Virtual Retail

Investigating the gaps between physical and virtual shopping environment

By

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Acknowledgment

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Abstract

Retail design has always been much more than selling products; it is a way for the brands to express them self. It is what they stand for through their brand essences. Turning their manifestation into physical forms to create space this physical space that interns offers the consumer an experiences. The interior architecture, bridges the gap between brand and consumers, as it evokes the essence of the brand while envisaging in an architectural form and tells one a story.

However, since the birth of the e-consumer market, this gap that's has differentiated the two apart has gotten widen, as 2D webpage can only offer so much. The interaction provided is minimal thus removing some of the experiential and service elements that traditionally a physical store would offer. This consequence lowers the brand engagement due to the limiting physical interaction of a webpage. Virtual Reality (VR) has become largely popular within many different sectors such as education, entertainment and military.

This thesis proposes to explore how virtual reality can be used as an extending to the e-consumer market and articulate a hybrid integration for a shopping environment. The thesis will use precedents of brand identity, brand identity "is the manifestation of a brand that can be seen, heard and immediately experienced" this is the embodied of the brand in the physical form. Brand identity will be used to design the virtual environment.

Contents

Introduction

Chapter 1

Problem Statement

Interior architecture is a multi-sensory experience of a space. Space is not just the physical area around us but is anything that stimulates a sense; this can range anything from virtual, lighting, smell, sound to tactility (Pegler, 2015). Kengo Kuma talks about this in this "Sensing spaces" that scenes should be separated into the individual scenes but thought as a collective, that is atmosphere. Retail design has been using multi-sensory techniques to create an atmosphere in the store, which engages the consumer. Over the past decade, the retail industry has seen a significant change in the way it operates. Rather than selling products they offer more of an experience and support the brand as more retailers move their attention to the online the market (Park, Im & Kim, 2018). Retailers are now investing more money in the e-consumer market, leading to closures of physical stores. This shift has seen the experiential factor of the "retail store" lost, as the e-consumer platform can only offer such a limited user interaction over a 2D visual. This action is either on a PC or a smart device. However, this conventional method does not exploit incorporating virtual reality (VR) technology to this market (Altarteer, Charissis, Harrison & Chan, 2013).

The shift observed in the way consumers interact and engage with the brand; brand engagement has started to decline since the birth of online shopping. Majority of retailers aim to add as much as possible to the online store regarding visual imagery. This information is used to engage consumers in a rich experience, with some retailers also offering 3D and virtual interactions (Corbett-Drummond, 2018).

However, over the past few years, there have been developments of consumer-grade virtual reality headsets making it affordable. Present day there are different types of virtual reality headsets available on the market, such as the HTC Vive, Oculus Rift and Samsung Gear VR. These headsets contain a display unit, paired with a gesture controller. This technology gives the user a highly immersive experience of the virtual environment; this can be CGI or photo-realistic (Deloitte, 2019). The e-consumer retail sector is an ideal industry for this technology it enhances the e-consumer market with regards to improving the experiential and brand engagement.

Research question

What is the role of branding in retail and how can Virtual Reality be used to enhance the experience for the e-consumer market?

Proposition

Interior architecture has played a significant role in the retail design sector. Retail design is the spatial and multi-sensorial experience for the consumer (Pegler, 2015). The art of manipulating the human senses to make you feel a certain way. The retailer stores and designers play on the human senses to create retail experience engaging the consumer and ultimately leading to the purchase of a product. Retail design is also about translating the brand ethos and values that are converted through the physical space and unifying the brand and product as one (Pegler, 2015). Over the years, the retail market has begun to change as online shopping becomes better and more convenient for our everyday busy lives. This shift in people shopping habits has seen large malls and retail chains saw closure as consumer preference online over physical stores, because of the low price margin online stores can offer due to their lower overhead running cost (McKone, D., Haslehurst, R. and Steingoltz, M. 2016).

The result has seen retailers experimenting with new technologies such as VR to create a virtual or mixed-reality environment. Virtual reality has the potential to enhance the e-consumer market, and as this technology advances, it will become readily available to consumers. Retailers will be able to create a virtual shopping environment for online shopping (Deloitte, 2019). This technology would add a new layer of interaction to the traditional 2D web interface and an experience that would make it more immersive and engaging for the consumer.

Aims

To understand the role of VR in retail and investigate the difference between a brick and motor shop and a virtual shop.

To explore a design framework of translating a brand in a virtual shopping environment that enhance their shopping experience.

Objectives

Identify the criteria difference between a brick and motor shop and virtual shop.

Outline the advantage and disadvantages of virtual in a shop to create a framework for a design toolset.

To translate the brand into a spatial experience with the qualities of interior architecture for a virtual environment.

Research framework

There are different methods that designers can use when approaching design research. Peter Downtown in his book 'design research' proposed three methods, research for design, research about design, and research through design.

Through design, the framework of the thesis focuses on the research being through design, with the use of Virtual Reality as the application of the design that is explored thoroughly. But the research is indeed to explore a toolset for a designer to give them a better understanding when creating virtual shopping environments and ultimately seen as research for design.

Research method

The method part of the research is organised into three sections; the literature review, design development and implementation to design. Each section is as important as each other, exploring each process in terms review, test and reflect. The literature review forms the theoretical knowledge about VR in retail with the addition of case studies to understand how it is being developed and used within the industry. The design development explores the development of the toolset that the designer may use to create a virtual shopping environment. The gaps discovered can be formally tested reflect that to the literature and case studies to understand the difference, which can be developed and implemented into a design toolset use for a design.

Literature review

The literature review focuses on the theoretical knowledge about VR in retail and how immersive VR being used in the retail industry and exploring consumer behaviour towards the technology and what toolset does that offer designers.

A review of the traditional retail design techniques and explore the knowledge within the discipline of brand identity and what branding means in retail to form design.

Analysis of case studies of brands using VR. To understand what they did, how they did and why they are using this technology.

Design phase.
The design phases focuses on the choice and analysis of the brand. A local retail store close distance from the university chosen to be the case study for the thesis. Selection of a brand is based on the brand essence and values including their online presence in the fashion community and online store. Interview with the owner allows us to gain a deeper understanding of the brand, what they stand for along with what the future holds for the brand.

Design experiment one:
Design experiment one conducted to figure out what the differences are between a physical shop and the same shop in a virtual space. The experiment is used to compare and develop based on the literature. The experiment will take a 1:1 scale 3D scan of the existing store using a Matterport 3D scanner. Then participants will be asked to do a walkthrough of the physical store followed by the virtual store and will be asked a set of architectural questions. The primary objective of the experiment is to understand the gaps between the two to help inform the design stage.

Design testing

Design testing involves reviewing the gaps found throughout the experiment and reflect upon the data and how this can be translating into a design toolset. That then can be used to create an immersive and brand enhance experience.

The data is then used to create and test the potential workflow in a simulated brand focused environment and highlight the benefits and shortcomings faces by the technology.

Methodology

A significant aim of the thesis is to create a workflow used as a tool. That can be used to translate a brand into a virtual environment. The workflow allows a baseline to be set that can assist designs by identifying techniques and tools that can aid the design for a virtual shopping environment for a brand.

The methodology selected to conduct the research was a simulation method. The approach taken analysed the literature to give an outline to the essential Characteristics of this virtual retail environments. The data is then analysed and compared to case studies of real retailers and how they have approached and created a virtual environment. This process is then used to inform the simulation experiment. This data will be analysed to show what are the gaps if there are any between the literature and the case studies. This data would help inform the design stage of the thesis as a tool. The toolset gained from the simulation will then use to inform the desired outcome, that can be tested and experimented to create a virtual environment.

The medium used to test the virtual environment is, Unity 3D and HTC-Vive.

Scope

This thesis will focus on the area of virtual shopping environment and examine what a virtual shopping environment looks like when centred around brandscaping. It explores how virtual reality (VR) can potentially facilitate a new medium for retail experience, and how this medium allows retailers to expand and enhance their brand. The aim of this thesis is not to create a 'final design' even though there is a design outcome at the end, but rather compare and contrast the design methodology being used in the industry and examining these gaps. As a result, the outcome of the thesis is a toolset and technique that can virtually translate a brand into a virtual experience.

Literature review

Chapter

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Literature Review

The use of Augmented Reality (AR) and Virtual Reality (VR) are emerging as rapidly developing technologies for on line retailing to enhance the selling environment and shopping experience (Jung & Dieck, 2015).

VR utilises a wearable device (usually a headset) that provides an alternative experience in which the wearer can usually move and interact (Pantano,2015; Dad et al , 2016; Sherman and Craig, 2002; Fuchs et al, 2011; Whyte, 2002). They suggest that VR is an interactive computer simulation that replaces or augments the feedback to the user's actions through one or more senses, conferring the feeling of being psychologically immersed in the simulation.

On the other hand AR is a technique 'to combine real and computer generated digital information into the user's view of the physical world in such a way that they appear as one environment' (Huang and Liao, 2015). AR typically captures real world data often with a digital camera and creates innovative ways for users to interact with virtual products (McCormick et al, 2014). Experiential value is thus created through product simulation, media richness, sound, GPS data and videos (McCormick et al, 2014).

They exist across sectors and several selected examples are highlighted later to underline the extent and application of such technology. However, they are clearly seen as an extension of the bricks and mortar shopping experience.

For example, Verhulst presented an immersive virtual reality user study aimed at investigating how customers perceive and if they would purchase non-standard (i.e. misshaped) fruits and vegetables FaVs in supermarkets and hypermarkets. This question cannot be tackled using "classical" marketing techniques that perform user studies within real shops since fresh produce tend to rot rapidly. In order to overcome those limitations, they created a virtual grocery store with a fresh FaVs section where 142 participants were immersed using an Oculus Rift DK2 HMD. Results show that participants tend to purchase a similar number of FaVs whatever their deformity. Nevertheless participants' perceptions of the quality of the FaV depend on the level of abnormality

Moreover, studies using immersive virtual stores are not common and usually rely on desktop VR. Pantano and Servidio [refer to 23 in paper] investigated how using VR in the

points of sale influences consumer perception and satisfaction. They used a virtual fashion clothing store that showed that the consumer's satisfaction towards the introduction of immersive virtual environment is influenced by the three following dimensions;
(1) The perceived ease of use of the innovative tools
(2) The provided enjoyment,
(3) The new store perception.

In another study Papagiannidis et al. created their own virtual retail environment consisting of a two-floor shop with fashion clothing for sale. They proposed different models to characterize how participants rate a "quality" criterion (e.g., level of control in the VE, level of realism of the VE, colour and graphics "vividness") could be related to their "user experience" (e.g., engagement, enjoyment, pleasure, satisfaction, etc.).

They found that level of control, colour and graphics vividness as well as 3D authenticity positively affect users' simulated experience which in turn creates higher levels of engagement within the simulated retail environment.

Wu et al. [36] studied the effect of three virtual fashion clothing stores on 145 consumers' retailer interest, retail pleasure, patronage intention, and purchase behaviour. Each store had a different way of grouping the fashion products: a store grouped products by their colour (warmness/coolness), a second store grouped products by visual texture (smoothness/thickness) while the third store grouped products by style coordination (clothes that could be worn together in an outfit). They showed that consumers who shopped in the style coordination store spent significantly more money than those who shopped in colour or visual texture stores. Those who shopped in the colour store experienced significantly more retail pleasure and showed significantly higher patronage intention than those who shopped in the visual texture and style coordination stores, and they showed more retailer interest than consumers in the visual texture store.

VR has been associated with many aspects but the key one appears to be 'immersion' (Sharples et. al., 2008; Lin et. al., 2014; Carulli et al., 2016; Noon et.al., 2016; Stein, 2016). This is similar to the sense of 'presence'. Both refer to a feeling of being physically present in a virtual world (Grabowski & Jankowski, 2015; Rebenitsch & Owen, 2016) and moreover can also 'interact with on screen objects'.

According to Cheng et al. (2014), the 'influential power of vividness is three times more

than that of interactivity,' indicating that 'vividness remains the primary factor that affects [tele] presence.' Moreover, most of the current applications of the technology use only limited interactivity (the extent to which users can participate in modifying the form and content of a mediated environment in real time), while the vividness aspect (i.e., the quality of the images and the sense of movement in the surroundings or the representational richness of a mediated environment) is the dimension that generally has been emphasized.

In addition, various researchers have proposed different definitions and used terms such as presence and telepresence interchangeably (Lombard and Jones 2015). Telepresence occurs in the case of teleoperation, when a person feels as if they are actually at the remote site of operation; whereas presence refers to the feeling of being present in the computer-generated environment. The key difference is that telepresence is associated with the illusion of being at a distant, but real location, the term presence designates the illusion of being in a virtual location, and thus, in a location that is neither close nor distant.' (Baus and Bouchard, 2016).

However, the literature in this area is both sparse and fragmented and hence the case studies of: (Jung & Dieck, 2015)

A brief overview of how companies are using augmented reality and virtual reality as a response to this and also to underline these two aspects was completed.

These case studies look at the following aspects:

The level of adoption by the company (the extent and reasons for its adaption). Contrasting perspectives emerged from retailers' adaption of these technologies. In some cases, challenges related to taking the risk and investing in these new forms of technology, without knowing exactly the expected generated profits, and against only the promise of implementation within the shopping experience, prevent several retailers from adopting them (Piotrowicz and Cuthbertson, 2014).

Applications. Some critics claimed that, although this technology helps enhance the in-store experience, it is more a tool to gain consumers' attention than a viable in-store solution.This is because it is costly and time-consuming (it takes a lot of floor space and resources and is only used by few shoppers a day) and most of the time helps only build the brand whilst generating minimal return on investment (Milnes, 2016).

Acceptance. There is a low level of technology expertise and commitment of employees and sales associates can also represent a challenge for retailers, especially where training is necessary to make sales associates comfortable with the new tools in order to communicate and promote them properly to potential users (Piotrowicz and Cuthbertson, 2014). On the other hand, early adoptions of these new technologies were viewed as highly innovative by consumers and competitors (Teo and Pian, 2003; Pantano, 2014)

The North Face

Fig 1. The North Face virtual tour

The North Face Store in South Korea has offered one of the world's first VR experience instore. The experience provides a mix of virtual and reality, with the use of physical objects, such a slays achieved with the use of a VR headset to give one an immersive experience of an alternative environment. The experience offers the individual an experience of being taken along a bobsleigh journey pulled by dogs. The content seen within the headset is a 360 video of someone pulled in a sleigh then replaced with the sleigh the consumer is asked to sit in. The experience is to promote a new jacket that was created by The North Face, showing the capabilities of the jacket in different conditions ("The North Face Uses 360-Degree Video to Connect Brand with Joy for the Outdoors - eMarketer", 2019). The North Face gives the customer a feel for the environment that they might be in or situation where they could use the gear.

The level of adoption by North Face is still low as the virtual tour has only it only been rolled out to the flagship stores in major cities ("The North Face Uses 360-Degree Video to Connect Brand with Joy for the Outdoors - eMarketer", 2019). The aim of virtual reality integrations is to enhance the in-store experience for customers, while showcasing a strong understanding of the brand and their value. Virtual reality is also used to give a better understanding of products and help provide a better perception of what kind of performance that product can offer the user.

What North Face offers is an immersive 360-degree video virtual reality experience with the goal to create a stronger understanding of the brand. The experience is around a particular line of clothing to show off the capabilities and performance of the garments.

The VR experience was developed with a VR media company called Jaunt, whom produced and created the VR immersive 360-degree VR experience. Creating a one-stop VR solution that is easy to use and set up.

The North Face has seen a broad acceptance of this technology from the public, as they enjoy the extra layer of experience to their shop. The North Face also plans to roll out a similar feature for their online store, where users can use their own headsets and experience an almost identical experience.

IKEA

IKEA the Swedish furniture brand has adopted the use of virtual reality and augmented reality. IKEA is one of the few brands around the world that is leading the way with generating VR content. The organisation has seen the potential use for VR, to enhance the consumer retail experience but also look at ways of how they would interact with the brand in the future. The Swedish homeware brand IKEA used virtual reality as design and creative tool. The tool allows individuals to inhabit a 1:1 scale model of the kitchen that they are either renovating or building. This tool has the ability for the client to create a perfect the layout of the kitchen and the ability to customise the design, with style, colour and materials of the draws and beach tops (ÅKESSON, 2019). The use of VR allows them to walk through the kitchen in real-time and be able to open draws and door. The significant detailing of VR gives the consumer a close to accurate feel of how the kitchen will look and feel of a real built kitchen than viewing it on a computer. Ikea believes this technology will help people who are furnishing their house to find the experience a lot easier and be happy with their choice. (ÅKESSON, 2019).

"Virtual reality is developing fast, and in five to ten years it will be an integrated part of people's lives" (IKEA 2016).

The purpose of this technology is to help consumers choose the right products for their home and therefore being much more satisfied with their purchase, leading to an enhanced overall experience. The AR app is available to anyone with a compatible smartphone. This app allows the user to place different furniture around their home to test if it would fit in not just with size but also the style.

The VR application that IKEA has created allows homeowners to design and layout their homes and kitchens with an immersive experience. The program was established in 2016 with collaboration with the French mix media firm Allegorithmic. The program is set up at IKEA stores for shoppers to experience or is available to try out at home through steam.

IKEA has seen positive feedback to the AR app, and VR app with multiple downloads of both apps. IKEA further looks to keep developing the tool but also look at how it can change the way we shop as well, using this technology.

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Fig 2. IKEA virtual kitchen

Singapore Airlines

Fig 3. Singapore airline virtual tour

Singapore Airlines created a virtual reality experience to celebrate one year flying from Wellington international airport in New Zealand. The experience allows users to travel to and experience one of three cities the airline operates to and from Wellington. The experience uses a mixture of reality with the use of 360 videos and interactive objects. Users are sat in a cart which is then also translated in 3D into the virtual environment, allowing the user to encounter a Tactile sense as well (Wrestler 2018). The virtual experience enables the user site see around three selected cities, London, Singapore and Phuket. Within each city, users can interact with the environment, for example, play the drums as the marching band walks by in London, or you can release a lantern into the sunset in Phuket ("VIRTUAL REALITY — Wrestler", 2019).

Singapore Airlines has adopted the use of VR to feature and enhance the consumer experience of their brand. The airline has a three permanent setups in each terminal at their central hub, Changi Airport in Singapore. The experience allows the airline to further engage their passengers to the Singapore Airline brand and portray the high level of customer service and a detail that the brand represents in their product. The airline also recently created 360 environment of the cabins allowing users to experience the atmosphere and the seating for each of the four-seat classes offered by the airline ("Explore The New Singapore Airlines A380 | Singapore Airlines", 2019).

The proposed use of VR for Singapore Airlines is an extension of the cabin product that they offer and for the user to experience the cabin to one of the destinations the airline offers. Along with this it shows consumer the level of customer service that Singapore Airlines offers to the consumer to differentiate themselves from other airlines, in a highly competitive market.

For the Wellington showcase, the VR experience was developed with a VR media company called wrestler, who produced and created the VR immersive 360-degree VR experience. The Airline worked alongside them to provide content that engages the consumer to the brand.

The experience has highly been successful as it allows the consumer to the learn about Singapore Airline brand and destination they could fly to on one of their routes.

Brand Identity

Brand identity is a substantial part of retail, and businesses spend a significant amount of time and money generating an image for their company or brand for the public (Pegler 2015). Branding identity has developed since 1920, when companies started to create logos for the public, as a method of being recognised, nowadays interior architecture and architecture contribute an active part in shaping the identity (Riewoldt 2002). The brand identity used to design a retail store or a business is call brandscaping, "brandscaping –the three-dimensional design of brand setting" this acts as a body that people use to connect with and learn about a brand (Riewoldt 2002). This is the manifestation that brands use to tell their story. These are the part of the brand that can be "seen, heard and immediately experienced", this system uses a method of design techniques visually and sensorial to communicate the identity of the brand (Pegler 2015). The brand identity is about adding emotional and sensorial element that engages the public, in which it creates appeal for the brand, by surrounding itself into the environment (Pegler 2015). The brand does end at the foot of the store, but this identity is created through their products and how they are presented. It starts to establish a culture around the brand and adds in how people see the brand (Riewoldt 2002). As the market becomes increasingly more competitive, brands are required to think outside the box about in how they grab the attention of the public, as flagship stores and showrooms alone, no longer provide brands with the attention that they need (Riewoldt 2002). Experience is now a key part of the brand identity, brands need to be offering more than just product, but also sell you an experience. As more brands move their attention to the online market, why are some brands go through the effort of creating brick and mortar stores. It is a way for the brand to express their identity as one cannot experience the same expression of the brand through an online webpage. An example the importance of brand identity is shown by the internet giant, amazon. Amazon has opened up a physical store, to increase their identity, as they believe people buying premium products would rather go to a physical store to receive an experience and service (Forbes 2016). Brand identity is a key part of the thesis and how this can be translated into a virtual environment.

Atmosphere

Atmosphere is an intangible aspect of architecture that cannot be measured by units but needs to be felt by the body. The word atmosphere describes gases, an item that comes out of a planet, likewise, the atmosphere of a building or space is produced by the form (Wigley 1998). It is a sensuous emission such as light, sound, heat and smell that contribute to create a stationary object, it is almost as important as the building's physical form, as it gives a building a soul (Wigley 1998). Atmosphere plays a vital role in creating space it is the centre to the project, "to enter a project is to enter atmosphere" quote by Wigley states that atmosphere is created with any project it cannot be discarded, as atmosphere is what creates an experience (Wigley 1998). Atmosphere is the whole experience it is what makes experience whole. Even if you discard atmosphere when designing it will also be there, due to the ambiguity of atmosphere, this is seen when looking at photographs, computer simulation, or computer-generated images where we see a lack of atmosphere if the materiality and lighting are not composed correctly (Wigley 1998). Materially is an important element in creating atmosphere, it is important to know how the materials react to one another. However, it is not just the material alone but the finishing and how the surface is translated that makes a big difference to the overall atmosphere (Zumthor 2006). As architect Zumthor talks about how we don't just control space by the object but deal with time, as you are simulating an experience for one, and because time is always moving this simulation is you constantly altering (Zumthor 2006). The architectural form is not just the finish product but is only the skeleton of the body, and the materials are like clothing on our bodies that give a sense of the personality to the building. Space also has multiple characteristics in play such as sound and temperature all combined to create an ambience that immersive you into that environment. Lighting is a crucial part of the atmosphere as it allows the visual communication to happen, the intensity and temperature of light is important as it can change the atmosphere, for example, the materiality and lighting are not complemented of each other (Zumthor 2006). The characteristics of atmosphere will help address some of the experience elements, to create an experience of the brand. The techniques used in the physical environment are required to be translated and tested in a virtual environment too

Narrative design

The narrative design technique is commonly found in the film industry, a way in which the director uses it to tell a story, but narrative design can also be used in the field of architecture as well (Brandt 2009). Narrative process in architecture is to tell a story about the spatial experience, as your journey through space. It is how the architect has designed the space and how they would like to lead your eye with the use of lighting, materials and sound (Brandt 2009). The narrative design gives a space a purpose as it enhances the interaction of the area. It provides the space with an emotional connection and framework to represent social and culture to shape spatial identity (Thompson and Blossom, 2015). This form of design starts to draw out different aspects of the subject, the environment, surroundings and culture to formulate into a spatial experience. This relationship is translated into the five-human sense and gives the environment a sensorial attribute (Brandt 2009). This form of design is helpful when interpreting the brand essence of a brand and help to inform the design stage such as journey, overall form and layout.

Review

The narrative design technique is commonly found in the film industry, a way in which the director uses it to tell a story, but narrative design can also be used in the field of architecture as well (Brandt 2009). Narrative process in architecture is to tell a story about the spatial experience, as your journey through space. It is how the architect has designed the space and how they would like to lead your eye with the use of lighting, materials and sound (Brandt 2009). The narrative design gives a space a purpose as it enhances the interaction of the area. It provides the space with an emotional connection and framework to represent social and culture to shape spatial identity (Thompson and Blossom, 2015). This form of design starts to draw out different aspects of the subject, the environment, surroundings and culture to formulate into a spatial experience. This relationship is translated into the five-human sense and gives the environment a sensorial attribute (Brandt 2009). This form of design is helpful when interpreting the brand essence of a brand and help to inform the design stage such as journey, overall form and layout.

VR shop

Chapter 3

Virtual Reality in Retail

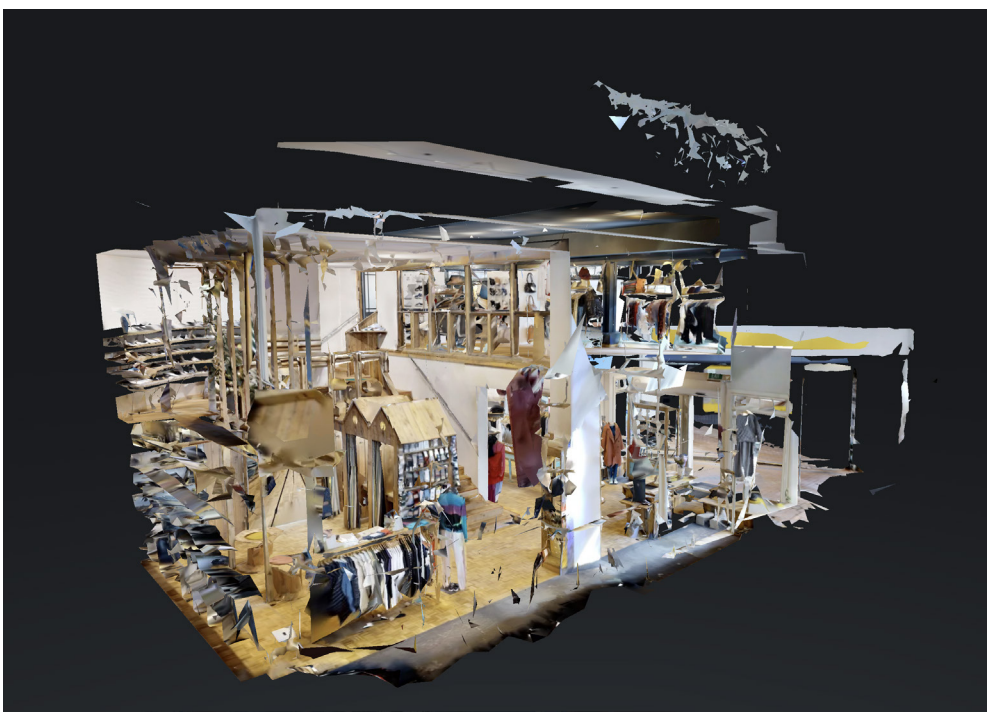


Fig 4. 3D scan model of virtual store

A common confusion that people make is between augmented reality and virtual reality. AR augmented reality or also known as mixed reality is overlaying information over reality, portrayed in two ways. Firstly, with devices as Microsoft HoloLens or google glasses, these are both wearable items or used with a smart device such as a smartphone or a tablet, that uses the camera to capture and software to the create the environment. Virtual reality technology has seen advances over the years and with VR headsets become more available to the consumer market, with such headsets as HTC vive, Oculus riff and Samsung gear to name a few. It has given retailers to transform the way consumers shop (McKone, Haslehurst and Steingoltz, 2016). Virtual reality is still in its early days with retail area, compared to the other industries such as entertainment and education where it has made more advancements with this technology and retailers will need to understand the value and application of this technology (McKone, Haslehurst and Steingoltz, 2016). VR started to offer the experiential factor that has been missing from online shopping, it provides the experience close to identical shopping environment to a physical store and consumers can experience this from their own homes (Dalton 2017). As this technology is new there are many different way retailers are experimenting with VR and how they could use it. eBay creating programme "shopticals" a way to view products in 3D VR and getting a 360-degree view of the item.

These developments made by companies in the case studies "shows they are excited by VR" but also shows that infant stage of the technology in the retail sector (Dalton 2017). VR in retail is very new and business are not willing to share the trade secrets. Therefore, there is minimal formal information that shows what some retail brands have done and are looking at what to do with virtual reality. Hence most of the information found is informal these developments recorded in blogs.

VR shop

The study

To study the differences between a physical shop and a virtual shop. An experiment was conducted, to understand the difference between the two. The walkthrough of both shops was designed to be identical as possible. A comparative approach was chosen to understand that difference between the two as it would be able to identify gaps. It also allows the data to be an objective appraisal, allowing for more reliable data rather than self-evaluation. To study the differences between a physical shop and virtual shop and examine if or any quality is lost or gain between the two shops. To help interior designers to compensate for these losses and use design as a way to bridge the gap.

Simulation brief

This experiment looked at the 1:1 scale difference between a physical shop and the same shop 3D scanned in a virtual reality simulation. Good as Gold was selected as the brand and store as the experimental test subject. Good as Gold was chosen because of their brand values and their presence in the Wellington retail and fashion community, and its close distance from the university. The brief firstly asked participants to walk through the physical shop on a set route, secondly requested to walk through the virtual shop on the same path, to get a 1:1 comparison.

Set up

The simulations asked 15 postgraduate architecture students from Victoria University of Wellington to fill out a self-reported questionnaire as well as a collective evaluation. Following each walkthrough, participants were asked the same series of questions to get comparable results.

A 3D simulation (captured using a 3d scanner) which was the mesh model from the output was put into the unity 3D to the experience in VR. The primary test used 15 participants in total. The results were recorded in the form of questionnaires which were then analysed to give an insight into the differences and the potential improvements.

Overall this experiment talks about the differences between the VR and the physical world. It highlights the differences and can help designers design for the virtual interior while having a stronger sensory experience and connection to the body.

Fig 5. Matterport 3D scanner in Store

Design phase

The way we looked at doing this was obtaining a client, a brand that we could closely work alongside. A small boutique brand was chosen called Good as Gold. It is located within a close distance from the school. Also, when selecting the shop, the brand was also subject to question as the brand needed to have a good brand essence and presence in the retail community.

Firstly, a virtual model required of the shop, this was done using a Matterport 3D scanner. The scanner was set onto a tripod and started from the outside of the front door and moved throughout the store, with a distance of 100-150 cm between each scan. A total of 35 3D scans were used between the two floors, to create a photogrammetry mesh model.

Once the model had been processed and stitched together. Autodesk remake was used to fine tune the model to get rid of any imperfections and any holes that needed to be fixed up.

Once the model was cleaned up, it was put into Unity engine where a collider was added to the mesh to stop participants from walking through walls. A teleport system was set up to allow participants to move throughout the model, which was all viewed through an HTC vive headset.

Once the Virtual model had been set up, a group of 15 students from the 2017 master cohort from Victoria University of Wellington School of architecture, were asked and chosen to participate in the simulation. The students selected had to have no previous experience or knowledge about virtual reality.

Participants were taken to the store and were told to do a walk through the physical shop, along the marked route. They were instructed only to observe and asked not to touch any of the items in the store. They were given a questionnaire that they would fill out after they have finished the walkthrough.

Once they had done the walkthrough, they were taken back to the university to complete the virtual simulation walk through and were asked to follow the same route marked out in the virtual shop as in the physical shop. They were allowed to walk naturally within the boundaries of the trackers and use to teleport between spaces, using a hand controller. Once finished they had to fill out another questionnaire, relating to the simulation walk through. With an additional questionnaire about the overall experience.

Finally, the owner and founder of Good as Gold was asked to walked thought the VR simulation and asked questions about the experience.

Real Virtual

Fig 6. Side by Side comparison of a physical vs virtual store
left physical store , right virtual 3D scan store

Walk through	1	2	3	4	5	6	7
Describe the atmosphere	Warm lighting bright music Different height, depth quality Warm to dark- contract	Natural aesthetic Urban feel Interior has exterior characteristics Double height space feels like a courtyard	Clean Warm Cabin Rustic Relaxed	Warm lighting Cabin feeling Squeezing floor/stairs Sound	Spacious	warm relaxed	relaxed spacious
Describe the sensory element	Lighting quality's Medium sound	Tactility to the interior design – emphasizes engagement with the products Sound of walking on timber	Rough wood Smooth walls	Soft floors Hard steel Soft fabric Cold steel railing	Music Warm lighting Timber Warm temperature	Sound music Smell of candle	Lots of light Timber everywhere Mezzanine space feel like an intermediate space
Describe design elements that stood out to you	Woody materials, colour lighting Surface- playful Transparent boundaries	Timber texture Fixing	White walls ceiling Double height space Wooden flooring Wooden flooring Rustic wood texture Large windows	Lighting direction Music level Ability to recognise scale of objects	Use of timber Open space Lighting	Rough wood Clothes display	Large use of timber Room upstairs feels more enclosed More private
What can you describe about the good as gold brand through the design	Urban / cabin Relaxed	Urban casual	Easy Simple Comfortable	Nostalgic Cabin homely	Cabin Easy going Friendly	Urban/street	Unique Items are well displayed and easy to view

Simulation	1	2	3	4	5	6	7
Describe the atmosphere	The various levels and move through the space	Visually same but brighter Lack of avditory elements and haptic engagement	Lighting Spacious	Fast pace able to cycle through a lot faster Being able to see the range of clothing	Spacious Light Empty	Visually stimulating	Very light Relaxed Spacious Lack of clarity
Describe the sensory element	Good quality of lighting and materials	Visually stimulating Missing tactilely and avditory elements of music	Clothing colour White bare walls	stairs	No sound or touch Visually light but no directional lighting	Only sensory element sight Much brighter	Feels not as convincing Sounds sight associated with retail not as powerful
Describe design elements that stood out to you	Different levels and various horizontal elements	Focus on the clothing more	Double height space Ledge and stairs	Very light Very open	Materials and objects Textures don't seem 3d but forms objects are	Clothes stood out the most	Lighting quality's Colour and texture Volumes of space
What can you describe about the good as gold brand through the design	wide range of quality and style	Urban casual	Relaxed Street style outdoor	Cabin style	Cabin	Urban street	Brand not as clear Lost identity

VR	1	2	3	4	5	10	12
Did you feel like you could buy something	Yes I did Close proximity and good quality of lighting helped More proximity more you can buy	Yes if clothes are displayed, cloths on hanger isn't visible Shoe would be easier to buy then clothes	Maybe I would want to touch the products but the way store is layout you cannot in VR	Almost could	Yes	Yes but as persuasive	Yes Relevant information needs to be included and detail
Would you be able to shop in an environment like this?	Yes I would be able too, simple and easy to use Would be better if there was more detail to explore the clothes and items	If the VR was complimented by and online store	Yes it is nicer than online shopping Better lay out than a webpage	Would be a faster way to cycle through clothing Visit a range of shop Experience scale which online shopping now is hard to recognise	To be able to see your hand	If more detailed	yes
Describe the architectural quality that you felt are missing in the virtual simulation	Sharper or contrast of colour, no texture , sound , quality of spatial and materials experience	Sound, footsteps Haptic/tactility Heat Light and shadow	Touch Texture Warmth	Sound Walking on timber floor Other human movement	Sound Touch To be more VR and real life would help	Tactility Warmth of space Noises of materials, e.g. foot steps	Tactility Music People

table of results

8	9	10	11	12	13	14	15
Relaxing freedom	All sensory elements contributed to a pleasant atmosphere Modern, friendly, playful	Rustic Soft lighting Relaxed	Warm lighting	Informal Inviting, creative	Open Clam Busy street to calm space	Relaxed, chill Warm	Tree house atmosphere
Music mask the emptiness of the space Footsteps on timber Different lighting for different zones	Cohesive Heard Felt	music, sound of music natural materials	Natural tactile of materials palette Music Easy on the eyes	Strong smell Comfortable temperature Music	Plants Filtered light	Large use of timber	Music Texture
Construction of racks	Consistency of materials Different height spaces Placement of items	The use of timber Pipe as clothes hangers	Contrast natural timber vs plain white elements	Materials Exposed framing Raw finishes Levels	Timber Natural elements Products on display	Rough Saw timber	Texture products Storage Joints Display
Individuality expression Raw elements and well layout out	Relaxed Architectural spaces supported the stock	The store is design to target a particnter group of people and age group	Well composed artefacts Product placement Sound	Urban Design is suited for the products	Treehouse Rough Youth Urban	New Zealand Cabin Natural	Focus on texture Tree house design

8	9	10	11	12	13	14	15
Light, bright	Relaxed and free	Lack of day light and music Overall very similar	No sound Visually 80% similar	Lonely Shopping without people or music	Very bright cleaner	Quite, surreal, isolating	A lot is lost Except the feeling of a tree house
Clear lighting that showed of the lighting much more	Brighter and more light	Timer did not stand out as much, lack of detail Music played a strong part in real store	No tactile ability No warmth from lights	Temperature, does not match the lighting of space	Movement between spaces Relying on sight	Clothing Structurally elements	Access all section of shop
Cabinet stood out as I went to touch, but I couldn't	I was thinking timber but then realised I wasn't walking on timber	Clothes and hangers Timber Volume	Stairs were realistic Product detail not as good	Same as the real store	Level change where more of a feature noticeable Journey less significant	Space, felt better than the real thing	Tones of materials
Relaxed	Unique And urban	The store is design to target a particular group of people and age group	No other people around	urban	Difficult to describe the brand through VR	Engaging but not music or smell	Sense of tree house is there, but texture quality is lost

13	14	15	10	12	13	14	15
No Felt uncomfortable, because of item layout and detail	No, not detail in the products	Yes , texture product more detail	Yes but as persuasive	Yes Relevant information needs to be included and detail	No Felt uncomfortable, because of item layout and detail	No, not detail in the products	Yes , texture product more detail
Sure, if more time was spend in the VR space If there were more atmosphere quality's	Maybe, if there is a different option in viewing the clothing	Yes, but I like to try on to see it fits my body or how it looks on me	If more detailed	yes	Sure, if more time was spend in the VR space If there were more atmosphere quality's	Maybe, if there is a different option in viewing the clothing	Yes, but I like to try on to see it fits my body or how it looks on me
Feeling of awareness, and a more solid form of space	Hard to perceive Structural elements Music People	Texture Lighting Interaction	Tactility Warmth of space Noises of materials, e.g. foot steps	Tactility Music People	Feeling of awareness, and a more solid form of space	Hard to perceive Structural elements Music People	Texture Lighting Interaction

Table 001

Discussion

The results from the simulation walk-through present a positive assessment of the simulation with participants enjoying the experience.

Walk through Questionnaire

•Describe the atmosphere?
•Describe the sensory element?
•Describe design elements that stood out to you?
•What can you describe about the good as gold brand through the design?

Additional questions

•Did you feel like you could buy something?
•Would you be able to shop in an environment like this?
•Describe architectural qualities that you felt were missing in the Virtual simulation?

Results

The data analysis from the results produced varying results which show promise as there is some mutual data but also varying data as well. A conclusion drawn from the experiment shows an average tendency of the participant's experience with the two different walkthroughs. The two different walkthroughs provide a much clearer understanding of what the participants are looking for regarding in a virtual shop and provides clear data that can help designers create virtual environments.

The response from 15 participants who experienced both the actual 'Good as Gold' shop and its 3D scanned version in a VR environment shown in table 001.

When asked to describe the atmosphere in the actual shop participants used adjectives such as warm (by 5 participants) and relaxed (4). They noted the natural aesthetic of the shop, the 'cabin' feel, its spaciousness, high ceilings and squeaky wooden floors in the midst of a busy urban context. They noted the lighting, the touch of the wood and the sound of the background music. The clothes displayed against a strong timber aesthetic but one that spoke to them about being urban (5), relaxed/casual (6) and being 'cabin' (4) that I took to be getting away from it. Hence the actual store was seemingly strategic and strongly focused. Moreover, it should be noted that participants walked through the Te Aro area of Wellington's CBD office and retail business area to get to it. Hence the journey to the shop would have undoubtedly been an influence on the shop experience that participants experienced and reported.

The VR experience, on the other hand, was done in the VR lab area of the school of architecture and consequently quite a different introduction than the

Fig 7. physical store walk-through

Fig 8. Person operates HTC vive as they do virtual walk-thought the store

actual shop. Consequently, there were differences between the two experiences and participants interestingly suggested that the VR one was lighter/brighter (7), faster/visually stimulating (3) but lacked sound (4) and perhaps surprisingly other people (2). The VR environment had good light and colour (3) but lacked tactile/sound (4) and thermal (2). Architectural details such as the stairs (2), the changing rooms (2) and the timber aesthetic of the shop (2) were enhanced but unfortunately could not be touched in the VR environment. One participant noted that although they could see the timber floors in the VR; they were experiencing a concrete floor. Hence their eyes were telling their brain that it was timber while their feet were signalling concrete; in this instance, the eyes won out. Interestingly, the VR experience did not shift the perception of the Good as Gold Shop and participants commented that the VR experience was urban (4), relaxed/casual (3) and being 'cabin' (4) which are similar numbers to the actual shop. However, at least 2 commented that the VR was not as clear or had lost the actual shop brand.

Nonetheless, 8 participants would have bought from the online shop, 3 would not and the remainder were in between. Moreover, 7 confirmed they could/would shop online in a similar environment with the remainder saying they conditional could/would. With the three characteristics of touch (4), sound (7) and thermal/warmth (2) being most notably absent from the VR experience.

The study did support the 'influential nature of vividness' as suggested by Cheng et al 2014 and the immersive nature of VR as suggested in the earlier literature review; albeit that the participants were aware of the context they were experiencing the shop. Nevertheless, at least one participant had the conflicting sense of whether the floor was timber as seen or concrete as felt. One surprising aspect and perhaps it was assumed by participants were the lack of comments about the 3D scanned environment of the same shop that participants experienced. The ability to 3D scan large building volumes is still being developed, and the use of Matterport technology to achieve that for this research was fortunate. The sense from the work was that it would not have been as effective in translating from the shop to the VR environment thus losing much of the immersive nature of the VR used for this investigation. That could be investigated further.

Whether this technology will become more commonplace was not the objective of this research. That aside, it is clear that retail will become increasingly more challenging and overwhelming with the innovative solutions and opportunities that are being presented, such as VR, in addition to others such as AR.

For this investigation and the design of a VR web site for the Good as Gold shop suggests the following aspects need to be included:

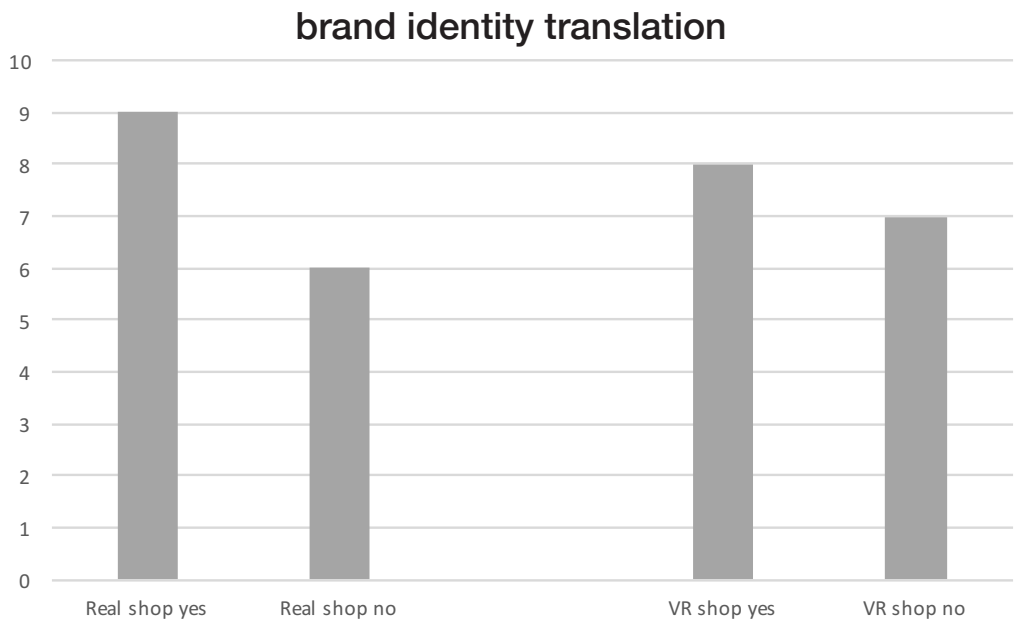
1) The VR site needs to reflect the strategy of the Good as Gold shop.
2) That reflection should/could include vivid colours and light. (the desire for music, touch and other people would be held back because of computer coding issues).
3) The material nature of the elements should be explicit.
4) The use of architectural features (like the stair) should be developed in the online site.
5) The virtual environment

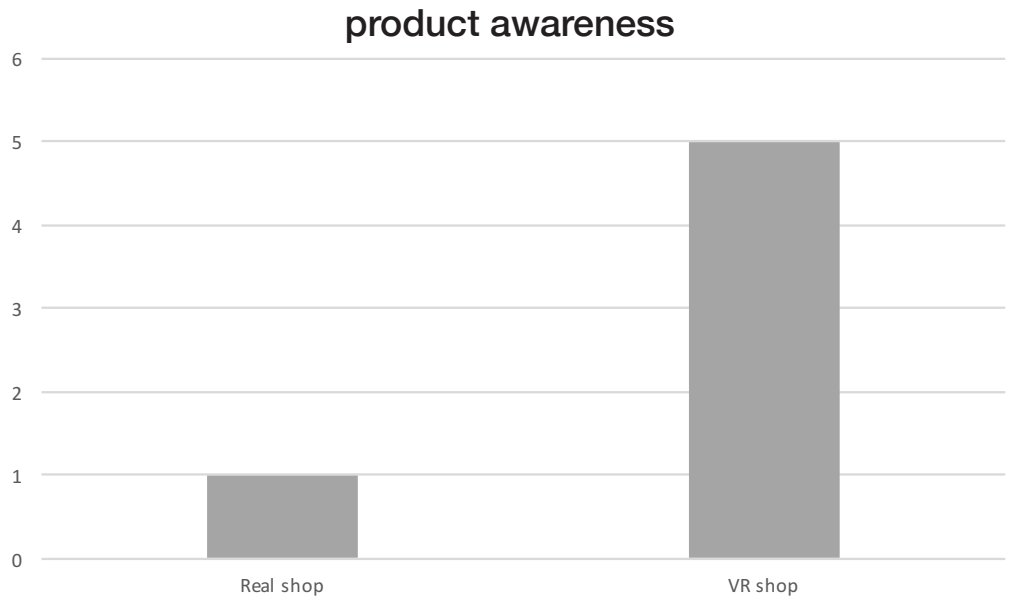
Conclusion and reflection

The results from the participants showed exciting and diverse responses; they show that there is more to learn about VR in retail. The tangible conclusions of the results appear to be difficult due to the nature of resources and test scenarios to the sample size of the experiment, but it does set up a foundation that can be further developed.

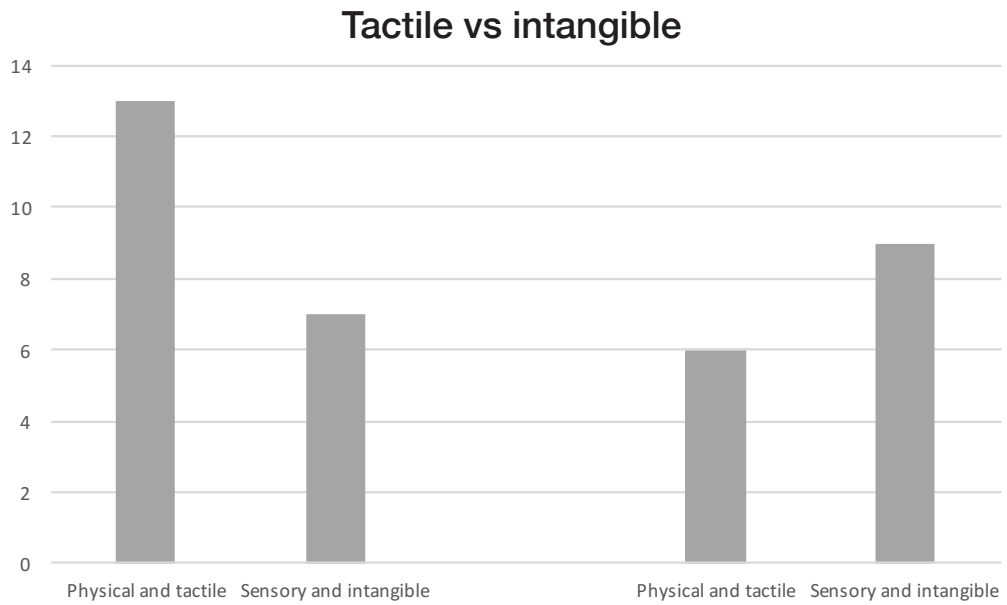
The results allowed the experiment to give several significant conclusions about the quality of experience for the VR shop. It has also given a flipped understanding of how retail design could potentially use VR to develop retail design. It was evident that the physical shop walkthrough had similar results but each student had a different experience in the VR, and the breakdown of these differences help understood the gaps. Despite the immersive of VR, not all the participants were sold entirely on the concept of a VR shop. There were many advantages and disadvantages between the shops, disadvantages are useful to develop virtual shop interior but vice versa the advantage of VR elements can be used to develop physical shop interior design.

The initial results from the simulation appear to be similar, but there are subtle differences between the experience that can add value to the design process for a VR environment. Firstly, and most importantly for any retail business is the reflection of the brand through the store. The brand identity is the public image of the company and plays a significant role in retail design (Pegler 2015). The brand's strategy is very clear throughout the VR shop by 70% of the participants, even though the space is exactly the same, it is interesting to learn the varying different answers to the exact same question asked in the physical shop walkthrough. Elements that stood out in the physical shop such as the physical tactility of materials, especially the timber, have not translated to the VR shop. Rather increased awareness has been giving to other objects in the space such as clothing but also the spatial experience of the space, which could suggest that the lack of simulation of the other senses allows the mind to focus more upon the products. But this did not change the way users experience the Good as Gold brand through the design, as most participants had similar responses to the physical shop, apart from a three who found it difficult to translate the brand through the design. Analysing their other response suggested that this factor could have been due of the lack of clarity of the 3D scan of the environment.

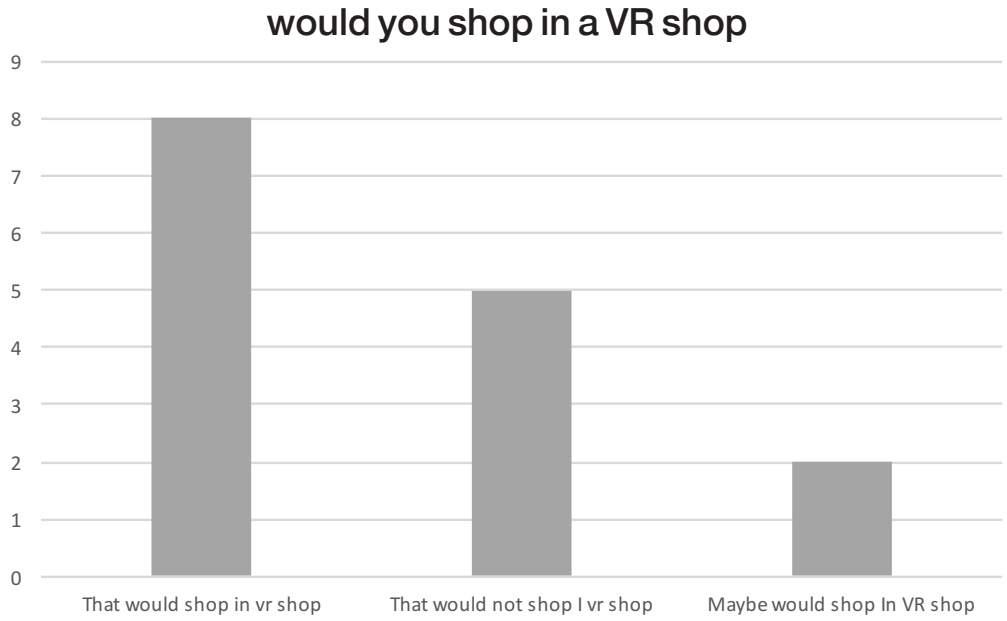




Nonetheless, the shift on participants focus from the different design element, the physical shop to virtual shop creates an interesting enigma from a design point of view and that a designer should create for the eyes rather than the body. This was pointed out by some of the participants and in particular one participant (9), where they felt like they were walking on a timber floor when they were actually walking on a carpeted concrete floor. The participant said "I was thinking it was timber, but then I realised I wasn't walking on timber" This show the importance of the visual connection of one has in VR. How visually the eyes can overpower the other senses. Likewise, with sound, as the participant would expect to hear the timber floor creaking as they walked across the floor although there was absence of sound, the eyes overpowered the senses and have the elusion they are walking on a timber floor. Another notable sensorial element observed was the element thermal in the virtual shop. The lighting caused the environment to feel warm but while doing the experiment users where in an air-conditioned environment. This showed the importance of lighting in a virtual environment and how it can be used to alter the atmosphere of a space. This helps the designers use lighting as a strategic and powerful design tool for creating a virtual shop.



Participants also reported the virtual shop to be more visually stimulating and a fast pace experience. The lack of virtual shopping environments makes this difficult to compare with others. However, the participants were not timed during the walkthroughs, so it is difficult to conclude if they spent less or equal amount of time within the environment. However, one participant commented on the environment to be more VR than real life, suggesting that users are looking for a different type of user experience in VR and one that does not mimic reality but rather exploring different design techniques to keep the user stimulated.



The participants were asked if they would be able to shop in such environment and purchase a product, as the aim of retail stores is to sell a product. The results show a positive response with more than half of the participants responding yes they would be able to, with participants even saying it is much nicer than online shopping. The results to if they would be able to shop in an environment as the VR shop also have similar responses, but that similar comment made; 'yes they would be able to shop and purchase an item but only if the products visual were a higher quality'. One of the limitation with the quality of the environment was the output of the matterport scanner, as the quality of the scan was determined by the quality of the scanner's output.

In addition, some participants noticed a lack of other people being around, but also some users felt more comfortable with the lack of people and interacting with others. This raises interesting question could this VR shop be also used to enhance the shopping experience of people that may have social anxiety because of the minimal human interacting within the environment.

From the responses, the research reveals that VR can be an efficient shopping environment, one that is almost as stimulating as a physical shop with greater potential as the technology further develops. The technology potential also saw a shift in the way designers would think and experience space, as experiencing the space in two different mediums, showed different ways of thinking about space, and how visually simulation of the eyes has greater value in VR that we physical do. Unfortunately, the research was limited as the clarity of the 3D scan of the model as the quality of the scan has a significant impact of the situation of the environment, to be a true 1:1 comparison the scan model would need to be Identical. Equally, this technology shows true potential for the online market as it further develops and its could promise to give back the consumers the brick and motor experience.

Reflection

The design of the Virtual shop has raised some key questions and the ambiguity of the representation of the environment, especially when the design has been unchanged from the physical shop. Several texts document this the aspect but are mostly inconclusive (Pallasamaa, 2014 and Whyte, 2002). These sources say to take advantage of the ambiguity that this medium offers and use it to exploit the human senses to fill in the gap in representation, creating room for imagination while offering the user a creative and flexible experience. This ambiguity was observed by one of the participants who said 'be more VR that real life' suggestion the vast creative options that the VR field offers to designers. The tradition architecture element in the built environment such as stairs and flooring do not have to be limiting characteristics to the way an environment is designed. The extent to which architects and designer implement realism into their environment would be based on their desired brief and context they are designing.

Chapter 4
The Brand

The Brand

A brand is very important to the design of the thesis, as this would shape and form the design element. The design would be based around the brand essence and how this can be translated into a virtual environment. The design experiment conducted will be used to inform the design along with the brand, for the virtual shopping environment.

The brand selected is Good as Gold, they are a New Zealand owned and operate boutique store opened in 2004. They have two stores located in New Zealand, Wellington and Auckland branch, along with an online store that ships worldwide. The store for the research was the Wellington store. It is a boutique store that houses items around streetwear culture, along with toys, magazines and artwork from around the world. They house multiple different brands, as well as their own. Their brand values revolve around confident, premium, and they are down to earth, these values are what the brand is built upon. The products that are housed at Good as Gold are chosen on their strong design, graphic imagery and ones that tell a story. They also prefer smaller brands over big brands, as relationship between brands can be form. Good as Gold prefer brands products that are organic, sustainable, and ethical.

Some of the brands that are available.
P.A.M., Kowtow, Brain Dead, New Balance, Henrik Vibskov, Shark Week, Yu Mei, Parra, Stan Ray, Taikan, Norse Projects, Patagonia, Maharishi, and Wood Wood.

Good as Gold is not just a shop, they also try to create a community as they try to host launches, barbeques, parties, exhibitions and Friday night beers on a regular basis. They are big on creating a warm and welcome feel, a place that it is cool to be different, stand out and strive to create a friendly and welcoming community.

120 Victoria Street, Wellington City 6011, New Zealand , +64 4 381 4653

Good as Gold

These principles expand upon what the brand idea stands for.

they are confident

Good as Gold know who they are and knows it better; confidence means doing your thing without ego or self consciousness

they are premium

Premium is the way they approach everything that they do and sell. It's about the highest level of service and quality of product. "It's not so much about pomp or posturing, it's about the level of service our customers have come to expect"m. They do not shy from delivering unique personalised shopping experience in an increasingly anonymous, homogeneous and automated industry.

they are down to earth

"Yeah all that stuff but don't get too big for your boots mate" Have fun and revel in the frivolity.

Good as gold store analysis

The Good as Gold physical store is based around the customer experience, from design aspect of the store to the service. The current Wellington store spans over two floors and has three different levels, and is designed to be a tree hut, in the urban jungle. The idea of the tree hut is created for the owner Ruben, with nostalgic memories of building forts and treehouse at a young age. The store has a warm and welcoming feeling with the use of warm lighting and light tone natural timber lining the interior of the store.

Fig 9. Good as Gold physical store

Spatial

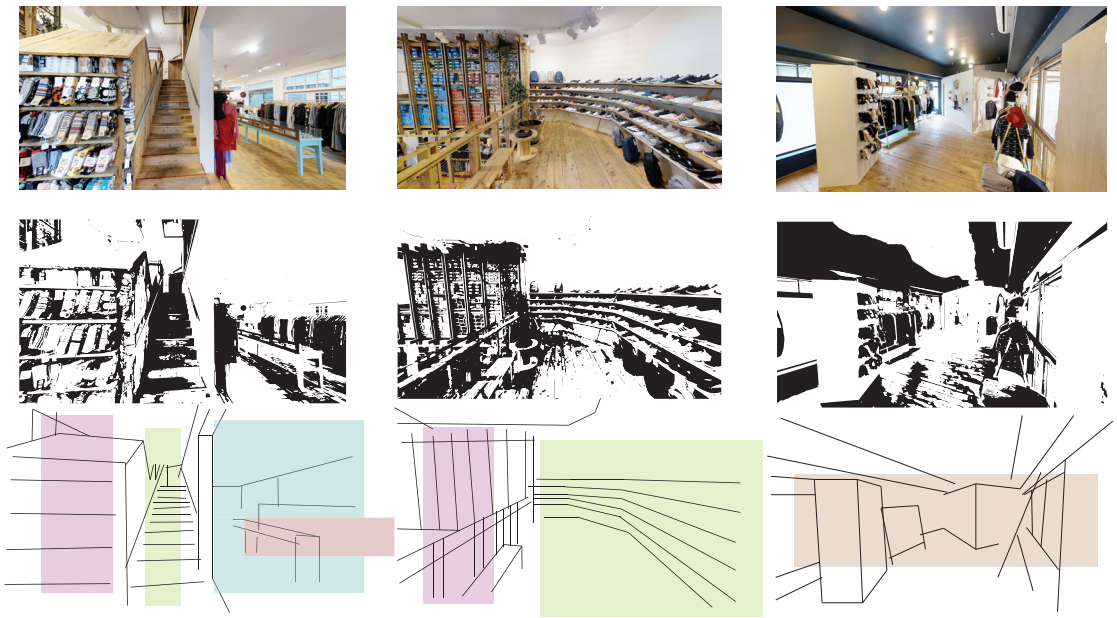


Fig 10. Good as Gold store analysis break down

Analysing the store and products they sell. There are five main categories, jewellery, street wear, high end, outdoor and footwear. These are the main categories of items and also the spatial arrangement of the store. Each space has the primary design of the tree house, but each space has a different ambience with the use of lighting and hierarchy of the tectonic architecture.

The five different categories are separated and examined, the culture of those categories in the fashion Industry and how these products relate to Good as Gold.

Zonal Planing

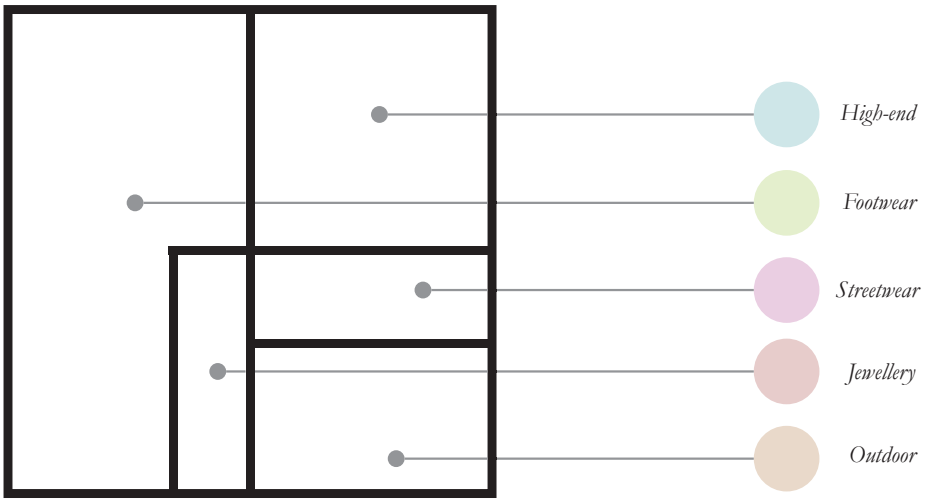


Fig 11. Digram showing the spatial divide of catalogue by area

The levels are split into four different zones, front entrance, changing area, footwear and upper enclosed cabin. The use of the internal window opens the spaces up and gives the atmosphere that you are in a large treehouse able to run around in. The changing rooms are also designed to look like tree huts. While the double height space helps to elevate and open the space up.

The atmosphere is welcoming, calming and fun, the music helps to block out the urban nose and plants and greenery help to give a nature feel within the store.

Good as Gold also has a division of space, this is done with the use of lighting to create a different ambiance throughout of the different. The space layout is to house different items of clothing in different parts of the store.

Good as gold web-store strategy

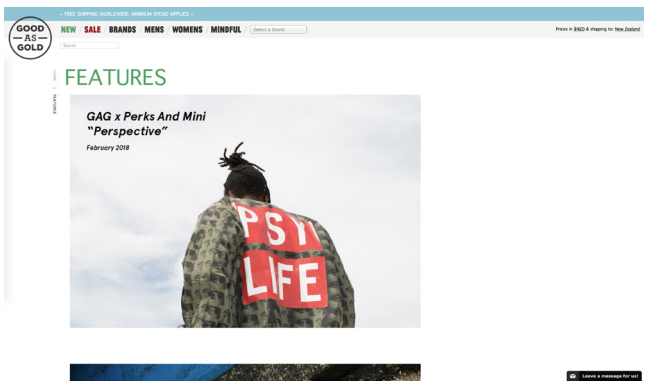
Good as gold webstore, ship around New Zealand and world-wide. There website offers 99% of their product range, items on offered are ones that cannot be shipped. They website is also smart device capable.

The interaction on the website is limited to click, scroll, zoom, offering consumers to click through different items, scroll thought categories and zoom in to get a closer look.

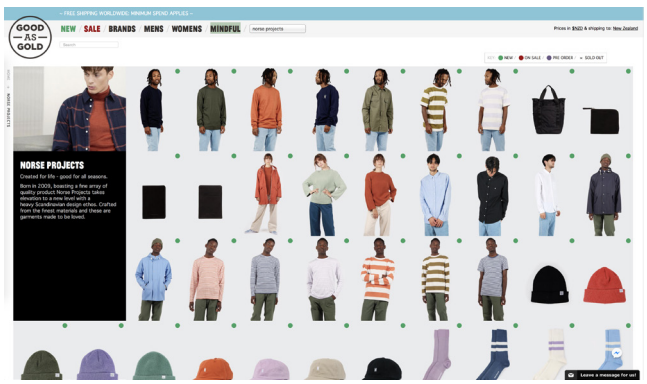
Fig 12. Digram showing the basic interaction of a web-page on a computer

The smart device interactions are, touch, swipe up and down and swipe across.

Fig 13. Digram showing the basic gestures use to navigate on a smart device



The website offers a fashion blog, about new products and news about the brands they house.



The website offers a insight into the brand that your purchasing, with a breif Description of who they are and what they do.

Fig 14-15. Good as Gold webpage layout

The analysis of the brand and store allowed the understanding obtained from the literature about branding in retail; this knowledge is helpful in developing a contextual and tangible understanding. The analysis examined the role of branding in retail and how branding offers the consumer experience. The analysis also looked at the physical Good as Gold store design and what makes it unique. How does the design impact the overall experience for the consumer, examining the branding and atmosphere; How can these elements facilitate through architectural design for a virtual environment.

Key learning objectives obtained from the analysis was the branding, zonal planning and website analysis of Good as Gold Things such as the brands housed at Good as Gold and how do they relate to the brand characteristics. This suggests that brands are carefully chosen to add to the overall image of Good as Gold. The layout of the store give perspective to the designing of the virtual environments. Designing environments that have an emphasis on branding for a house of brands establish a way of achieving the question.

Design criteria

Chapter 5

Research Summary

The research conducted in the field of virtual reality in retail and the experiment one, 1:1 comparison of physical vs digital shopping environments. The research combines the theoretical knowledge in the field of VR retail environments with the addition of case studies, and the results from the experiment to give a grounded framework.

The right turn

With the analysis of the case studies and experiment, found the critical aim is creating an experience for the consumer. Both IKEA and The North Face offer an experience, and results from the VR shop also suggest that people are looking toward experience.

Design criteria

The frameworks will guide design and development of the virtual environments that will facilitate the characteristics of the Good as Gold brand. The process reflects on the experiential factors behind retail and how they can be exploited in the virtual reality. The outcome of the case studies and experiments set out the design criteria. These criteria are design/architectural and multi-sensorial, provide a framework of how they can be incorporated with the Good as Gold brand to create a multi-sensorial virtual retail environment, that offers an experience.

Developed design

Chapter

6

Design exploration

The developed design focuses on architectural gaps that were found in the Good as Gold VR shop. The analysis of the data looks at breaking down how the elements that can be addressed via design. The focus of the thesis is to explore the visual sense of the VR application, engaging the user with a visual stimulus to trigger other sensory elements. These elements have been selected from the analysis of literature, case studies and data from the VR shop experiment. Each one of these key elements was reflective to have a key role in creating the visual immersion need to create an engaging experience. The VR approach to developing a VR shop gave the design ability to be more brand focused and not be limited by the traditional elements. The ability to tell the story of Good as Gold in a more creative and playful manner, this is similar to how the Good as Gold physical store has been designed to be a tree hut and not just a space with clothing racks and shelves.

The architectural elements that were observed from the VR shop were;

Geometry,
The form that will house objects but also be used to tell the story of the items and Good as Gold.

Materials,
To create the atmosphere, the narrative of the space.

Lighting,
Used to create atmosphere, but also used to draw you through the space as a navigation tool.

Interaction,
Used to visually try to connect one with the space.

Environment,
To set the overall scene of each storyboard, to give context.

Movement,
Movement being included as it visually affected the results of the VR shop due to the type of movement used.

These will be the elements that will be further looked at and developed within the VR environment.

Geometry

The geometry of the space is an important part of the environment, as this would house the products and the space that the user inhabits. The geometry used by Singapore Airlines and North Face use photo-realistic and imagery to immerse the user into the environment, this as they are showing the user real environments, that they may visit or the product with being used in, were as IKEA use architectural elements such as floors, ceiling, draws and cupboards. The experiment investigation, suggests that users become more spatially aware become of the lack of tactile, sound and smell stimulation.

One of the comments that was made by one for the participants was the virtual environment being more virtual, suggesting that users are not looking for mimic of reality but more of an abstract experience that you might not experience in everyday life. Moreover, the data show even with the lack of stimulation from the other scenes users were still able to experience the brand visually.

Results

The results of the forms have been developed based on the breakdown of the Good as Gold brand. They have been designed by keeping in mind that Good as Gold houses brands that fit their brand ethics. The forms create the space which are broken down into five main Categories, Jewellery, Streetwear, high-end, outdoor and footwear. The brands that stock these items and their relation to the Good as Gold brand has been examined and from this, the form have been created by individually reflecting the housing of the brands at Good as Gold through a spatial experience.

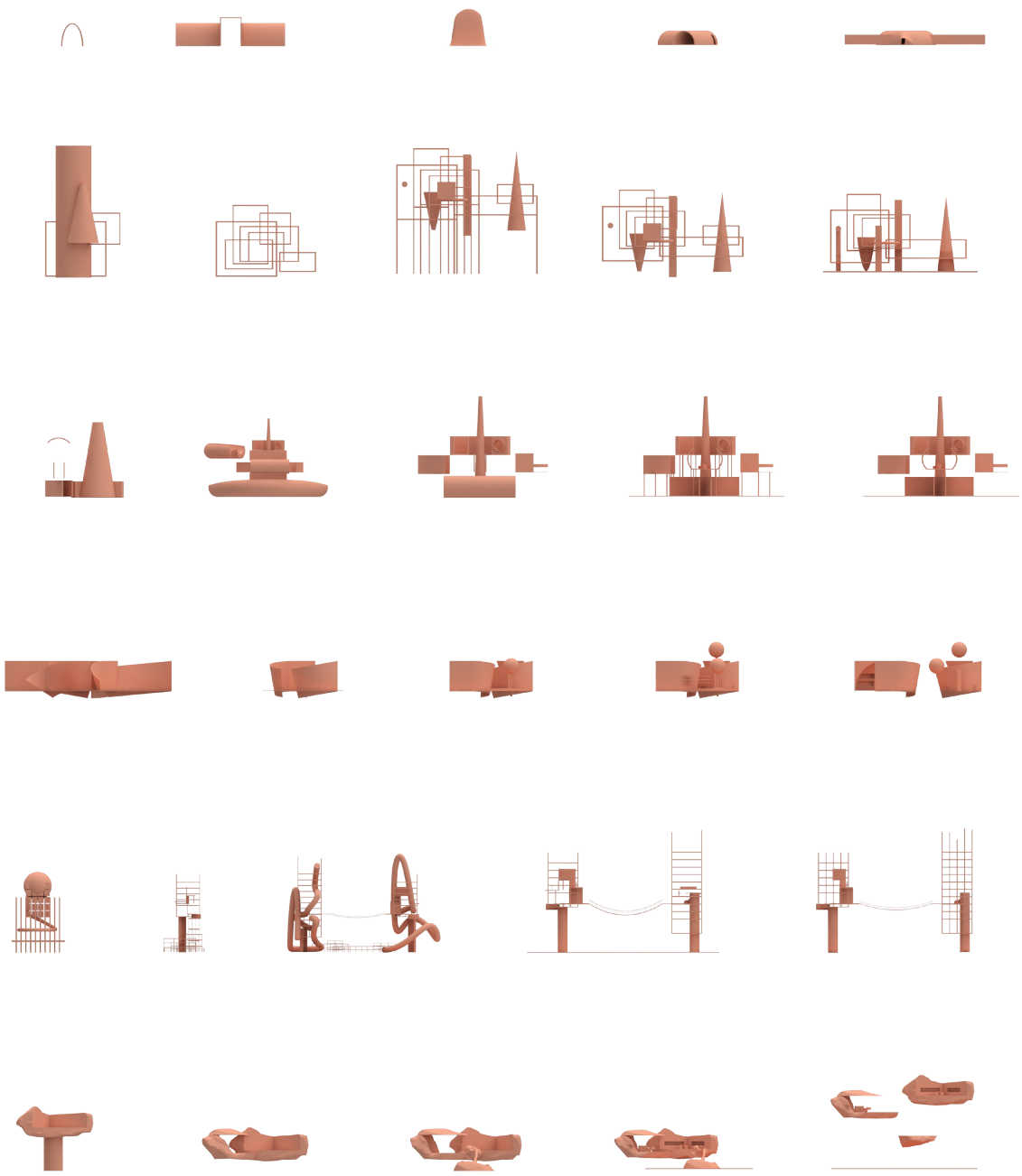


Fig 16. Interaction for the form study

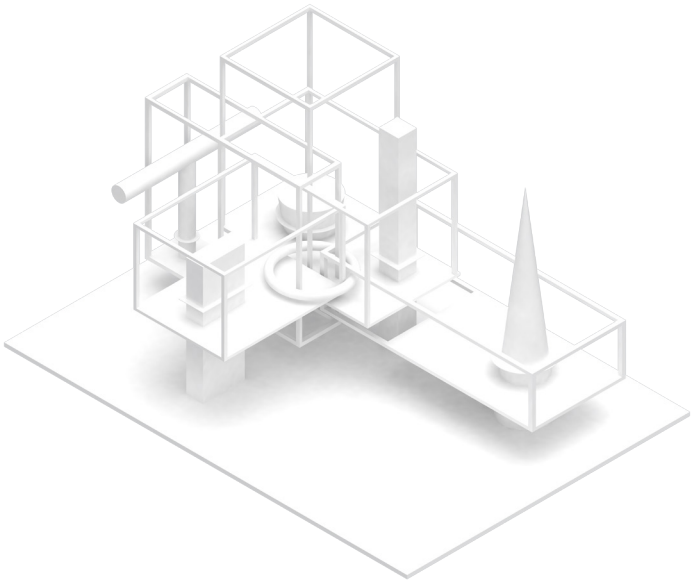


Fig 17. Jewellery form

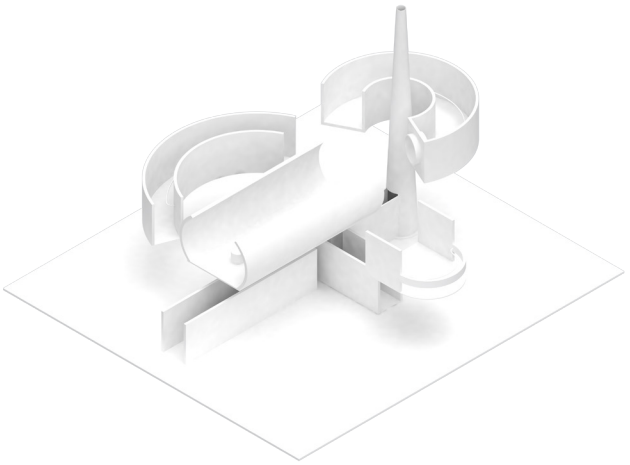


Fig 18. Streetwear form

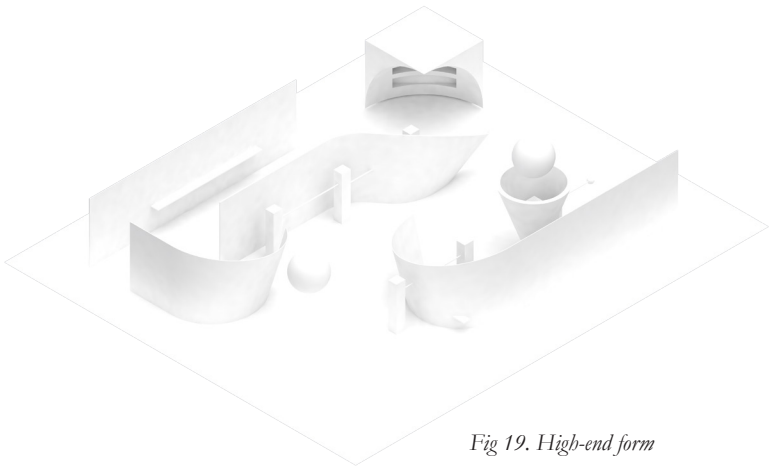


Fig 19. High-end form

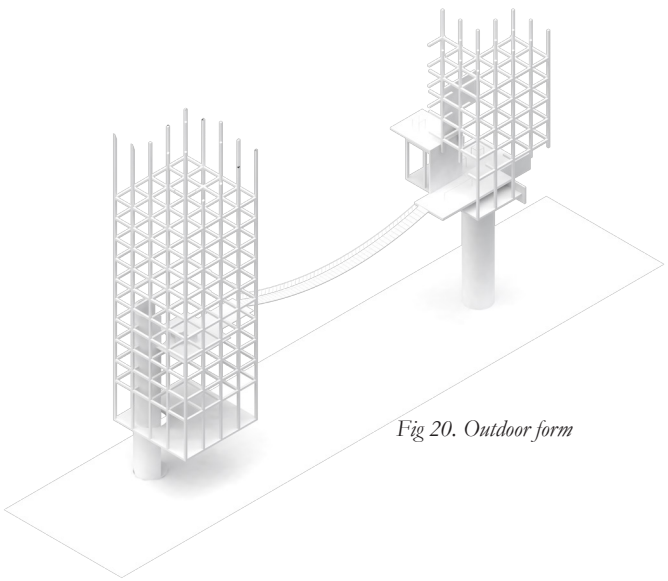


Fig 20. Outdoor form

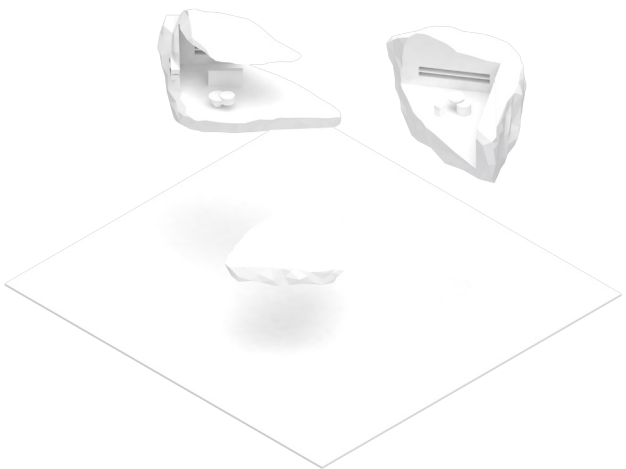


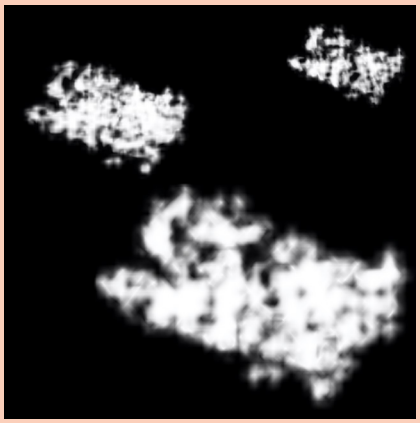
Fig 21. Footwear form

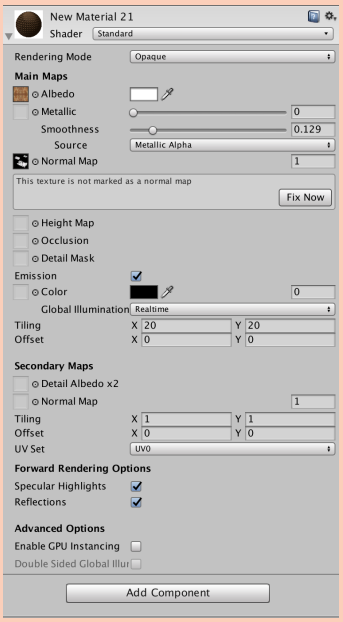
Materials

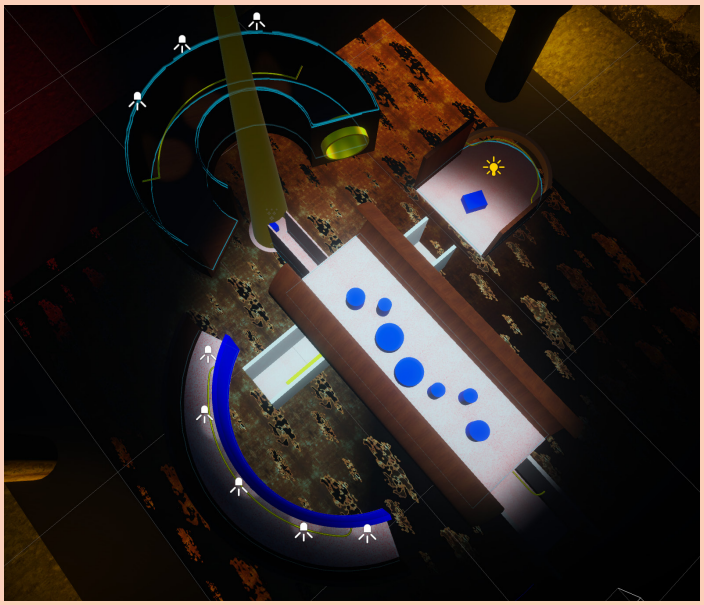
Materials in the real world offer multi-sensory experience, rather it being visual, tactile, sound, smell or thermal, they add to the overall ambience and atmosphere of a space. However, as the results from the VR shop experience indicate the only sense that is stimulated in VR is primarily visually. This raises the question, should material in VR be photorealistic, where the user is visually stimulated and made to believe they are standing on a timber floor, or should they be plain and simple. The VR shop shows evidently, that the other senses can be visually overwhelming and can make one feel things they are not.

Results

The material used on the forms and for the environment have a been computer generated to look realistic and used where necessary to create atmosphere. VR techniques have also been used to develop immersion by adding Illumination to objects and material, making them glow something that you would not see in the physical world. Material mediums were tested, to view what would be the best approach; if photogrammetry would produce better result or CGI (computer generated image). This result was test in the VR shop which was a 3D scanned photogrammetry model, where participants found the materials to be not as clear, which lessen the overall immersion.







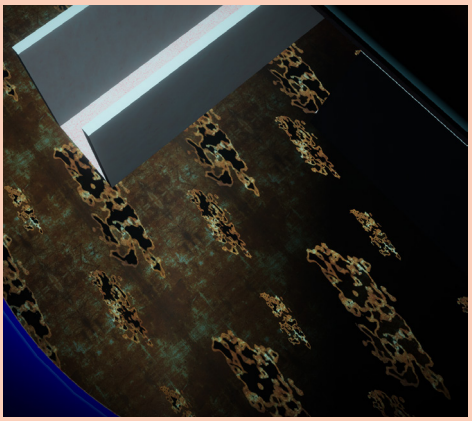


Fig 22. Inside Unity3d, shader texture information of unity-based shader system and mapping system, to create a wet metal.

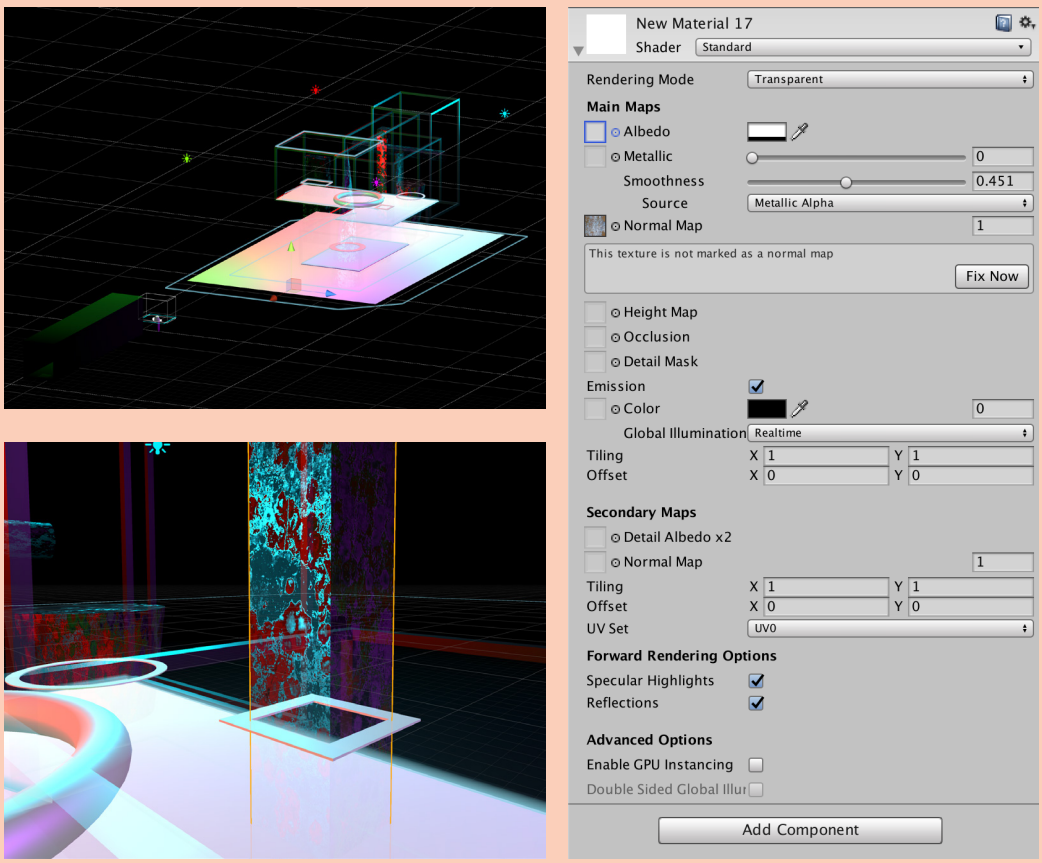


Fig 23. Inside Unity3d, shader texture information of unity-based shader system and mapping system, to create the weather glass texture.

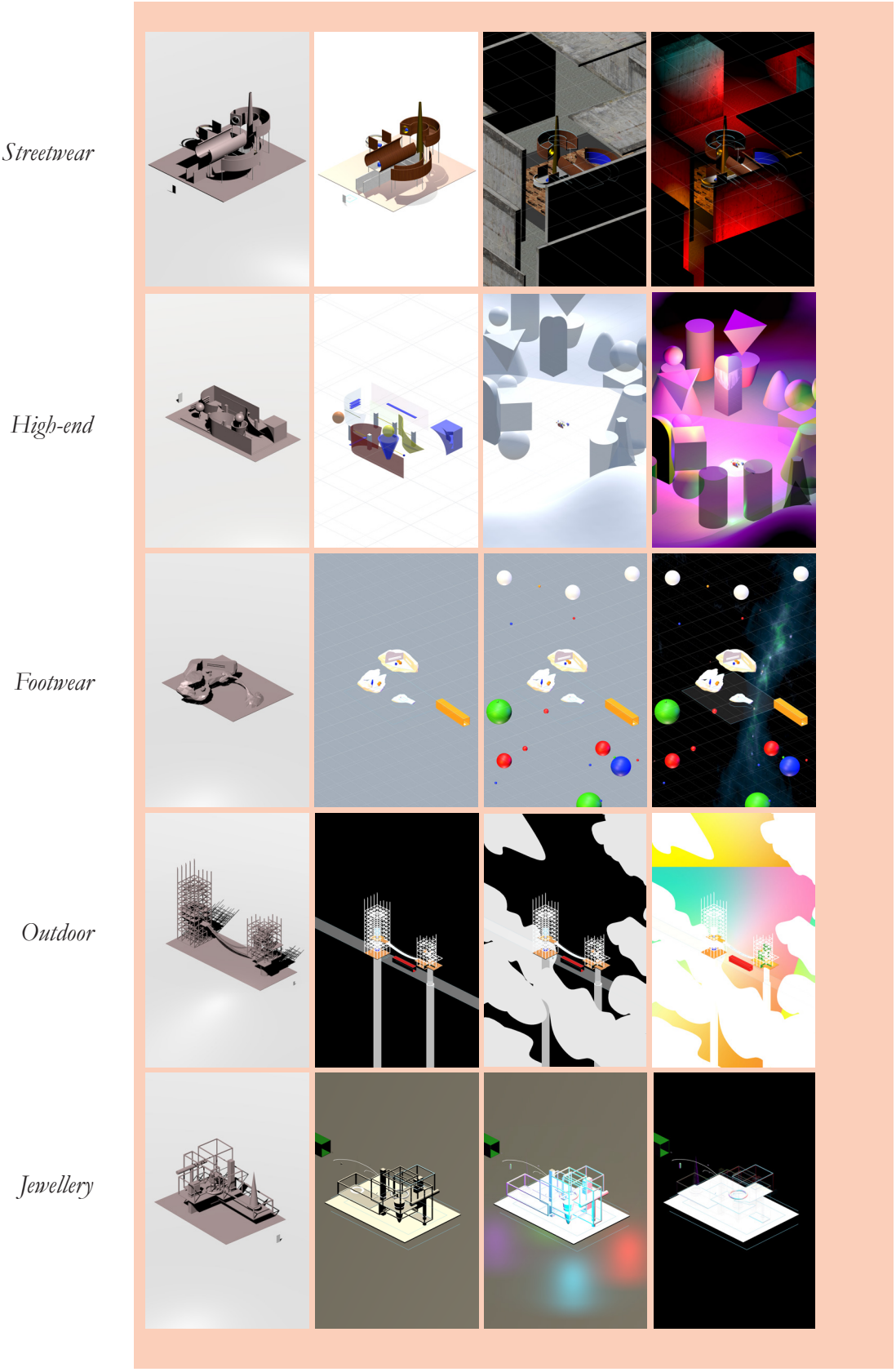


Fig 24. The material interaction and development .

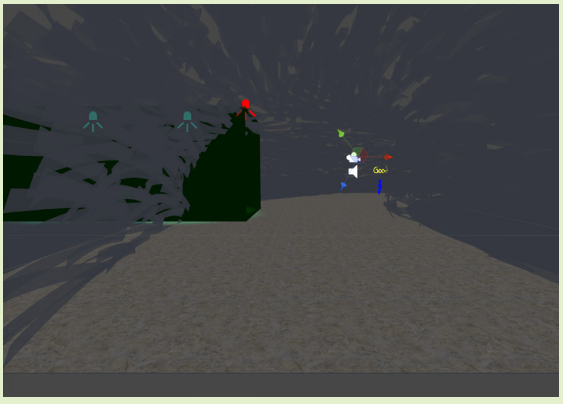
Lighting

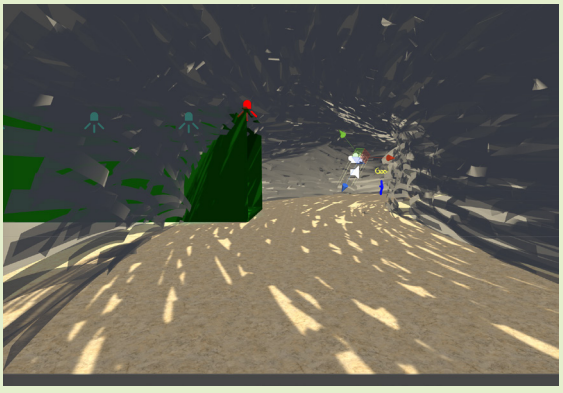
Lighting is a vital part of any space, as it is one of the defining characteristics of atmospheres. Nonetheless it is more than critical in a virtual environment as it one of the ocularcentrism characteristics of the environment. Ocularcentrism is "A perceptual and epistemological bias ranking vision over other senses in Western cultures", as virtual environment highly relies on the visual simulation. Ocularcentrism was experienced first-hand and seen in the results of the virtual shop experiment. Users saw a timber floor in the model but were standing on a carpet concrete floor, but the user felt like they were walking on a timber. Lighting is used to create the dynamic atmosphere of each of shopping environment but also used to enhance the property of the materials.

The lighting played a significant role in the virtual shop, as the results in user experiencing different spatial qualities that they did in the actual shop, with the space feeling much bigger. The lighting also played a thermal role, as the lighting characteristics gave eyes the sensation that space would be warm but their bodies felt cold being in an air-conditioned room.

Results
A mixture of different lights and lighting techniques were used to create in each of the different environments. The lighting was used to create an atmosphere within the environments but also as the element to enhance materiality and immersion.

Fig 25. dynamic lighting setup to draw you through and navigate through the space





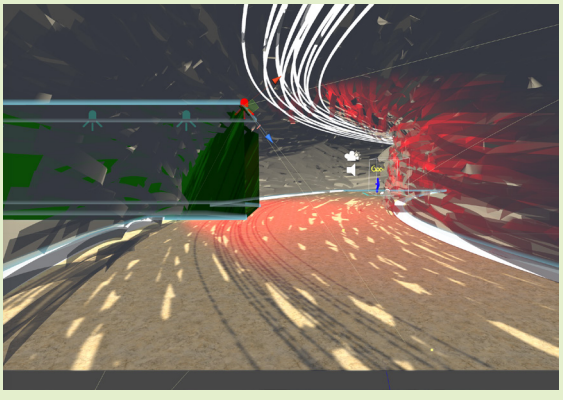


Fig 26. Series of image show laying of lighting within the environment and without dynamic emissive lighting.

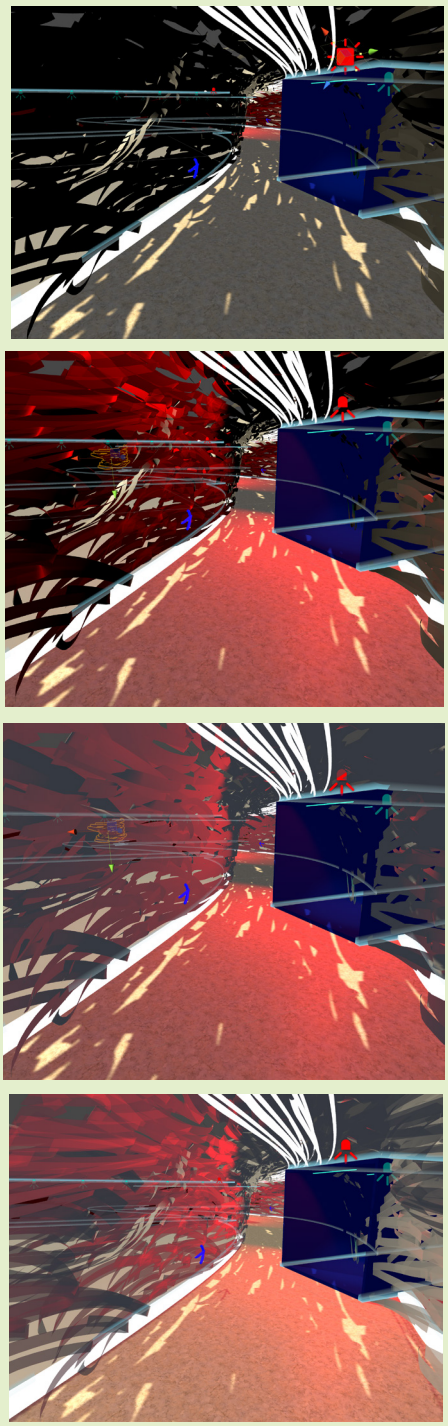


Fig 27. Lighting experiment with materials to create dynamic emissive lighting.

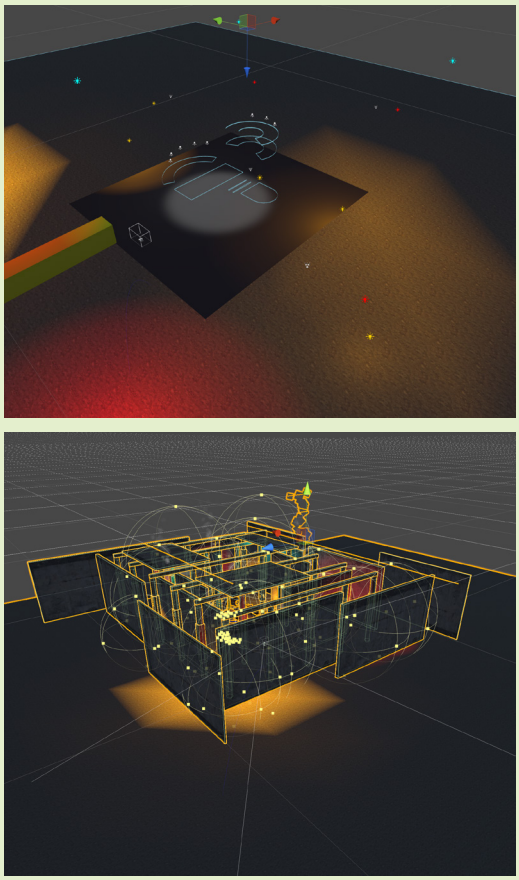
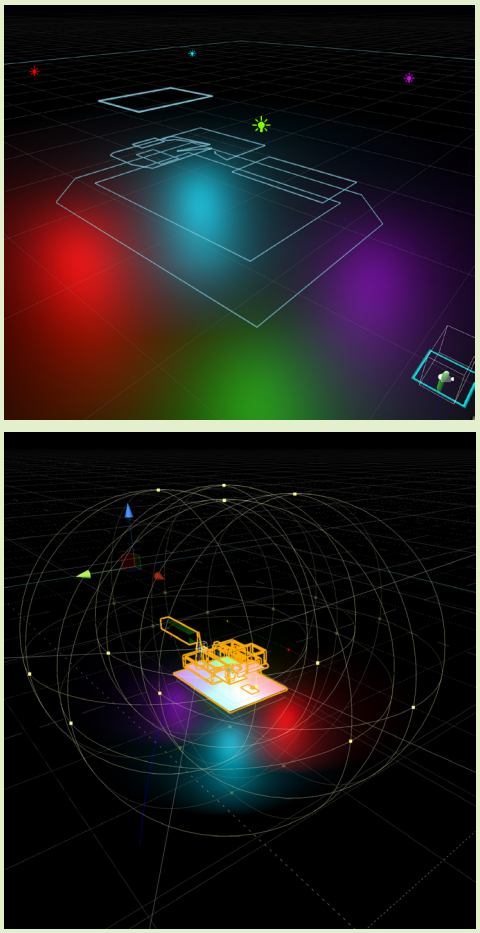


Fig 28. Streetwear lighting set up

Fig 29. jewelery lighting set up



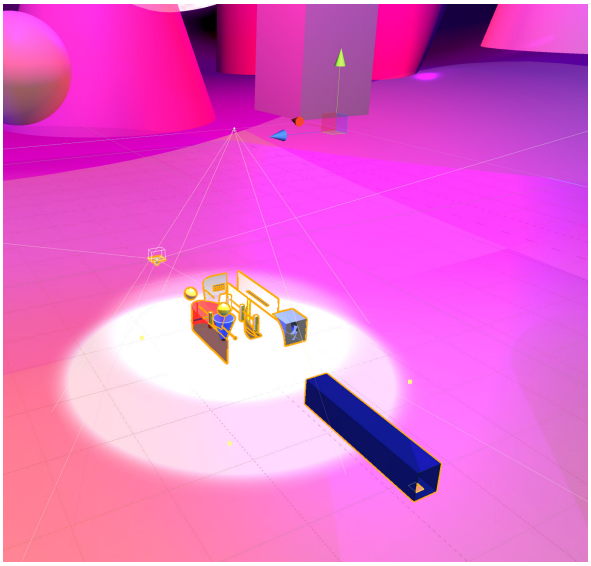


Fig 30. High-end lighting set up

Fig 31. Footwear lighting set up

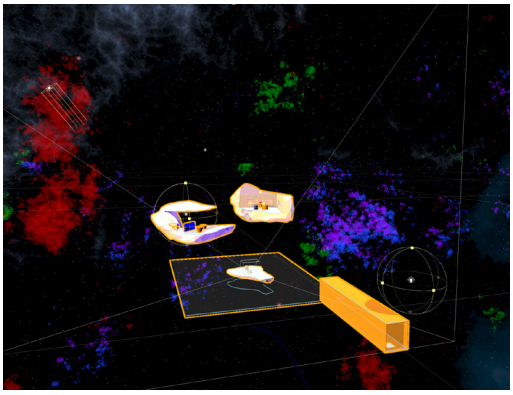
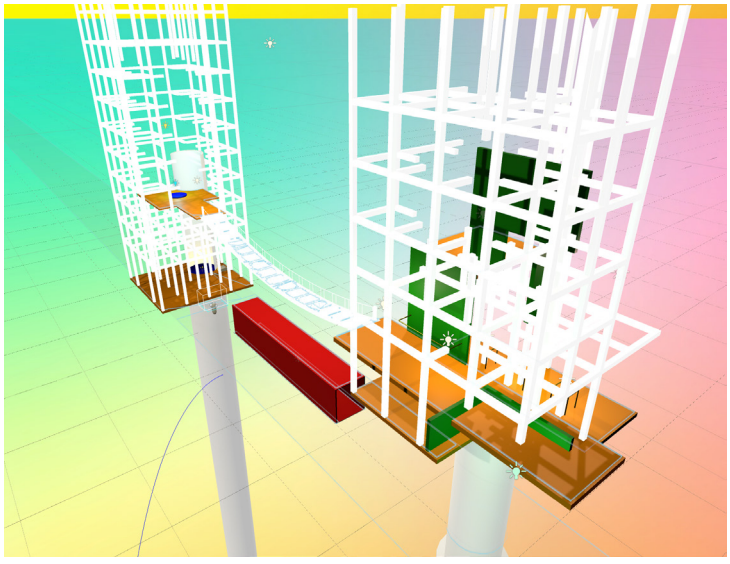


Fig 32. Outdoor lighting set up



Streetwear

High-end

Footwear

Outdoor

Jewellery

Fig 33. The lighting interaction and development .

Environment/ inhabitation

The overall focus in creating the environment is to try to create a sense of inhabitation for the forms and to give them a context regarding the narrative behind the design. To create inhabitation without needing other people in the space but the ephemera on the design experience. North Face and Singapore Airlines, both us 360 videos to inhabit the environment giving the user an experience like they are there, but having lack of movement as it is a stationary experience.

The VR shop was the design form, but it did not have a surrounding context, that being the environment outside the shop. This created a surreal effect, where the user knows that there is a context but are disconnected with as they cannot visually see it, creating a notion of a surreal feeling. Creating an environment for the design forms to inhabit not just gives the form context but also provides better grounding to the design and overall a more stimulating experience for the user.

Results
Developing the virtual environment into a scheme with different environments within the primary environment with two essential notions of narrative design and experience. Different strategies of creating environments where tested, ones where all the environments are together or having one overall environment to create familiarity but the one that proven to be effective is creating individual environments.

The layout of the virtual environments resembles a similar arrangement to how online shopping web pages are laid out. They categorise items together that are similar in type, making it easier to locate the item, while making it easier to navigate the webpage as well. The overall form of the program, consist of seven different environments that you transition between start, intermedium, virtual shopping zones and finish. The hut is the starting environment; this then leads to the intermedium passageway. The passageway acts as the medium between the different shopping zones as you transition back and forward. The finishing zone will transition you back to the hut that you entered from but with a change in atmosphere. Each of the different environments has been designed in the context to the genre of product and design according to the narrative.

The circulation of the simulation has an identical manner to the overall form. The circulation is based on the storyboard narrative. The circulation uses the central passageway that is connected all the different environments that you use to transition.

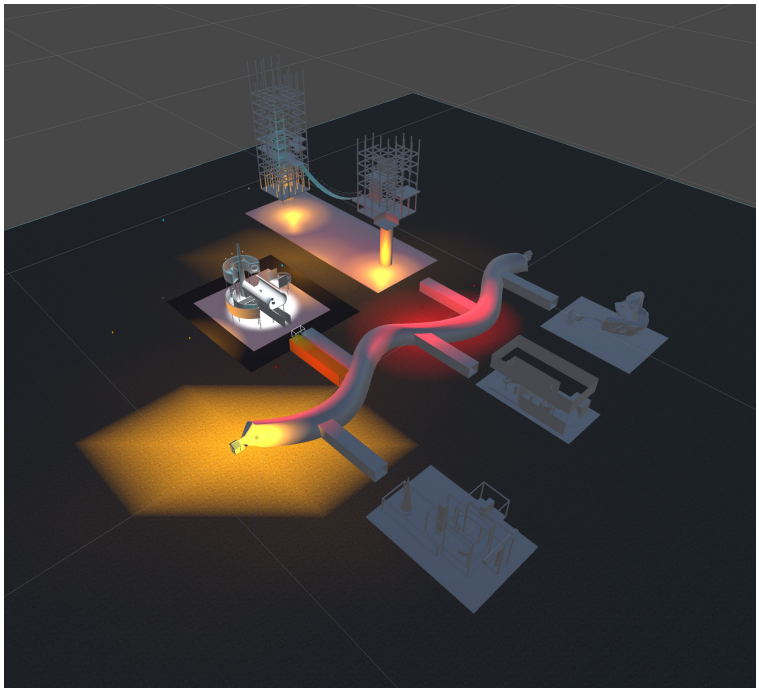


Fig 34. Testing of a all in one environment

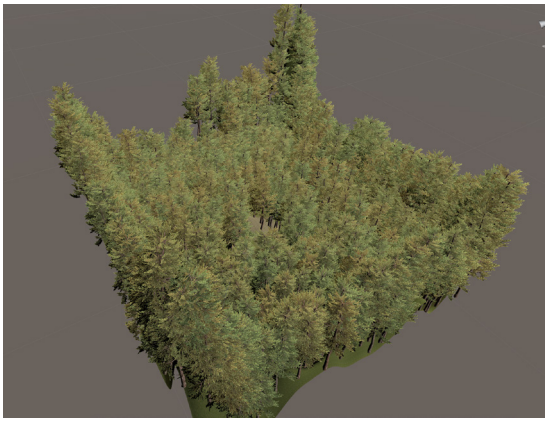
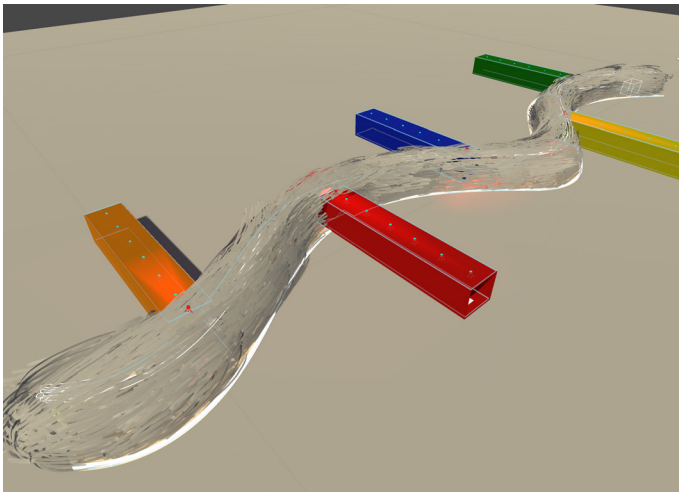


Fig 35. The hut

Fig 36. The main navigation tunnel



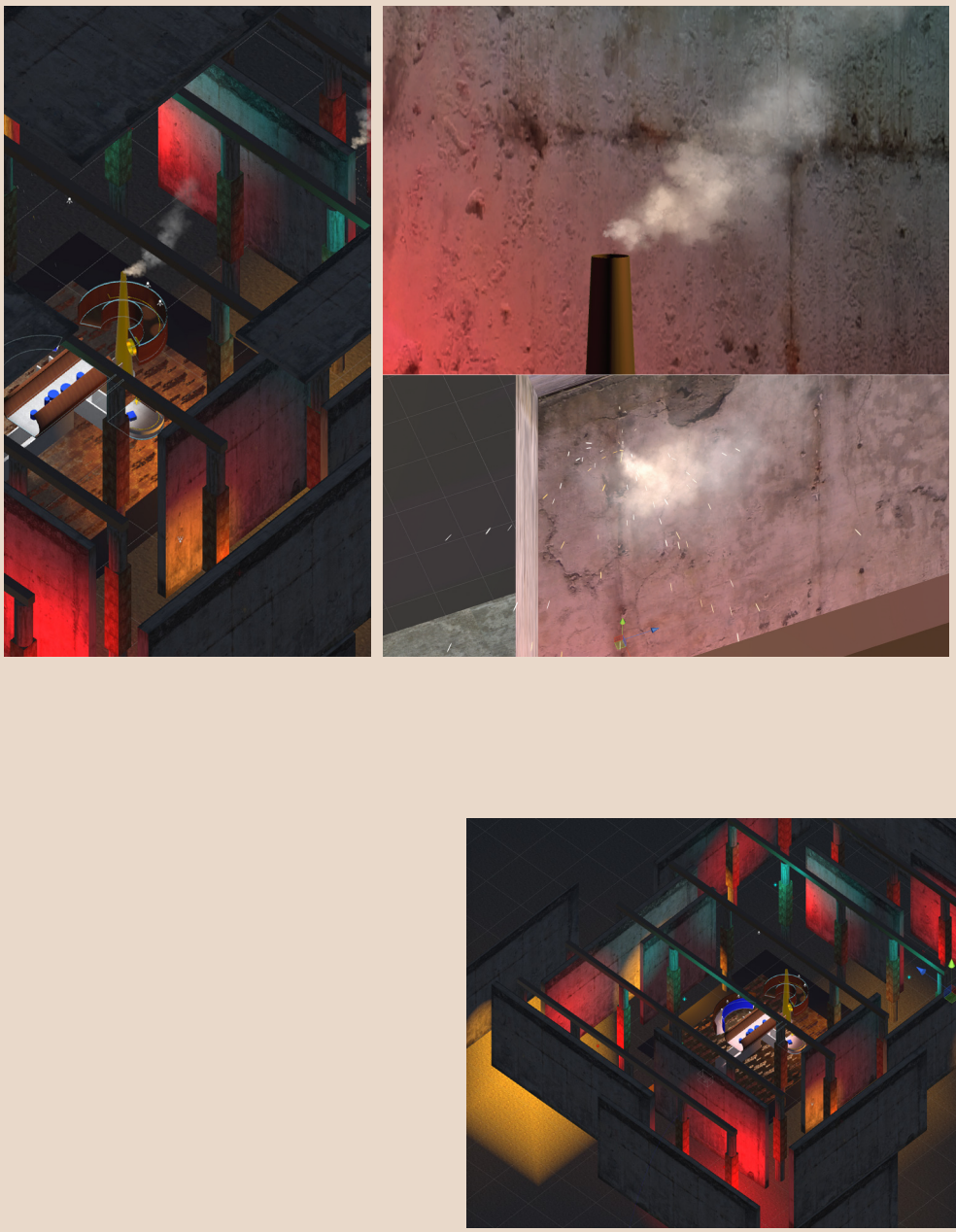


Fig 37. The streetwear environment

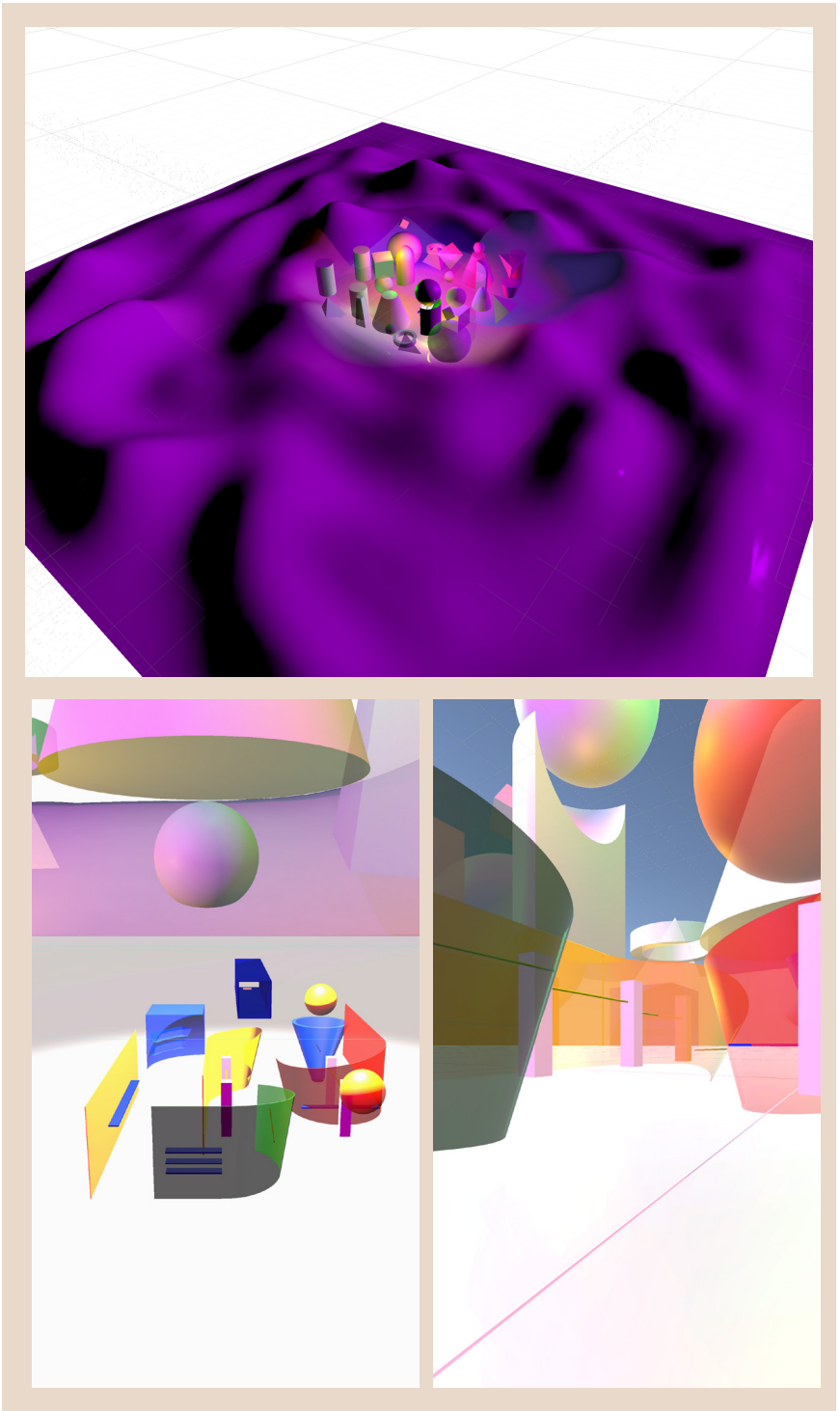


Fig 38. The High-end environment

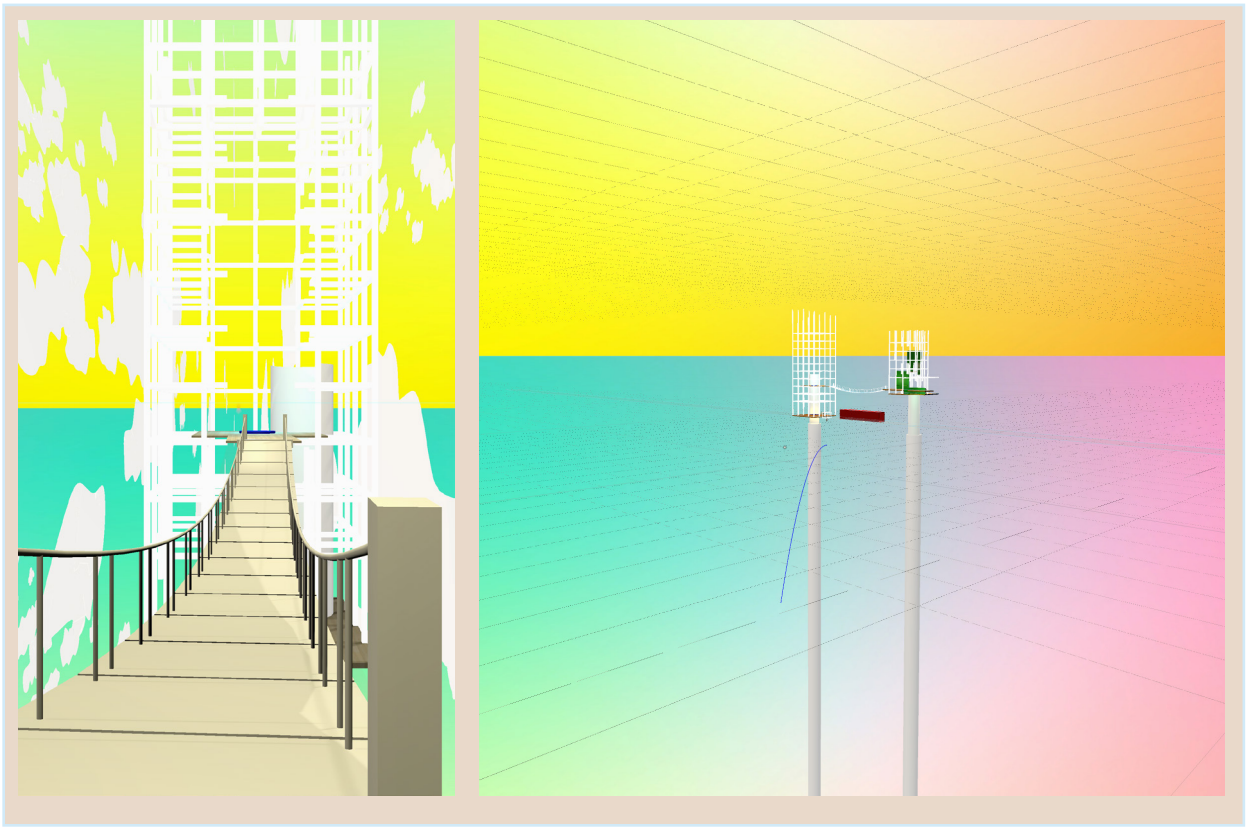


Fig 39. The Outdoor environment

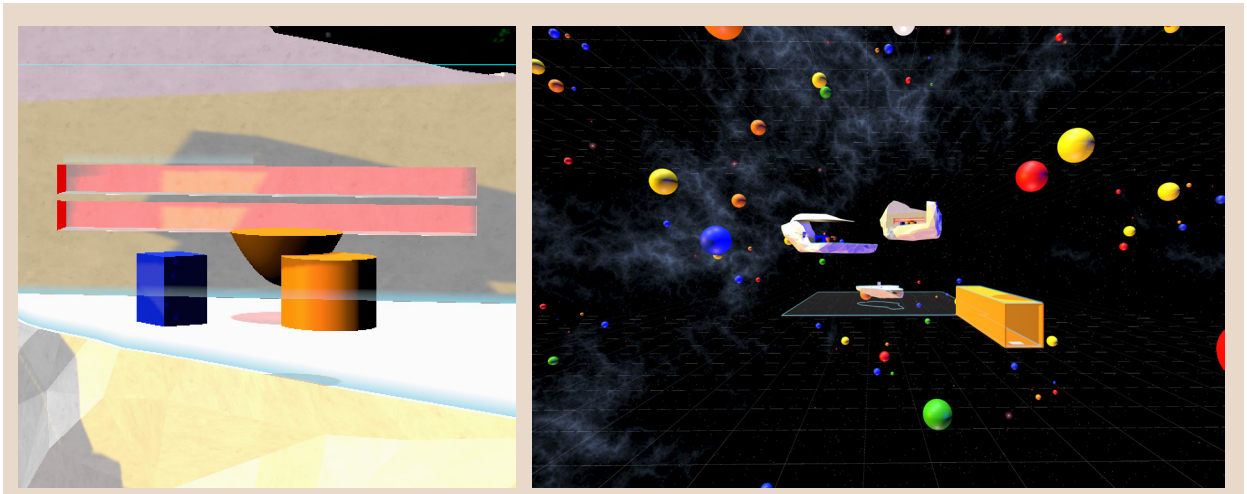
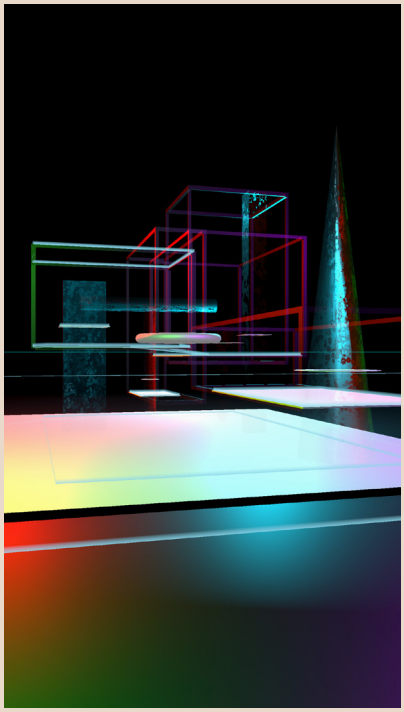


Fig 40. The footwear environment



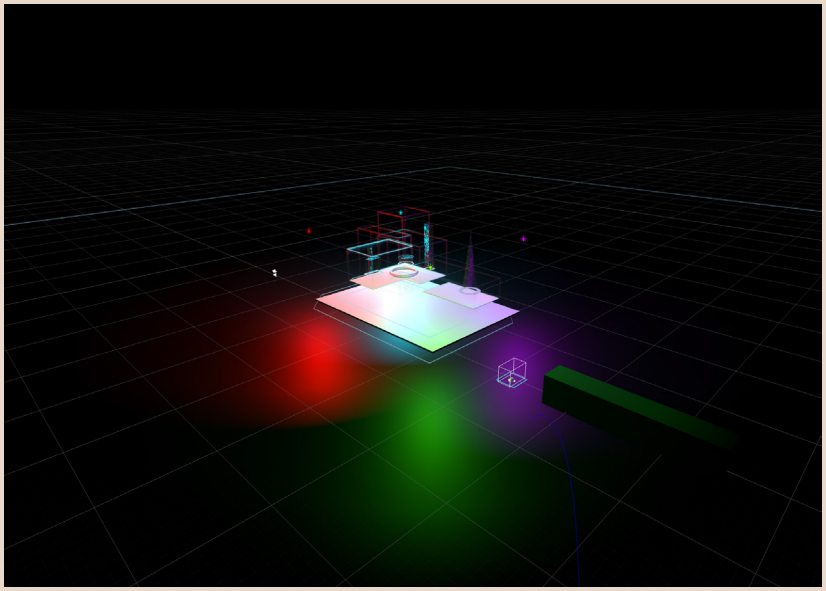


Fig 41. The jewelery environment

Interaction

Interaction is a big part of any environment, as it allows the user from just viewing the environment to interacting with the environment. The main interaction in a virtual shopping environment is the interaction between user and product.

The feedback received when asked if you would be able to shop in such an environment was positive. The data found 70% of the candidates said they would be able to, but with more interaction with the product. By this, they meant being able to pick it up or view the product as a whole. IKEA uses a high level of interaction between the user as they can move draws in and out and Singapore Airlines used a lower level of interaction where simple objects such as playing the drums as the marching band walks past in London, and The North Face being a viewing experience. The addition of interaction adds complexity to the environment, as the more interaction you have, the more complicated the environment becomes to navigate.

Results

The interaction within the shopping environment allows the user to be able to pick and view the object. Products will be placed throughout the different shopping environments as user walk toward them they will be able to pick out the item to view it. Another approach that was tested was the products coming to the user and as they entered the environment similar to the way Singapore Airline has used in their environment. This was found to be unaffected, as this disconnected the user from the environment rather than creating a seamless journey between environment and product. Haptic feedback was also tested and found to be successful as it gives reassurance to the user that have interacted and engaged with the product. Although physical tactility cannot be overcome in a virtual environment, the haptic feedback did successfully give the user a sense of touch.

The shopping environments also have interaction within them. In the jewellery environment, as you enter, you will see a small object that you are told to pick up. As soon you pick it up the form will pop out of your hand and grow to be the inhabit space. In the outdoor environment, there is a platform moving up and down that are users to travel up to the form.

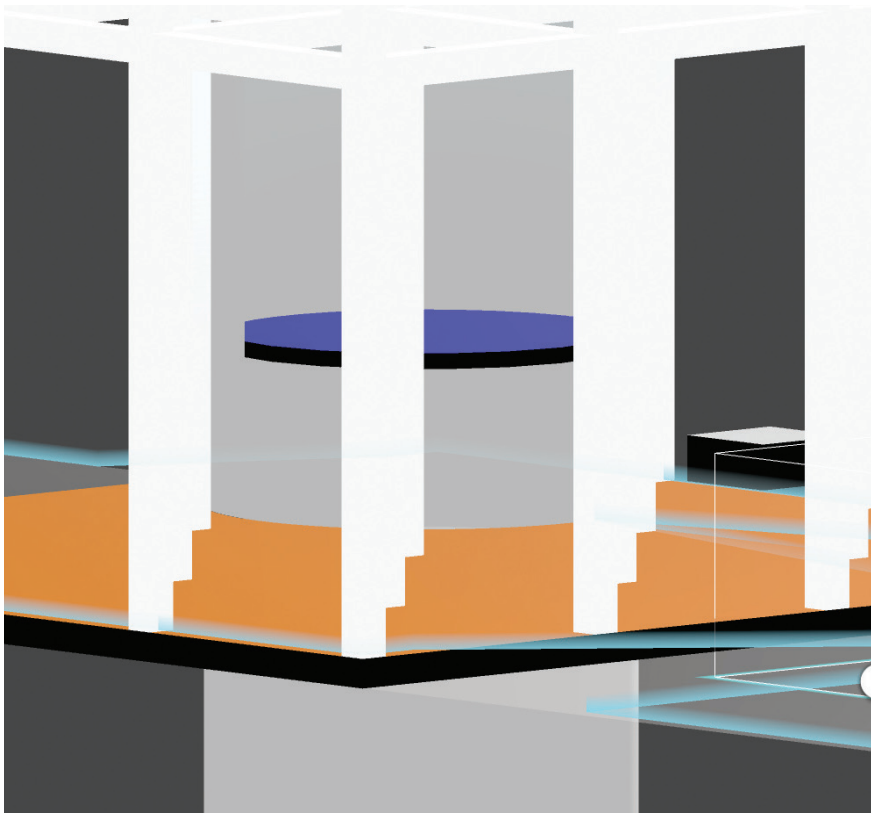


Fig 42. Moving platform to transport one up and down in the outdoor environment .

Fig 43. Expanding form interaction in the jewellary environment .

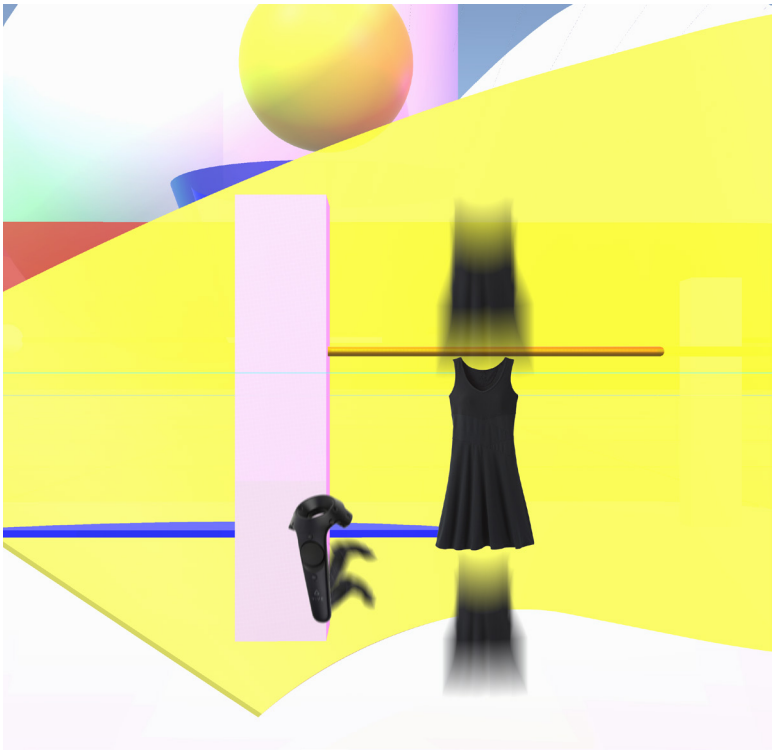


Fig 44. Swiping through clothing option to see different style and colored garments.

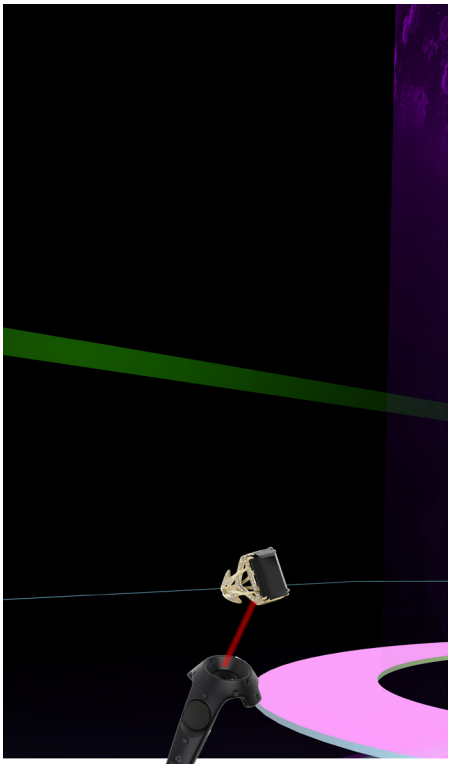


Fig 45. picking up of product.

Movement

Movement is an important element of any space, physical or virtual. It defines how one moves and navigates through space and ultimately experience the space. It is well known that movement in a virtual environment is known to cause motion sickness, this is from your brain being told that it is moving even though you're stationary.

One of the feedbacks that was found from the data examined from the virtual shop simulation was movement. The virtual shop felt unnatural as it used teleportation as its form of movement through the space; it allowed users to skip from one area to another quickly and easily. The downside to teleportation is that the experience felt very unnatural due to the blinking of the screen in between movements. Teleportation is used by IKEA to move around in the kitchen compared to Singapore Airlines, and The North Face which uses a stationary simulation, where the user would be seated, and the environment would move around them or come to them. Teleportation did not create the immersion that was required to create a seamless experience.

To create a seamless movement through the space, one that would need mimic walking to create the most natural feeling motion as possible. A movement system was tested and experimented with. The experiment looked at different aspects needed to move around the different environments, as each category had a different form of movement due to the particular design form.

Results
A mixture of the continuous movement system and teleportation were used throughout the model. The continuous movement system helped to improve the immersive nature of the environment, as it creates a seamless movement through to be the flat planes of the environment without creating the blinking effect that you would experience from teleportation. The continuous movement system proves to be a challenge to find the right balance of velocity needed to create a continuous movement that did not cause motion sickness from the inertia, and that wasn't to slow to feel unnatural. Teleportation was also used to jump between the various levels within the shopping environment. The system was selected over a continuous jump system, as the motion of jumping caused intolerable levels of motion sickness, because of this, a teleportation system was used. The split blink between the level found to lower the motion sickness that was previously caused and found to gives a more comfortable overall experience. The use of teleportation affects the level of immersion but creating a comfortable user experience was prioritised; ultimately if environment is inhabitable then the environment has and shop have failed.

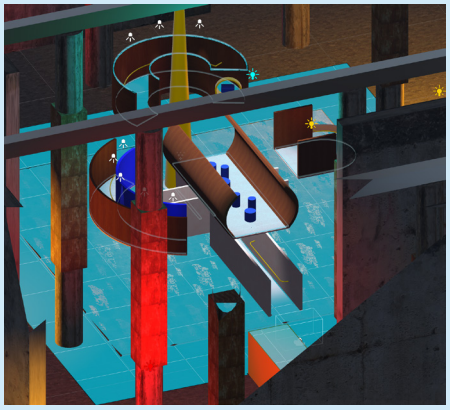
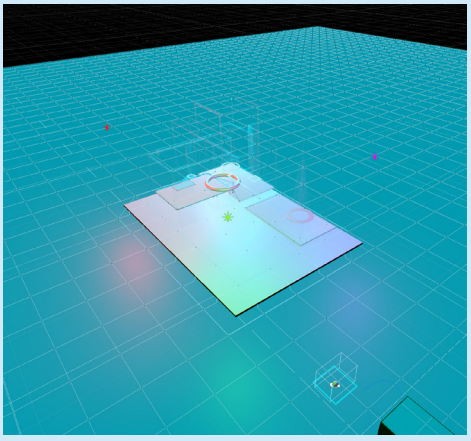
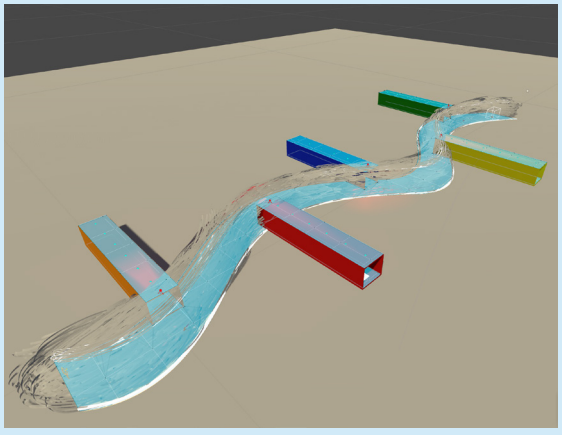
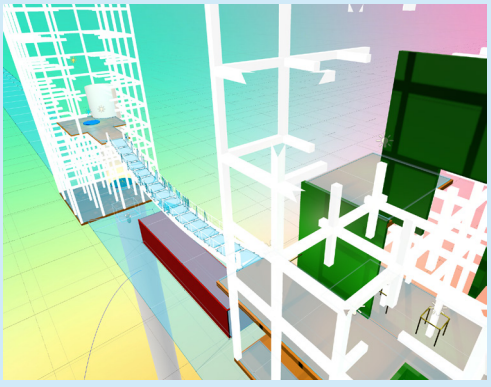
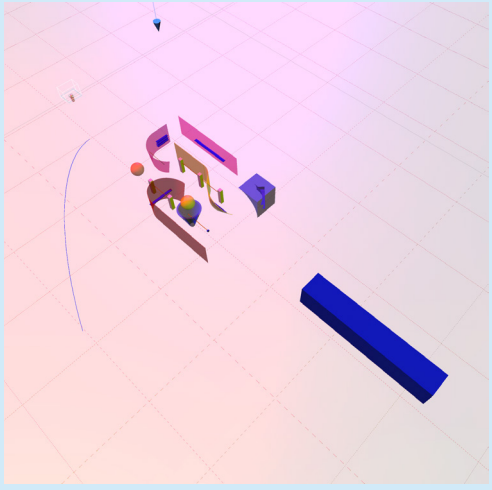
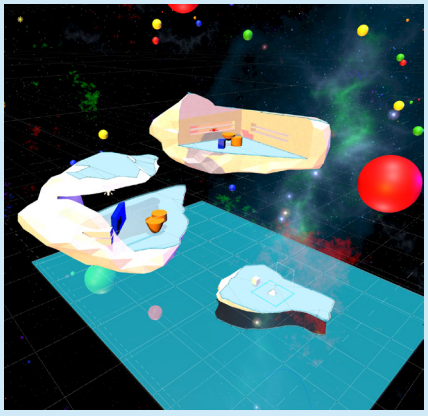







Fig 46. Navmesh map inside unity for teleportation of the different environments .

Final narrative

Chapter 7

As VR is very much a visual stimulus, the visual that is seen by the user is an essential part of creating the user experience, as it determines how the user will respond. Narrative design is regularly used by visual media to tell a story, it is commonly used in film, to set the atmosphere, design and story scene by scene. Many architects and retail designs use narrative design to create the spatial journey and create a user experience, to led one through. Brandt 2009 and Thompson and Blossom 2015, explain this in the literature the use and importance it has to tell a story through the space. Retail designer often use this technique to translate the brand into a spatial experience also known as brandscaping explained by Riewoldt in the book 'Brandscaping: worlds of experience in retail design'. The developed design uses the narrative design to guide the user through space, while translating the Good as Gold brand through design narrative. Narrative design is used by the two of the case studies The North Face and Singapore Airlines, they use narrative design as a way to tell a story about their brand and product that they are offering, by taking the user on a journey.

The develop design tells the narrative of Good as Gold and the brands that are housed by the brand. The journey that is designed, is meant to make you sense your apart of the brand. To give a sense of belonging and Confidence to the consumer, this is one of the brand values of Good as Gold that it offers to the consumer by making them feel welcome and apart of the brand.

The journey is broken into three parts, the start, the products and the end. The start and the end give the user grounding by connecting the hut to the physical store's cabin tree hut design, but to create familiarity for the user, so they know that this is a part of Good as Gold. As Good as Gold is a house of brands they stock many different item by different brands, each one different but as simple characteristics that portray the style and image of Good as Gold. The products have been categorised into five main categories, jewellery, streetwear, high-end, outdoor and footwear, each one tells a different story of the category of products housed, giving a different interaction user experience for each space.

Each of the storyboards set the scene by describing the atmosphere and what will unfold throughout the journey.

Storyboard

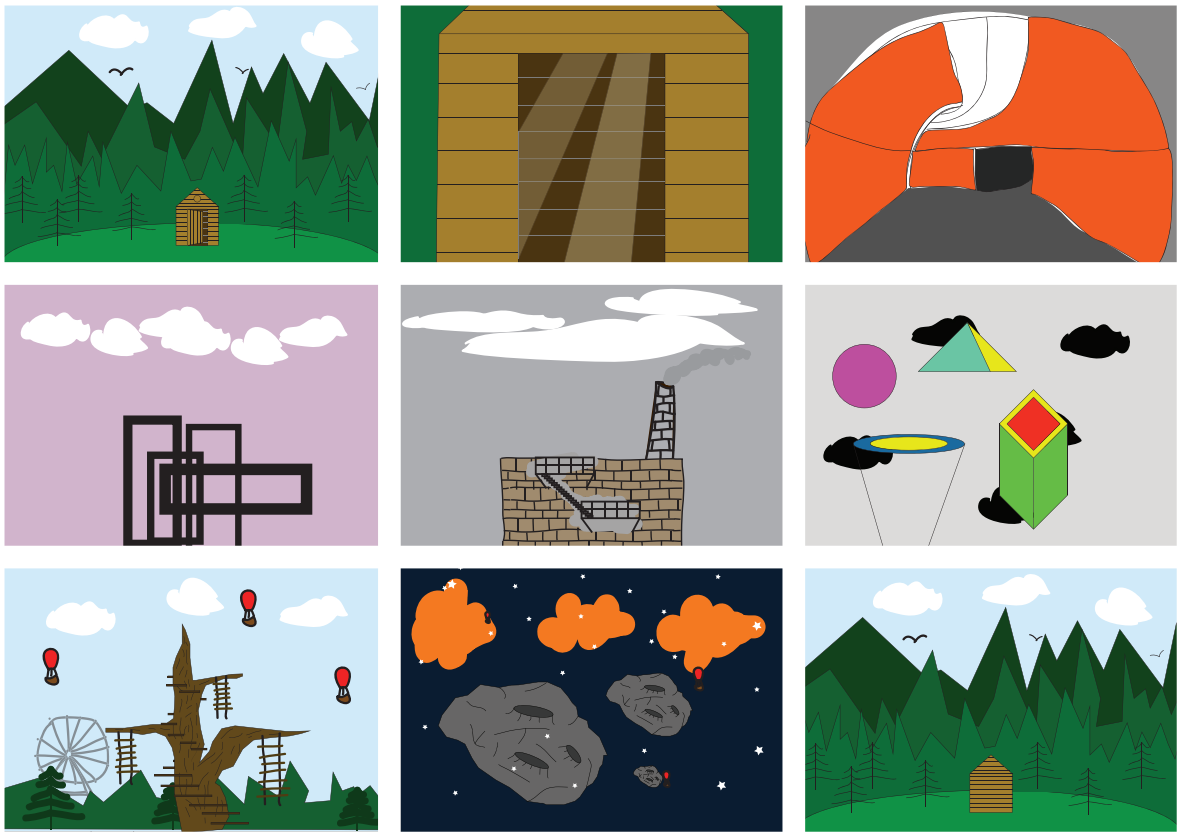


Fig 47. Visual storyboard

One Day.....

Fig 48. Forest and hut

You wake up in the middle of the forest with tall pine trees and patches of grass and dirt, as the light trickles through the pine needles. You wonder where you are. You get up and start walking and come across an open patch, as the light starts to diminish, a vale of mist appears to surround you. You look over to see a small hut. You walk towards it, and wonder what is inside, but there is nothing, you step in to take a closer look. Upon stepping in there's a flash of bright light and you've been transported into a different world.

Final Scene

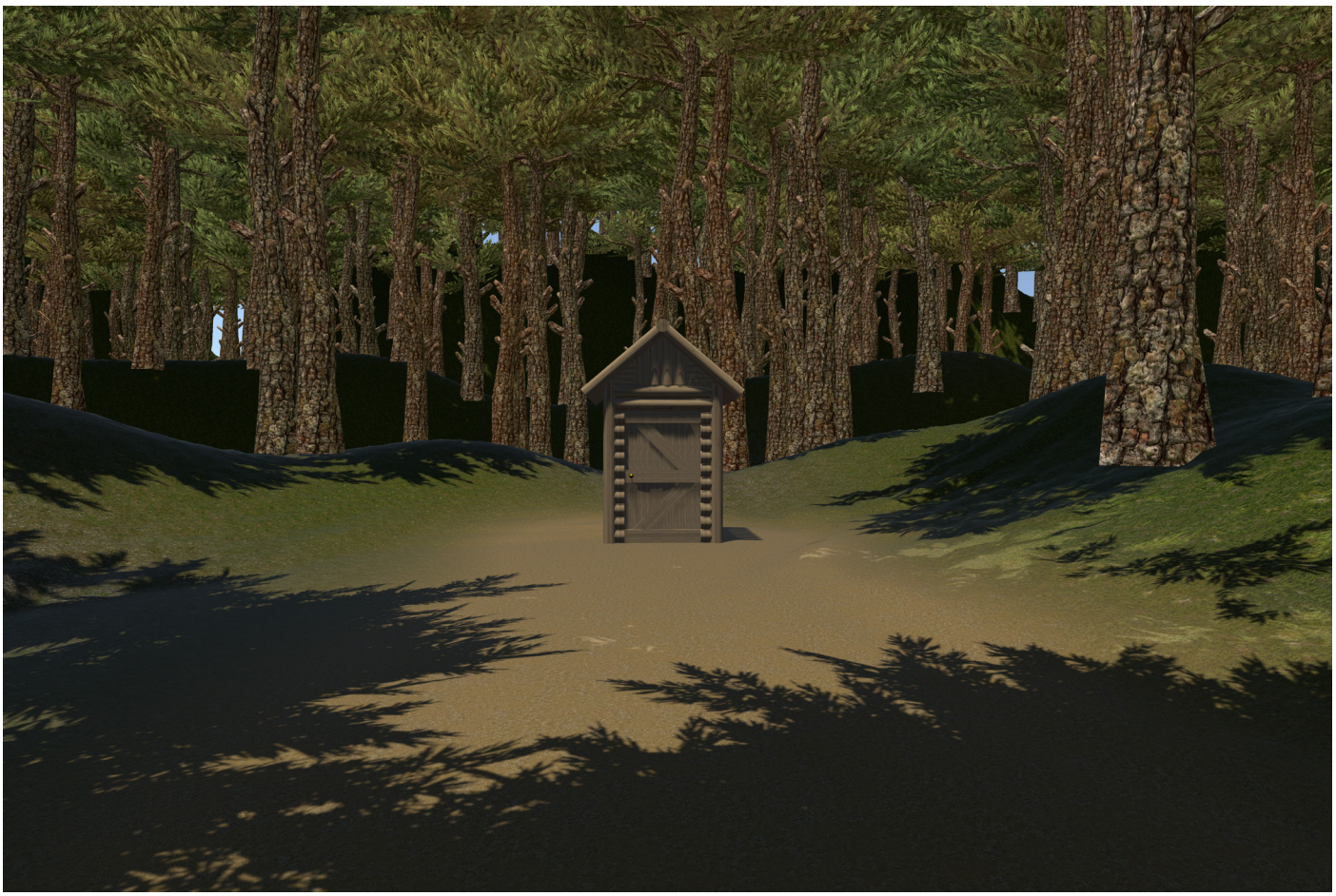


Fig 49. Hut in VR environment

Tunnel

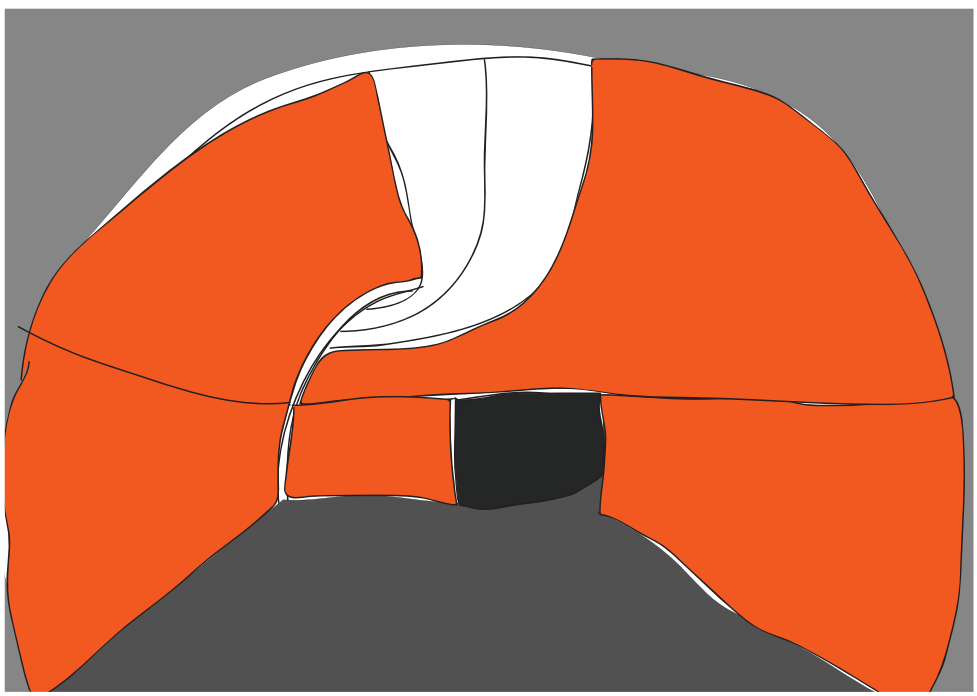


Fig 50. Tunnel

It looks like you have been transported to what it seems like a tunnel. The walls are lined with a ribbon like form, as if it was form by strokes from a spray can, with a translucent surface that sucks the red light in and glow into the surroundings. Through the surface you can see glimpse of a flat plane world on the other side. The rail of lights guides you and moves you forward moving towards the red glow. As you walk along you come across an opening, another tunnel with a blue glow, with a glowing square at the end of it. You walk towards the square wanting to see if there is anything there, as you move towards it and touch you see a flash of bright light again.

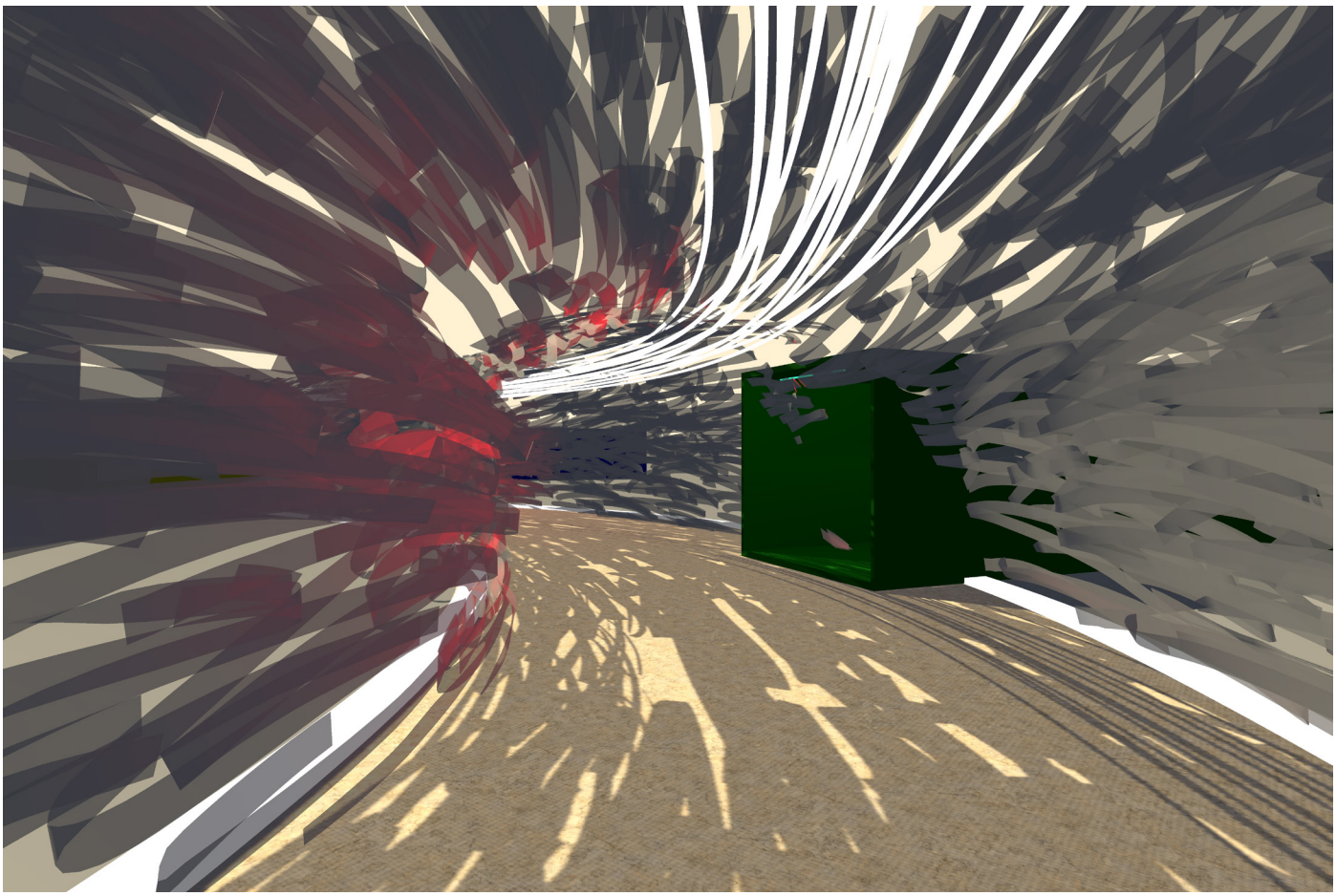


Fig 51. Tunnel in VR environment

Jewelery

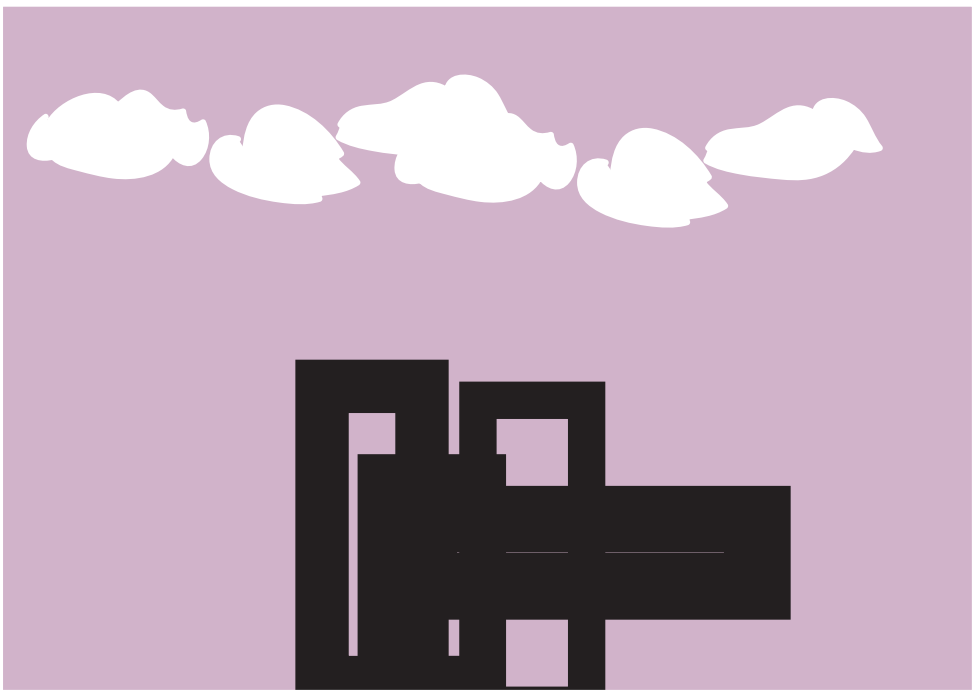


Fig 52. Jewellery environment

You've been transport into another space, you look around and its dark, you see the colours light greens and purples reflecting off the floor. You look on the ground and see an object and pick it up too see what it is, couple seconds later it jumps out of your hand and grows. Then things stop and you decide to have a look and explore the frame like form. As you move around, the colours on the frame change and that they reflect off the framing elements. You turn around and see the same tunnel that you came through with the same white square, so you gravitate towards it. With a flash of light, you are back where you came from. You walk back towards the red glow, and look around the corner to see another red glow, so you follow it and come across another tunnel, this one is coloured yellow, with a similar white glow at the end of it.

Final Scene

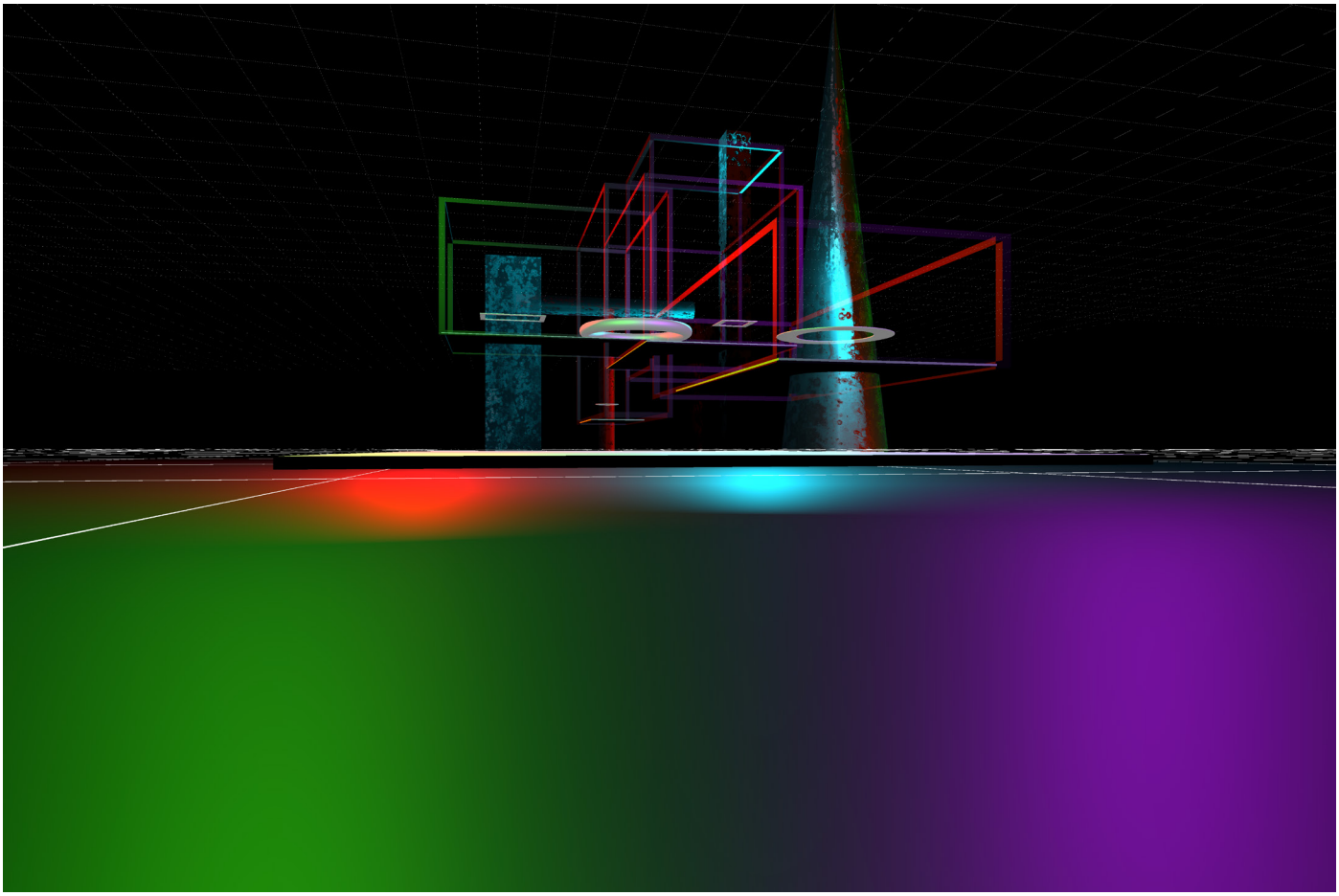


Fig 53. Jewelery space in VR environment

Street-wear

Fig 54. Streetwear environment

You get transport but this time to a different place. It feels dark and cold, there are high walls and beams, a feel like of abandon industrial estate, as you look around you see sparks and smoke. In the middle of the space, there you will see a tall chimney with curve forms, like if they were in a skate park. This space compared to the surroundings looks and feel more premium. As you enter you jump from platform to platform to move around. The same tunnel is visible, and you walk towards the with glow. You are taken back to the initial tunnel and once again you follow the red glow around another corner to see a blue tunnel. This also has a white glow that you move towards and right before you know it you get transported again.

Fig 55. Streetwear space in VR environment

High-end

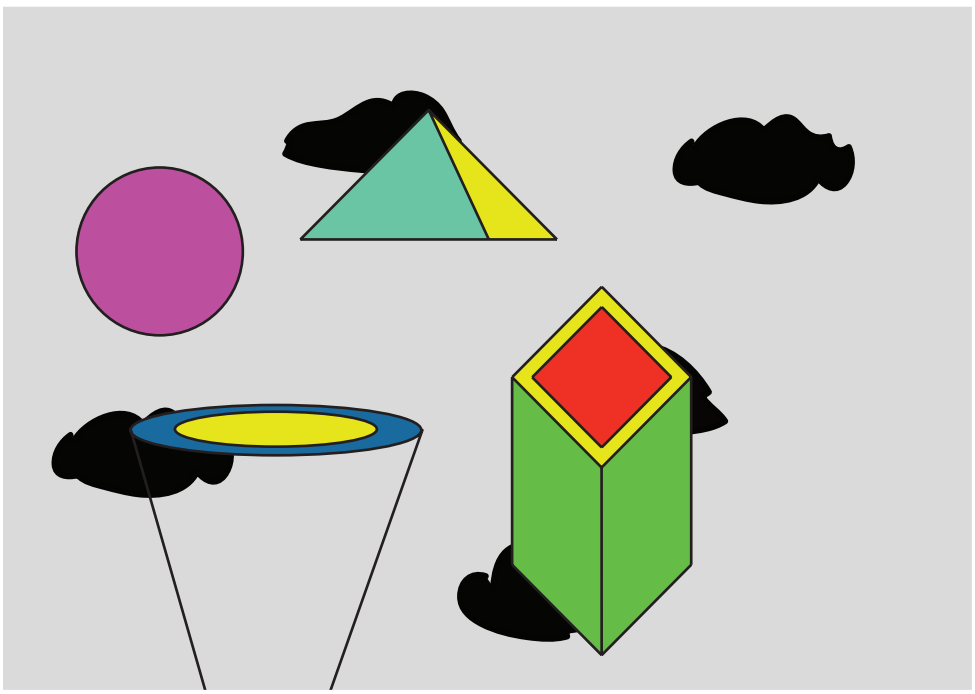


Fig 56. High-end environment

The space feels much lighter than the last, you look around and see the white surface following graciously like mellow hills. You look up to see large shapes but looking at them from the front makes them look like they're 2D but it's not until you look around that you see they're 3D. The lighting bouncing off the objects gives the objects a hologram feels; a spotlight draws your eye to the centre too see a colourful 2D form. Once near it you realised it is 3D and made up of multiple curves. These translucent curves draw you through the space by sucking you in and repelling you out, to a blue tunnel with a white glow. The glow lends you to another red glow with a different coloured tunnel with a white glow.

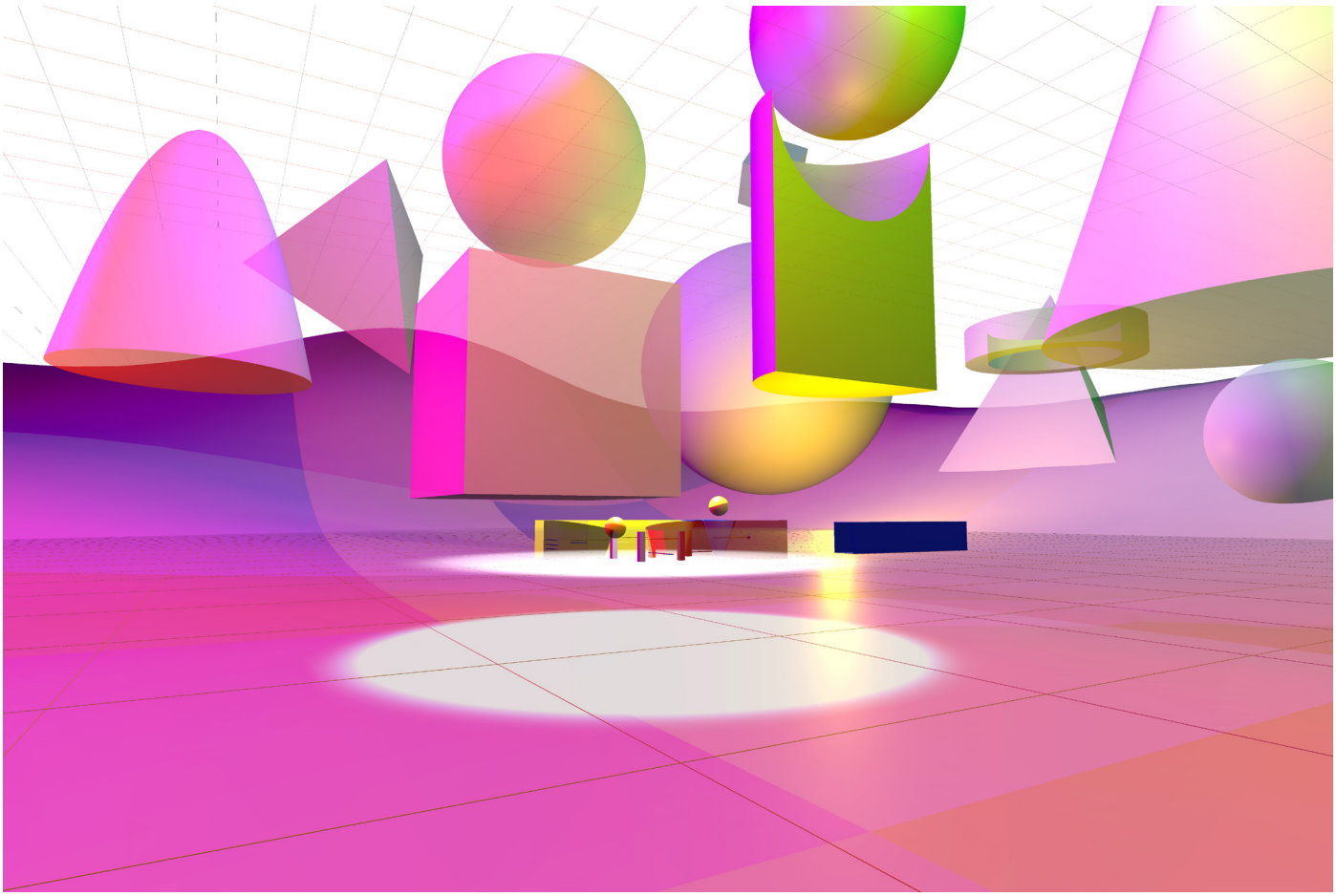


Fig 57. High-end space in VR environment

Outdoor

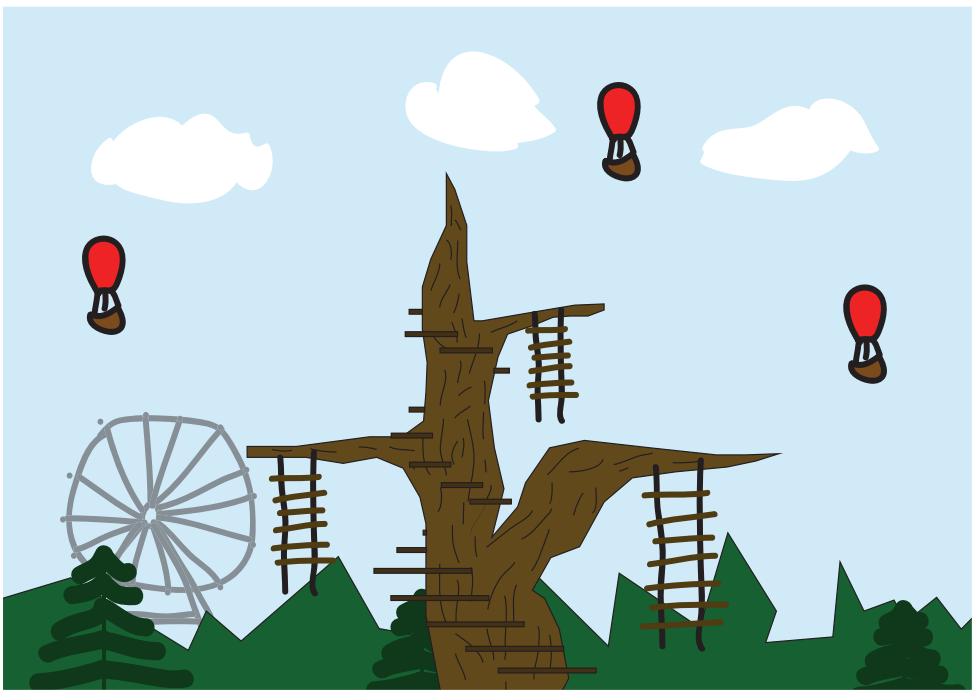


Fig 58. Outdoor environment

This time you have gotten even more higher. You see these two structures ahead and look down, at a never-ending floor. You move up to the structure to discover two lattice towers, there is a levitating floor that is going up and down that you stand on, to move up. Connecting the two towers the is a swing bridge, at this point large 2D clouds start to the move pass you. It was like if you were on a playground jumping between different levels and swing from area to another. A familiar tunnel sat between the tower with the white glow that seems to transport you between the different areas. And once again you follow the red glow around the corner to another tunnel, this time it was orange.

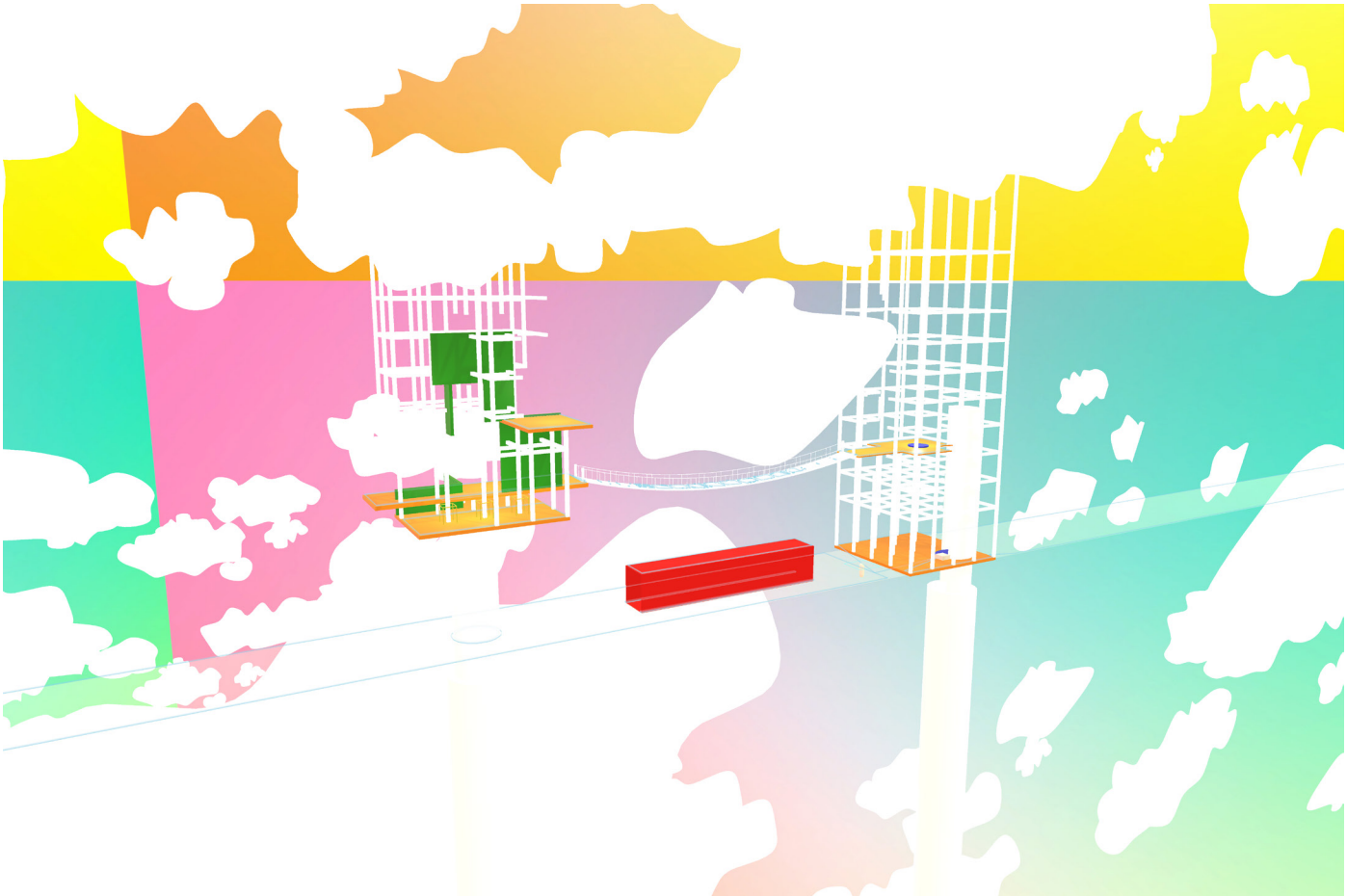


Fig 59. Outdoor space in VR environment

Footwear

Fig 60. Footwear environment

The space felt like it was from outer space, there are different coloured clouds moving around you. As you look around you see coloured balls floating in space and ahead of you a two rock like forms. You jump on one of the forms to look around and move between the two rock forms. Being in the last space it has felt like you started from the ground and climbed up and gone out of this world, but what world are you in and what is real. One more time you see a tunnel and drawn to the white glow.

Final Scene

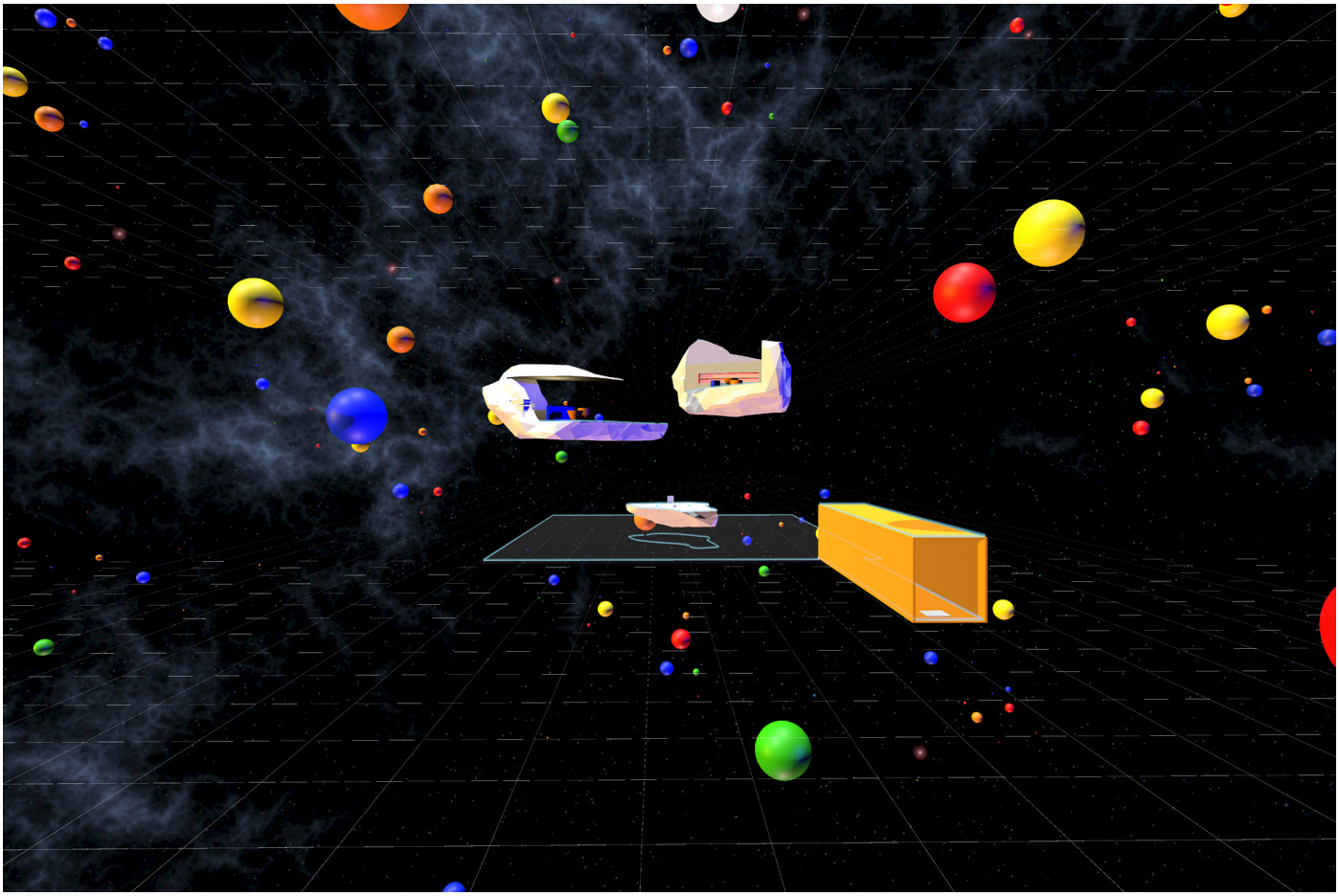


Fig 61. Footwear space in VR environment

The End

Fig 62. Final scene

Once exiting the last tunnel, you walk around the corner to see you the end of the red glow and what looks like the end, but there is still a white glow that see ahead and you wonder where this would take you. With a flash of light, you transported back to the start and see the hut in a misty forest, the hut door is open. You want to see if it takes you back but this time nothing happens and you wonder if all of what happened was just a dream.

Conclusion & Discussion

Chapter 8

Reflection

The thesis creates a discussion around the current research of VR in the retail industry from an architectural point of view. Within the literature shows there is a significant gap and disconnect between the virtual shopping environments research and interior architecture of virtual shopping environments. At the beginning of the thesis, two aims were established, firstly to understand the role of VR in retail and investigate the difference between a brick and motor shop and a virtual shop, and secondly to explore a design framework of translating a brand in a virtual shopping environment that enhance their shopping experience. A more holistic level of design is required, where the workings of VR is integrated with techniques of the retail design of brandscaping to create a uniform environment that considers the brand, retail design and VR to create a more complete experience.

The first aim formed the groundwork of the thesis. The experiment of the VR shop present results that helped to answer the second aim of brands translating the brand into a Virtual shopping environment. The results along with the case studies provide a deeper understanding of the gaps and linkages between a VR shop and actually shop, showing that brand plays a significant part when creating a VR retail experience. Understanding how a brand is represented in VR, raise the question should virtual reality retail research also be basic around the branding as well, as it is a key component of retail. The user data shows that architectural element might not be as important as first thought for a virtual environment but rather creating a narrative based around the brand.

Evaluating the final developed retail environment, suggests the research question has somewhat been answered to a varying degree. This is because the final developed scheme has not been tested with the original VR shop, to show if the user experience has been enhanced. The approach gathered from the data would suggest in theory the final scheme would be more engaging environment as it more virtual and brand focused than the original VR shop. What is being proposed is a scheme and a set of tools to understand how you might design a virtual shop, that then could be used to design other brand-focused VR environments. Overall, while VR is more than capable creating a fully functioning store the technology is still a long away from replacing a brick and motor store but it is at a stage where it can be used to assist the store and brand, by giving their consumer and immersive and engaging experience. The feedback received from the shop shows a positive response to the technology but it also showed the technology weakness, that being VR is still in early stage of development. As designers, we design for physical space but the virtual world is also real space in its own right, and designing for it presents its own challenges that we yet to fully explore, but the thesis research gives an understanding of how to create a virtual shopping environment that is brand focused.

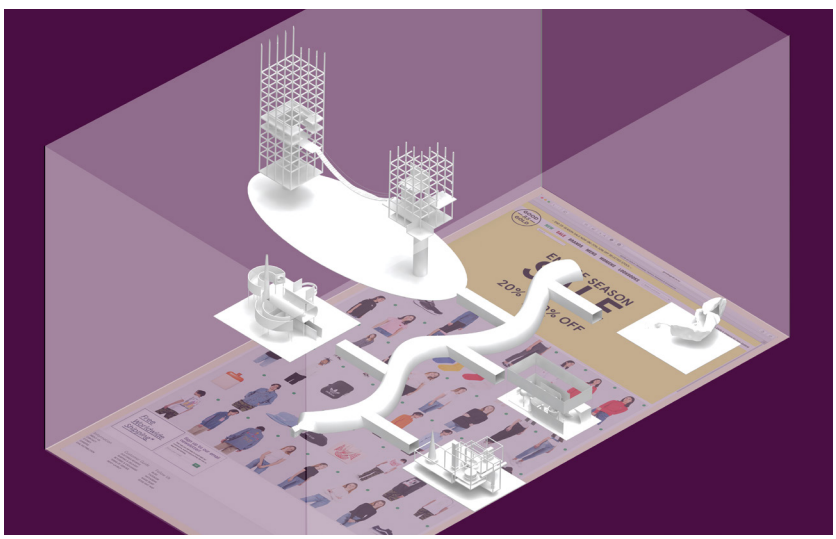
Future work

From the research, recommendation for future work have been identified

•Testing VR shop with people with social anxiety, could this be a potential option for one to experience a retail store more comfortably.

•Run the study with members of the public with non-architectural backgrounds to get an understand how they would perceive the space.

•Comparing the 3D scanned VR shop to the redesigned shop, to compare the difference and see if the brand connection has increased.



Conclusion

The argument that led this design research investigation is responding to how virtual reality technology is used to bridge the gap to enhance the retailer and consumer for the e-consumer market. The brick motor store is an essential part of the brand, it is not there only to sell products but also sell the consumer and experience. This experience differentiates the different tiers of retail, ranging from low end to high-end retailers. This is an important and contextual topic that is faced by retailers and interior architects, how the consumer can be given an enhanced retail experience online. The thesis reviews one such approach of how virtual reality can be used to the bridge the gap between the brick and motor store and online platform. Architecturally there is little data out there to support architects creating virtual shopping environments from a multi-sensory point of view.

The field experiment played a significant part to the research portfolio, as it assisted with the objectives of the research, one of them being the understanding the differences between a physical store and virtual store with a simple to one to one comparison. This helped discover that the virtual environment is a very different to what everyone believes. Rather than trying to replicate a physical store virtually as suggested by the literature, what in fact we learned from the experiment is that the virtual environment is very unique. This helped to inform the design, which is a virtual shopping environment for Good as Gold. The final outcome allows Good as Gold to provide their e-consumer clients an experiential interaction of the brand, similar to what they would receive instore, but in a virtual environment. In conclusion, this thesis has not offered a particular solution rather a process. Somewhat it has reimaged what virtual reality can offer retailers within the e-consumer market. The final design is a concept design of what a virtual store experience could look like, this method is unlike any other, what has been seen in the literature has a more experiential approach with a strong focus on brand identity and narrative design to create the design.

Bibliography and Figures

Chapter 9

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Figures

Fig.1 The North Face (2015). Bobsleigh. [image] Available at: http://www.adweek.com/creativity/north-face-gave-these-shoppers-vr-experience-suddenly-got-awesomely-real-167900/ [Accessed 1 Mar. 2018].

Fig.2 IKEA (2016). IKEA kitchen. [image] Available at: http://www.ikea.com/ms/en_US/this-is-ikea/ikea-highlights/Virtual-reality/index.html [Accessed 1 Mar. 2018].

Fig.3 Singapore Airline (2018). Wrestler. [image]. Available at https://www.wrestler.nz/virtual-reality/#originals-2[Accessed 2 Feb. 2019].

Fig.14 Goodasgold (2018). GAG. [image]. Available at

All other figures, images and imagery are property of author

Appendix

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

Phone 0-4-463 5480
Email susan.corbett@vuw.ac.nz

MEMORANDUM

TO	Pranil Mistry
COPY TO	Prof Regan Potangaroa
FROM	AProf Susan Corbett, Convener, Human Ethics Committee
DATE	8 August 2017
PAGES	1
SUBJECT	**Ethics Approval: 24966** Makeup (a study of Virtual Reality in an interior space)

Thank you for your application for ethical approval, which has now been considered by the Standing Committee of the Human Ethics Committee.

Your application has been approved from the above date and this approval continues until 6 March 2018. If your data collection is not completed by this date you should apply to the Human Ethics Committee for an extension to this approval.

Best wishes with the research.

Kind regards

Susan Corbett

Convener, Victoria University Human Ethics Committee

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

FACULTY OF ARCHITECTURE & DESIGN Te Wāhanga Waihanga-Hoahoa
139 Vivian Street PO Box 600, Wellington, New Zealand
Phone + 64-4-463 6200 Fax +64-4-463 6204 Web www.victoria.ac.nz/fad

Make up
Questionnaire Sheet

Researcher: Pranil Mistry,
Architecture and Design School,
Victoria University of Wellington.

To be conducted with the written consent of the participant.

Please try to answer as many of the questions as possible, if you can not answer leave blank

Describe the atmosphere

Describe the sensory elements

Describe design elements that stood out for you

What can you describe about the good as gold brand through he design

Describe the atmosphere

Describe the sensory elements

Describe design elements that stood out for you

What can you describe about the good as gold brand through he design

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

MAKEUP

(A study of Virtual reality in an interior space)

INFORMATION SHEET FOR OWNER

Thank you for your interest in this project. Please read this information before deciding whether or not to take part. If you decide to participate, thank you. If you decide not to take part, thank you for considering my request.

Who am I?

My name is Pranil Mistry and I am a Masters student in Interior Architecture at Victoria University of Wellington. This research project is work towards my thesis.

What is the aim of the project?

This project will examine the effects of VR (virtual reality) on an interior retail space, and how it defers from the physical world. To see if VR can enhance your experience of a interior space, by using VR(virtual reality) simulations.

This research has been approved by the Victoria University of Wellington Human Ethics Committee 0000024966.

How can you help?

If you agree to take part, I will need your permission to allow myself to take a 3d scan of your shop, this 3d scan is similar to a google street view. The areas that will be scan are only front of house no storage or back of house spaces are required. This will take a total of 1 hour. I will also ask you to take part in an interview about your brand and business. This will take 1 hour in total, these question will be based around retail and branding and future of retail. I will record your voice during the interview and write it up later. You can stop your participation at any time, with out giving a reason. You can stop the audio recoding of the interview at anytime. You can withdraw from the study by contacting myself at any point before, 30/07/2017. If you withdraw, the information you provided will be destroyed or returned to you.

What will happen to the information you give?

You will be named in the final report and your organisation will be named (provided you have the authority to agree to this on behalf of the organisation).

Only my supervisor and I will read the notes or transcript of the process. The transcript summaries and any recordings will be kept securely and destroyed by the end of my masters thesis 06/03/18.

What will the project produce?

The information from my research will be used in my 2017 Masters research thesis.

If you accept this invitation, what are your rights as a research participant?

You do not have to accept this invitation if you don't want to. If you do decide to participate, you have the right to:

- choose not to answer any question;
- withdraw from the study before 30/7/2017
- ask any questions about the study at any time;
- receive a copy of your interview recording
- receive a copy of your interview transcript
- read over and comment on a written summary of your interview
- be able to read any reports of this research by emailing the researcher to request a copy.

If you have any questions or problems, who can you contact?

If you have any questions, either now or in the future, please feel free to contact:

Student:

Name: Pranil Mistry

University email address: mistrypran@myvuw.ac.nz

Supervisor:

Name: Regan Potangaroa

Role: Professor of Architectural Science

School: School of Architecture

Phone: 04 4639530

regan.potangaroa@vuw.ac.nz

Human Ethics Committee information

If you have any concerns about the ethical conduct of the research you may contact the Victoria University HEC Convenor: Associate Professor Susan Corbett. Email susan.corbett@vuw.ac.nz or telephone +64-4-463 5480.

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

MAKEUP

(A study of Virtual reality in an interior space)

CONSENT TO SIMULATION AND INTERVIEW

This consent form will be held for 1 year.

Researcher: Pranil Mistry, School of Architecture, Victoria University of Wellington.

- I have read the Information Sheet and the project has been explained to me. My questions have been answered to my satisfaction. I understand that I can ask further questions at any time.

- I agree to take part in an audio recorded interview.

- I agree to take part in a VR simulation

I understand that:

- I may withdraw from this study at any point before *30/07/2017*, and any information that I have provided will be returned to me or destroyed.

- The information I have provided will be destroyed *1* years after the research is finished.

- I understand that the results will be used for a Masters thesis

- My name will not be used in reports, nor will any information that would identify me.

- I would like a copy of the recording of my interview: Yes ● No ●

- I would like a copy of the transcript of my interview: Yes ● No ●

- I would like a summary of my interview: Yes ● No ●

- I would like to receive a copy of the final report and have added my email address below. Yes ● No ●

Signature of participant: _____

Name of participant: _____

Date: _____

Contact details: _____