CATAPULT Digital

Immersive Content Formats for Future Audiences

A report produced by Limina Immersive
for Digital Catapult, June 2018

LIMINA

CONTENTS

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This report was produced by Limina for Digital Catapult, and funded by Innovate UK.

Digital Catapult, Immerse UK and the High Value Manufacturing Catapult have been working together on a large-scale programme of business support, funded by Innovate UK, for the UK's immersive technology industries since September 2017.

This report forms part of that work along with the following complimentary reports:

- The Immersive Economy in the UK
  (Innovate UK, Immerse UK and Nesta)
- Growing Your VR/AR Business in the UK: A business and legal handbook
  (Digital Catapult and PwC)
- Creative Tools and Workflows for Immersive Content Creation
  (Digital Catapult, Opposable Group and TechSpark)
- Evaluating Immersive User Experience and Audience Impact
  (Digital Catapult, Nesta and i2Media Research)
- Immersive in manufacturing – the adoption and use of immersive technologies in manufacturing and a report covering the feasibility of the use of immersion in a digital twin
  (High Value Manufacturing Catapult).

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FOREWORD

From fantastical virtual worlds, to augmented design tools and immersive training environments; VR and AR technology is opening doors to new opportunities every day.

Innovate UK's recent Knowledge Transfer Network report on The Immersive Economy in the UK estimates that Britain has around 1,000 immersive-specialist companies employing around 4,500 people and potentially representing as much as 9% of global market share. UK Creative Industries have a huge amount to contribute to this emerging immersive sector, not least because many of the skills involved are derived from different corners of this thriving, diverse and crucial part of the economy (such as film, TV, games, visual effects, etc).

But the challenges remain. As an early stage market with a varied set of creatives, technologists and researchers driving its development, we lack a common language to describe the way we create, define, refine and value immersive content.

Digital Catapult has commissioned a set of three reports from industry-leading companies to help demystify some of the common questions around the creation of immersive content. While there is a focus on the creative industries, much of this insight will extend across industry boundaries to other sectors implementing and experimenting with a broad and exciting range of immersive applications.

This report on Immersive Content Formats for Future Audiences, conducted by Limina Immersive, takes a look back at the range of creative, immersive content experiences released in the last 4-5 years; identifying patterns, trends and insights into the formats that are beginning to emerge. By taking a step towards a taxonomy that describes these new creative formats, it is hoped to improve the way that we understand and share thinking about the future of immersive content, and ultimately move closer to finding the most engaging and sustainable forms of new media for our future audiences.

By sharing the insights from these reports, Digital Catapult hopes to consolidate key industry insights and help lower the barrier to entry to this exciting and rapidly growing market. The diversity of entrepreneurs, technologists, educators, developers and content makers working in this space is one of its greatest strengths, which is why we believe the UK will become the best place in the world to create immersive content and applications.

Jeremy Silver
CEO, Digital Catapult

Rebecca Gregory-Clarke
Lead Technologist - Immersive, Digital Catapult

This report demonstrates that immersive media has the potential to be a creative medium in its own right

Creative XR
Digital Catapult, 2018

EXECUTIVE SUMMARY

This report is a step towards an immersive media taxonomy for creative formats. It identifies trends within the most impactful and creative consumer-facing experiences released by the emerging immersive media sector over the last 4-5 years.

By combining data science with curatorial expertise, we identified 15 creative format trends which have particular potential. The largest audiences for products like these will be the early and then late majorities. This support will only manifest once the sector has crossed the notorious chasm on the technology adoption curve [Fig.1].

Immersive media is currently poised to cross this.

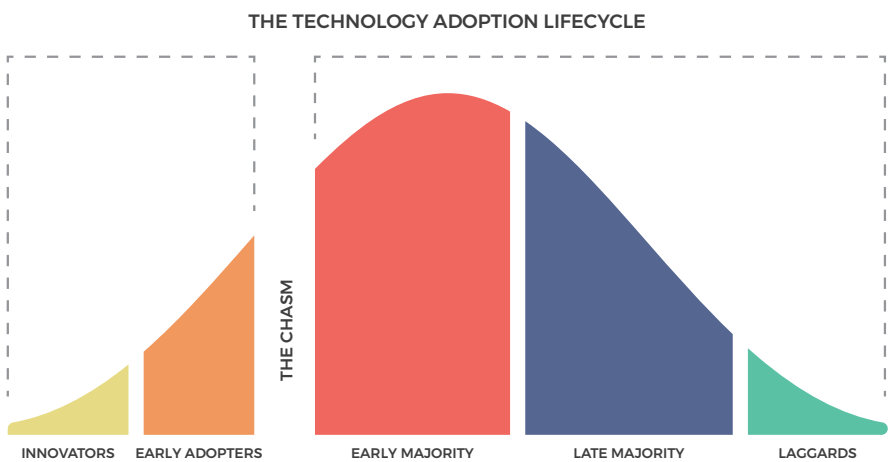


Figure 1
Geoffrey Moore's Crossing the Chasm, 1991

THE FORMATS IDENTIFIED ARE SET OUT IN THE FOLLOWING SECTIONS:

3.1. ACTIVITY SIMULATOR entertains, informs or educates by recreating real world activities.

3.2. SHORT FICTION invites users to experience more classic stories that are told in an immersive way.

3.3. DATA VISUALISER uses immersive 3D graphics and shapes in space to make data about the real world more tangible and accessible.

3.4. IMMERSIVE MAKER TOOLS allow users to make things in 3D space.

3.5. RE-VISUALISING TESTIMONIES brings to life oral history content.

3.6. TREASURE HUNT enables users to search for digital items in a real or imagined setting.

3.7. PERSPECTIVE SHIFTER aims to change user attitudes and values, often by enabling them to enter another person's body or experience a slice of another's life.

3.8. UP CLOSE AND PERSONAL allows users to experience the immediacy, charisma and presence of another person or small group of people.

3.9. AUDIO JOURNEY is a form of audio augmented reality – it adds an immersive audio layer to the user's physical surroundings in order to tell a story or convey interesting and/or relevant information.

3.10. ACCESS ALL AREAS experiences enable audiences to explore unique, inaccessible or imaginary environments.

3.11. WONDER IN EDUCATION creates feelings of awe about something while simultaneously providing educational content about the topic.

3.12. FANTASY TRIP provides an imaginary, sensation-inducing ride.

3.13. BEST SEAT IN THE HOUSE locates the user at the heart of a performance or event.

3.14. VIRTUAL HANGOUTS enable users to interact with each other in virtual spaces.

3.15. ENHANCED FILTERS use AR and often AI to augment spaces and people with virtual decoration, characters or items, allowing users to take photographs or videos of these scenarios.

3.16. In addition, this section considers potential future formats, which include:
- Learn through doing
- Time travel

Each format is tagged with its commonly associated genres. We identified these as follows:

Art | Sci-Fi | Horror | Nature | History | Kids' activity | Fitness & wellness | Biography | Games | Education | Justice

THE USE OF FOCUS GROUPS

We tested an example of each format on a focus group of 21 people in total in the 'early majority' category on the technology adoption curve. We aimed for a range of ages from 20 to 65. The group was 74% female and 17% black and minority ethnic (BAME).

CONCLUSIONS

Immersive media already has a very wide scope of creative formats.

- Potential audience appetite is high, and there is enough variety in the impactful formats we identified to feed a broad market base.

- The most successful creative formats with the audience, judging by their desire to experience content of that type again and likelihood of recommending that format to a friend, were:

  1. Immersive maker tool
  2. Activity simulator
  3. Fantasy trip

- The most successful formats provided the material for the audience member to create their own, personal narrative. Academics and game theorists have described this style of narrative as an emergent narrative - a format that supplies the raw material and structure for the audience member's own storification[1] process to occur. More recently, VR industry leaders have described this user-centric approach to narrative as storydoing[2] or storyliving[3].

- The most successful formats tended to generate more than one sort of immersion in their audience. Immersion can be categorised into being immersed in a space (spacial immersion) and being mentally immersed (strategic immersion, narrative immersion and tactical immersion[4]).

- High quality CGI very much contributed towards the simulation of presence. Most of the individual pieces within the top three formats primarily utilised CGI instead of simply 360 video.

- Storyliving or storydoing has a lot of potential when it comes to immersive media formats. Whilst classic storytelling skills can be relevant to making immersive media, there is another type of story that is equally, if not more relevant – the audience member's story. Popular formats often involved the audience storifying their own personal experience.

- The general wisdom around scalability from other forms of digital media still apply. A generative concept like an Immersive Maker Tool is likely to be more scalable because it is an experience that grows with its audience. It is more of a platform and toolkit rather than a boxed up, authored unit of content.

- However, we know already from sectors like film and book publishing that these individual pieces of content can of course attract huge audiences, remain perennially relevant and hence create lucrative franchises.

- If the predictions on immersive media's growth are correct then we have an exciting few years ahead of us. This report demonstrates that immersive media has the potential to be a creative medium in its own right. It is not derivative of other forms of media, nor does it depend on them for its success.

1. **Ruth Aylett, Emergent Narrative,** Social Immersion And "Storification" (Salford: Centre for Virtual Environments, Business House, University of Salford, 2000)

2. **Catherine Allen,** "With VR, Publishers Must Focus On Storydoing, Not Storytelling", Thebookseller.Com, 2018

3. **Thomas Maschio,** "Storyliving: A Study Of VR In Journalism", Google News Lab, 2018

4. **"Different Types Of Immersion And How They Work",** International Society For Presence Research, 2018

INTRODUCTION

At the heart of Digital Catapult's mission of unlocking digital growth in the UK economy lies a need to inspire and harness the creativity of those who power it.

This report intends to assist the UK in becoming a global leader in the development and commercial exploitation of a new and emerging digital area; consumer-facing, creative immersive media.

It will accomplish this by identifying 15 creative format trends that this research highlights as having already demonstrated significant potential with audiences, especially as creative immersive media begins to reach the mainstream.

The immersive media industry has significant growth predicted: Innovate UK's recent Knowledge Transfer Network report predicts that there are around 1,000 immersive specialist companies in the UK employing 4,500 people and generating some £660 million in sales, potentially representing as much as 9% of the global market share. If the UK market keeps pace with global growth forecasts, turnover could reach £1bn the end of this year[5].

PwC forecasts that the VR industry will be the fastest growing area of the UK's media and entertainment output[6]. The UK is also predicted to become the largest virtual reality industry in Europe, larger than those in the Middle East and Africa.

VR and AR are the main focus of this report, but the field also includes, for example, audio guides, video projection domes and walk-through audio-visual visitor experiences.

As the sector grows, so does its need for a taxonomy and shared language. This project's goal is to contribute to the beginnings of a shared way to categorise types of immersive media.

We want to begin to establish a language that has not been directly imported from other forms of media, but instead is unique and bespoke to immersive content as an industry in its own right. For immersive media to be seen in its own terms, it needs its own terms.

This report will enable industry leaders, influencers, academics, commissioners, producers and career entrants can see the wide range of format and genre opportunities that immersive media offers.

It is important that we understand these creative content formats in context. Hence we have explored how current technology platforms have influenced these formats, explored factors affecting their scalability and, crucially, we have evaluated the potential appetite of future audiences.

5. "12 Things You Should Know About AR/VR", KTN, 2017

6. "UK Entertainment And Media Sector To Be Worth £72Bn By 2021, According To New Pwc Report", Pwc UK, 2017

METHODOLOGY

This report identifies the most distinct formats that have emerged so far from the growing immersive media industry. After having identified 15 clear formats, we considered the genres that applied to them, assessed their potential popularity with the mainstream public and explored their scalability, that is, their potential to be expanded and developed further.

IDENTIFYING THE 15 CATEGORIES OF FORMAT

In order to identify trends in format and genre, we needed a sample set of significant immersive media experiences that represented the breadth of creative, consumer facing immersive content.

To do this, we first generated a long list of thousands of products mentioned in festival programmes, awards nominations, app stores, and other lists. The data scientist then created an initial list of the 130 most impactful immersive creative media experiences released in the past 4-5 years.

The programme first generated a long list of thousands of products mentioned in festival programmes, awards nominations, app stores, and other lists. He then used an algorithm to rank them in terms of impact.

At this stage, impact was assessed by a number of factors, including the number of specific Google search results; Google news results; festival screenings and awards nominations. Limina then reviewed the top 130 results to remove anomalies and outliers.

We then applied our curatorial judgement to sense check that this list represented a meaningful set of impactful experiences. Diversity of products, country of origin, makers and audiences was also taken into account to ensure the widest spread possible.

After a list had been confirmed, we then experienced all the 130 products and, with a larger group from the Limina team, identified the 15 content formats together with their genre tags.

HOW WE DEFINED IMPACT

For us, impact means a significant contribution to artistic and creative development of immersive media. It is the format's contribution to the growth of immersive media as an art form in its own right.

HOW WE DEFINED CREATIVE CONTENT

For a piece of immersive media to be creative, it must demonstrate VR as an art form in its own right. It must hold direct cultural value and demonstrate imagination or original ideas.

This meant that we did not include experiences that were derivative of something else, for instance companion products that required another piece of content in order to make sense.

WHY FOCUS ON AR, VR AND IMMERSIVE AUDIO?

The report focuses on mobile AR, immersive audio and VR because these forms of immersive media are currently the most accessible technologies for the mainstream public and have been in the public domain long enough for trends to be apparent.

This report methodology focuses on work that has already generated impact, both qualitatively and quantitatively. So while other immersive technologies, for instance headsets like Hololens or Magic Leap, are considered important innovations within the immersive media industry, they have not yet made sufficient impact on consumer audiences to give us enough information to spot format trends or impact.

THE INFLUENCE OF GAMES

The principles of game design, including presence, immersion, agency and world exploration are fundamental to VR and AR experiences of all kinds. The existing consumer market for immersive media is dominated by video games content and is likely to be one of the largest short- term markets for immersive content makers. For this report, however, we have chosen to focus on the less established, emerging formats that are further out in terms of mass adoption, and therefore classic game formats are not covered here. This said, many of the emerging formats described involve elements directly derived from existing game formats, as well as other, more traditional forms of media.

GAUGING 'AUDIENCE APPEAL'

Researchers worked with a focus group to assess audience appeal for the 15 content formats and identified. A sample of content from each format was selected, which illustrated the characteristics identified for that category.

21 members of the public were recruited who self-identified as early majority users, and who had previously attended Limina's VR events at Bristol's cultural cinema/digital creativity centre, Watershed. They therefore had some experience of, and prior interest in VR. This was deliberate, since the intention was not to test their basic receptiveness, or hear from experts and early adopters, but to explore views of potential future consumers.

The focus group members varied in ages from 20 to 65. 74% of members were female and 17% were from BAME backgrounds. Over six 2-hour sessions, focus group members were shown examples of the 15 different creative formats and then were then asked for their thoughts in chaired verbal discussions and feedback forms.

To provide a simple indication of audience popularity, an average score for each format has been generated, based on feedback from the focus group. On a scale of 1-5, an average score for each format has been generated to rate how much would like to see more content of this type and then if they would recommend this sort of immersive media to a friend. Scores have been averaged to create one overall score for each format.

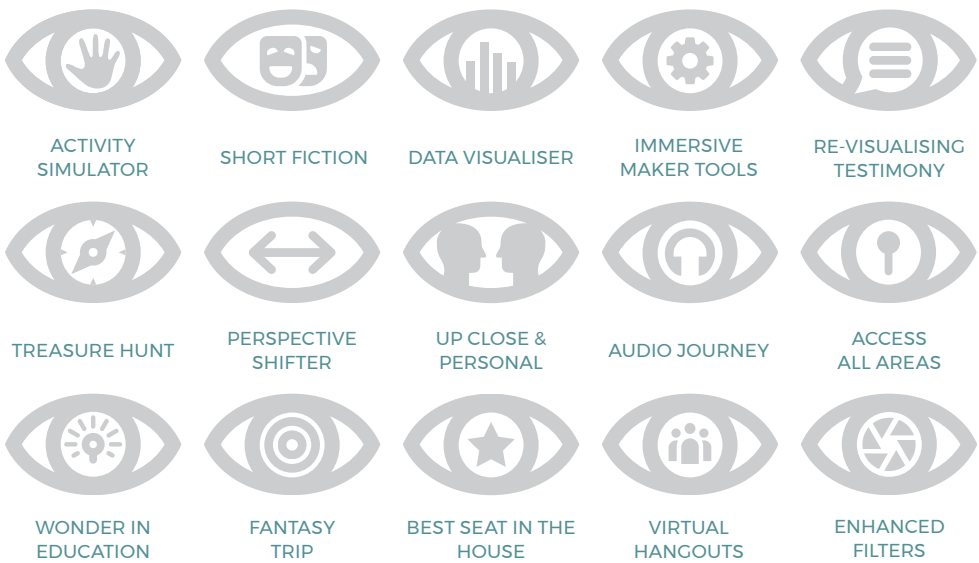
It should be noted that, whilst this method provides an indicative measure of audience appreciation, future research may involve a more in-depth approach, such as that outlined in Digital Catapult's report on Evaluating Immersive User Experience and Impact, developed in parallel with this work.

FINDINGS

This section presents the 15 content formats identified, plus an additional section on potential future formats, with a focus on AR and VR. Each includes the following:

- **THE NAME GIVEN TO THE FORMAT**
- **DESCRIPTION**
- **FEATURES**
- **INFLUENCE OF TECHNOLOGY PLATFORMS ON THE FORMAT**
- **POTENTIAL FOR SCALABILITY**
- **GENRES**
- **AUDIENCE APPEAL, INCLUDING AVERAGE AUDIENCE APPETITE SCORE (OUT OF FIVE)**
- **EXEMPLAR PROJECT(S)**

To help readers visualise these creative formats, a set of easy to remember icons that represent the project's findings were created. It is hoped that this representation will be a useful aid for strategy, brainstorming, categorisation and more. These are as follows:



Audiences loved that they had their own story to take away with them – something they did rather than something they saw

Creative XR
Digital Catapult, 2018

ACTIVITY SIMULATOR

This AR and VR format entertains, informs or educates by presenting a simulation of an experience one might have in real life. This format is highly interactive. Users are offered the required tools, materials and environment for that virtual activity. Sometimes the user is also provided training as to how to do that activity.

Without the need for a classic, tightly author-controlled narrative, these 'bottled activities' are engaging both mentally and physically and often tend to be task orientated. Like the access all areas format, Activity simulator scenarios tend to be involve things the user wouldn't be able to do easily in their daily lives, like climbing a rock face or playing a virtual AR piano.

FEATURES

- The user can often move through scenarios, sometimes by task completion. Elements of game are occasionally integrated, such as rewards, or progressing through different levels.
- The user is an active participant in the space and has the ability and power to affect the environment.
- The eye of the user is always a point of view (POV), complete with hands or arms, and in some cases a body too.
- Objects are really important to these experiences. Being able to find and use tools or even simply discard or destroy things contributes to the immersion, agency and presence the user feels.
- You are not always human, for example Birdly[7] which simulates the experience of being a bird in flight.
- Presence in these experiences is very powerful and has even led to users screaming, falling, stumbling or throwing themselves to the floor (something that content creators should be mindful of when creating safe and accessible experiences).

  This is a common online video trend, and has developed into a meme.

7. Max Rheiner, Fabian Troxler and Thomas Tobler, Birdly (Switzerland: Somniacs, 2014)

INFLUENCE OF TECHNOLOGY PLATFORMS

The ability to build interactive, reactive environments is important to this creative format, therefore, game engines are the primary technology used to create this format.

Activity simulators make full use of both AR and VR's simulative qualities. They are wholly about simulating an experience rather than using symbols or words to represent it. In this way, Activity simulators are more influenced by the very core fundamentals of AR and VR than any other format.

A strong range of Activity simulators emerged from developers after the major VR headsets introduced effective hand controllers, for instance the Oculus Touch controllers or the Google Daydream controller.

Intuitive and natural-feeling control is an important part of this creative format's success. It is likely that as controllers improve, so will the ubiquity of this format.

SCALABILITY

So far this format has focused on entertainment at home, but there is potential to scale up via in-location-based experiences, with simulators in games arcades, VR escape rooms, and theme parks.

For highly immersive, at-home Activity simulators to really scale and thrive, consumers need to already own advanced controllers as well as a headset allowing for 6 degrees of freedom (6DOF). In the short term, this could add a barrier to scalability into the mainstream. One notable way that activity simulators could cross the adoption curve chasm and scale is through partnerships with existing activity brands.

GENRES

Kids' activity | Games | Fitness & Wellness | Education

AUDIENCE APPEAL

Audiences specifically noted this format's relation to gaming. While these experiences are not traditional games, they are certainly a cousin of gaming. The Activity simulator generated more physical reactions from focus group than the other experiences.

Users self-reported phenomena ranging from an increased heart rare, to sweating, to noticeable adrenaline rushes.

Most audience members felt that this format was highly entertaining and fun. They often said, in post VR discussions that it activated the mind's state of flow in the way exercise or an activity does. It was widely acknowledged that this sort of experience is not very much like film at all. Instead, they felt it was more like a game or even a real-life experience.

Audiences loved that they had their own story to take away with them – something they did rather than something they saw.

Activity simulator was rated as the second most popular format, when asked about the likelihood of sharing with friends or wanting to do similar experiences in future.

Average audience appetite score: 4.5/5.

EXEMPLAR PROJECTS

THE CLIMB

Crytek GmbH
VR app for Oculus Rift

The Climb
Description adapted from The Climb website
Image Credit ©2018 Crytek GmbH. All Rights Reserved

The Climb brings alive the excitement and thrill of rock climbing in incredible virtual reality. Players will scale new heights and explore stunning environments in a new gaming experience developed exclusively for VR, using the power of CRYENGINE™.

Experience the adrenaline rush as you ascend to epic heights, explore caves, find shortcuts, and more. Feel the thrill in four beautiful, immersive locations by day or night.

JOB SIMULATOR

Owlchemy Labs
VR app for HTC Vive, Oculus Rift & Playstation VR.
Available on Oculus, Steam and Playstation

Job Simulator
Description adapted from Steam

A tongue-in-cheek virtual reality experience set in a world where robots have replaced all human work, step into the "Job Simulator" to learn what it was like 'to job'.

Players can relive the glory days of work by simulating the ins and outs of being a gourmet chef, a convenience store clerk, and more. Use your hands to stack, manipulate, throw, and smash physics objects in an inexplicably satisfying way!

Short fiction was described as a more intense version of watching any other kind of drama

Alteration
Jérôme Blanquet, OKIO Studios/Arte, 2017

SHORT FICTION

This primarily VR format consists of short, punchy dramas that are either animated room scale VR, animated 360° video or live action 360° video. Characters and narrative are central; this format is the most tightly authored of all formats and relies on good, classic storytelling in order to work. These pieces are typically between 5 and 15 minutes long.

FEATURES

- Two particular existing trends the report has identified are dystopias and satires and short, character-centric animations.
- Spaces can be stylised. short, character-centre animations often depict animations in fantastical scenes that create a storybook-esque atmosphere. In dystopias and satires, the combination of retro-styling and sci-fi imagery is often used to create confusion and discomfort for the user.
- Dystopias and satires may lack interactivity to make the user feel trapped within the consciousness they inhabit - e.g. a robot in Miyubi, or the consciousness of Philip K Dick in I Philip[8].
- Creators may use techniques like specially placed audio or lighting to guide the user's attention towards certain events.
- Occasionally a branching narrative is used, where the user chooses what happens next out of a series of options, however these 'choose-your-own-adventure' type VR experiences are quite rare.
- Similar to the medium of television and film, content usually consists of several acts, a graphic narrative and a central protagonist's story told with a familiar rise, fall and resolution.
- The spaces in which these stories are set can tend to be small, often a single room or space.
- Sometimes interactivity is subtle and not triggered by the user intentionally selecting things with gaze or a controller.
- Interactivity also can take the 'gate' structure – the user is invited to do something in order to trigger the next part of the narrative.
- Unlike most formats this research identified, this type of VR is often driven by dialogue.
- Makers tend to keep your attention in a relatively small focal space; the drama usually plays out in front of you, so the characters themselves become the visual cues.
- Creators often use clever techniques like binaural audio in order to direct the audience member's gaze to where the story is visually unfolding.

8. Pierre Zandrowicz, Rémi Giordano, Pierre Zandrowicz, I, Phillip (France: Okio Studio, 2016).

INFLUENCE OF TECHNOLOGY PLATFORMS

Many people creating and commissioning these have come from TV or film drama backgrounds. Due to this, storytelling language and techniques honed through decades of film-making heritage have translated to VR projects. This means that this new VR medium is often explored and developed in filmic terms.

To date, many products have sought to embrace the limitations of mobile-based 3DOF VR, where audience members are constrained to a fixed viewpoint. They have embraced this limitation as a story-point in itself. Working this fixed point of view into the narrative most likely provides easier suspension of disbelief for users. As more devices and makers are able to create experiences with greater interaction and more degrees of freedom, it will be interesting to see if this narrative trend changes.

Another limitation that the current technology platforms present is file size. As many of these dramas are optimised for mobile devices, they cannot be too long, as there is a clear limit as to how much data can fit onto most people's phones or be processed. This may be one reason why these dramas are bitesize. There is, however an emerging trend for Short Fictions to be episodic, for instance in Here Be Dragons' series, Dispatch[9].

Looking to the future, Short fiction makers are increasingly using AI to compliment storytelling opportunities. For example, Alteration uses AI driven visuals in a sequence where you yourself are an AI. Baobab and Google's Spotlight Stories team both report looking into how they can use AI to create more intelligent characters that react to the user.

SCALABILITY

Much like TV, film or books, the core conceit of the format is scalable across a very wide number of genres. The short story technique works well with available technology and existing styles of storytelling from non-VR backgrounds. The potential talent pool is large. Existing talent from other media industries can move to Short fiction without much friction or training in storytelling.

The economies of scale are less obvious. If we see the trend develop for serialised drama – or story worlds with re-usable assets and environments – scalability may improve, but otherwise, it is a format in which new narrative and technical worlds are created each time. The possibility of spin-offs and tie-ins with existing films, TV dramas and fiction books, however, would increase the immediate scalability of this format as some assets could be reused and there would be an existing, willing fanbase to sell to (providing they have the required headset).

There is a conflict that will need to be resolved in order for the sub-format of short, character-centric animations to truly scale as, judging by the style and tone of the works, these often appear to be aimed at children. The irony here is that the lower age limit set by headset manufacturers is usually 12/13+.

GENRES

Sci-Fi | Horror | Drama | Kids' Activity

AUDIENCE APPEAL

Audiences consistently agreed that this was an enjoyable format if the storytelling was done well. Classic rules around what makes a good story applied. Good stories lead to mental absorption, which in turn lead to a greater degree of immersion. Short fiction was described as 'a more intense version of watching any other kind of drama.'

Average audience appetite score: 4/5.

9. Edward Robles, Dispatch

EXEMPLAR PROJECTS

Alteration
Description adapted from the Oculus store

ALTERATION

OKIO Studios/ Arte/ St George Studio/CNC
VR app for Samsung Gear VR

Alteration is Sci-Fi mystery following Alexandro, who volunteers for a dream experiment. He discovers the scientists have injected him with Elsa, an Artificial Intelligence which will digitise and take over his subconscious, turning him into a human being.

MIYUBI
Description adapted from the Oculus store

MIYUBI

Felix & Paul Studios/ Funny or Die
VR app for Samsung Gear VR

MIYUBI is an episodic drama that puts you in the body and mind of a Japanese toy robot that is gifted to a young boy on his birthday in 1982 suburban America.

ViewRanger Skyline
ViewRanger/
Augmentaria, 2016

Audiences generally enjoyed interacting with data visualisers. In general they felt it made information much more accessible and tangible

DATA VISUALISER

Data visualisers use various forms of 3D graphics to drive engagement with quantitative or location-specific data about the real world. These experiences can be either AR or VR. Sometimes AR and AI image processing are used to annotate the real world with interesting data, and sometimes data is solely visualised in 3D space.

FEATURES

- Data visualised in space often makes it feel real and tangible, and hence, more accessible.
- Seeing data in a space can also add a human connection to it and make it more memorable.
- Experiences in this format guide the user through not only data, but the meaning of that data. They often allow the user to see the data from the perspective of wherever they happen to be located, often using the hardware of the device to create location awareness.
- In order to visualise what are complicated natural or scientific phenomena, experiences in this format commonly use colour, shape, size, symbol, orientation and other visual cues to convey information about what is being seen in the experience.

INFLUENCE OF TECHNOLOGY PLATFORMS

The growth of the availability of large datasets has contributed towards the growth of this creative format, especially when the datasets have associated APIs and/or are open access. There are also data visualisation plugins available that automatically generate data visualisations in 3D space.

SCALABILITY

When it comes to mobile AR Data visualisers, the viability of this format is largely driven by the availability of accurate and suitably formatted data. This can be then processed by AI-driven image processing, GPS data, compass, accelerometers and other sensors in the hardware. Data must be gathered or recorded in order for this format to scale. With open source datasets and/or the availability of big data, this format has a great deal of scalability potential.

VR data visualisations can be fairly cheap to produce, with a games engine, especially using a data visualisation generator plug in.

Coming back to the point above on audience context, there are a range of user scenarios and interests that could offer market opportunity. These opportunities could revolve around hobbies or life stage.

For instance, people using fitness tracker apps could see VR representations of their routes projected over topography and adjust their routes to fit easier or harder terrain. Pregnant women could let an app know how many weeks pregnant they are and it would present them with an interactive life-size 3D model of how big their baby is likely to be, complete with relevant data about the stage of development.

GENRES

Kids' activity | Education | Nature | Justice

AUDIENCE APPEAL

Audiences generally enjoyed interacting with Data visualisers. In general they felt it made information much more accessible and tangible.

Although we had framed our tested data visualiser to audience members as a leisure experience, many said that they felt this format had to serve an educational purpose to warrant them engaging with it.

They could understand its application but wanted to feel that they had come away with specific learning in order to engage again. The anomaly to this trend, however was that a couple of focus group members said they would use an augmented reality data visualiser on their phone in order to impress, specifically with the context of a romantic date in mind. Apps like Viewrangers Skyline and Sky Guide lend themselves well to this. It seems that context is key.

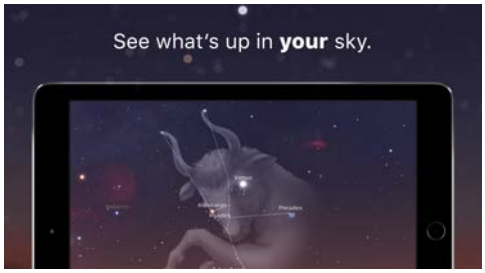
Average audience appetite score: 3/5.

EXEMPLAR PROJECTS

ViewRangers Skyline
Description adapted from the ViewRangers website

SKY GUIDE

Fifth Star Labs
AR app for Apple iOS



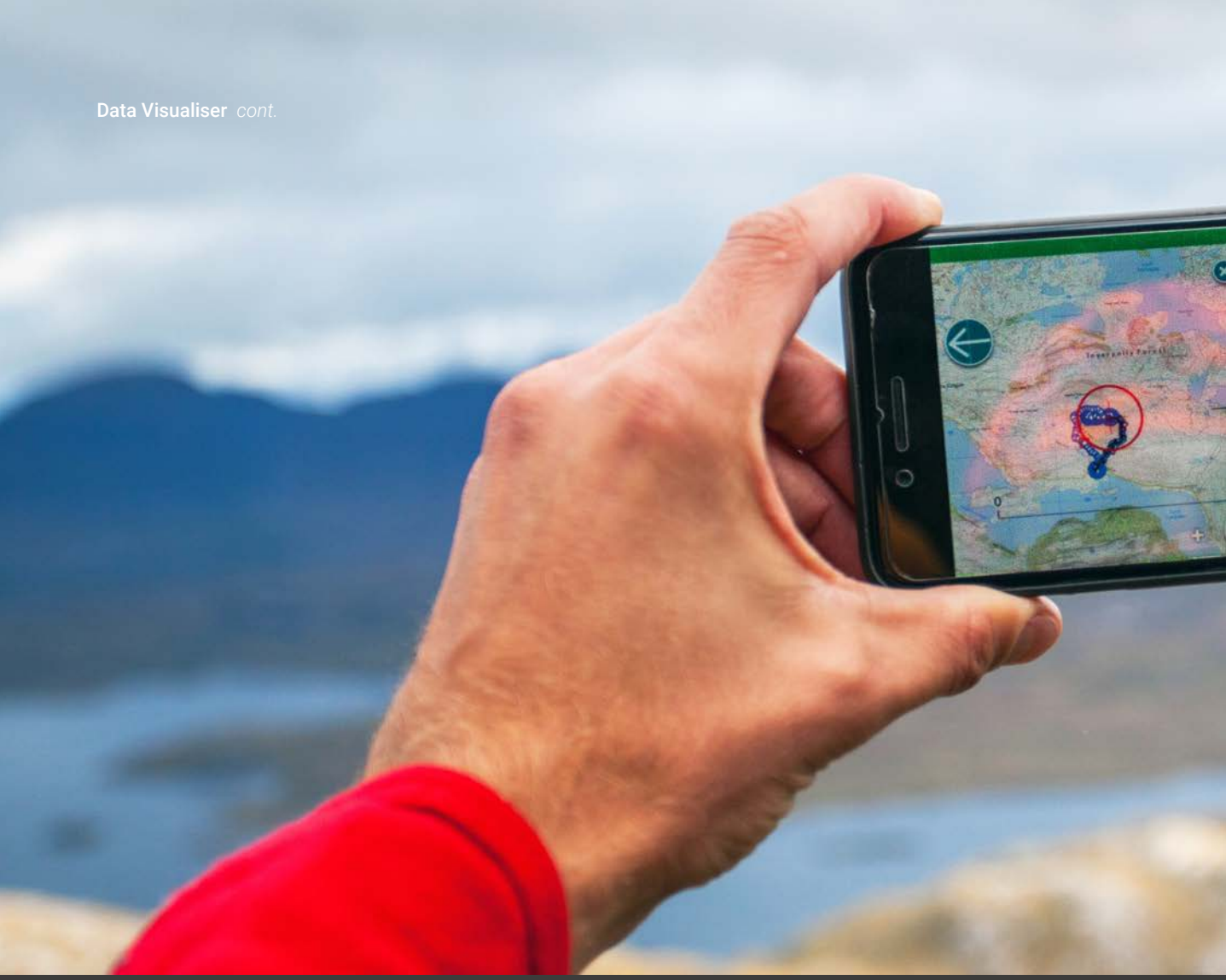
A star app has never been more beautiful and easy to use. Just hold it to the sky to automatically find constellations, planets, satellites and more. Is it a star or Saturn? With Sky Guide, there is no fumbling about with confusing star charts, compasses and flashlights. Simply hold it overhead and Sky Guide automatically adjusts to your viewing direction so you can easily identify stars, planets, constellations and more.

DeathTolls Experience
Description adapted from Alllesss website

DEATHTOLLS EXPERIENCE

ALLLESSS
VR app for HTC Vive

DeathTolls Experience is a data visualisation in virtual reality that aims to re-sensitise the user to the casualties of the terrorist attacks in Europe, refugee deaths in the Mediterranean Sea, and the human cost of the Syrian civil war. The project challenges the lack of concern that results from the frequency of such news on mass media. By walking the user through hundreds of thousands of dead bodies in photorealistic CGI scenes, the creator Ali Eslami aims to inspire an active awareness towards big data that represents massive deaths, and compassion for the people behind those numbers.



VIEWRANGER SKYLINE

ViewRanger/Augmentaria
AR app for iOS and Android

ViewRanger Skyline labels more than 9 million landscape features. Through AR the app shows you points of interest, 'where to walk' walking guides with real-time directional arrows.

(Description adapted from App Store)

ViewRanger Skyline labels more than 9 million landscape features

Every single focus group participant said they were highly likely to recommend it to their friends and highly likely to want to engage with this type of content again

Tilt Brush
Google,
2016

IMMERSIVE MAKER TOOLS

This format is about enabling creativity - to make, experience and potentially share. These AR and VR immersive products are creative toolkits that allow users to make things in 3D space. Immersive maker tools typically let participants draw, build, model or sculpt things. If desired, the resulting user generated content can then be published by the user and even imported into 3D modelling programmes like SketchFab[10].

These tools can also be utilised as a way to make other animated VR experiences, for example, some short fiction pieces are made with Quill. These experiences work with room scale VR (like the HTC Vive) or HMDs with positional tracking sensors. There are also several popular AR maker tools available, using Apple's ARKit or Google's ARCore, for instance Lego's AR Studio or the StroodleDoodle AR[11].

FEATURES

- Unlike most immersive experiences, the user has near-total control over the environment, doing things like painting with virtual brushes, building with three dimensional virtual objects or creating explorable spaces.
- User experience varies from drawing simple 3D doodles to constructing structures to designing fully explorable 3D worlds.
- Some platforms allow existing 3D assets to be imported into the space.
- Some platforms also allow user's end creations to be exported into a 3D modelling programme.
- Each toolkit has its own aesthetic qualities and often mimics other tools of creation; Quill mimics paintbrushes, Tilt Brush mimics digital art tools, and LEGO® AR Studio mimics… Lego!
- Whilst most of these tools are not currently multiplayer, Tilt Brush have said since 2016 that they would add a multiplayer update, and have released a video of a prototype in use. When this happens, it is likely others platforms will follow suite.

10. Sketchfab (Sketchfab, 2017) [web, mobile, AR, and VR application software]

11. StroodleDoodle AR (BFC, 2016) [VR and Mobile application software]

INFLUENCE OF TECHNOLOGY PLATFORMS

As highlighted above, this format has taken cues from 'making tools' from other media and platforms – whether they be graphics software packages or full creative suites. As the company that acquired and then further developed Tilt Brush, Google have had a significant effect on creating a domino effect of development in the immersive media sector. As the makers of Medium[12] and Quill, Oculus have followed suit – also influencing the democratisation of VR building and creativity, putting powerful tools in the hands of users who have little previous technical knowledge.

The core value behind these tools is about accessibility. Therefore the technology has developed with ease of user experience in mind - as close to 'plug and play' as possible. This means that Tilt Brush and Quill, although quite advanced from a technology perspective, are two of the most popular apps on the stores for VR first timers (something that the authors of this report have observed).

Immersive Maker tools in VR address one of VR's perceived weaknesses in public demos: it can be isolating. When hooked up to a large monitor, VR apps like Tilt Brush, can be adapted to be as much a spectator sport as a personal activity. Body movements that are required when 'painting' appear performative and can be engaging to watch.

SCALABILITY

Even though Immersive maker tools are already popular, they are still in their infancy. Experiences could be developed further for certain market segments, for instance various hobby markets like therapeutic colouring, gardening, model trains or Scalextric cars.

In some ways the success and scale of these tools feels closely aligned to availability of hardware than some of the other formats. General Immersive maker tools like Tilt Brush could become a 'bundled' creative tool – akin to how Microsoft Paint was free with Windows PCs, which rapidly democratised 2D user generated content.

GENRES

Art | Kids' Activity | Fitness & Wellness

AUDIENCE APPEAL

Repeatable and entertaining, this was the most popular format tested with audiences. The user's feeling of 'presence' typically came very quickly.

Every single focus group participant said they were highly likely to recommend it to their friends and highly likely to want to engage with this type of content again.

With Quill, it was observed that participants would use their whole bodies as well as their arms and hands – they were absorbed and moved in ways that appeared intuitive and natural. Afterwards audience members explained how using their whole bodies helped them 'switch off' and relax into it. Participants described how they not only felt deeply immersed in the virtual space (i.e. present), they also felt immersed in the task. Presence and absorption appeared to be a winning combination.

Average audience appetite score: 5/5.

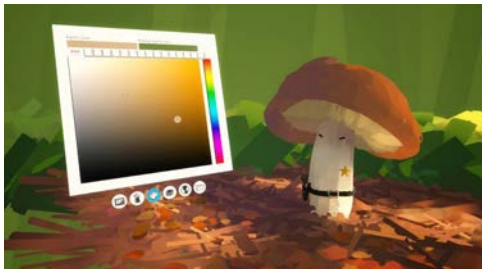
12. Medium (USA: Oculus, 2017) [VR application software]

EXEMPLAR PROJECTS

Quill App
Description adapted from the Oculus Store

QUILL APP

Facebook Studio
VR app for Oculus Rift

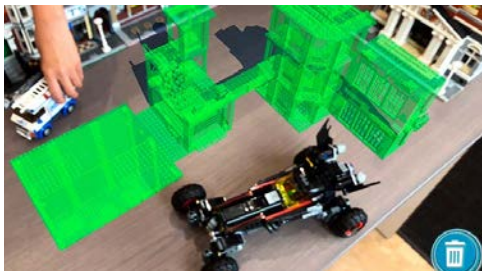


Quill is the VR illustration and animation tool built to empower artists and creators to create three dimensional final art or as a production tool for concept creation aid. Quill allows users to paint and animate in virtual reality on an infinitely 3D, scalable canvas - with rich colors and intuitive tools. Non-creators can download Quill to experience amazing illustrations in a pre-loaded showcase and have an experience completely unlike a traditional gallery.

LEGO® AR Studio
Description adapted from the App Store

LEGO® AR STUDIO

Lego Systems
AR app for Apple iOS devices. Available from the App Store



Introducing LEGO® AR Studio – a new augmented reality experience from LEGO® - where you can play with digital versions of selected LEGO® sets in your real-world scenes! Place a collection of LEGO® AR sets on any real-world surface. Make your LEGO® AR sets respond and interact with each other in fun ways. Try out movie-making, framing the right shots just as you want. Perform and act out stories using your imagination – save the action as movie clips directly to your device.

TILT BRUSH

Google
VR app for Oculus Rift and HTC Vive.
Available on the Oculus Store and Steam.

Tilt Brush lets you paint in 3D space with virtual reality. Experience painting as you have never before. Unleash your creativity with three-dimensional brush strokes, stars, light, and even fire. Your room is your canvas. Your palette is your imagination. The possibilities are endless.

(Description adapted from Oculus Store)

Tilt Brush lets you paint in 3D space with VR. Experience painting as you have never before

This format can make a potentially inaccessible piece of oral history engaging and open to a broader audience

Witness 360: 7/7
UK: VR City,
2015

REVISUALISING TESTIMONY

These pieces usually centre around a key moment in someone's life, or sometimes a longer life story. The format reproduces material such as an original recording of a 999 call, or of a person recounting their memories. They are, more often than not, VR pieces, and interpret the subject's memories and experiences by creating representative spaces or visuals.

Users tend to play the role of follower, journeying with the subject into an interpretation of their story. This type of experience is often described as 'bringing to life' archive content from the past, sometimes giving a 'time machine'-like quality or the feeling of stepping into another's memories.

FEATURES

- Creators might present you with an internal conflict: you feel like you are there whilst also feeling you are someone else. This often gives you a dual perspective.
- Stylistic choices and tools used in this format are often metaphorical, interpretative, and sometimes unrealistic or fantastical. They tend to use more abstract imagery and create moments that might feel ambiguous, emulating the fragmented texture of memory.
- There is a trend of starting and finishing in a separate safe-feeling or neutral space, e.g. the bedroom in After Solitary[3] the 'mind palace' in Easter Rising: Voice of a Rebel and the open spaces of Witness 360: 7/7[14].
- General exploration of the environment is often limited as you feel led to focus on specific areas and closely follow the narrative. The user is often either an outsider bearing witness or they become/embody the central character.
- Re-visualising testimony experiences almost always have a fixed timeline, with the narration forming the central spine of the piece.
- There may be several scenes, so you have time to meet the central character before being led through their story towards resolution/revelation.
- Importance is often placed on objects as metaphors, or totems within the testimony. For example the rifle in Easter Rising: Voice of a Rebel, or the golden braid in Last Goodbye[15].

13. Cassandra Herrman, Nonny De La Pena, After Solitary (USA: Emblematic Group and PBS' investigative 2017)

14. Darren Emerson, Witness 360: 7/7 (UK: VR City, 2015).

15. Gabo Arora, Ari Palitz, Last Goodbye (USA: Here be Dragons, 2017).

INFLUENCE OF TECHNOLOGY PLATFORMS

Game engines like Unity or Unreal are the main ways these types of VR experience are created, however 360º video or volumetric video capture have also been incorporated. By utilising fast-rendering low-polygon counts as a feature, developers often create angular styles which can lend themselves to surreal imagery. This may contribute to the lack of photorealism that occurs in this format.

Re-visualising testimonies have so far focused on less interactive, less room-scale and certainly less social experiences than some other formats. This is perhaps partly because the focus has been on storytelling over 'storydoing', but also because in history, only one thing happened – the user cannot change the outcome of history when talking about real-life events.

Interactive touches can be added, for instance stroking the Gear VR's touchpad to represent wind in Notes on Blindness, however these cannot result in alternative narratives that change the fundamental outcome of real events.

SCALABILITY

Re-visualising testimony experiences often utilise archive content, resulting in a final product that can seamlessly get the best from both old and new media. As a society, we are brimming with archive audio content that could be utilised in virtual environments to help people engage with history or an important topic.

GENRES

Art | History | Biography | Education | Justice

AUDIENCE APPEAL

The focus group responded very positively to re-visualising testimonies, which were tested with Easter Rising: Voice of a Rebel. On average they were highly likely to recommend the format to a friend, and also, the majority were keen to experience more immersive media in this format.

A participant's prior knowledge of Irish history seemed to make little difference to the amount they enjoyed the piece, indicating that this format can make a potentially inaccessible piece of oral history engaging and open to a broader audience. Whereas the testimony recording on its own would have had no context, the VR could add crucial background information and add emotional texture. History was said to be brought to life through presence in a space.

Average audience appetite score: 4.3/5.

EXEMPLAR PROJECTS

EASTER RISING: VOICE OF A REBEL

BBC/Crossover Labs/VRTOV
VR app, available for Oculus Rift and Samsung Gear VR

Easter Rising: Voice of a Rebel
Description adapted from the Oculus Store

NB: In the interests of declaring her affiliations, it is to be noted that Catherine Allen (Lead Author of this report) also produced Easter Rising: Voice of a Rebel for the BBC

An historical VR experience that is part documentary, part virtual theatre. You can step into one man's memories and journey back to a moment that changed Irish history forever: the 1916 Easter Rising. The story revolves around tape recordings of Willie McNeive, made in the 1970s, in which he talks about his involvement in the Easter Rising 60 years before.

NOTES ON BLINDNESS

Arte France/Archer's Mark/Ex Nihilo
VR app, available for Samsung Gear VR

Notes On Blindness
Description adapted from the Notes on Blindness website

Notes on Blindness is a VR journey into a world beyond sight. In 1983, after decades of steady deterioration, John Hull became totally blind. To help him make sense of the upheaval in his life, he began documenting his experiences on audio cassette. These original diary recordings form the basis of this project, an interactive non-fiction work using new forms of storytelling to explore his cognitive and emotional experience of blindness.

The Gruffalo Spotter
Forestry Commission England/Magic Light Pictures/Nexus Studios, 2017

In the short time span of the study, it is estimated that Pokémon Go has added a total of 144 billion steps to US physical activity

TREASURE HUNT

Treasure hunt experiences are primarily geo-located and AR, however there are occasions of this format occurring in VR. The format is built around the incentivised collection of digital items or experiences of some kind - inviting the user to search for and collect one or more identifiable but hidden pieces of 'treasure' such as tokens, stories, information or game points.

The hunt can take place either in the real world – amplified and editorialised with a form of augmented reality – or in a fully virtual environment. Frequently, but not always, the incentive is driven by a game. It is important to note that Treasure hunt owes many of its key qualities and heritage to Geocaching, though Geocaching itself doesn't fit the definition of immersive media.

FEATURES

- The discovery of treasure normally should not follow too strict a pattern or it becomes predictable and so less attractive. A non-repetitive environment in which to discover treasure makes the challenge more interesting, and requires the user to familiarise themselves with a growing number of landmarks and distinguishing features, just as in real-life exploration.
- Scarcity, which contributes to the feeling of discovery, has to be replicated in digital experiences, as most digital media are readily reproducible.
- Given the demands on users' attention, and their propensity to get bored easily, it is common to increase engagement by maintaining a degree of novelty. Virtual treasure must be sufficiently well hidden to engage users, but not so difficult that it defies discovery. Success in these terms is often described as a strong effort/reward curve.
- Some Treasure hunts are more loosely formatted and have crossovers with city tours – England's Heritage Cities are an example.
- Physical activity and getting out and about in the real world is fundamental to this format's ideology.

INFLUENCE OF TECHNOLOGY PLATFORMS

Treasure hunt experiences that engage the physical world are often built with augmented reality frameworks such as ARKit, although Treasure hunt AR is possible without OS-level frameworks, for instance using image markers or QR codes.

Treasure hunt experiences usually use geolocation technology to report the user's position, and process other input data accordingly. One means by which smartphones also track orientation and user movement is with gyroscopes, which are built into virtually all smartphones, and accompanied by software frameworks that support the processing of the data they capture.

AR treasure hunts might become more sophisticated as both the devices and development software advance, so better depth mapping and object recognition is available.

SCALABILITY

Like other mobile AR formats, for mobile AR Treasure hunts, the emphasis on smartphone inputs and distribution makes this more immediately scalable because of the existing ubiquity of the technology.

However, as with Audio journeys, the site-specific nature of 'anchored' Treasure hunt presents a barrier for reaching large scale audiences. Creating a bespoke Treasure hunt could require a great deal of on-site research and design in order to build the audio in relation to the physical space.

A way of getting around this is by building a Treasure hunt experience on top of a reliable and existing location-tagged data layer. Objects can be automatically placed according to pre-set rules; a water themed coin could appear wherever there is a public pond. Even the 'breakthrough' AR hit Pokémon Go was itself built on the learnings and data-sets of the earlier game, Ingress[16].

GENRES

Kids' activity | Games | Fitness & wellness | Sci-fi

AUDIENCE APPEAL

Audiences were more familiar with this format, especially if they had done Geocaching or previously played Pokemon Go. The more interaction the treasure hunt objects would have with the real world in relation to how much the audience felt they had to direct the action, the stronger the impression that the experience appeared to make.

The practical applications of this technology where also very clear to audiences. They considered this experience as enhancing a real experience, either making it more fun and engaging or adding information, rather than an experience in and of itself.

More broadly, it is also worth noting that when these experiences reach high levels of popularity, they can have significant direct impact. According to research carried out for three months in summer 2016:

> *"Pokémon Go leads to significant increases in physical activity over a period of 30 days, with particularly engaged users increasing their activity by 1473 steps a day on average, a more than 25% increase compared with their prior activity level (P<.001). In the short time span of the study, it is estimated that Pokémon Go has added a total of 144 billion steps to US physical activity."*[17]

Average audience appetite score: 3/5.

16. Ingress App (USA/ Japan: Niantic, Android 2013, iOS 2014) [Mobile application software]

17. Tim Althoff, Ryen W White and Eric Horvitz, "Influence Of Pokémon Go On Physical Activity: Study And Implications", Journal Of Medical Internet Research, 18.12 (2016), e315

EXEMPLAR PROJECTS

THE GRUFFALO SPOTTER

Forestry Commission England/Magic Light Pictures/Nexus Studios
AR app for iOS and Android

The Gruffalo Spotter
Description adapted from the Forestry Commission England website

The Gruffalo Spotter has been designed for use at 26 forests across England where visitors can join the adventure through the deep dark wood. Families can follow clues on an interactive trail and track signs of their favourite characters based on The Gruffalo. The self-led trail is packed with fun facts about forest animals with fantastic activities along the way. Once families have spotted the characters, they can use the app to bring 3D animations to life and take photos alongside them.

ENGLAND'S HISTORIC CITIES

Hex Digital/Visit England/Discover England Fund
Location based AR app for iOS and Android

England's Historic Cities
Description adapted from the England Historic Cities website

The England's Historic Cities app tells the stories of 12 of the country's best-loved heritage sites. Find trigger points scattered throughout each heritage site. Then, using your phone camera, uncover augmented-reality displays, 3D reconstructions, and 360° panoramas that tell unique stories associated with them. Hear stories told by famous figures such as William Shakespeare, Countess Ela of Salisbury and the Venerable Bede.

POKÉMON GO

Niantic, Inc/Pokémon Companies International
Location based AR app for iOS and Android

Travel between the real world and the virtual world of Pokémon with Pokémon GO. Pokémon GO gives you the chance to explore real locations and search far and wide for Pokémon. As you move around the places where you live and visit, your smartphone will vibrate to let you know you're near a Pokémon.

Once you've encountered a Pokémon, take aim on your smartphone's touch screen and throw a Poké Ball to catch it. But be careful, or it might run away! Also look for PokéStops located at interesting places—such as public art installations, historical markers, and monuments—where you can collect more Poké Balls and other items.

(Description adapted from Pokemon website)

Credit: David Grandmougin

Pokémon GO gives you the chance to explore real locations and search far and wide for Pokémon.

EMPATHY ENCOUNTERS

A subset of particularly moving Perspective shifters are intended to increase donations to a charity or stimulate social media conversation around a particular issue. Referred to here as empathy encounters. These invite you to bear witness to something the funder and/or maker believes deserves action. They may present overwhelming situations in which users feel a deep connection. Over the last 2-3 years NGOs and charities have commissioned these, and they have been known to significantly increase charity donations. For instance, Clouds Over Sidra, a VR film about the experiences of a Syrian refugee, was shown to potential donors at a conference in Kuwait. It contributed towards raising $3.8 billion – almost twice what was projected. Unicef have also found the film has doubled donations when using it as part of their fundraising activities.[18]

▲ In My Shoes: Dancing With Myself
Jane Gauntlett, 2017

18. Angela Watercutter, "VR Films Work Great For Charity. What About Changing Minds?", WIRED, 2016

PERSPECTIVE SHIFTER

In Perspective shifter, the user enters someone else's life circumstances, either via the simulation of inhabiting their body or by 'meeting' them. Essentially, audiences are invited to experience a slice of another's life. The result the creators aim for in their audiences is a shift in perspective. This could be a whole shift in world view, an increase in understanding, the fostering of empathy for a particular group of people or simply a change in opinion on an issue.

FEATURES

- Often (but not always), the protagonist's situation is challenging and this frames the experience. You might encounter disease, poverty, or disabilities. Sometimes it's simply just inhabiting the body of the opposite gender.
- Audience members are usually introduced to the central character. A continuous voice over or direct address to camera often follows. Narration from the central character usually holds the piece together.
- You are either an 'unseen other' moving from scene to scene as an inanimate presence that others are aware of, or you inhabit another's body, for instance in BBC and Aardman's We Wait and Jane Gauntlett's Dancing with Myself.
- In experiences where you are in the body of another person, the opening and closing of the 'eyes' or the imagination taking over the visual senses are commonly used devices to move through the action or change the scene.
- Narration from the central character usually holds the piece together.
- Most Empathy encounters focus on women and/or children, usually victims of a situation they could not control. For example, Sidra, in Clouds over Sidra, lives in a refugee camp, and Decontee in Waves of Grace[19], survived Ebola but lost her family.
- Music is often used more purposefully than in other formats, such as to manipulate emotions.
- The user rarely has any agency beyond looking around. This has been described as creating an effect of helplessness, where audience members are surrounded by another's struggle, yet in this non-interactive simulation, there is nothing they can tangibly do to help.
- There are a few that do include user agency. In Unrest VR, for instance, users interact with the bedroom environment of an ME sufferer in order to understand particular struggles she faced whilst living with her condition.

19. Gabo Arora, Chris Milk, Waves of Grace (USA: Here be Dragons, United Nations, 2015)

INFLUENCE OF TECHNOLOGY PLATFORMS

People who make Perspective shifters often come from a documentary, journalism or activist background, so tend to have film-making skills. Because of this, Perspective shifters are often 360º video, rather than CGI pieces. Stylistically, they are heavily influenced by documentary film techniques, charity film tropes and video journalism workflows. Creators of this format often describe a strong desire to tell a story in order to generate positive social change. Criticism here often stems from the negative impact of how filmmaking techniques like cuts and music can detract from feeling present.

The complexities of creating interactivity in VR – especially for new developers – may add to why the Empathy encounters subset became popular. The powerlessness you feel due to lack of interactivity becomes a feature. It contributes to the narrative: you want to do something to help, but you can't.

It is interesting to note that the VR software and hardware developers at Oculus and Google have funded many Perspective shifter experiences directly, for instance through Oculus' VR For Good programme. Mark Zuckerberg, Facebook's CEO (who own Oculus) even described 'empathy' as one of VR's main features[20]. Colum Slevin, Oculus' Head of Experiences has stressed the importance of VR causing positive social change[21].

SCALABILITY

Perspective shifters are a solid format with a clear case for development. There is potential for serials, or thematic curations about regions or issues. One aspect, however to bear in mind with future format scaling is user fatigue. While the format is still relatively new, audience members are less familiar with the techniques creators use in order to shift perspectives. However, this will change. As with charity promotional videos or advertising, which are all designed to also shift perspectives, we may see audiences becoming less susceptible to change and potentially more sceptical. Creators of this format will need to continue innovating in order to scale and avoid user fatigue.

Another issue to bear in mind going forward, is that whilst most existing Perspective shifters have been funded or supported by widely respected charities and NGOs, in the future this may not stay the case. Fringe groups on the extreme ends of the political spectrum or those involved in controversial, issue-specific campaigning may create Perspective shifters of their own. As the format grows, there will be fewer barriers to entry, and a wide range of people will have access to these powerful techniques. Looking at the development of other forms of media in the past, it is clear that democratisation can be a very good thing for a medium's development.

GENRES

History | Biography | Education | Justice | Art

AUDIENCE APPEAL

These experiences were among the most popular with the focus group and created more physiological feelings in the audience – for instance, audience members told us they felt their heart rate increase. Participants explained in discussion that they were 'in' rather than simply watching a story. Post-VR reactions were occasionally quite emotional.

The repeatability of the type of Perspective shifter where you are 'in' another's body was something that our participants were divided on. Some found it too challenging and unpleasant, finding the lack of agency tough, and therefore wouldn't want to do this sort of experience again. Others were fully absorbed in the scenario, gaining a deeper understanding of how the character they inhabited felt.

Average audience appetite score: 4.3/5.

20. Ben Tarnoff, "Empathy – The Latest Gadget Silicon Valley Wants To Sell You", The Guardian, 2017

21. Colum Slevin, "Keynote at Immersive Stories Summit, The Audi Dublin International Film Festival", 2018.

EXEMPLAR PROJECTS

Clouds Over Sidra
Description adapted from Within

CLOUDS OVER SIDRA

The UN/Here be Dragons
360º video on a range of platforms including Within

Sidra, a charming 12-year-old, guides you through her temporary home: the Zaatari Refugee Camp in Jordan. Children make up half the population of 130,000 Syrians there. Sidra leads you through her daily life: eating, sleeping, learning and playing in the vast desert city of tents.

In My Shoes: Dancing with Myself
Description adapted from Watershed's website

IN MY SHOES: DANCING WITH MYSELF

Jane Gauntlett
360º video, view in-location only

Dancing With Myself is a first person, virtual reality retelling of an evening filled with friends, food and seizures - offering a window into the epileptic life of the piece's creator, Jane Gauntlett. Dancing With Myself's narrative is crafted to let participants experience both Jane's outer world and her inner monologue. It dares you to let go of preconceptions and step into her shoes, to experience an evening out injected with surrealism, embarrassment and kindness.

Unrest VR
Description adapted from Unrest's website

UNREST VR

Shella Films/AudioGaming/Ex Nihilo/Little by Little Films VR app for Oculus Rift, view in-location only

Unrest VR is an interactive non-fiction experience inspired by Jennifer Brea's documentary, also called Unrest. This is an immersive journey into her life with an invisible illness, myalgic encephalomyelitis (ME). It contrasts the painful solitary confinement of a bedroom with the freedom of an inner dreamscape. When you're too sick to leave your bed, where do you go?

WE WAIT

BBC/Aardman
VR app, available for Oculus Rift

Based on BBC interviews with migrants, We Wait is an animated, dramatised story that transports you to the heart of the refugee crisis. On a starlit beach in Turkey you meet a Syrian family about to embark on their second perilous attempt to cross the sea to Greece.

Description adapted from Oculus store

NB: In the interests of declaring her affiliations, it is to be noted that Rebecca Gregory-Clarke (report comissioner) also produced We Wait for the BBC.

We Wait is an animated, dramatised story that transports you to the heart of the refugee crisis

AN AUDIENCE WITH

A sub format for the future of Up close and personal is An audience with.

This sub format allows audience members to actually feel they are meeting someone in VR, and spending time with them. A high profile person's persona and presence is scaled. Sky's recent release of VR experience, Hold the World[22] is a good example of this in action.

Users can meet a volumetrically captured David Attenborough, and listen to him explaining a variety of items in the Natural History Museum's collection, whilst virtually 'holding' these items.

When Artificial Intelligence (AI) is further integrated into VR and AR, and we can have conversations with advanced chatbot avatars, this format is likely to morph or branch into two or three different ones.

We might be able to meet realistic avatars of celebrities and hang out with them in AR or VR. For this format, some avatars may not be based on real-life people, but be famous personas in their own right. It may be possible to form close friendships, intellectual partnerships or romantic relationships with AI avatars.

▲ Draw Me Close: A Memoir
Jordan Tannahill, 2017

22. Factory 42, Hold the World (UK: Sky VR Studio, in association with Dream Reality Interactive and Talesmith, 2018).

UP CLOSE AND PERSONAL

Up close and personals are intimate and physical scenarios where the focus is feeling present with the bodies of the character(s). These experiences tend to be dance or movement pieces. Physicality, touch, movement and body language of the characters are the essence of the experience.

Physical intimacy or relationships expressed physically are often a central focus and a simulated experience for the user who could feel the proximity of the characters in a heightened way. The focus is often on relationships between couples, but can often extend to others. These experiences are primarily 360° video.

FEATURES

- These are often dance pieces, for instance in Heroes or Through You.
- Body language is often more important than pure dialogue.
- The user experiences a kind of hyper-connection between the people they see or embody within the experience.
- Scenarios may be realistic, as in Jennifer Lyon Bell's Second Date[23], but are often abstract and metaphorical, for instance in both Heroes and Through You.
- Music often plays an important role in these pieces, but not always.
- Whilst some pieces have a clear sense of story, it is often much looser than any sense of a classic narrative structure. Themes, feelings and presence are prioritised.
- Makers tend to favour a specific area of focus rather than letting the user look around. The result is that the characters themselves (particularly in dance pieces) become the 'visual cues', with choreography taking the user through the tableau.

23. Jennifer Lyon Bell, Second Date (Netherlands: Blue Artichoke Films, 2017).

INFLUENCE OF TECHNOLOGY PLATFORMS

Up close and personal pieces utilise techniques and tools that give the audience an extra level of intimacy and human connection.

The traditional limitations that CGI pieces have in conveying realistic human emotions and movement (particularly around faces – which can cause audience disconnect) has meant these experiences have tended to lean into live-action video capture.

In order to counter the fidelity issues around resolution and picture quality, there appears to be a trend in thinking about context and surrounds – such as choosing to capture bodies with real spaces as backdrops – like the theatre in Heroes – placing the user as a spectator in a real space.

We are beginning to see up close and personals being volumetrically captured, or captured with motion capture technology and an avatar being used. This allows the character(s) and/or their movements to be manipulated and incorporated into room scale VR or AR after filming.

SCALABILITY

There is clear potential with contemporary dance content as it plays to dance's visceral immediacy. Dance is not about words, and rarely has a very clear linear narrative. It is about bodies moving in space. When you feel the presence of those bodies it can become even more effective. There is clear opportunity for further up close and personal experiences in this genre.

Until now, up close and personals have been made primarily with actors or dancers who the audience are not aware of already. This format could work well though with celebrities as protagonists. Feeling the presence and charisma of a high-profile actor, model or dancer is something that audiences have shown an appetite for through other mediums for decades – it is likely this could work particularly well in VR due to the vivid simulation of another's presence that can be obtained. We may see this format consumed by mainstream audiences in a similar way to how music videos or films of modelling shoots are consumed.

GENRES

Art | History | Fitness & wellness | Biography

AUDIENCE APPEAL

When testing with Heroes, the participating audience reported very physical reactions. Some felt excited and enticed, however others said they felt their personal space was invaded by the proximity of the characters. Interestingly, women were more likely to describe these as 'invasive' or 'too close'.

Limina have found when screening this sort of VR that the gender perspective of the creator often influences audience outcome, even though it was unlikely to be intentional. Women have sometimes highlighted that they can sense when pieces are created through a male lens, and this makes them feel it is not for them. When Limina screened an explicitly feminist up close and personal as part of another project[25], feedback results demonstrated equal enjoyment between both men and women.

Although creators' unconscious bias' are woven into all creative formats, their bias' were especially prevalent to the participating audience in up close and personal experiences. This is perhaps due to the core facet of these pieces; the one-on-one feeling of intimacy that they bring being very personal – you feel as if you are getting to know someone. By directing the interpersonal connections within a piece, the creator's innate bias' easily become hardwired in.[25]

Average audience appetite score: 3/5.

24. Bill Thompson and Catherine Allen, "Virtual Reality and Real Relationships", Report from Encounters Film Festival, 2017

25. Waddell and Ivory, "Real stereotypes continue to exist in virtual worlds", Penn State University, 2015

EXEMPLAR PROJECTS

Heroes
Description adapted from the Oculus Gear VR store

HEROES

Helios Dance Company/MPC/MAP Design Lab
VR app for Samsung Gear VR and accompanying AR experience

The dance duet, to David Bowie's Heroes takes participants inside the world of two dancers performing an athletic and intimate duet at the historic Ace Hotel in Downtown LA.

Through You
Description adapted from Jaunt

THROUGH YOU

Oculus Story Studio/Jaunt/The Sundance Institute
360º video, available on Jaunt

Through You is a dance duet – a love story over a lifetime in virtuality. The project spans the early 1970s through 2043 and beyond, exploring topics ranging from love and rage to passion and mortality.

Draw Me Close: A Memoir
Description adapted from Draw Me Close website

DRAW ME CLOSE: A MEMOIR

National Theatre/All Seeing Eye/NFB Canada
A VR app for HTC Vive

Draw Me Close: A Memoir blurs the worlds of live performance, virtual reality and animation to create a vivid memoir about the relationship between a mother and her son in the wake of her terminal-cancer diagnosis.

50% of audiences who attended heard about the experience through word of mouth, showing visitors found the experience exciting enough to share with others

The Lost Palace
Historic Royal Palaces, 2016

AUDIO JOURNEY

Audio journeys are a form of audio augmented reality – they add an immersive audio layer onto a user's physical surroundings to tell a story or convey interesting, relevant information. This audio can be 3D, spatial sound or binaural. The user's physical space is a fundamental to the experience of an Audio journey. A good Audio journey allows users to feel even more immersed in their real-life surroundings.

Usually in the form of a mobile app, this creative format integrates audio voice over, sound design and sometimes music with the physical environment. This is usually in combination with sensors or geo-location. Users are lead on a journey around a physical space whilst listening to this audio, which is connected to their immediate surroundings.

FEATURES

- Most Audio journeys feature a central narration or voice over that guides the user through their physical environment.
- They are often used in the arts and heritage sector, having served museums and galleries for decades.
- They use GPS and sometimes iBeacons, QR codes, NFC or other sensor technology to know where the user is in the physical space.
- Non-fiction Audio journeys can feel like being accompanied by an expert friend who puts the space in context for you.
- Fictional experiences, or stories from the past allow another narrative layer to exist on the top of the real, present, physical world.
- Audio journeys can be anchored to a certain spot or portable – where they'll work anywhere that fits a certain set of conditions. These portable Audio journeys let the user pick a place to do the walk convenient for them, sometimes with a range of guidelines provided around what is necessary in that environment. For example, in It Must Have Been Dark By Then[26], the user is asked to move near a body of water. When the mobile device (using geo-location and maps) senses that you are near water, a new soundscape is created.

26. Duncan Speakman, It Must Have Been Dark By Then (UK: Calvium, Circumstance, Bristol Central Library College Green, 2017).

INFLUENCE OF TECHNOLOGY PLATFORMS

One of the most common tools used for Audio journeys is binaural audio. This is a spatial sound mix created using two or more microphones to mimic the hearing cues created by acoustic interaction between a user's body and the environment they are in.

Makers sometimes choose to hide mobile devices used for geo-tracking and sound activation in either custom-built or existing objects. For example, users activate the sounds of historical conversations and soundscapes around the grounds of a castle using an 'Echo Horn' in A Knights Peril[27] - an object designed by Splash and Ripple with Raspberry Pi technology and speakers built into the device.

SCALABILITY

The locality and site-specific nature of the 'anchored' experiences presents an obvious barrier for reaching larger audiences. Though any one place may attract a great number of visitors, the experience remains anchored to one location, limiting audience variety and number. Creating these experiences also requires a great deal of on-site research and design in order to build the audio in relation to the physical space.

Portable Audio journeys, however have a greater degree of potential for scalability. When combined with large, location anchored datasets and/or APIs, they have the potential to be both scalable and tailored to that specific location.

Although public institutions have acted as the main distributors, and independent makers as the main content providers, in recent years, a number of companies have scaled this format by creating platforms for users to create and sell their own Audio journeys. For example, Detour, which is detailed in the Exemplars section have chosen the UGC route. This may well be one key way this format will scale.

GENRES

History Drama Art Nature Biography Education

AUDIENCE APPEAL

This audience research was conducted during The Lost Palace's audience run, in 2016 by the commissioner Historic Royal Palaces[28]. As Audio journeys are generally location specific, and many have a time that they 'run' for, it was not possible for us to bring the same focus group to do the experience. This is a summary of what Historic Royal Palaces told us about audience response to the piece.

This research suggests that this format can be extremely popular with its audiences, especially in regards to attracting a diverse age range of visitors. 37% of visitors were between the ages of 25 - 34, which is rare for a heritage attraction.

Audiences praised the high quality of the audio and the innovative uses of mobile technology and used phrases such as 'bringing history to life' and 'made learning fun'. Visitors noted how different it felt to the simple museum audio guides they had experienced in the past. Particularly interesting was that 50% of audiences who attended heard about the experience through word of mouth, showing visitors found the experience exciting enough to share with others.

Average audience appetite score: N/A.
(Research was conducted during the project's audience run, in 2016 by the developer)

27. Rosie Poebright, A Knights Peril (UK: Splash and Ripple, UWE Bristol, National Trust, Bodium Castle, 2016)

28. Research commissioned by Historic Royal Palaces - designed by Courtney Consulting, analysis by Alis Templeton

EXEMPLAR PROJECTS

The Lost Palace
Description adapted from the Calvium website

THE LOST PALACE

Historic Royal Palaces (HRP)/Calvium/Uninvited Guests/Chomko and Rosier
Location based sound, through specialised wooden devices (containing iPhones) In-location only

Whitehall Palace burned to the ground more than 300 years ago. From July to September 2016, visitors flocked to London to explore the hidden spaces of Whitehall Palace for Historic Royal Palaces' The Lost Palace. There, they interacted with the rich history of a site which saw the executions of Guy Fawkes and Charles I, performances by Shakespeare and the reign of Elizabeth I.

Up Close with Neta Alchimister in VR
Description adapted from the Detour website

DETOUR - GUIDED WALKING TOURS

Detour
Location based audio, for iOS and Android

Immersive Audio journeys that guide you through the world's most interesting places with the people that know them best. Whether exploring solo or with friends, Detour will change the way you experience places. Available in 17 cities around the world, Detour uses GPS to keep the narrator in sync with your location so you can stare at the sights instead of your screen.

Sometimes just being present in a space is enough for audiences. No interactivity or even narrative is needed

Limina VR Sessions
Cambridge Film Festival, 2016

ACCESS ALL AREAS

This VR format is about immersion and exploration of an unfamiliar environment. It puts the user into situations or locations that are unique, often physically unreachable, inaccessible or even imaginary.

In some examples of this format there is an element of wish fulfilment for the user – they get to virtually tick something off their bucket list, and are given easy, virtual access to the otherwise unreachable. Sometimes these experiences are simply 360° photographs.

FEATURES

- In most of these experiences there is little agency beyond where you look, however, there are exceptions. In 6x9, the user can trigger audio snippets with their gaze, where prisoners describe their experiences relevant to that part of the cell.
- It is common for these spaces to be explored more like a reference book, where looking at different objects or places (hotspots) triggers more information to be revealed.
- Sometimes a linear narrative packages the experience, for instance in David Attenborough's Great Barrier Reef. These narrative access all areas experiences are often driven by a voice-over.
- Access all areas experiences do not need to be long. If they are not packaged within a classic narrative then just the feeling of being present in a space can be enough to achieve the creators' goals. This means they can be good demos for the VR medium as a whole – pop the headset on for less than a minute, and you still have a worthwhile experience.
- For in-location screenings, other senses can be made use of as well as visuals, for instance, haptic feedback, heat, humidity and olfactory techniques have all been used to enhance the sense of presence in a space. Greenpeace's Munduruku: The Fight to Defend the Heart of the Amazon[29] is a great example – the multi-sensory version included rainforest smells, heat and even a liquid-free hot 'cup of coffee' to hold, handed to the user at the appropriate moment.

29. Grace Boyle, James Manisty, Munduruku: The Fight to Defend the Heart of the Amazon (UK: Alchemy VR, Greenpeace, 2017)

INFLUENCE OF TECHNOLOGY PLATFORMS

Most access all areas pieces are 360º video content due to its strengths – 360º video is good at static things, fostering a sense of space and playing with scale. However this type of video isn't so good at close ups of characters as stitch lines become more obvious and the lower picture resolution becomes more obvious. This current spatial strength of 360º degree video has likely led to producers choosing to make access all areas pieces.

The capture of real spaces through photogrammetry is emerging as a technology that has, and will further shape the subject matter and approach to many experiences. It means that rather than 'baked-in' 360º video that cannot be explored in room-scale spaces, nor be adapted in post-production, environments can be captured and manipulated. Photogrammetry can be modelled with software and developed in game engines like Unity or Unreal.

SCALABILITY

The big question around this format is whether it can last beyond novelty status and as a good demo for VR. If this format can last in its own right, then it has strong potential for scalability.

There are many interesting spaces that elicit responses from their visitors - from spooky caves, to sublime waterfalls. Humans are curious creatures, and this curiosity could fuel a whole market in VR tourism. Owners of these spaces could find extra revenue streams through VR rights deals, e.g. from royalties, licensing agreements or buy-outs.

Access all areas pieces could be packaged in a series in order to go beyond a one-off novelty. Future series could feature, for example, the world's wonders or various famous archaeological sites. There is a clear opportunity for tie in with the tourism industry. We have seen already that travel agents like TUI are using VR in their high-street venues to preview holiday packages[30]. Perhaps holiday previews will become standard, or even as a souvenir: people may pay for VR access to landmarks they have visited whilst they are physically there, and motivated to want to 'take it home with them'.

GENRES

Art | Sci-Fi | Horror | History | News | Education | Fitness and wellness

AUDIENCE APPEAL

Participating audiences mostly enjoyed this sort of content, saying they were quite likely to tell a friend about it and want to see more pieces in this format. They could see a lot of potential – for instance 'VR Through the Keyhole' or 'VR Cribs'. Researchers showed participants 6x9, produced by The Guardian. Participants were physically and emotionally affected by the simulation of the space – they felt there.

Researchers have seen this tendancy for spatial-affect in previous studies. These observations will be no surprise for theatre set designers or installation artists. Researchers observed that sometimes just being present in a space is enough for audiences. No interactivity or even narrative is needed, provided they have the right surrounding context to allow them to relax into it, soak in the space and even be mindful in that environment. Even with no interactivity, the virtual space can be an environment for a user to take away their own reflections from – a place for emergent narratives to arise.

There are many meditation VR apps on the app store that take users into calm spaces like beaches or riversides. Their popularity is an indication that VR, and its lack of distractions could be a good focus tool, even aiding mindfulness techniques.

Average audience appetite score: 4.2/5.

30. Thomas Hobbs, "The Future Of The Travel Agent: Virtual Reality, Digital Screens And 'Smell Generators'", Marketing Week, 2018

EXEMPLAR PROJECTS

6X9: A VIRTUAL EXPERIENCE OF SOLITARY CONFINEMENT

The Guardian/The Mill
VR app for iOS and Andriod, Samsung Gear VR, Google Daydream and Google Cardboard

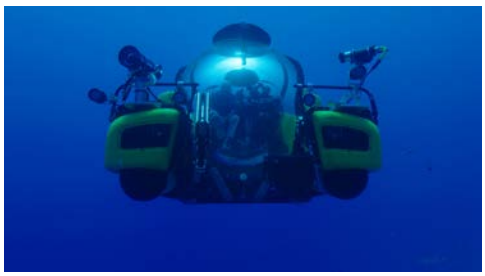
What's it like to spend 23 hours a day in a cell measuring 6x9 feet for days, weeks, months or even years? 6x9 is the Guardian's first VR experience, which places you inside a US solitary confinement prison cell and tells the story of the psychological damage that can ensue from isolation.

6x9: A virtual experience of solitary confinement
Description adapted from the Guardian website

DAVID ATTENBOROUGH'S GREAT BARRIER REEF DIVE VR

Alchemy VR/Natural History Museum
VR app for Samsung Gear VR. Viewing in-location only at London's Natural History Museum

David Attenborough's Great Barrier Reef Dive lets viewers experience one of the greatest natural wonders on Earth. In a state-of-the-art Triton submersible you dive through a wonderland with over 3000 reef systems, one of the world's most important natural resources.



David Attenborough's Great Barrier Reef Dive VR
Description adapted from the Alchemy VR website. Image Credit © Atlantic Productions/ Alchemy VR.

PERFECT

nDreams
VR app for Playstation VR, HTC Vive and Oculus Rift

Perfect is VR escapism at its purest. Leave behind the daily grind and slip away to beautiful and relaxing locations, made possible through VR. Visit several stunning and interactive destinations, from sun-drenched beaches and peaceful mountains to the spectacular northern lights. Instantly accessible yet endlessly captivating, Perfect is the ideal companion to show off your VR headset.

Perfect is the ideal companion to show off your VR headset

The audiences felt connected to the facts, which became more 'personal' through experiencing them via a headset

▲
Limina VR
Diversity Initiative
Digital Catapult Centre, 2016

WONDER IN EDUCATION

Wonder in Education pieces are experiences in which immersion, encounter and scale are used to provoke feelings of 'awe' and are used to motivate users to become educated on the topic. The beauty of the scenario also may help users remember what they have learned, providing a vivid image to help the information stick. This format can be experienced across a number of different platforms including AR, VR and 360° Projection dome's such as planetariums.

Experiences often see the user as an 'explorer', guided through spaces often in which they feel metaphorically small. This feeling of smallness tends to be used to amplify the gravity of the chosen topic, such as the majesty of the Milky Way, the intricate development of a human embryo, or the ecosystems of the Amazon rainforest.

FEATURES

- In terms of traditional media, this format is closest perhaps to 'landmark' television science or nature documentary.
- 'Awe-inspiring' is a common descriptor of these kinds of experiences.
- Because the learning happens in a space and involves the 'wow' factor, core educational principles can be more memorable. However, more specific details can sometimes get lost.
- Sometimes interactivity is used, but not always. In some examples, like Wonderful You, the user effectively 'clicks' to find out more and in others 'being', 'doing' or simply moving affects the user's environment, such as Treehugger[31] and Home: Spacewalk.[32]
- The motivating factor for the user to learn is often the sense of 'wow'. Sometimes the experience has been framed in a way where the user is not even consciously aware that they are learning.

31. Barnaby Steel, Ersin Han Ersin, Robin McNicholas, Treehugger: Wawona (UK: Marshmallow Laser Feast, 2017)

32. Tom Burton, BBC Home - A VR Spacewalk (UK: Rewind, BBC, 2017)

INFLUENCE OF TECHNOLOGY PLATFORMS

As high fidelity is key, creators tend to opt for game-engine driven production techniques.

The CPU/GPUs that power high fidelity experiences are particularly relevant in shaping what is possible. Increased processing power has enabled the creation of more and more realistic recreations of environments or objects.

SCALABILITY

There are thousands of existing 3D assets in content libraries, for instance, the planets in the solar system or every organ in the human anatomy. These existing 3D assets could be utilised in VR production, for instance allowing audiences to encounter a huge, beating human heart that is annotated and contextualised with a voice over.

For VR instances of this format, an existing, common reliance on powerful PC's and high-end headsets to show the most high-end and awe-inducing experiences could make it more difficult to scale up in the very near future.

Distribution partnerships with schools are a clear way for this kind of content to scale in the future. However, there may be other avenues as well, for instance, if the audience's appetite for these experiences is proven, then the format could have potential as an in-location attraction, or as an accompanying experience to an exhibition, TV documentary or science season. IP-owners of particularly wondrous properties may enter into rights deals with VR studios, generating a new revenue stream and giving audiences access to exciting new educational opportunities.

GENRES

Nature | History | Science | Education | Kid's activity

AUDIENCE APPEAL

Audiences felt connected to the facts, which became more personal through experiencing them via a headset and the direct targeting of the information to the audience. Visualising that information through physically represented objects and/or spaces made it more memorable. Some people did however find it slightly overwhelming to access information in this way, however.

Even if audience members didn't particularly engage with the experience themselves, they still saw the potential of the format to educate and would recommend it to others.

This reports researchers have found in previous research with audiences that addressing these 'grand' topics through such an immersive, intimate way sometimes resulted in profound reactions from audiences. For example, after experiencing Wonderful You at Cambridge Film Festival in 2017, one woman expressed feeling "more connected to [her] unborn self and mother", something that she had sought after having had a particularly distant and troublesome relationship with her mother.

Average audience appetite score: 3.7/5.

EXEMPLAR PROJECTS

Wonderful You
Description adapted from the Oculus store

WONDERFUL YOU

BDH

VR app for Samsung Gear VR and Oculus Rift

Wonderful You journeys through the strange world of your developing senses; sight, sound, touch, taste & smell– during your epic first 9 months of life in your mother's womb. As you grow from a tiny cluster of cells to a fully formed baby, the five senses that will shape your destiny develop and form. Wonderful You plunges you into the expanding sensory world of your unborn self. Safe in the womb, you hear music in your dreams, you taste what your mother eats, you see sunlight and colour, your hands grasp what they touch. Through You takes you back to a time and a place all of us have visited, but none of us can remember.

Jigspace AR
Description adapted from the App Store

JIGSPACE AR

Jigspace Inc.

AR app for Apple iOS Devices. Available from the App Store

We learn better in 3D, that's how we experience the world. JigSpace empowers you to learn about the world in a way that simply wasn't possible before. Explore and share truly interactive, 3D knowledge. When you ask "How does that work?" the answer is right in front of you, in beautiful, interactive 3D. With JigSpace you can view step-by-step interactive 3D breakdowns of complex ideas, products and phenomenon in Augmented Reality, bringing your learning into the real world. Dive through dozens of Jigs in the Jig Library, learn at your own pace, and satisfy your curiosity.

Efe Kurnaz
Limina VR Weekender Programme image, Watershed, 2017

What defines a fantasy trip is that the experience transports the user in order to elicit certain feelings

FANTASY TRIP

These surreal, fantastical journeys are VR experiences that are all about letting go and allowing the creator to take you on a fantasy ride. The experiences can be themed, set to a particular piece of music and/or may include the re-working of existing, non-VR assets (e.g. music, paintings or statues).

The user is usually moving through a space, seeing things as they go. As a transformative experience, various feelings are ellicited such as joy, fear, anticipation, awe, relaxation and even amusement. Music is often a very important element of the user experience.

FEATURES

- There is often no sense of being anyone. There is also no sense of being a known observer. Audiences often describe these pieces as 'like an out-of-body' experience.
- Often, without music, which is a key driver, this would be like an immersive 'screensaver'. Visuals compliment or respond to the music – it is usually crucial that they are in woven in sync.
- Techniques honed in the electronic music industry and video DJ culture are adapted into the VR environment, for instance ways of building anticipation, giving the audience a release or sending them into a trance-like state.
- A Fantasy trip might be inspired by ancient rituals, it could be created in the style of a famous surrealist, or it could be educational.
- The feeling of the body being irrelevant in some Fantasy trips often contributes to a liminal quality. For a set period of time, we step out of ourselves and can lose self-consciousness.
- There is a trend for the experience to involve the user crossing one or more thresholds. The music might 'drop' at the same time as the user moves forward into a new environment.
- Memories are often described by users in days or weeks afterwards as feeling 'like a dream'.
- The work might be crafted as a one-off, bespoke journey, or it may be generated using an algorithm and software. This way means that it can be different every time.
- For people not familiar with the format, Fantasy trips may appear light on meaning, however, in fact they can be quite profound.

INFLUENCE OF TECHNOLOGY PLATFORMS

Most Fantasy Trips are made using game engines. Tilt Brush and Quill have also been used as creative tools that form part of the production process.

However more broadly – the format has been shaped by this emphasis on graphics-led (rather than video-led) technology. The surreal and experiential nature of the pieces has been enabled by the greater freedom around visuals and physics that come from building within such engines.

The visual interest and focus of Fantasy trips has also made them good test-beds for technical experimentation – with many almost evolving as demos or learning experiences for the makers who want to toy with the capabilities of the technology.

SCALABILITY

Effective Fantasy trips can be made with fairly low budgets, especially if they avoid high profile music tracks with higher licensing costs. Because some Fantasy trips are generated procedurally, they can be different every time at no extra cost. This means the same trip has high replayability.

There is an emerging type of Fantasy trip that has a significant potential for scalability; one where the user selects their own track from their own music library and a bespoke, stylised trip is automatically generated for them. This means that music licensing is not necessary. It also makes it highly tailored for every user's music tastes.

This research has observed that Fantasy trips can have a marked effect on an audience's mood when they come out of the experience. In both the focus groups and during Limina's own events, it was observed that this sort of content can stimulate giddiness, laughter, smiling, awe and even relaxation. There is a potential here for this VR format to be packaged and marketed as a mood-enhancing tool.

Although in-location VR experiences are traditionally less scalable in the long run, the social context of a theme park, party, arts event or club night lends itself so well to this format that there may be very rapid adoption.

GENRES

Art | Sci-Fi | Music | Education | Fitness & wellness

AUDIENCE APPEAL

In terms of audience effect, there are clear parallels with the animated chill out videos of the 1990's, with experimental montage films like Koyaanisqatsi[33], with non-scary theme park rides like Disneyland's Pirates of the Caribbean, or even with the joy people get from kaleidoscopes. As a user you are escaping the real and being taken on a ride through what could be described as a virtual hallucination.

This was a highly popular format with the focus group. This research tested with HelloEnjoy's Fantasynth, and audiences found it 'beyond words'. They were eager to do it with friends. Specific adjectives to describe the format that they used were thrilling, addictive and fun. They all said that they would pay to do this again and again as a leisure activity. It seems the format's appeal can go far beyond a tech demo.

There was a distinct interest in telling friends about this format from the focus group, indicating that as VR goes mainstream, the format could spread. The research has found that tickets for its in-location Fantasy trip experiences sell fast. These events tend to have sold out every time the organisation have screened this type of content. In the future, certain Fantasy trips may even gain cult-like significance.

Average audience appetite score: 4.5/5.

33. Godfrey Reggio, Phillip Glass and Ron Frick, Koyaanisqatsi: Life Out Of Balance (USA: Santa Fe Institute for Regional Education, 1983)

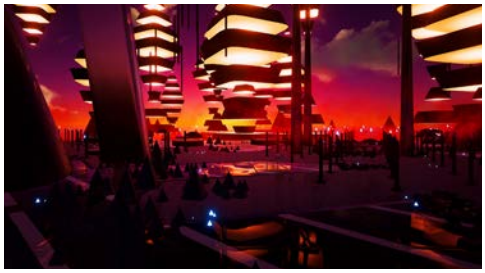
EXEMPLAR PROJECTS

Fantasynth
Description adapted from the Fantasynth website

FANTASYNTH

HelloEnjoy™
VR app for Oculus Rift, HTC Vive and Windows Mixed Reality

Fantasynth is a joyful audio-reactive experience designed for Virtual Reality. Glide through a procedurally populated environment that comes alive with the music of Chez Nous by N'to.



Evolution of Verse
Description adapted from the Within website

EVOLUTION OF VERSE

Here be Dragons/Virtual Digital Domain
360º video for Oculus Rift, HTC Vive, iOS, Android and Playstation VR. Available from the Within platform

A full CG, 3D virtual reality film that takes the viewer on a journey from beginning to new beginning, with a nod to early cinema.

You, the audience member are part of a significant or even risky moment add a great deal to its perceived value

FOX Sports VR
Fox Sports,
2017

BEST SEAT IN THE HOUSE

This puts the user at the heart of a performance or event, creating a 'personal' experience in which they feel present and part of the scene around them. As a user you are yourself, not an unknown observer, a witness or an embodied character.

Users are presented with the best view possible; whether this be the centre of a boxing ring, the front row of an auditorium, in the midst of a street festival or on stage with their favourite performers.

FEATURES

- Content commonly places the user amongst prominent groups such as musicians, sports people, actors or dancers during a well known event.
- A powerful sense of presence is the goal of this format (although not always achieved). This is often obtained through the users close proximity to the people around them in the scene and strengthened by moments of eye contact.
- Scenes are usually visually very rich and full of the energy of the performance or the crowd; makers often make effective use of the 360° tableau in this way.
- There are a few instances of this format involving live streaming, for instance the BBC's 2016 Rio Olympics app[34] for Samsung Gear VR and the Fox Sports VR app. This is not yet commonplace though.
- It is very rare that the user has the ability to roam, explore or even teleport within the scenario. These are very much 'sit back' experiences and beyond allowing and actively encouraging you to look around, they rarely offer any agency or interaction.
- Sometimes, performances are 'edited' or the user's position is changed within the space throughout the performance.

34. Justin Barritt, 360° Rio 2016 Olympics VR, (UK: BBC, 2016) [Mobile application software]

INFLUENCE OF TECHNOLOGY PLATFORMS

Years of academic Performance Studies' research from various universities tells us that much of what makes performance affective with audiences is its very 'liveness'[35]. The knowledge that it is happening right now, that anything could happen, and that you, the audience member is part of a significant or even risky moment adds a great deal to its perceived value. Given this, broadband speeds and mobile network coverage are still a clear barrier for Best Seat in the House content to be regularly streamed live to mainstream audiences.

This format has, up until now, stayed away from interactive and room-scale experiences. Instead, it has been executed via mobile VR and 360º video. However, as with every format favouring 360º video, picture quality is rarely high. This is particularly problematic with a format that regularly features detailed scenes and sets out to capture the looks, expressions and charisma of well-known performers and sportspeople. The resolution issue is particularly problematic when it gets in the way of a sense of presence and when audiences would still get a better view if they were there in person (especially, as there are with arena concerts there are big screens to see the action on, live).

SCALABILITY

VR platforms like Fox Sports VR and Melody VR[36] demonstrate the clear potential for this format's future scalability.

The UK live entertainment sector is growing. It hit a record level of £17bn in revenues in 2017 and in a recent report, Deloitte predicted further growth for 2018[37]. If the Best seat in the house format can hone a product that is satisfying to audiences and is as exciting as seeing events in person, then immersive media could benefit from this growth, and contribute to it in decades to come.

GENRES

Music | Theatre | Sport

AUDIENCE APPEAL

Before experiencing the format for themselves, the participating audience were strong advocates of the opportunity to experience an event from a unique perspective and were already interested in the idea, expressing feelings of awe and excitement at the thought of being in a 'best seat' position.

Interestingly, after seeing the content, audiences responded from personal, subjective positions. They were discerning about which performance they were watching. The key question was, would it be something they'd want to watch in real life anyway? When researchers showed audiences Google's Beethoven's 5th experience, the audience reaction was polarised. Some felt that simply capturing a performance in VR did not make it more accessible, whereas others with prior interest in the artform tended to find it more powerful.

A word that came up in discussions was 'imposter' for those that didn't feel welcome in the performance space they were taken to and the type of performance they were shown.

However, all participants responded favourably to the concept of their favourite performer performing directly for them, especially when the experience could be more intense than if they bought a ticket to see them in real life.

This indicates that while this creative format may not necessarily be a way of attracting new audiences to something they would not otherwise be interested to see, it could present a way to extend experiences to engaged audiences that otherwise might not be able to experience it.

Average audience appetite score: 3.5/5

35. Richard Schechner, Performance Studies (New York: Routledge, 2010)

36. Melody VR App (UK: Anthony Matchett, Sony Music, 2018) [VR application software]

37. "UK Entertainment And Media Sector To Be Worth £72billion by 2021", Pwc UK, 2017

EXEMPLAR PROJECTS

Beethoven's Fifth
Description adapted from the Philharmonia Orchestra's YouTube channel

BEETHOVEN'S FIFTH

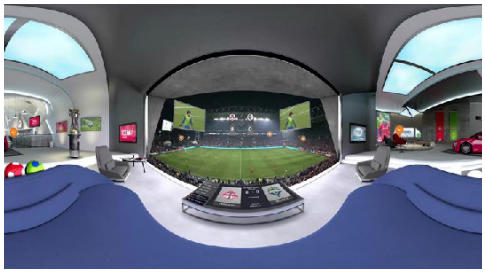
Google/NASA/Philharmonia
VR app for Google Daydream

Journey into interstellar space with a performance of Beethoven's Fifth, First Movement by the Philharmonia Orchestra, London, featuring principal conductor, Esa-Pekka Salonen. This is inspired by content on Voyager's Golden Record and is a collaboration between Google Daydream, the Philharmonia Orchestra, NASA, and NASA JPL. This piece is about the impact and importance of music. It both engages us with our world and holds the power to propel us mentally and seemingly physically to other ones.

FOX Sports VR
Description adapted from the Fox Sports VR webpage

FOX SPORTS VR

Fox Sports
360º video and VR app for iOS, Android, Google Cardboard, Samsung Gear VR



FOX Sports VR lets you experience top live sports events in ways you never could before! For supported events, you have a ticket to your own VIP stadium suite, where you can watch live events in immersive Virtual Reality. You can even teleport effortlessly to one of several on-the-field VR camera positions that let you see the action in brand new ways! When live games aren't on, you can check out VR highlights, other 360º videos or just relax in the FOX Sports GO Theater, watching a selection of live FOX Sports content.

INSIDE THE BOX OF KURIOS™

Felix and Paul Studios/Cirque du Soleil Media
VR app for Samsung Gear VR

Step on stage and immerse yourself INSIDE THE BOX OF KURIOS™ - Cabinet of Curiosities from Cirque du Soleil®! A mysterious and fascinating realm that disorients your senses and challenges your perceptions, leaving you to wonder: "Is it real, or just a figment of my imagination?"

(Description adapted from Oculus Store)

Step on stage and immerse yourself
INSIDE THE BOX OF KURIOS

Microsoft's Altspace VR
Microsoft, 2017

There is immediate mainstream potential for targeted, packaged Virtual hangouts, bringing together users from around the world, united by similar interests

VIRTUAL HANGOUTS

This primarily VR format brings people together in a variety of virtual settings to interact through conversation and/or play. The format is centred around avatars representing users who move around the space and can speak. Virtual hangouts are inspired by a number of existing contexts, from the online chatroom to a business boardroom. The primary purpose of the Virtual hangouts format is to socialise and spend time with other people, in VR. These may be people you know already or people you don't.

Unique settings and separation from everyday life allow for connections through conversation and interaction in virtual spaces. Avatar representation can also give users a sense of ownership and control over their presentation.

FEATURES

- Various worlds or stylised settings are available in a virtual hangout format, such as a campfire, a lecture hall or a train carriage.
- Avatars represent users and can explore spaces. Without a motion capture suit, users can still make recognisable physical gestures, such as nodding, dancing or bowing.
- With a motion capture suit their whole body enters the virtual space, and the experience can be even more responsive and immersive.
- Formatted events happen within these virtual spaces, for instance games, parties, seminars and discussion groups.
- While it is possible to access this format via a mobile handset, the optimal experience for the user is using a room scale VR headset.
- Users can hear their own and others' voices within the Hangout, or incorporate a translation platform to speak with people from anywhere.
- As in everyday life, users tend to focus on the eyes of fellow avatars. Figures often have disembodied hands for gesturing or drawing.
- Some Virtual hangouts are geared towards spending time with people you already know, for instance, Facebook Spaces.
- Some allow you to take photos in the VR space and then share them with the outside world.

INFLUENCE OF TECHNOLOGY PLATFORMS

In its current form, Virtual hangouts' UI and culture has parallels and influence from the popular non-VR multiplayer world, Second Life[38]. It's creator, Linden Labs, recently launched Sansar[39], a platform for people to make their own social VR environments.

Facebook's Spaces software has had the largest uptake and is compatible with the biggest social network on the planet. Ongoing developments in this area include speech and graphics software to create realistic synchronised facial expressions.

Some Virtual hangouts, including Altspace and VRChat[40] allow users to enter anonymously. This has been a factor in anti-social behaviour, for instance avatar trolling and even virtual sexual harassment.

SCALABILITY

Virtual hangouts have many applications, from re-inventing the chatroom or the boardroom to hosting lectures and interactive exhibitions. However they are currently more generalised social spaces populated by early adopters.

This research suggests that there is serious and fairly immediate mainstream potential for targeted, packaged Virtual hangouts, bringing together users from around the world, united by similar interests, activities or goals. TheWaveVR[41] is an example of a multi-user clubbing experience, there are fusions of gaming and social in Rec Room[42], and beyond that there is the commercially successful world of eSports. Growth could include packaged activities like virtual yoga lessons, choirs or celebrity meet-and-greets. The social element could also be an important, additional feature to another format, making it a shared or collaborative experience.

Future scalability potential is likely to also come from VR and AR meetings as a replacement for video chat services like Skype or FaceTime. Avatars will be 3D scanned, realistic models of ourselves. Our movements and expressions will be mimicked in real-time in the virtual space, meaning we can have realistic conversations with friends, family, loved ones or colleagues. When applied to AR, this format begins to mimic genuine telepresence.

GENRES

Virtual hangouts can sit within any and all genres.

AUDIENCE APPEAL

For the focus group, it was quite a cultural leap from their existing daily lives and one of the hardest formats for them to imagine having a motivation to want to engage with, at present.

Whilst keen on the concept of a VR hangout, many of the focus group participants found it difficult establishing a shared social language and etiquette within the space. However, even with this confusion around social rules, audience members discovered a higher level of connection to others than they would in an online chat room experience.

Participants all said they would find it easier to engage with strangers if they knew that the conversation was serving a purpose, either as a learning space, discussion forum or as a space for building specific online communities.

Most focus group members told researchers they were unlikely to want to experience similar content in the future and would be unlikely to recommend it to a friend. However, it is worth noting that during testing, users had to speak to strangers. Based on post-VR conversations, this group would have better enjoyed experiences that would have them spending time virtually with people they already knew.

Average audience appetite score: 2.9/5

38. Ebbi Altberg, Second Life (USA: Linden Lab, 2003) [Mac, Windows or Linux]

39. Ebbi Altberg, Sansar (USA: Linden Lab, 2017) [VR application software]

40. Graham Gaylor, Jesse Joudrey, VRChat (USA: VRChat Inc, 2017) [VR application software]

41. Adam Arrigo, and Aaron Lemme, WaveVR (USA: TheWaveVR, 2016)

42. Nick Fajt, RecRoom, (USA: Against Gravity, 2017)

EXEMPLAR PROJECTS

Microsoft's Altspace VR
Description adapted from the Altspace website

MICROSOFT'S ALTSPACE VR

Microsoft

Online multiplayer VR app with microphone connectivity. For Google Daydream, HTC Vive, Samsung Gear VR, Oculus Rift, 2 Mode, Windows Mixed Reality. Available on Oculus, Steam, Google Play and for download from Altspace web page

AltspaceVR is the leading social platform for virtual reality. Meet people from around the world, attend free live events in Virtual Reality, and play interactive games with friends. Day or night, there's always someone to hang out with.

TheWaveVR
Description adapted from TheWaveVR website

THEWAVEVR

TheWaveVR

Online multiplayer VR app with microphone connectivity. For Oculus Rift and HTC Vive Available on Steam

TheWaveVR is a platform for people who love music, enabling them to view, host, and socialize in shows world wide, anytime, anywhere.

Fans won't have to travel the globe or miss out on their favorite DJs, musicians or festivals and can experience the music like never before, while socializing in totally new ways alongside their friends.

LEO AR App
SV Teknoloji Inc,
2018

What came up frequently from users was a desire to use these apps socially in groups, or to share the images with friends

ENHANCED FILTERS

This mobile AR format engages the user by enabling them to manipulate familiar images and video in ways that are fun or useful. Input is sometimes in the form of photos taken from the user's surroundings, or may be images of the user themselves.

In some cases, the image manipulation has a practical purpose, for example subtle 'improvements' or reparative modifications to the image. In other cases, the image processing is more extreme and is itself a form of entertainment and social bonding, with the results shared over social networks.

FEATURES

- Sometimes this creative format is as simple as overlaying another image on top of the input image. However, it is most fitting with the category of 'immersive media' when the objects are three dimensional and positioned in a fixed spot in the user's environment, giving the illusion those items are really there.
- A good deal of the incentive for the manipulation of an image comes from a desire that it be seen by other people.
- More recently, some applications of this format have begun to use neural networks to alter the structural and semantic features of the image in ways that are more precise and contextually sensitive – for example the features of a human face or a landscape. The most prominent instance of this application is probably the 'face swap' feature of Snapchat, or the facial manipulation features of FaceApp.[43]

43. Faceapp (Russia: Wireless Lab OOO, 2018). [Mobile application software]

INFLUENCE OF TECHNOLOGY PLATFORMS

The only hardware strictly required by this format is a combination of a camera and display such as that found in a smartphone. This format almost always uses smartphones and tablets, particularly when processing facial images, because they are the only affordable, portable technology that entails this combination, and also has an unobstructed camera view of the face.

The release of Apple's AR kit and Google's ARCore made mobile AR cheaper and more streamlined for developers. This has led to more developers exploring and implementing AR in their apps.

The widespread availability of cameras, and the low unit price of optical components in electronics manufacturing has greatly enabled and amplified experiences of this kind that are so dependent on easy, quick processing of images or video. The mainstreaming of neural network-based software in the last five years has also had an enabling effect on some of the experiences in this format.

SCALABILITY

This is one of two of the creative formats this research uncovered that do not work without user generated content. From a scalability perspective, UGC centred products are usually the most scalable (if there is audience uptake). Generative experiences grow with their users.

The software development requirements for this format tend to be relatively sophisticated, which impairs the scaling of the format as a whole. Brand recognition tends also to play a factor, with a small number of well-known, trusted apps combined with a long tail of imitations. However, once the app and basic functionality has been created and brought to market, new filters can be added relatively easily, and the filters and effects of each app can be made into a platform, on which they can be purchased, or installed according to time (Halloween, valentines day), or location. This structure enables a potentially lucrative platform for the exchange of new effects and filters.

GENRES

Kids' activity | Games | Education

AUDIENCE APPEAL

Our audiences were already quite well familiarised with the format, having found these apps to be fun and exciting. Words used were 'novel', 'amazing' and 'incredibly fun'. What came up frequently from users was a desire to use these apps socially in groups, or to share the images with friends rather than as a solo pursuit or activity in and of itself.

Most participants felt the enjoyment of the apps was time limited, and perhaps not particularly long lasting. Audiences suggested that they would not likely return to this app after the initial excitement wore off and this would make them less likely to recommend the app to a friend. Audience members told us that in the short-term they found it harder to see a mass usefulness, or a long term practical use beyond entertainment and fun for this kind of media.

Looking at audience appetite more generally, audiences for these apps often do not realise that what they are engaging with is augmented reality. The apps are commonplace, usually free and easy to use. For this reason, Enhanced filter apps can be a gateway into other forms of immersive media.

Average audience appetite score: N/A.
(Research was not conducted in a controlled environment – gathered from audience feedback about use of Snapchat in their daily lives)

EXEMPLAR PROJECTS

Snapchat
Description adapted from Snapchat on Wikipedia

SNAPCHAT

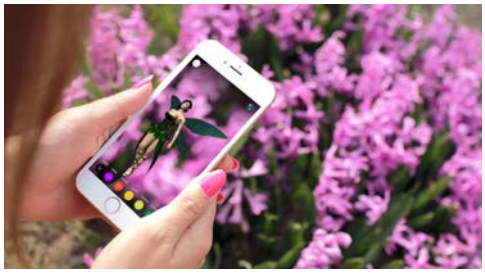
Snap Inc.
AR photo and video app for Android and iOS devices

Snapchat is an image messaging and multimedia mobile application developed by Snap Inc. originally Snapchat Inc. One of the principal concepts of Snapchat is that pictures and messages are only available for a short time before they become inaccessible. The app has evolved from originally focusing on person-to-person photo sharing – Snapchat has become notable for representing a new, mobile-first direction for social media, and places significant emphasis on users interacting with virtual stickers and augmented reality objects.

LEO AR App
Description adapted from the App Store

LEO AR APP

SV Teknoloji, Inc.
AR app for iOS devices



Leo is an augmented reality app allowing people to experience advanced augmented reality through realistic animated and 3D objects in the real world. The phone camera becomes a portal and tool that allows anyone to augment their world through Leo. It features and ARKit powered marketplace with 3D realistic objects, allowing users to place 3D realistic objects, take photos or capture video and share the moments with friends.

Imagine that you can capture a moment in time so that it can be relived again and again, realistically via virtual reality

Creative XR
Digital Catapult, 2018

FUTURE FORMATS

Having gone through this research process, researchers identified two early yet strong signs of creative formats that will play a significant role in immersive media's mid to long term future.

1. LEARN THROUGH DOING

Want to learn a new hobby? Learning through AR, MR or VR might become a viable and fun way to get involved. There are already a large number of research papers, articles and reports that show the increased benefits of learning through doing. Hands on or practical experience (something that gets someone physically and emotionally involved) in either training or education has greater efficacy than reading about it or watching someone else do it[44].

For instance, you could learn how to make your own ceramics at home, without the cost of a pottery wheel, kiln or the messiness of clay. Fancy learning a few salsa moves before heading out with a date? Learn the basics with a virtual salsa partner, complete with haptic feedback. Haptics are improving to the extent that this could be possible. As well as gloves and bodysuits, mid-air haptics are currently being developed that use waves to mimic the feeling of objects in a space. UK-based Ultrahaptics are world market leaders in this space[45].

Learn through doing experiences don't necessarily need haptic technology, however. There are all the technological building blocks necessary for developers to create a range of experiences, from an acting class, to photography lessons to interior design lessons. The combination of avatars and motion capture suits could lead to all sorts of lessons being available with real people.

2. TIME TRAVEL

Volumetric capture and photogrammetry is become an increasingly more viable way for creators to realistically capture a real environment in high resolution. Imagine capturing a busy Oxford Street in London on a Saturday afternoon. Imagine that you can capture that moment in time so that it can be relived again and again, realistically via virtual reality. If you were to come back to that moment in VR ten years after it was captured, it could feel a bit like travelling back in time.

There likely wouldn't be any interactivity, however there could be a lot of presence. Akin to the golden record or a time capsule, there is the potential to create and capture our current times for visitors of the future to experience and gain insight into what life was like in the 21st century.

Another way that immersive media could elicit the feeling of time travel is through the capturing of people and their personalities. People can be 3D scanned, and then AI versions of their personalities can be built. This means that generations to come may be able to interact with their ancestors, learning from them and potentially even building relationships with them. People can spend time with these ancestors via AR glasses or VR headsets.

This is already happening with the technology available to us today. For instance, The Shoah Foundation's New Dimensions in Testimony[46] allows audiences to virtually meet holocaust survivor Pinchaus Gutter, and ask him questions about his life and experience in the holocaust. This piece was created after five days of interviewing Gutter. The team used volumetric video capture, natural language processing and advanced chatbot technology. It is available in AR, VR and interactive video.

The potential for exploring our time through immersive media is still in its total infancy. There is a great deal of potential to create something that has parallels with a time machine – something culture has held in its shared imagination for many years.

44. David A Kolb, Experimental Learning: experience as the source of learning and development (Englewood Cliffs: Prentice-Hall, 1984)

45. "Ultrahaptics - Discover A New Type Of Haptics", Ultrahaptics, 2018

46. New Dimensions In Testimony (USA: USC Shoah Foundation, USC Institute for Creative Technologies, Conscience Display, 2017)

CONCLUSION

After an enlightening research process that included data science, curation, audience testing and analysis, immersive media has a very broad scope in terms of creative formats.

This is good news for the UK's creative industries as a wide range of skills from a whole host of backgrounds will be applicable to this new industry.

Audience appetite is high, and there is enough variety in the impactful formats this research identified to feed a broad market base.

Looking at all the creative formats together, it is clear that some immersive media experiences may fit into more than one of them, or take elements from a range of categories. The hope is that seeing the formats outlined together in this way will be a source of inspiration for creators and commissioners, perhaps even as stimuli to generate new successful formats of the future.

The top three most successful creative formats with the participating audience, judging by their desire to experience content of that type again and likelihood of recommending that format to a friend, were:

1. Immersive maker tool
2. Activity simulator
3. Fantasy trip

WHAT DO THESE FORMATS HAVE IN COMMON?

Firstly, they all provided the material for the audience member to create their own, personal narrative. Academics and game theorists have described this style of narrative as an 'emergent narrative' - a format that supplies the raw material and structure for the audience member's own 'storification'[47] process to occur. A scenario is presented to an audience in which audience members' own individual narratives can emerge. More recently, VR industry leaders have described this user-centric approach to narrative as 'storydoing'[48] or 'storyliving'[49].

It may sound counterintuitive, but researchers found that experiences do not require obvious interactivity in order to foster emergent narratives from a user. Sometimes, a scenario or environment can be stimulating enough that it alone is enough to cause a user to have their own positive, personal experience to take away with them. This is how non-interactive Fantasy trips tended to work from an audience perspective.

Another quality that was observed in the most successful formats was that they tended to generate more than one sort of immersion in their audience. Immersion can be categorised into being immersed in a space (spatial immersion) and being mentally immersed (strategic immersion, narrative immersion

47. Ruth Aylett, Emergent Narrative, Social Immersion and "Storification" (Salford: Centre for Virtual Environments, Business House, University of Salford, 2000)

48. Catherine Allen, "With VR, Publishers Must Focus On Storydoing, Not Storytelling | The Bookseller", Thebookseller.Com, 2018

49. Thomas Maschio, "Storyliving: A Study Of VR In Journalism", Google News Lab, 2018

and tactical immersion[50]). The most popular creative formats with audience groups were formats that involved both the simulation of presence and the conditions for total mental absorption in the story, environment or task.

Intuitive design, where the audience felt like they knew what they were doing, particularly helped achieve strategic or tactical immersion, when necessary. High quality graphics very much contributed towards the simulation of presence. The individual pieces that the top three formats mainly consist of utilise CG graphics much more than 360º video. Audience members often pointed out the low resolutions, asking, 'why wasn't it HD?'.

THE ROLE OF STORY

Taking a step back and looking at the range of creative formats immersive media offers, it becomes clear that classic storylines with a narrative arc and a strong authorially controlled plot are not necessary for an experience to be compelling. Whilst classic storytelling skills can be relevant to making immersive media, there is another form of story that is equally, if not more relevant – the audience member's story. Sectors like gaming, participatory theatre and sport are familiar with nurturing this type of story already. For sectors like film and book publishing, built around more classic, authorially controlled storytelling, there may be some exploration to do.

SCALABILITY

Looking at these creative formats in regard to scalability, the general rules from other forms of digital media still apply. A generative concept like an Immersive Maker Tool is likely to be more scalable as it is an experience that grows with its audience. It is more of a platform and toolkit rather than a boxed up, authored unit of content. This is not to say, however, that the platform approach is the only way immersive media can scale up. We know already from sectors like film and book publishing that these individual pieces of content can of course attract huge audiences, remain perennially relevant and hence create lucrative franchises. The immersive media formats that are not so generative and do not involve UGC are equally as valid and may well scale this way.

The most crucial factor for scalability is the appetite and size of a potential market – will a large enough group of people pay for these products in order to make their existence commercially viable? There are a range of conditions that need to be in place in order to reach this point. We need mainstream audience motivation, context, access to the technology, distribution channels, and more.

FUTURE WORK

This initial work has used audience feedback from a relatively small user group and a restricted amount of content. Having identified an initial set of formats, further insight could now be gained from a more comprehensive study with a greater volume of representative content and users, and using a methodology such as that outlined in Digital Catapult's recent report on Evaluating Immersive User Experience and Impact.

Overall this research shows that immersive media can be a creative medium in its own right. There is a vast wealth of cultural opportunity in different types of creative immersive media. Because the medium is still in its infancy, there is great potential yet to be unlocked.

50. "Different Types Of Immersion And How They Work", International Society For Presence Research, 2012

FOOTNOTES

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ACKNOWLEDGEMENTS

Many thanks go to Isla Badenoch, Bristol VR Lab, UWE's Digital Cultures Research Centre, Watershed, Pervasive Media Studio, Icon/ contributing report designer Piers Elliott, Data scientist Richard Brooker, Editor Sarah Levitt and the creators whose work features in this report and our focus group participants.

CATAPULT Digital

Digital Catapult is the UK's leading advanced digital technology innovation Centre, driving early adoption of technologies to make UK businesses more competitive and productive to grow the country's economy.

We connect large established companies, startup and scaleup businesses and researchers to discover new ways to solve big challenges in the manufacturing and creative industries. Through this collaboration businesses are supported to develop the right technologies to solve problems, increase productivity and open up new markets faster.

Digital Catapult provides physical and digital facilities for experimentation and testing that would otherwise not be accessible for smaller companies.

As well as breaking down barriers to technology adoption for startups and scaleups, our work de-risks innovation for large enterprises and uncovers new commercial applications in immersive, future networks, and artificial intelligence technologies.

LIMINA

Limina Immersive is a leading immersive media curation, events and consultancy company who specialise in creative VR and AR. Founded by BAFTA-winning Catherine Allen, Limina's goal is to make immersive media more accessible by diversifying audiences and widening participation in the emerging sector. Key projects include the Limina VR Weekender arts festival, ongoing VR curation for the British Council and the VR Diversity Initiative.

DAN TUCKER

Dan is an award winning digital director and VR producer with over 20 years of experience working with broadcasters, digital agencies, startups and international artists. His experience spans the production of TV projects like Charlie Brooker's How Videogames changed the World to digital projects like the interactive episode of BBC Three's Our World War and the VR documentary Easter Rising: Voice of a Rebel. Dan has programmed and showcased award winning VR and Interactive works for the Guardian, Greenpeace, BBC and National Film Board of Canada.

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