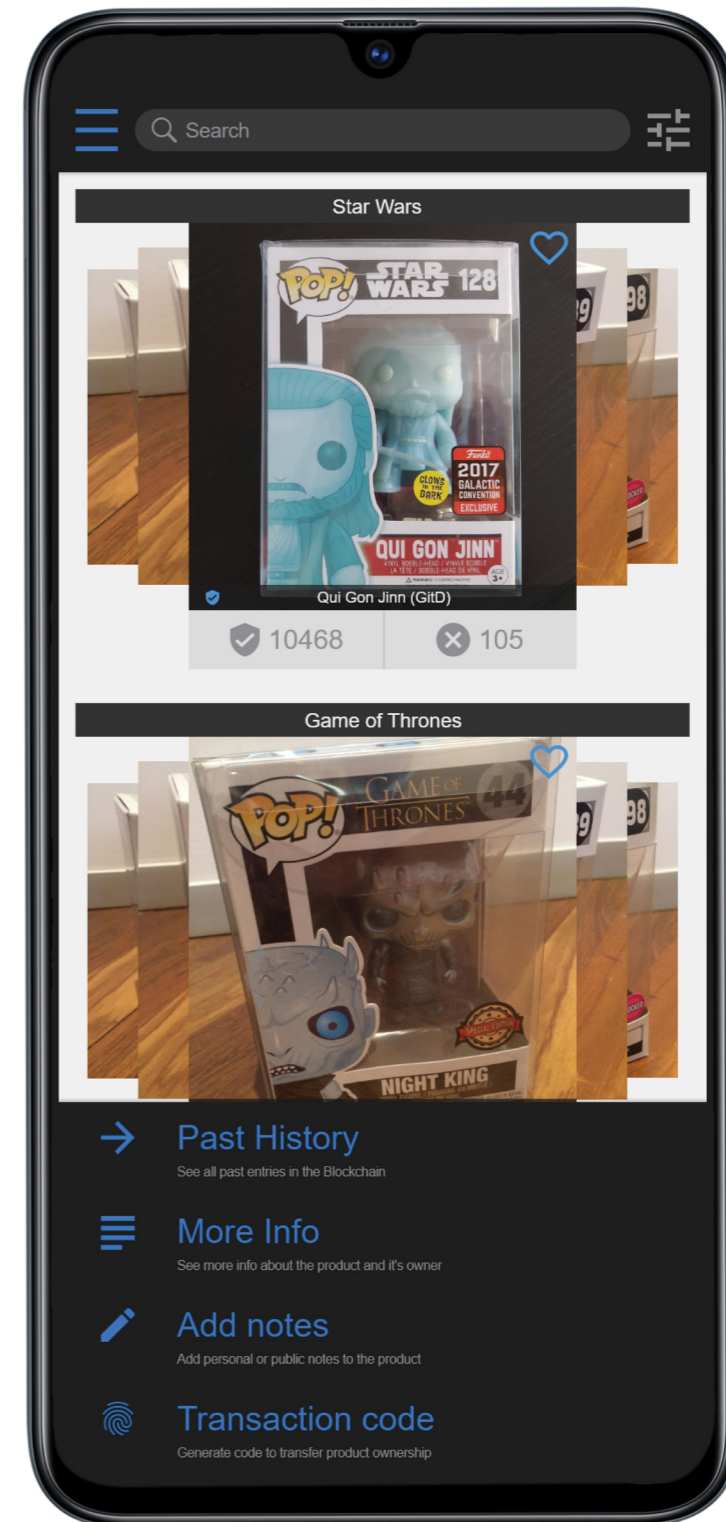


Figure 5.8 - Interactive Banners

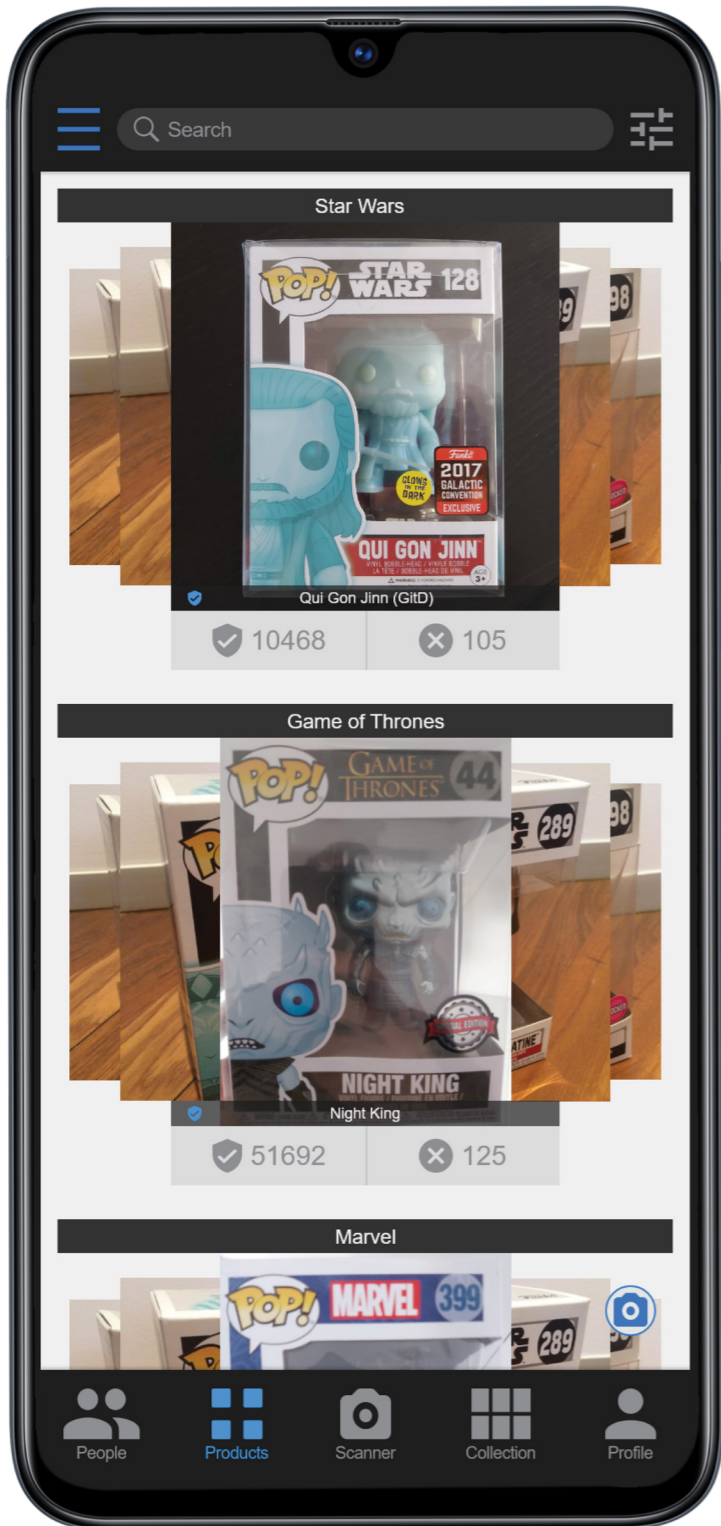


Figure 5.9 - Products Page

platform. The input derived from the target audience shaped the outcome into something that included the core values at the heart of their collections. The design started to incorporate elements that allow users to not just see the authenticity of random products in the marketplace but what their friends are adding to their collections as well as the product franchises that interest them (see Fig. 5.9). Even though security remains at the heart of the project, the design needed to incorporate social elements to capture the attention of its target audience.

It's the inclusion of things like this that pushed the community to take more interest in the project and be more responsive as the research progressed. Engaging the communities was difficult at first but it is very noticeable that responses increased as the design was more suited towards their needs. This redirected the design into a more valuable space because not many apps aim to encapsulate most elements of collecting. Collection tracking apps such as the Funko app (see Fig. 5.10) and Gemr often focus on the individual user and then links with social media and online marketplaces to create a more wholesome experience. A vast majority of the users interviewed in person expressed their interest for the ability to buy and sell products on the platform. It was clear from

the discussions that moving between platforms to purchase a given product was frustrating and seemingly unnecessary. This is one of the major comments that pushed the design to incorporate as many core elements of collecting as possible onto a single platform.

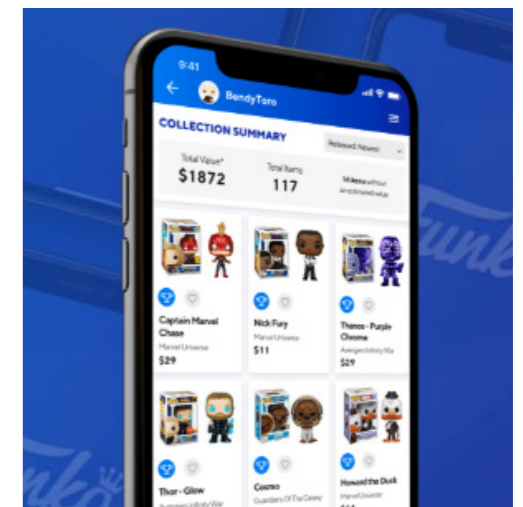


Figure 5.10 - Funko App by Funko.com, 2019

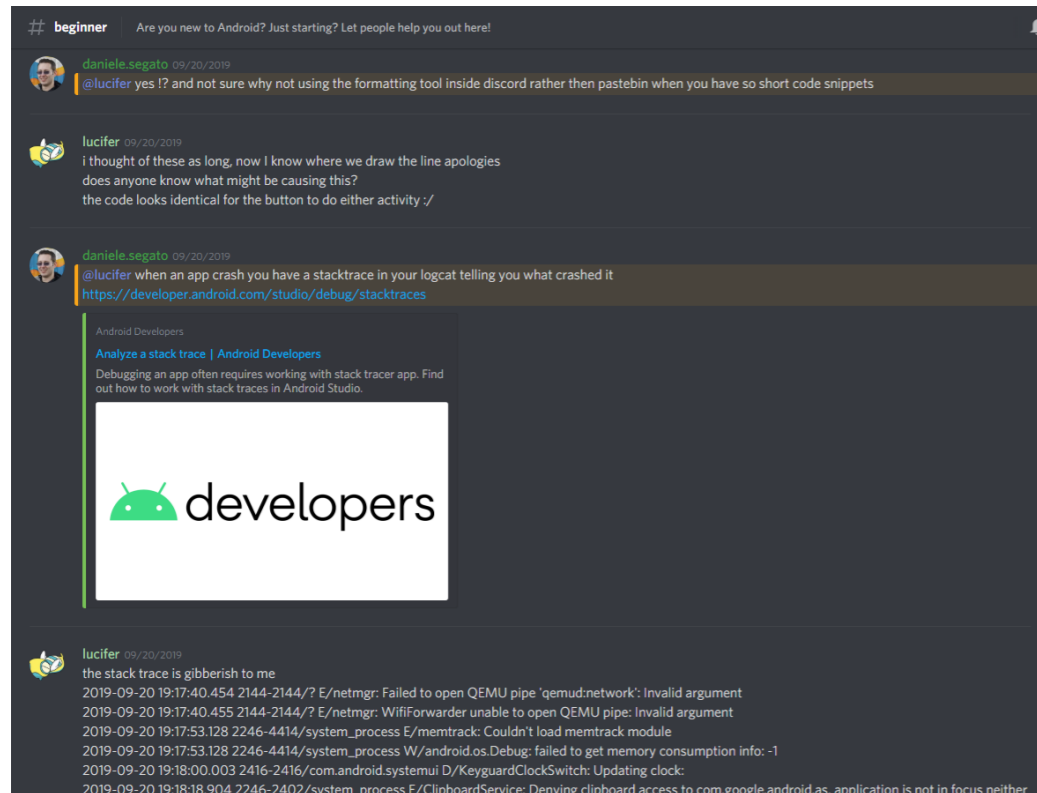


Figure 5.11 - Android Developers assistance

Help from Android Developers

Many different designers at RMIT University and Android developers from online forums also assisted the research when designing and creating the final application. Feedback loops were established with designers and the online communities during the Adobe XD iterations to synthesize the feedback into something more intuitive. The other side of this is the in-depth development of the product itself. The research conversed with many professional Android Developers on a platform called Discord. This

platform is beneficial because of the way it highlights code syntax and makes it easy to discuss code snippets with other users. Android Developers know what good and bad practice is in the world of app development and their assistance was required to develop something that followed the guidelines of the android platform. By discussing the designs incorporated logic and flow; feedback could be obtained to drive the design into a more efficient and secure outcome (see Fig. 5.11). It prevented a loss of time further down

the track because of the multitude of bugs that would have occurred without their assistance.

When moving the product into the Android Studio workspace the research discovered that android contained many inbuilt limitations to force developers to conform to 'good practice'. The most major instance of this was the Adobe XD bottom navigation menu had six items whereas Android Studio limits it to five. The discussion on discord often revolved around something called 'good practice'. This is essentially the standard rules of app development for the android platform that developers must conform to. Anything not adhered to unless done for a very specific reason is essentially taboo in the android community. These inputs from qualified android developers

improved the applications usability and kept it within the bounds of the industry standard to avoid issues down the track. These are often linked to the standardised future updates of the android software installed on all modern android smartphones. When Google updates the android software across all mobile platforms, developers need to do the same to keep up. Since Google ensures all their software adheres to the 'good practice' that's in place any application that doesn't follow these methods during development suffers a myriad of bugs every time something minor changes in the smartphones operating system. Keeping up to date with important Android documentation is important to create less issues down the road and discord became a tool to do this.

Discussions with Designers

Many discussions with other designers who don't have a major interest in the area helped temporarily take the research's focus outside of the collectables community to consider its broader opportunities. The product was designed for a certain space, but broader discussions enable it to engage with other locations not inherently associated with collecting. Collectors have recognised a need for the outcome in conjunction with other types of collectables. However, many non-collectors have also recognised a potential for it to be incorporated into other supply chains entirely where trade and authenticity are strong focuses. Highly traded items that could encapsulate the design include vintage wines, computer parts and collectable shoes. These come from very different worlds, but they share some key similarities that make them prime targets for the technology introduced in the application. Products like these are highly traded, and their value is largely dependent on where the product came from and its current condition. This feedback has prompted the design to keep the outcome as modular as possible. Data points including serial numbers, dates and other valuable information on labels and packaging need to be included for significantly different types of products. However, some of

these data points can be streamlined across the board by adding less mutually exclusive information such as including the country of origin.

Evaluating a design's success before it goes into the marketplace can be quite a difficult task. Community feedback and inspiration has been a large component of the design process and from taking onboard their opinions the design has had a positive response. Many collectors the research has talked with have expressed their interest to one day be able to download it. However, to really push it into a beneficial venture for the benefit of the field of collectables, large companies may have to invest the time into incorporating it into the collectable's world. It is largely dependent on functioning within an ecosystem. If the other parts don't incorporate it, such as the social cultures that determine value within the communities alongside scarcity then it can't help anyone. Validation within the community as a viable addition to the field of collectables is integral to its usefulness. If it can prove its worth to enough users in the community then large corporations will undoubtedly incorporate a system like this to benefit not only the collectors, but their own financial agendas.

Chapter 6

Design Outcomes

Through extensive consultation with collector communities the research proposes a new application that uses Blockchain technology to determine the authenticity of popular collectables called 'Funko Pop vinyls. The Blockchain ensures a permanent record can be maintained for each collectable, and by using the proposed 'Vinyl Chain' app (see Fig. 6.1), collectors can authenticate products within the collectables market and have greater confidence when trading with others. It suits every different kind of collector, whether they just want to keep up with their friend's collections, or store away products with the intention of selling them decades down the track. Every member of the community can use the platform in a way that suits their collecting habits and adheres to the social culture that has established itself in the wider community.

Vinyl Chain is the design outcome of the project and aims to secure the collectables market in ways it desperately needs due to the evolution of the collectables field. It is a smartphone application that utilises Blockchain Technology to allow users to securely store digital certificates of authenticity that will help improve trust in the community. The field of collectables has traditionally always been situated in the physical world but the availability of products in online marketplaces have created a space for the outcome to be developed. It uses a plethora of different strategies to create a secure platform, Optical Camera Recognition to translate images into important data, Tamper-proof NFC Tags to store information over long periods of time and Blockchain to create a decentralised ledger that's visible to everyone. It seeks to allow users to be able to view any relevant information on a product before they commit to purchasing and will alleviate many of the risks associated with buying from dodgy sellers. The app allows them to engage with a variety of different user scenarios to easily navigate around the product and create a powerful user experience. The app also allows manufacturers to not only monitor their own products through a supply chain but remove the competition creating knock-off products of their design. The app secures the collectables market but has been designed in such a way that will allow it to easily apply itself to other fields where authenticity is important.

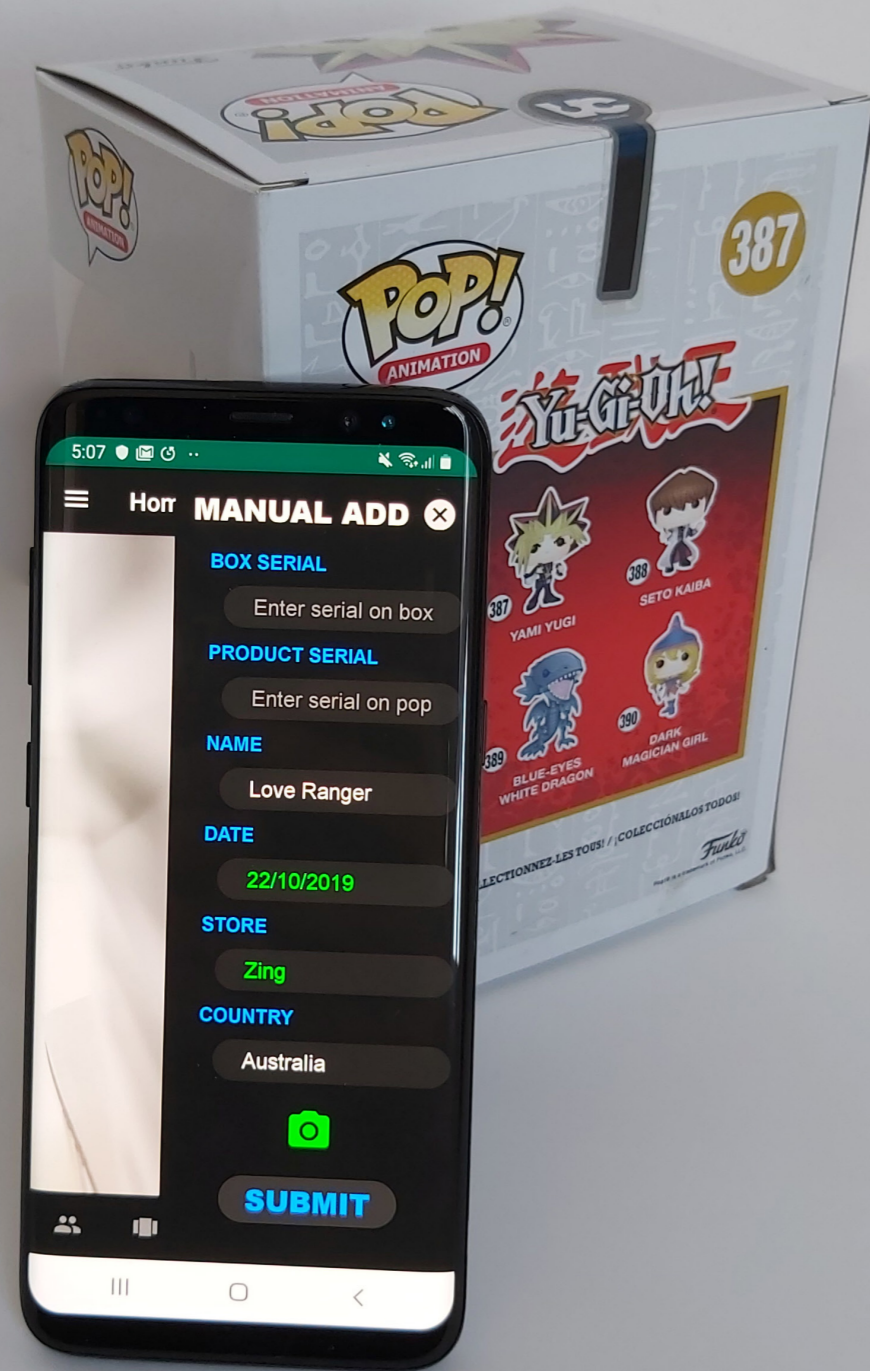


Figure 6.1 - Vinyl Chain

Design Functions

Throughout the course of its development the outcome has taken on several different functions that further help it interact with the field of collectables. It is an application that can be likened to other collection trackers however that isn't its focus unlike other tracker apps in the field such as the Funko collection tracking app and Gemr general collectables tracking app. Its focus in the field is giving as much information to people as possible when they go to purchase a product to fill their collection. In this way it fits better as a competitor to eBay as a platform that allows people to search for products they want to buy (see Fig. 6.2) and reduces the risk involved with the online medium. When a new collectable is added to the platform that the owner is willing to sell it will appear to anyone who is currently searching for it. However, unlike the more common collection apps, it will not only allow them to also purchase using the app, but they can visually see all the previous owners. Sellers are also forced to upload current pictures (see Fig. 6.3). Pictures taken and uploaded onto eBay are often uninformative and this rings especially true when bootleg manufacturers attempt to scam potential customers. The requirement to include current pictures of the real product make it significantly harder to scam users

and people can see exactly what they are buying. It also allows users to sell products they have vaulted away for years without updating its images because of the way it integrates NFC tags (see Fig. 6.4) into the system. By using specialised tamper-proof tags, it can be easier to prove to other collectors that the product hasn't been changed since it was

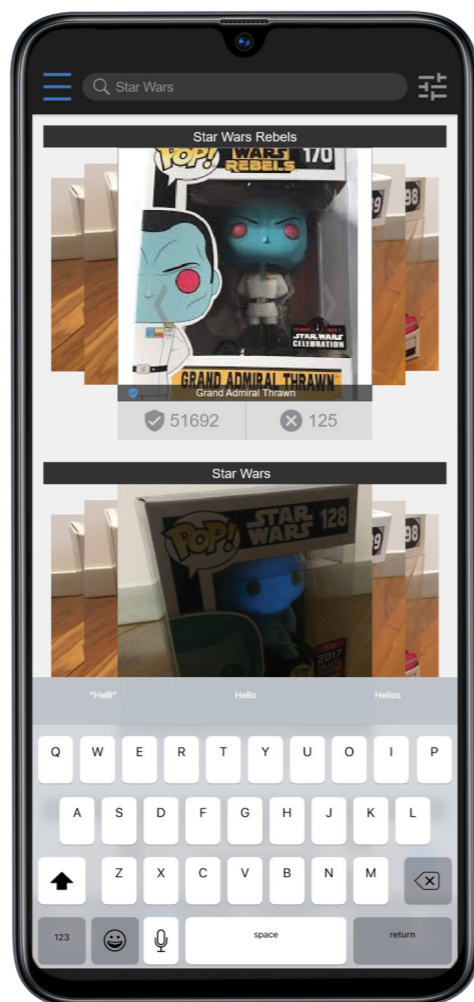


Figure 6.2 - Searching for a Product

initially entered in the Blockchain. The combination of the two has been used before in the field with products such as Amiibos, to help them connect to gaming systems, but never for product security.

The design outcome uses three major types of technology and

includes them in an application that makes them easy to understand for everyday users. The digestible user interface seamlessly integrates the likes of Blockchain, OCR and NFC into the application to all serve different functions in terms of providing a secure marketplace for all kinds of collectables.

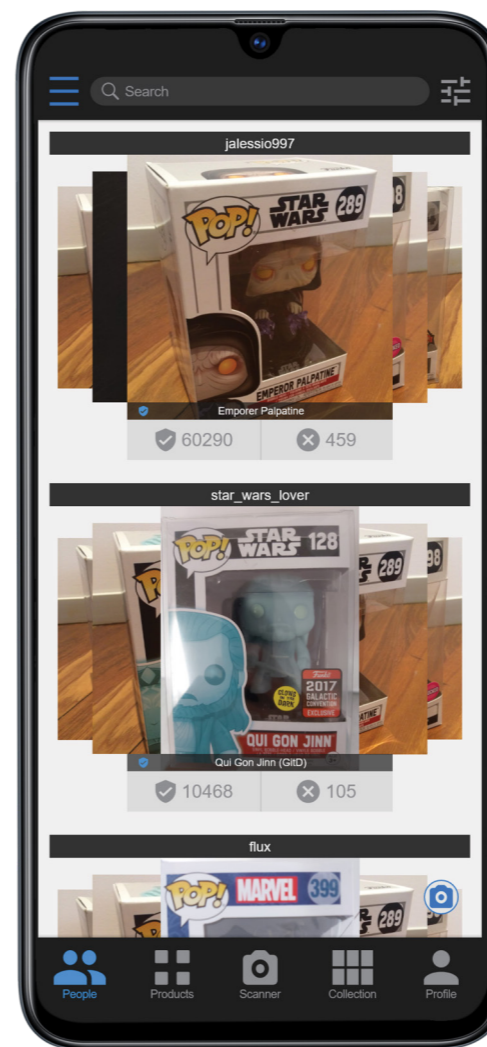


Figure 6.3 - Main App Page



Figure 6.4 - Tamper-proof NFC Tag

Blockchain Technology

Blockchain is used within the application to create a decentralised ledger that stores any added information about any given product (see Fig. 6.5). It will store any manufacturer information, every user that has owned the product in its life, whether they have added NFC tags and even what countries it has travelled to. It will also store images provided by the community

to keep track of its changing condition and provide more detailed information to any potential buyers. Its decentralised nature means the data isn't stored in a single location but rather on the devices of its users. This ensures that anything added to the system can no longer be changed in the future making sure no information is hidden from the community.

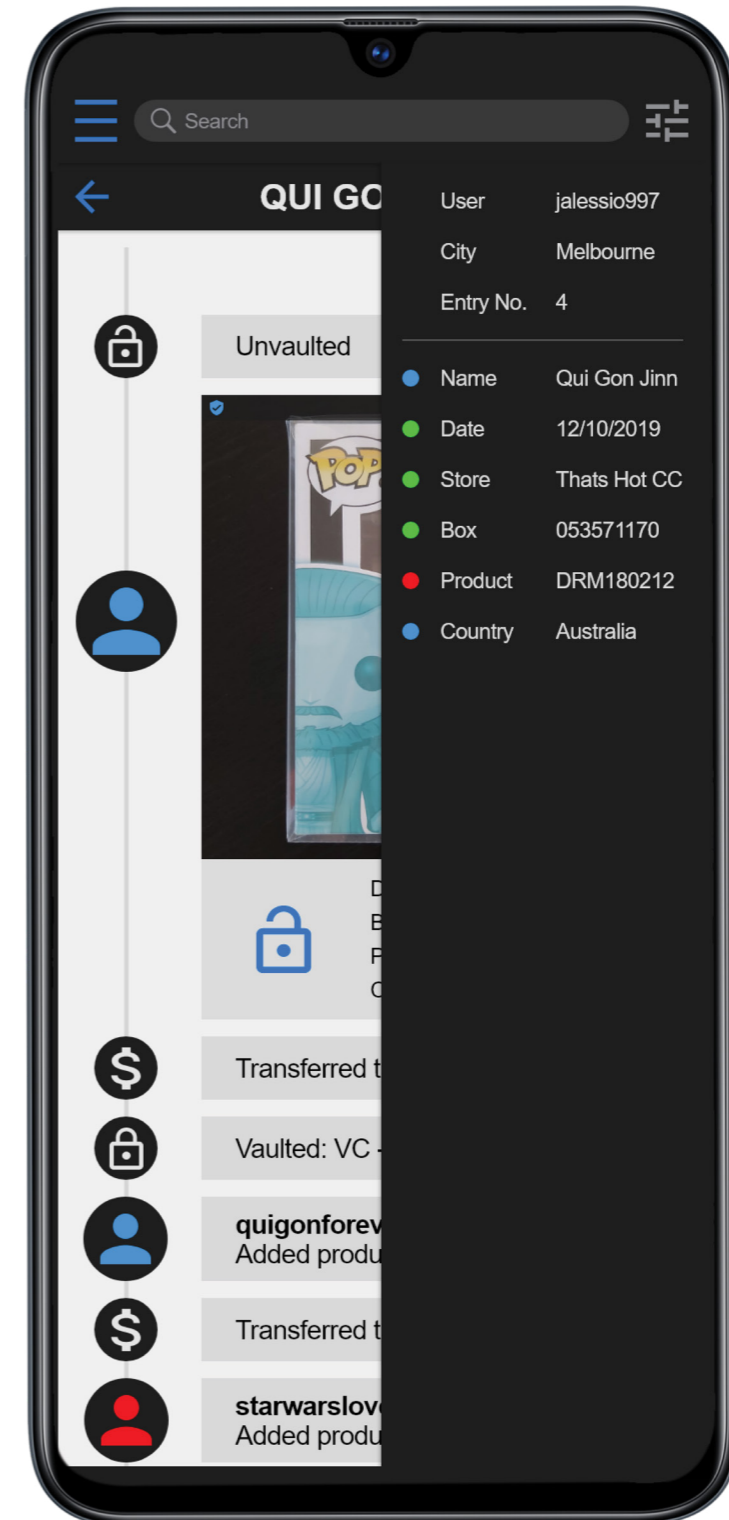


Figure 6.5 - Blockchain's More Information tab

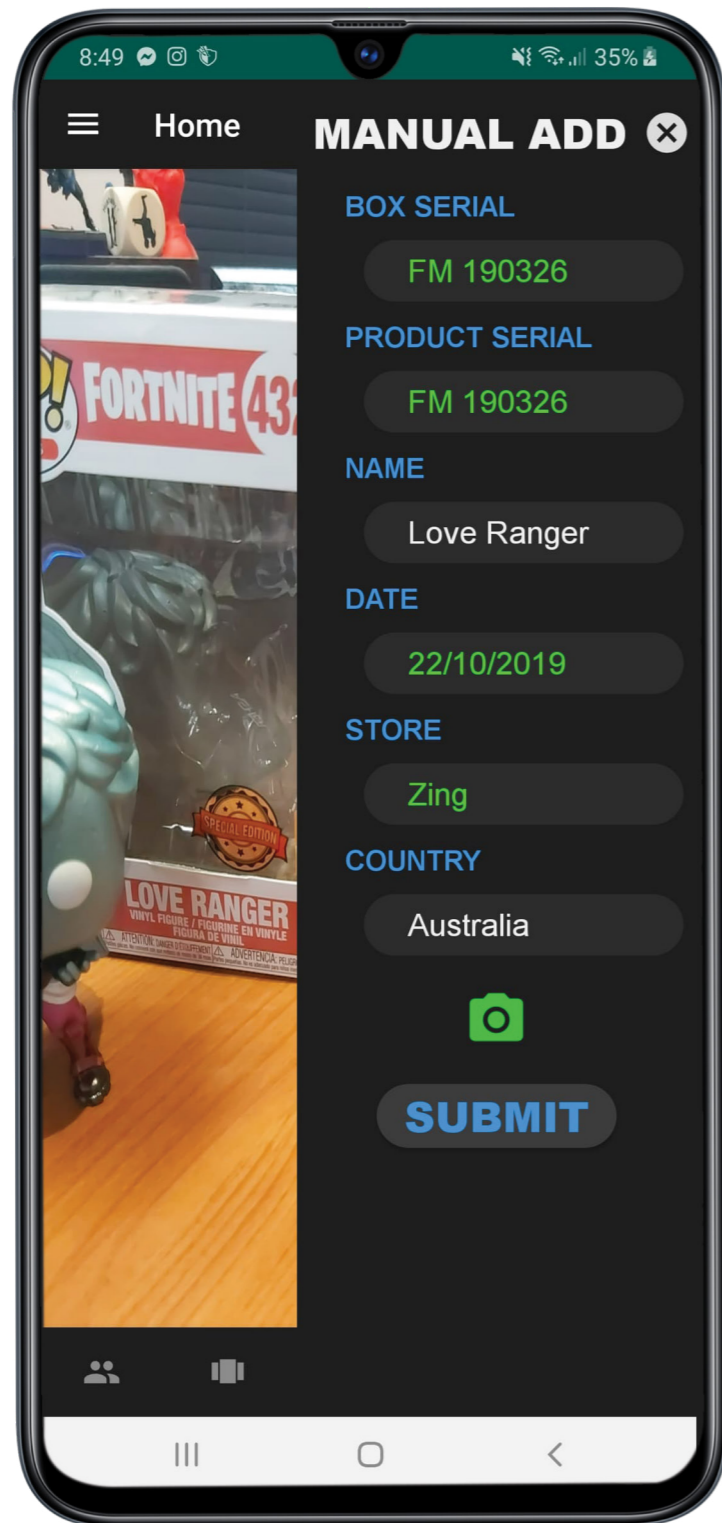


Figure 6.6 - OCR text input

Optical Camera Recognition

Optical Camera Recognition is technology that is being used in the application to make it easier for users to enter their product data onto the platform. It will also allow information entered on the platform to be better analysed by others. Any information entered from the inbuilt OCR tool will show up as green text or with a green indicator which tells viewers that the product owner entered it with their camera (see Fig. 6.6). This doesn't prevent

people from manually entering things like serial numbers, but it tells everyone in the community that the information has more of a chance of being falsified. Using current machine learning libraries, the app can be taught to recognise whether it's a product box, Funko Pop vinyl or something else entirely. This is simply an added layer of security that will give people the information to help inform any future decisions.

Near Field Communication Tags

Near Field Communication is used in most people's everyday lives, they are quite accessible because smartphones have the technology built in. This technology is used in conjunction with a product called NFC tags, they allow small amounts of data to be stored on a chip that doesn't require power to function. The design uses a variant of these called Tamper-proof NFC tags which sends varying signals dependant on if the user has meddled with them or not. These NFC tags are often used to securely check products along supply chains and on products such

as medicine to prevent tampering that could endanger someone's life. The act of Vaulting already occurs in the field of Collectables and this is a seamless way to connect this part of the collecting culture with the design. Users can purchase an NFC Tag from a supplier for a low cost, apply it to their product (see Fig. 6.7) and log the information onto the Blockchain. Whenever another user acquires the item, they will be able to see if it has been opened and can be confident in their purchase because of the underlying Blockchain system.



Figure 6.7 - NFC tag on a product

User Scenarios

Users will engage with a variety of different scenarios when interacting with the world through the lens of the application. There are five major individual user experiences with the application however they often link to one another in some way.

- Users will be able to see the collections of friends and any product franchises they are interested in. After they view any associated product information, or just the image that is front and centre they will be able to vote the product up or down depending on if they think its authentic or not (see Fig. 6.8). Over time the community's consensus, especially the opinion of collector veterans will influence less experienced collectors in their ventures.
- To add a product to their own collection quickly they can do it as follows. They open the app soon after a purchase, scan the receipt for information such as the store bought from and the country and date of purchase (see Fig. 6.9). They then scan the products box, open it up and scan the bottom of the product, close it up as it was previously, take a picture and click submit. It will add all the required information to their collection and create the first entry into the Blockchain. If the manufacturer has already added it to the Blockchain then the receipt will transfer it and it will be added as the second entry.

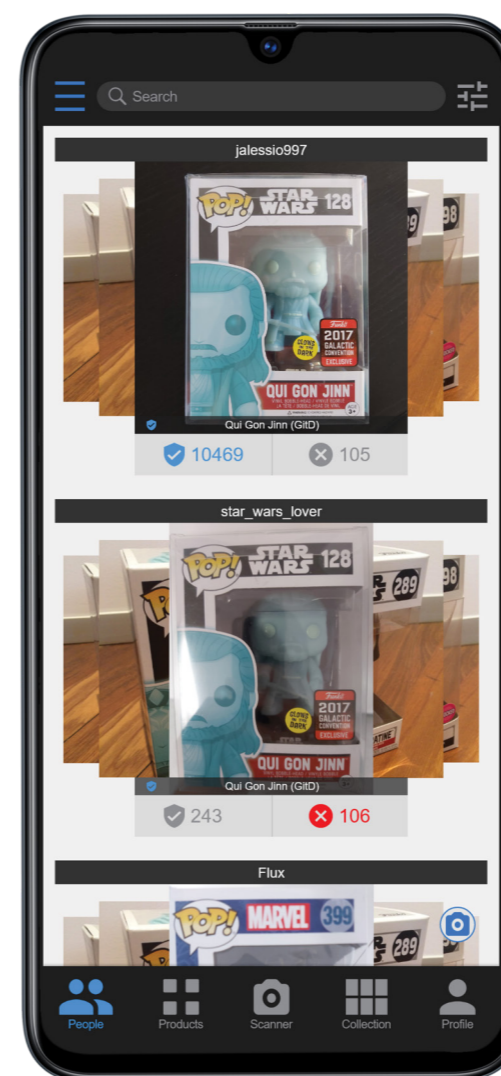


Figure 6.8 - Upvoted product

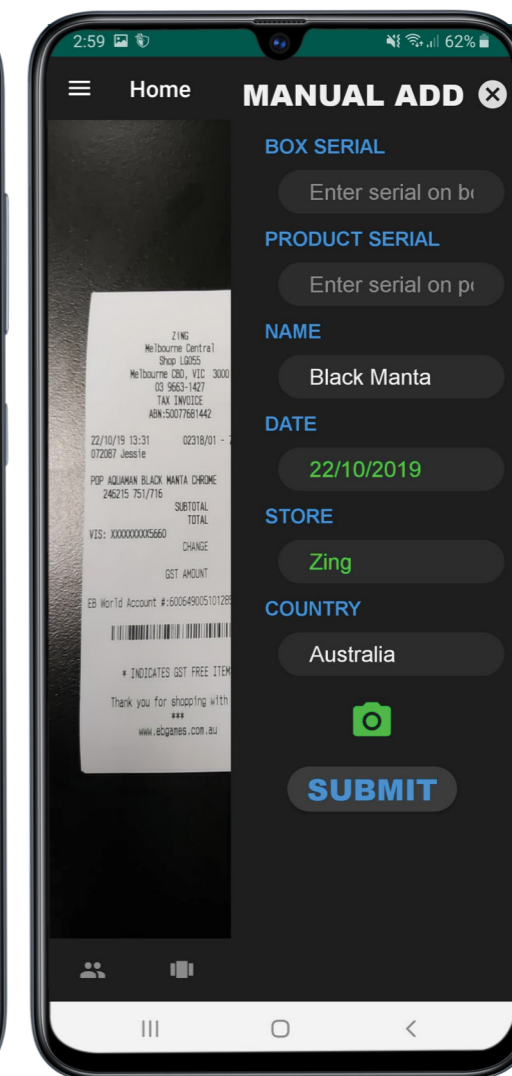


Figure 6.9 - OCR entered data from receipt



Figure 6.10 - NFC Tag Closeup

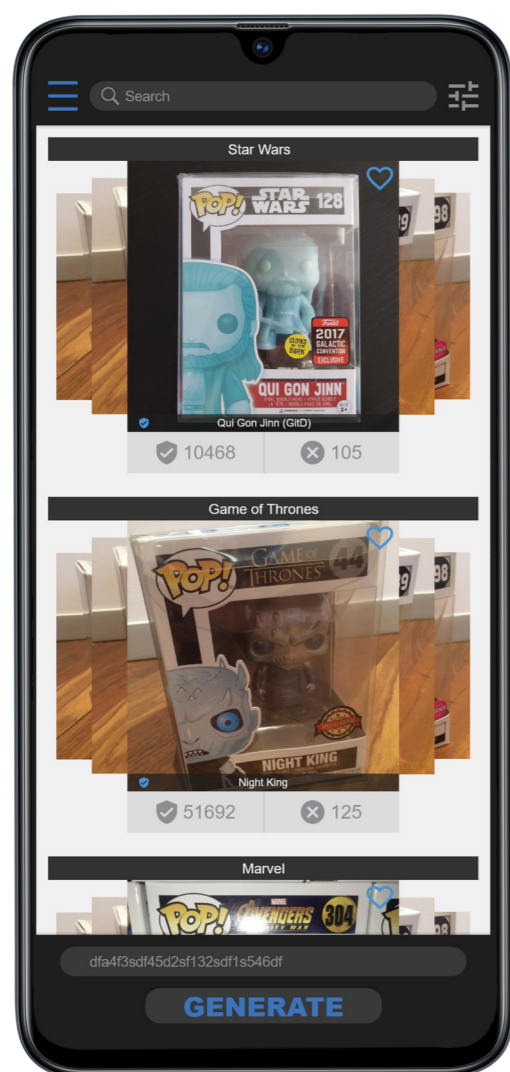


Figure 6.11 - Random serial generated

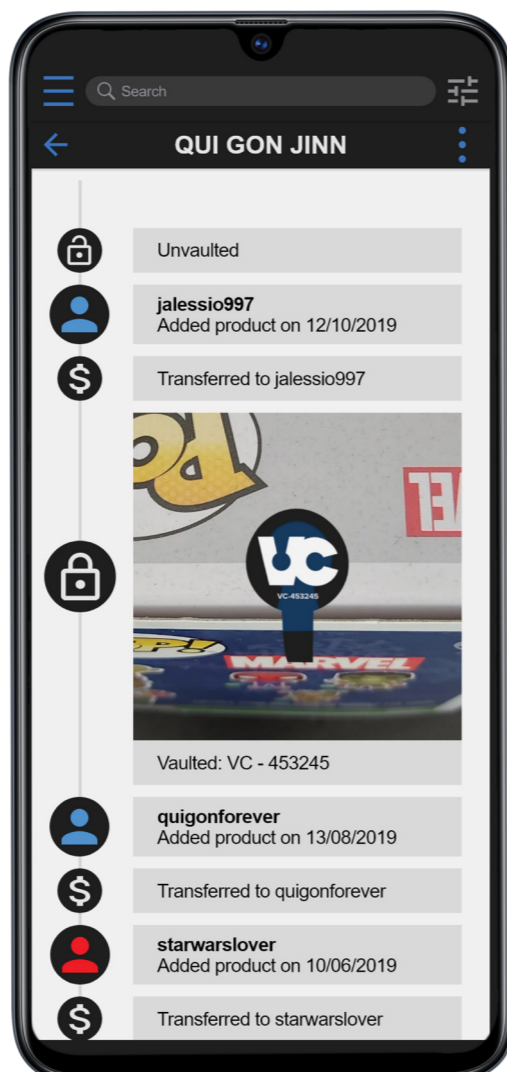


Figure 6.12 - Vaulted on the Blockchain

- To add an NFC tag to the product a user simply attaches the NFC to the product over the edge of the box securely sealing the box opening. They then tap on the corresponding item in their collection and select the option to scan an NFC tag. Once they scan the tag, they then take a photo on the app that shows the serial key on top of the NFC (see Fig. 6.10). This prevents them from scanning a tag that isn't attached to the product. The collector can then vault the product and when they sell it, the buyer can be confident that any data entered hasn't changed.
- When they sell a product to another user they go to their collection and tap on the option to receive a randomly generated serial key (see Fig. 6.11). The buyer receives the key and once they enter it, they are prompted to take another picture of the product, along with any other information they want to change or add. It then changes hands and adds any relevant information into the Blockchain.
- When someone wants to view the data on the Blockchain they simply bring up the options on any given product and tap the view history button. After they do this, they can view information such as product vaulting (see Fig. 6.12), images each user has uploaded, and any other relevant product information.

The Next Steps

The Funko company is the licensed manufacturer for any and all Funko Pop vinyl products and their addition to the Blockchain is quite important. Collectable products derive a lot of their value from their authenticity which is determined almost exclusively from whether a licensed manufacturer created the product. For a manufacturer to engage with the product they simply attach an inexpensive NFC tag to all their products at some stage during the supply chain. They then send the data automatically inputted into Vinyl Chain to any retail stores that sell the product. This data can either be stored on the NFC tag or on the retailer's computer system.

When a collector makes a purchase, they can either scan a special generated QR code off the receipt (see Fig. 6.13) or scan the attached NFC tag. It will then transfer the product into their collection and prove its authenticity through the Blockchain's origin beginning with the official manufacturer.

Vinyl Chain doesn't stop at Funko Pop vinyls let alone collectable products. The final design's capabilities to secure the digital market also applies to other fields where authenticity is important. The app can incorporate all kinds of products including collectable shoes, computer parts and vintage



Figure 6.13 - Receipt with QR Code

wines. Wine will be worth less unless it is made by a specific winery and computer parts will pale in quality and effectiveness from bootleg manufacturers. This makes them strong candidates for the outcome.

The modularity of the product evident by the possibility to add or remove different types of data points

for diverse types of products means it can be used for a variety of purposes. For example, if the product were used for vintage wines instead, it would have different data points instead of the two serials a Funko Pop vinyl has. It would have a heavier focus on the label on the bottle (see Fig. 6.14). The OCR would identify the date the wine was created, where it was made,



Figure 6.14 - Wine Label

and any other serials on the label (see Fig. 6.15). If it incorporated computer parts, condition would be considerably more important since it's a functioning electronic product. The application may then prompt close-up images of components (see Fig. 6.16) to help prove to others that it's in good working condition.

Vinyl Chain engages with these possibilities and has been designed in such a way that has a security theme. Any product can easily fit into the developed interface because it isn't built just with collectables in mind. The research has included as many generic pieces of information as possible such as the country of

acquisition for any given product. This information is more useful for a wider array of products and will allow them to all coexist on the same platform. All these different pieces of data will build the core structure of what users view on the Blockchain when investigating a products authenticity.

Vinyl Chain engages with the community in such a way that gives them more detailed information when purchasing products. Through this it can help secure the digital marketplace in new and exciting ways.

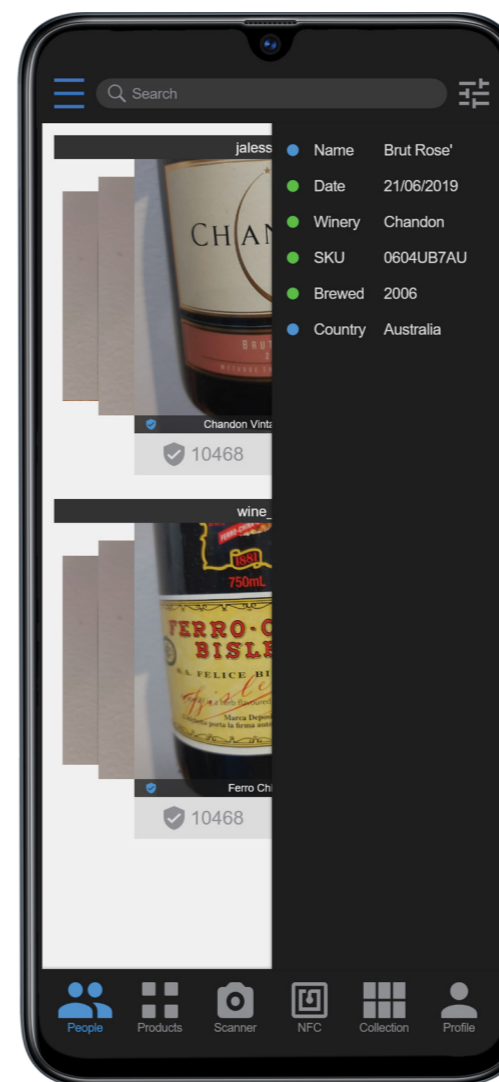


Figure 6.15 - Wine Bottle data points



Figure 6.16 - Closeup Prompt



Conclusion

Throughout this design process I have developed an application called Vinyl Chain (see Fig. 7.1) that has the potential to change the way collectables are bought, sold, traded and even discussed in the community. By using new technology such as Blockchain it helps create a transparent system for users to identify authentic collectables in the world. It gives people a new level of confidence in what they're buying and creates more trust in the communities, manufacturers and designers. Vinyl Chain allows rare collectables to retain their high value based on their exclusivity in the market since the outcome alienates unofficial copies reducing the number of products in circulation. Collectors invest a lot of their time and money into their collections and protecting the authenticity and resale value is important.

I have held a strong focus on user engagement during the design process due to the strong social culture of the field of collectables. The Vinyl Chain project has tested its viability and strengths within the community at intervals between most design iterations. The design concept as well as the final product has constantly shifted because of feedback from all types of collectors

and even those who are not directly involved with collectables. Collecting has a lot of different aspects to it and I have incorporated as many as possible. This strong focus on user involvement has really transformed the way I view the entire design process. By allowing potential users to direct the design it helped me transform it into an app that they have expressed their eagerness to use. It is something that can quite visibly fill a space necessary to the community because I let them control the outcome in various ways. In my future design practice, I will continue to hold users at the centre of the process.

Developing the outcome on a common medium like a smartphone has made the product accessible to those who might not completely understand the complex technologies lying underneath. This helps collectors authenticate their products in such a way that doesn't require them to know about the technologies but still have access to valuable product information through an easy to understand user-interface. Typically, collectables travel between users and the associated product information becomes sparser because there is no data passed along during transactions. With Vinyl

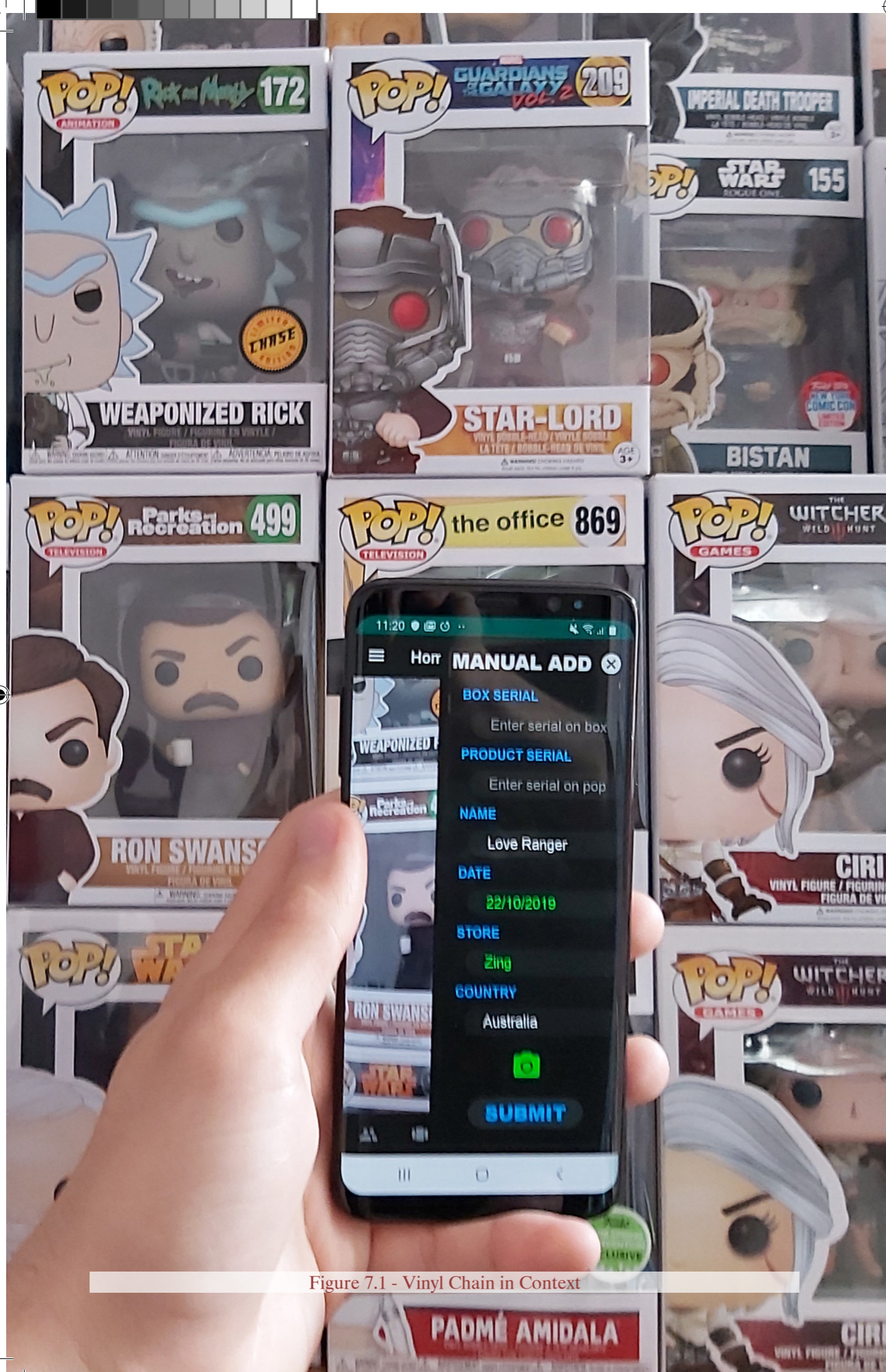


Figure 7.1 - Vinyl Chain in Context

Chain, every single time someone new comes in possession of a product there will be extra information in the system instead of less. Not to mention every time it changes hands; it passes the eyes of even more members in the community giving more chance to identify a fake product.

Design for authenticity was uncovered as a major issue in the field of collectables but the research had to be delicate when designing the outcome. It is quite possible to make it easier for unofficial retailers to sell their products to unsuspecting victims. The strongest way to reduce the possibility of people exploiting the product is to allow the community a level of control. Veteran collectors already established in the community can use their knowledge to more easily assist newer collectors through the transparency of the platform. The application serves as a gateway to let experienced collectors see the collectables' detailed history instead of trying to blindly purchase the final product to complete their favourite collection.

I aim to continue to iterate the application and finalise the design to an industry standard. I will then further discuss the design with different companies about the possibilities of its implementation. Small resellers would benefit from the product when buying or selling

their goods because it will help give their customers more trust in their business. A large reseller such as eBay would also benefit because it could improve consumer confidence in their company and provide a level of insurance for any refund claims lodged on their platform. Lastly, I will continue to interrogate new technologies and create a functional Blockchain to prove its viability and conduct some beta testing in the community to reveal any remaining flaws and complete its development.

Extending on this there are other areas where the product is also valuable and creating a design that can engage with other fields and communities in the future has further improved upon its initial vision. The interface has been created in a way that focuses on security rather than pop culture or collectables because of the future potential the platform has. This means that other types of collectables and products can coexist on the platform without feeling out of place in its overall aesthetic design. Other products also rely on authenticity to be sold with greater confidence including vintage wines and computer parts. By developing the design to be modular it meant that I can include any other products in the app by only changing a few lines of text to ask for slightly different data points.

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Appendices

Appendix A: Definition of Terms

VR and AR

Two emerging pieces of technology in the world are Virtual and Augmented reality, however augmented reality poses greater opportunity for collectables because it is more accessible and tangible to the user, instead of a completely virtual space, helping them maintain both mediums. Currently Augmented reality places a 3D model inside a space the user is occupying by almost making it holographic to their eyes on the mobile device. It uses basic camera functionality and camera tracking to virtually place a product live in a real environment. Forsey (5 Ways Augmented Reality (AR) Is Transforming Retail, 2018) also comments that one of the biggest ways AR will transform retail is by helping customers see products in their home before purchasing. This innovation in the retail space translates into the world of collectables since people love to display their collection to onlookers.

Certificate of Authenticity (C.O.A)

Certificates of authenticity are used to prove a products origin; this is especially important when the product is extremely exclusive and limited. When it comes to collectables a good example is a signed Funko Pop Vinyl. Before Stan Lee's passing companies would occasionally take products to him, have him sign them and then sell the product for ten times its original value. This value is determined by the fact that there are only a couple of these products circulating in the world and are extremely difficult to obtain. Now after his death it is impossible for him to sign anything else, that makes the existing copies extremely exclusive, things that will never actually be created again and can only be bought by other people. Since no one is selling the product anymore the only way to prove its authenticity from people who already have a copy in the world is with the associated Certificate of Authenticity or C.O.A for short. This proves that it was signed by the celebrity themselves and not signed with a marker from some random user, certificates often must be purchased at the time of the signing but can be forged. In the world of art 'certificates have allowed the works of art to be positioned as branded products, serving as their deeds.' (Kordic, 2016) This is important for the same range of reasons

but also because artwork isn't mass produced almost every single piece is a one-off product. This is what allows art pieces to have such a high value but to prevent people from copying the work only the real one was signed, dated and certified by the artist themselves.

Optical Character Recognition (OCR)

Optical Character Recognition is technology that allows people to convert PDF documents, images and other file types into editable and searchable data. The most basic form of this is extracting text from documents that aren't easily readable or accessible by the computer. For example, a book pdf may be readable by the human eye but to a computer its just an image and the image just so happens to be text based. 'The program analyses the structure of document image. It divides the page into elements such as blocks of texts, tables, images, etc. The lines are divided into words and then into characters. Once the characters have been singled out, the program compares them with a set of pattern images. It advances numerous hypotheses about what this character is.' (Abbyy.com, 2019) It then extracts all the text data, decides on a closely related font and takes it out of the image as this readily readable and editable information. Users can then edit the pdf document almost like it was a word document and rectify text, easily copy and paste it in this more useful format or whatever else they want to do. This technology has plenty of limitations however especially for open source versions of it, the largest one being that difficult to interpret and non-standard text like Algerian or Bauhaus 93 can't easily be extracted. All of this has a wide variety of applications and through more complex artificial intelligence different things can be recognised and used for all sorts of applications.

XML

XML Stands for Extensible Markup Language and is used to describe data. Both HTML and XML contain markup symbols to describe page contents. HTML is the standard for web pages however both XML and HTML are very similar to one another. XML data is known as self-describing whereas the structure is dynamically understood within the XML file and no other documents are required in order to understand it. HTML is often paired with other files like CSS to define certain parameters whereas XML often stands on its own and builds its own structure to store its data. 'XML is actually a simpler and easier-to-use subset of the Standard Generalised Markup Language (SGML), which is the standard to create a document structure.' (Rouse, 2019)

XML Layouts are built using a series of elements defined by tags enclosed in '<>' brackets. These are usually contained in an outermost definition called the root element. It supports nested elements to develop its overall structure. A few key root elements include, linear layouts and constraint layouts. In a linear layout all the elements are placed in a linear fashion in the order they are coded, padding and margins are used to divide between them. These can be arranged in a vertical or horizontal orientation, but they are often nested amongst each other to utilise a combination of the two. A constraint layout organises all the elements on the page in a relative fashion to each other in a more dynamic way. The bottom most element is often constrained to the very bottom of the page and the topmost element relates to the top. This keeps all the items in the same locations regardless of the different screen dimensions it adheres to.

Java

Java is a general-purpose programming language that is object oriented. This means that it uses a series of user defined classes and each class often refers to methods and variables stored in other classes. These objects often define parameters and are called upon by the main class to achieve functions laid out in their Java code. Java 'is intended to let application developers "write once, run anywhere"' Gupta (2016).

Java is the most popular programming language for Android applications largely because of its security, object-oriented development. It allows developers to hide variables and other data directly from the users unless they have permissions to access it. It allows a lot of control in many of its facets which makes it powerful for android applications. It also benefits networking which is crucial when it comes to modern technological programs.

Buttons

In Adobe XD it enabled a user to link pages together through shapes however in Android Studio it is more complicated. A button is almost completely made up of code, and it can have a variety of functions, it can change the page the viewer is looking at, change different elements on the page, send data to different devices or even open menus and pop-ups. It's extremely versatile and to use it in different capacities it usually must be written in a slightly different way. They can also be defined in other back-end code to make updating them across the interface easier. Lines of code can establish fonts, text sizes, radius's

on shapes involved and the colours and types of shapes that make up different buttons. This allows the developer to then edit these lines of codes to update how their interactive elements appear across the entire application.

Appendix B: Designer Interview Responses

Ben's interview responses

When I joined the company the Shopkins series was already huge, at the time it was doing more sales in units than LEGO was (probably not anymore). So, I really didn't have any understand as to what the business angles were, but they were really just trying to push out as much as they could in terms of series of Shopkins (series 1, 2,3 etc) They really had the mindset that the Shopkins would 'take over the world'. So, 100 percent the whole collectable idea is a half-based advertising idea

What stops the company from keeping a couple of these ultra-rare items and giving them to customers is that it gets rid of half of the 'fun' of buying the collectables. These collectables run off a surprise supply and demand ideology. So, if you can simply buy the collectable that you want for no matter what amount, it gets rid of half of the hype. Remember that the series is made for children at a 3-11 age group so for the company to hold some of the rare items at \$xxxx would seem absolutely outrages to the public

David's interview responses

A collectable product is based around collectability and the themes of the product. One of our largest collectables right now is Pikmi Pops, the theme is that they're all plush and there are two seasons every year, the current theme is donuts and there are lots of different shapes and sizes of them. I mainly work on Pikmi Pops, I've been working on them for three seasons now, you can see them on the market now, in Kmart etc. Personally, plush was never something I thought I would get into as a designer. I like plush because it speaks to a young and old audience and gives a wide range in terms of QA specifications, in terms of choking hazards and those kinds of stuff. In terms of the digital space, in terms of TV series and stuff like that, they're almost synonymous with TV series, YouTube dominates that.

Kids spend a huge amount of time watching these shows on YouTube, the digital space is having a huge effect on collectables these days, it's not just developed a product, there's a lot of work done on TV series and things. Millennials are currently at that age where they are having kids and the nostalgia makes them buy their kids toys, they had when they were younger.

You go to toy fairs and see what the trends are, if kids are playing with squishy materials, or things that are heavy or light. It's not always coming up with an original idea but innovating things that already exist and pushing it to the next level.

Children are more susceptible to collecting products, they love collecting things, if you give a kid a coin and an open book and a slot to put that coin in and a bunch of empty slots that can fill coins then they will go and collect. They get a large amount of pride and achievement from collecting things, displaying these things and showing their friends.

The amount of functionality doesn't define how successful the toy is going to be, it's more the play patterns and how it functions within society and the school yard. It is essentially playground currency. You'll usually start with a budget; the tooling always comes after but in the end will always define certain things. Say you want a collectability of 25 different characters, you just make different ratios, within that rarity, just the fact that they are harder to find makes them special, for the consumer you still want to make them special, then you figure out tooling and within a budget you may have to take away certain elements from certain characters to get everything to work.

Appendix C: Interaction with the Online Communities

Cultural Probes

I asked three different communities to show off their favourite collectable or collection of the day for the duration of a week. It got lots of responses and a few people who engaged with the activity every single day. The purpose was to gauge their values, priorities and reasons why they collect certain things and the most important aspects of their collection.

Funko Pop vinyls' community

A few people liked to post the pop vinyl that started their collection, it seems to have a lot of significance and meaning to them. A lot of the people who collect pops tend to buy their favourite characters from movies and TV shows, the trend being that they find one or two characters they love and the collection of the fandom sprouts from there. Another key response was about nostalgia, plenty of people including one SpongeBob fan loved getting pops of things they loved in their childhood, probably one of the reasons Star Wars is so large in pop vinyl's. They tend to split the group between selling and discussion and discussion doesn't seem to get much of a look at by most people because selling is the focus with this type of product. Also, good to note that cost and price are large deciding factors for some, probably because they put a money value on products and if its more than what they spent it helps justify their purchase.

Pokémon Go community

Pokémon Go page barely generated any response when faced with a wall of text and I had to reconsider my approach, not too surprising considering its more a page for trying to sell off Pokémon more than anything. With the Pokémon responses it was often a static response of what their favourite Pokémon was period. I was criticised for changing my favourite Pokémon of the day on every post, I do have a single favourite but tried to prompt multiple responses, healthy to note that others feel the same about their collection where there's one design that seems to appeal to each individual. To my surprise not many based their response on the strength of the Pokémon in the games

battling functions but on the Pokémon's design and/or rarity, for example shiny Pokémon which are approximately a 1 in 4000 chance to encounter. It's safe to assume that you'll never find a Pokémon that isn't someone's favourite because of how massive the franchise is.

Coin collectors' community

Important to firstly note that after people responded once the admin stopped letting my post become public, however the first and only post got more responses than the other two communities received for the entire duration. These responses seemed to be split between two areas. The first one was heavily focused on the value of the coins, how many were made and if their value would increase later, this is what gave them value to their collectors, the value everyone saw in the coin. The other response was surrounding the history of the coins, some people loved a part of their collection because of the history it held and what this meant to them.

Authenticity questions

I asked a series of questions to Funko Pop vinyl collectors and coin collectors in the communities about what authenticity means to them and current systems in place to deal with fake products. I gained lots of responses and even posed some questions related to the concepts I was working on to delve into some of the ways I could implement it in a way that wouldn't disrupt the social culture already present.

The only real way to guarantee real products is buying from a trusted source, the mint for coins, the IP owner for Funko Pop vinyls. Grading the condition of a product is very important and will determine its value, this is especially the case for coins since they are more often circulated than other products, which means they can get degraded. When coins are graded there is a grading called uncirculated, it would be worth the most since it hasn't been touched by anyone except the mint.

Authenticity matters because people are spending their hard-earned money on something that could one day be worth a lot more. The communities are always willing to see pictures and give advice on whether something is a fake, this often happens after the sale however, not preventative but a good teaching mechanism for future sales. Currently Funko Pop vinyls have date stamps on the bottom, stickers on the front are also useful and recognisable and there are usually serial numbers on the foot of the product as well. Fakes have a lower

quality, a video has highlighted the worse paint jobs, weaker colours and just overall altered form to make it cheaper for the impostor to produce them. Something being authentic means it's worth what you paid for it, something unauthentic will always be worth less, and thus someone has literally just paid significantly more than it's worth.



Appendix D: Survey Results

What would you consider to be a collectable product or thing?

9 responses

Statues, Figures, Limited Edition Artwork, Signed Merch
Something I like, limited,
Anything. People collect buttons and bread bag ties
product
Chromosomes
Figurines
Boardgames
Almost anything. From Stamos, books to belly button lint.
Anything that holds/ increases its value over time

Figure D-1 - List of Survey Responses to understand what a collectable is

Why do you like collecting collectables and other things?

9 responses

I like to be able to show I have love for something
Because it's characters I like, I like the look of the item.
Nostalgia
tools
I have autism
Not necessarily 'like' but I have a hoarding problem
I don't
A sense of satisfaction in attempting to complete a collection. Also interested in collecting items that may increase in value as a collection.
They hold there value better

Figure D-2 - List of Survey Responses to understand why people collect



When would you consider a collection "complete"?

9 responses

When I have got all the collectables from that line that I wanted.
If you have every item in the wave and the different versions
Never. Unless there is a finite number of items in that particular product
never
When i have 67
When you have everything
Never!
When all unique parts are collected, a complete set. No more to collect.
When I have everything that is in the set (stranger things everything but gold hopper)

Figure D-3 - List of Survey Responses to understand a collection

Is there any social force that drives your collecting? Do you ever show your collection to anyone in your life and who might they be?

9 responses

No
Only friends and if family are over and want to see it
Like minded friends. But I collect for me.
yeah, my friends and I
I show it to other tardies
Not really, self satisfaction?
I like having enough of something that I won't get bored with it.
Pride in a complete collection of items that are popular. Show my collection to interested parties.
Not rly I like the look of it

Figure D-4 - List of Survey Responses to understand the social aspects of collecting

Appendix E: User-Testing Data

The proceeding interviews with users and other designers were all documented on a small notepad in shorthand during the conversations. The information documented here is a translation of this data into an account of the information they shared with the research regarding their opinions and question responses.

Oz-Comicon Interviews

Questions

- How do you feel about security seals on pop vinyls?
- How important to you is pop vinyl authenticity?
- If there was an app to help secure this would you use it?
- Can you recognise a fake pop vinyl?
- What do you think of this app design?

Collectables Store employee #1

Security seals and authenticity are important to them. Their husband is a hardcore collector and never takes Funko Pop vinyls out of the box. The interviewee would use the application if they were an avid collector. Most fakes aren't well made, and they would recognise these, but they don't think they would notice the difference with more carefully produced fake Funko Pop vinyls. They mentioned that colours are normally a giveaway. They like the app design and didn't have much more to say.

Collectables Store employee #2

Security seals are a good idea but more for high value or rare Funko Pop vinyls. They said they would use the app and uses the Funko app currently. They said that the Funko app doesn't allow buying and selling and my app should incorporate some other functions to make it more useful. Authenticity is crucial to making sure a product is officially licensed. How licensing products work is that each country will have an official distributor for Funko, and the stores get supplied through them. The most noticeable

thing with fake products is the box is terrible and way thinner. Probably the main reason it's cheaper for them to produce.

Oz-Comicon Attendee #1

Security seals are good for reselling Funko Pop vinyls but not everyone keeps them in the boxes. Authenticity is important to get what the buyer pays for. They weren't sure if they'd use my app, they have an app for diecast cars that have product information on it regarding releases. However, they have concerns about information not being updated regularly enough and damaging the function of the application. They aren't invested enough in Funko Pop vinyls to be able to recognise a fake product.

Oz-Comicon Attendee #2

Security seals to show tampering would be good. Making sure its real is important. They mentioned that they would use the app once completed. They have never seen a fake Funko Pop vinyl before so they don't know if they would be able to recognise one. The app looks straightforward and the icons are recognisable enough to understand the basic navigation. However, it was clear when they were testing the app that seeing information and tapping small icons was difficult.

User Scenarios with Four Participants in a Collectable's Store

User-Scenarios tested

- Navigate to the scanner or camera
- View the information of a Funko Pop vinyl
- Add information to a scanned product
- View all the previous entries of Qui Gon Jinn
- Navigate to the products eBay listing
- Sort the products by brand/person

Collectable's store Employee #1

The user pressed on NFC when the scenario mentioned the scanner function, most likely because the scanner button said camera. When asked to sort by franchise, they clicked the sort button instead of the products button. When asked to bring up options, they didn't notice the three dots icon. They recommended for the research to separate the sort button from the product and users' sections and incorporate all three together in some way. The design originally had an enlarge option for the image which they recommended to remove to keep it simple and instead make that function a double tap. A '+' icon was for adding information which they saw it as adding a new entry instead, this caused some confusion. Instead of taking pictures of the different data points they recommended using a live camera feed instead which is faster and more intuitive.

Collectable's store Employee #2

They tapped on the image to view the options instead of the three dots icon. The '+' icon was easy to find for this user. They recommended including hot toys collectables which are larger collectable figurines. They stated that lots of these products have bootlegs floating around and sellers find it easier to scam people. Only the text for the options banners was previously clickable and they recommended making the entire banner tappable. This was an issue found across the board. They used the android phones back button to return to a previous page instead of tapping on a navigation tool. They recommended collating the sort function into a singular list instead of separating it out. They want to see a way to sell from the application and tell others you are doing so to make selling to potential buyers easier.

Collectable's store Customer #1

They tapped the image instead of the three dots icon to make information appear on screen. They mentioned that the colour scheme means that colour blind users may struggle to operate the application. They mentioned that they were interested in a way to make notes for the products for their collection inside of the application. They had no idea what the '+' icon was for, they would rather text below it saying what it is. They thought that the hamburger icon (3 horizontal bars) could be for something different in each section. They also hit the banner instead of the text when navigating the options. They were wondering if a way to compare prices between different products might be

possible within the app. They asked the design to consider more colour options for picky users, potentially a way to engage this in settings. They noticed the bottom bar disappeared when scrolling but said it would be better if both bars disappeared to allow more space for content.

Collectable's store Customer #2

They tried to tap the three dots icon after trying the image first and struggled to get it because it was so small. They managed to bring up the information on the product quite easily. When they reached the scanner, they eventually found the '+' icon but it took them a while to understand that it was to add information. They managed to view the previous entries of the product on the Blockchain quite easily but said they would have liked a way to enlarge the images. They asked why the product doesn't just have a listing on the app instead of navigating to eBay to buy it. They finally mentioned that other collectables could be included such as footwear because they are worth more money, so people make fakes of them more often.

Pax Interviews

Questions

- How do you feel about viewing a products history before you buy it?
- What product comes to mind when I say, hard to authenticate online
- If you could view a products history (app) what sort of information is most valuable to you?
- Are you uncomfortable with others seeing how much you bought Funko Pops for? Even hidden under a username, are there any issues with including your Country and other potentially private information?

Collectables Reseller #1

They thought that seeing the history of a product would be useful. They also mentioned that authenticating a product online is difficult unless you can compare it to one you already have or other online listings. Important information includes where it originated, who has owned it, the manufacturer and serial numbers. When reselling a product, sold price could be bad because people can track the market and its harder to sell at a high price. Country and location are irrelevant in terms of privacy.

Collectables Reseller #2

They said that they don't view the history but can use photos to authenticate products and their condition however sometimes it can be difficult. With Funko Pop vinyls, bootleg sellers use the photos of the original ones. Important information includes when the product was made, the location of its creation, especially because fakes come out of common places. For reselling, hiding the purchase amount is good, it would make products harder to flip when trying to turn a profit. Location data is everywhere anyways.

Pax employee

Viewing the history would be interesting and useful. To know important details about whether products are in good condition or not. Collectable pins come to mind as hard to authenticate products. Good details on the history are where the product was originally purchased and when. Things like Swarovski jewellery is seasonal and annual and come with certificates. Dates are important for authenticating products like these. Including the price could be okay but it would make people feel like they were getting ripped off, however, allowing their friends see potentially secure information is fine.

Group Discussion

This discussion was held with 5 different participants of varying design interests. None of them had a major stake or interest in the field of collectables and gave opinions based on the aesthetic component of the design. The first major concern with the design is that users would be taking better photos of their products and the research should more properly emulate this in the app. Some of the designs presented included backgrounds with lots of different shapes to represent the security theme. The designers continuously referenced

back to standard app design and mentioned that the research's designs were too cluttered and difficult to comprehend. They also took away from the images which should be the most important component to keep users engaged with the product.

The user scenarios for the application were brought up as weak and difficult to comprehend. It is difficult to understand the flow of the application. Also, to make images easier to see for users, taking reference from something like Google Photos worked well. Keeping a minimal number of images on the screen at any given time to make them more visible is important. Then developing simple sliding actions to move between them makes it easy to navigate through the pictures. These were some of the main focuses of the discussion.

Discussing the most important user scenarios was also important. Things like the first page users see when they open the application and the major tasks they need the app for. This covered things like seeing the products they are interested in when loading the app and how to scan NFC tags easily. This was as simple as making key navigation points accessible from the main menus on the navigation bar and pushing secondary user journeys into the navigation drawer.

