Xperience programme research findings

Learnings from venues and audiences

StoryFutures

Xperience

StoryFutures
National Centre for Immersive Storytelling

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Introduction

Funded by the BFI Audience Projects Fund/ National Lottery, StoryFutures led the Xperience Programme with a network of venues across the UK to understand how cinema and arts hub venues might be part of a network that can improve audience access to wider forms of screen culture. StoryFutures provided these venues with Meta Quest 2 VR headsets, made available through Meta's donation to us for education and research purposes. We also provided supporting kit, a programme of training, a catalogue of VR experiences, and suggestions for programming and exhibition. The VR content provided freely to cinemas from our catalogue featured local, untold stories, and all were short and accessible for novice audiences, with a variety of themes suitable for different programming opportunities.

This report is in two parts. **Part One** focuses on what we learned from cinemas about serving these audiences – in terms of building skills to exhibit and support VR; and what kinds of exhibition formats and partnerships were trialled. We also examine how audiences responded to different kinds of content and what audience journey was required for a good VR experience, out of a general survey administered to all audiences.

Part Two focuses on the impact of the space and sound setup on the audience experience. This study examines the specific setting of the cinema for VR exhibition, considering the unique opportunities and characteristics of a cinema environment for VR viewing – what makes it different from a location-based or museum-based experience, for example? The study shows that there is both audience appetite and opportunity for a more scalable type of VR experience using the cinema infrastructure of the theatre, which has enhanced social potential and presents interesting creative possibilities for developers.

The Xperience programme was not only an opportunity for venues to experiment with immersive content and to reach new audiences, it was also an opportunity to support the proliferation of this new technology to a wider audience. While in financial terms the benefit to venues of including VR in their programming remains unclear, a well-supported network of venues could provide a valuable service to the sector that is worthy of further funding and investment.

Initial proposal for Xperience

Establish VR hubs network with 5 participating independent cinema venues across the UK

Distribute Quest 2 headsets donated by Meta to partners

Training and workforce development to support practical programming guidance and widen business model to include immersive

Create a pathway to audiences for VR writers, directors and producers, to meet 2033 BFI screen culture strategic objective to improve audience access to wider forms of screen culture

Backed by research and experience from two nationwide tours: Laika and StoryTrails

VR screenshot from *Goliath*, courtesy of Anagram

The Partners

Chapter (Wales)

Depot (Lewes)

Dundee Contemporary Arts Centre (Dundee)

Queen's Film Theatre (Belfast)

Showroom (Sheffield)

Nerve Centre (Derry ~Londonderry)

Wales Millennium Centre (Cardiff)

Leeds Young Film (Leeds)

Project Goals

Widen audience access to VR

Provide access to diverse stories to widen audience engagement

Develop venue staff expertise in supporting accessibility

Explore the sustainability of VR exhibition for arts and culture venues

Background and Process

Catalogue:

We made available to venues the entire catalogue of StoryFutures content, thus, 21x VR experiences commissioned across three rounds of R&D StoryLab innovation funding. We also negotiated the inclusion of the Asif Kapadia VR film *Laika*, an earlier production out of a BFI/StoryFutures Academy collaboration, for a total of 22 VR pieces.

Implications for this research:

- Because the licenses with the creators specified these pieces would be freely exhibited, this meant our cinema partners were able to charge only small ticket fees that would go toward the expense of hosting and exhibition. This put some constraints on the testing of business models.
- Having freely-available content was essential to the execution of the programme as the venues had no budget to acquire content; it gave some the ability to provide an immersive programme even in the face of budget cuts.
- The original purpose of the content was to be accessible to a wide audience; thus, the pieces were mainly 8-10 minutes long (with the exception of *Laika)*, and intended for new or inexperienced VR users.
- These pieces were part of research and development projects for VR, such as use of historical 2D archive and re-versioning. They varied in technical quality, but all had strong narrative, which alongside the consistent duration and diversity of storylines made them ideal content for this programme.

Equipment and Software:

Through the donation of Meta headsets we received in 2022, we were able to provide each venue with 20 Meta Quest 2 headsets.

While the libraries in our network use ArborXR's launch software to allow audiences to launch experiences themselves, we purchased licences for ShowtimeVR for the cinemas. ShowtimeVR provides cinemas with content control options, including individual or group launch of experiences, creation of playlists, and device monitoring, providing cinemas more exhibition options.

Distribution Stages:

- Programme initiation (April – July 2023): Distribution of equipment, staff training through the workforce development programme, and in-person tech production days at each partner venue.
- Distribution stage 1 (August – November 2023): Initial 5 partner venues to commence events; however, it was a slow start, with only 2 venues managing to run events in Q2 and Q3 of 2023.
- Distribution stage 2 (December 2023 – February 2024): Three new venues joined the network. Initial 5 partner venues allocated £3,000 each from the BFI allocated funds to resource a VR programme schedule that would reach a minimum of 180 beneficiaries per venue.

Achievements by the numbers:

Research and data collection:

We collected data across the project via numerous sources. This research report is based on:

- Two surveys:
  - General Xperience Audience surveys collected via all participating venues (297 responses)
  - "Sound and Space Study" surveys – a specific study into the impact of the exhibition context on the audience experience (109 responses)
  - Total responses: 406 of 5,172 attendees (8% response rate)
- Focus groups with "Sound and Space Study" participants
- Event reports from participating venues
- Sandpit event discussion and feedback with venue representatives, held at Sheffield Showroom on 19 April 2024

PART ONE:
Xperience – Key takeaways

There is an audience for VR in cultural venues

- This audience is still developing; audiences are still often drawn by the medium of VR rather than the content itself. They were quite open to the variety of VR pieces on offer.
- Only 30% of audiences had experienced VR narrative content before Xperience.
- 45% of attendees were attending the venue for the first time ever.
- 87% of survey respondents enjoyed the experience 'very much' or 'quite a lot'.
- 83% were 'likely' or 'very likely' to attend a similar event.
- Audiences were generally willing to pay the amount of a cinema ticket to have a VR experience of roughly comparable length (i.e. 2-3 short VR experiences).
- 87% of respondents attended with people that were known to them (i.e. friends, family members).
- Audiences enjoy 'passive' content, and it is easy to deliver and accessible; nonetheless, they still express a desire for more interactive content in line with their expectations of VR.
- 1/3 preferred a group viewing experience versus 16% who prefer a solo viewing experience; half of audiences were neutral on their preference for solo or group viewing.

Cinema staff can be excellent VR ambassadors

- Staff who were enthusiastic about the possibilities of the medium were most invested in the programme.
- It takes time and practice to build hosting and technical skills, as well as the vocabulary for explaining experiences and interactions; but staff mastered these to a high level as evidenced by low levels of technical problems and high levels of audience satisfaction.
- Some culture change is required for staff used to working behind the scenes to assume a more hands-on, front-of-house role.

VR requires specific resource

- Lack of resourcing for additional staff time for VR-specific programming and screening was a barrier to delivery. The VR programme has very different needs to other elements of cinemas' regular programme.
- Availability of space for storage, setup and exhibition was an issue for some cinemas.
- Cinema schedules are planned months in advance; it takes time for VR to be incorporated into the schedule.
- Marketing VR remains a challenge, with more support required for collaboration between producers and exhibitors; commissioning funds need to be accompanied by exhibition support.
- Programming VR (ticketed vs drop-in, free vs a small charge) requires further experimentation, with audiences at times unable to assess the value until after the experience; these decisions also have an impact on audience attendance and follow-through.
- A well-supported cinema distribution network for VR could be a positive investment for the sector.

VR screenshot from *Buried in the Rock,* courtesy of ScanLAB Projects

Detailed findings

We present here two perspectives on the research from the Xperience programme.

First, the venues have passed their learnings on to us and we have consolidated these to understand the successes and challenges that they experienced during the programme.

Next, we present the results of responses to the general audience survey to understand audience characteristics, appetite and attitudes toward the VR events.

Xperience Sandpit participants, Sheffield Showroom, 19 April 2024
Back row: Laryssa Whittaker – StoryFutures; Debbie Maturi and Jamie Cross – Leeds Young Film; Isobel Harrop – Showroom; Joe Carlin – Nerve Centre; Ryan Finnigan – Showroom; David Massey – Wales Millennium Centre.
Front row: Eleanor Hodson – Leeds Young Film; Destiny Lawrence – StoryFutures; Carmen Slijpen – Depot; Abi Fitzgerald – Wales Millennium Centre. Not pictured: Kylie Bryant – StoryFutures.

Other research partners not pictured: Hugh Odling-Smee – Queen's Film Theatre; Claire Vaughn – Chapter.

What we learned...

FROM VENUES

Venue reports and a wrap-up sandpit event allowed representatives of the venues to feed back on their learnings from the programme.

Enthusiasm for VR

In the final sandpit, participants reflected on the wealth of opportunities that VR offers, including:

- Reaching new audiences – drawing people who had previously no exposure to narrative VR (70%), or who had not previously attended the venue (45%).
- Providing audiences with unique, moving, emotional experiences that have strong impact.
- Being in the vanguard of new experiences at the convergence of media, presenting creative new types of storytelling.
- The transformation of previously reluctant audience members into enthusiasts.
- Providing access to content and technology that people can't access from home.
- Flexibility of spaces that can be used for exhibiting VR with appropriate planning.

Challenges of VR

The key challenges that venue staff cited were mainly operational:

- Headsets that are built for gaming provide technical challenges for audiences and hosts.
- The technology is still unpredictable (and setting the guardian is a nightmare!).
- Developing the language to explain experiences and interactions to people takes time and practice, and helping them when they get stuck is still tricky.
- Scalability is still a challenge, although cinema viewings go some way toward providing scalable options. (See Part Two of this report.)

Aesthetically, they noted an additional limitation:

- The artwork of VR still often appears visually simple in comparison to film and video games (due in part to the limitations of headset memory and the fact that the StoryFutures catalogue comprised mainly prototypes).

What we learned...
FROM VENUES (continued)

Training & Delivery

Venue staff gained the knowledge and skills needed to support audience members in having high-quality VR experiences with a wide variety of content and configurations.

Quite Demanding:

Significant onsite training, resources, and ongoing workshops were provided, but mastering the equipment requires individual, firsthand practice.

Riskiness for Staff:

VR feels high-risk to staff accustomed to polished delivery and working behind the scenes.

Cultural Shift:

VR can be unreliable, since it is prone to glitches. A cultural shift is needed towards developing skills and confidence with solving these problems in a more audience-facing role.

Ongoing/Continuous Training Required:

Ongoing training is fundamental for smooth onboarding, particularly if the work-team is fluid and changing, involving casual or part-time staff.

Relationships

Cinemas with strong relationships with established immersive events, like Sheffield with DocFest and Queen's with Belfast XR Festival, leveraged these connections well. Other venues, such as Nerve Centre and Leeds Young Film, made use of their local ties to educational and cultural institutions to reach audiences.

While opportunities to build more relationships were identified, these required time and resources, and some efforts fell through.

Challenges with Relationships:

A closer connection with VR creators was needed but didn't materialize due to limited staff resources, resulting in missed opportunities for collaboration and knowledge exchange. Connections with local VR creatives would also have mutual benefit.

There is also an opportunity for Xperience venues to collaborate with nearby libraries in our VR network, many of whom have been developing innovative approaches to immersive content with their audiences.

Timelines & Resources

Time resources were stretched thin, as VR required different considerations and additional effort compared to regular films.

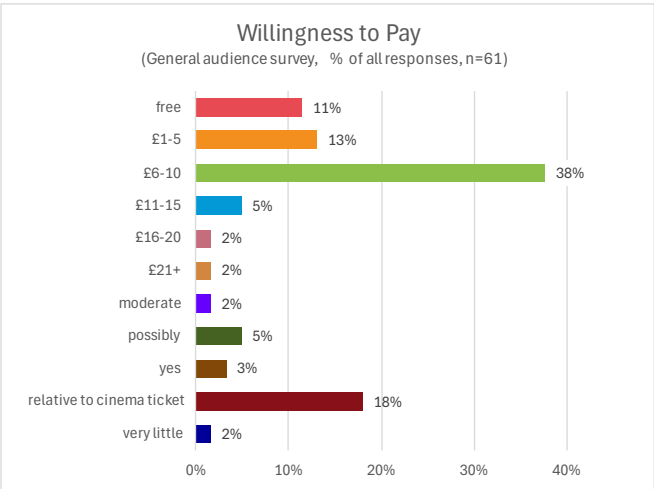
Marketing and tech support often exceeded capacity, challenging the integration of VR into established cinema programs.

Cinema schedules planned months in advance meant that the one-year programme allowed just enough time to get started.

Business Models

Effective business models for VR events are still being developed, and the content provided during this programme was not conducive to robustly testing business models. There's a need for experimentation, integration with other events, and exploring demand to cover costs.

The design of the StoryFutures content and the fact that the experiences were generally delivered as free catalogue impacts perceived value, affecting how much people are willing to pay.



What we learned...
FROM VENUES (continued)

Marketing

Marketing strategies need refinement, especially in explaining VR. More venue collaboration and sharing of marketing approaches would help.

Better promotional assets from creators are needed. Synopses, stills, and behind-the-scenes footage were provided, but more video content would enhance marketing. Wales Millennium Centre also had some success with an advert comprised of video testimonials of the experience by young people.

Additionally, venues sometimes noted that integrating VR content into their website structure and updating processes was not straightforward and required extra planning.

Experiments with Ticketing and Promotion

Venues tried different methods of promoting and structuring events. In general, one-off drop-in events that were not tied to a larger event did not tend to receive a lot of uptake. However, drop-in events connected to a larger event OR held in conjunction with regularly scheduled events were better attended. For example, DCA's regular "Drop in and play" event which features video game companies already had an established audience who was enthusiastic to view VR content. Depot and Showroom both programmed *Locker Room: Rumble in the Jungle* alongside Cassius X as part of Black History Month.

Venues found themselves in a double bind over ticketed events: if marketed as 'free', they often had a 50-60% fall-off in attendance (despite some venues exerting significant effort in follow-up communications); if venues applied a £3-£4 booking fee, these events would sometimes not sell out. Wales Millennium Centre has experimented with a post-event donation box, finding that audiences often did not know what an experience was worth until after they'd had it.

Venues noted it was extremely important for the wider cinema team to be aware of the content in order to support audience follow-through. Leeds Young Film has learned to harness the footfall of busy events through their partnership model, locating VR near the footfall of the Leeds City Museum, for example.

Exhibition Formats

Event Spaces:

Seven venues experimented with multipurpose event space screenings, for a total of 26 events. These were a mix of synchronous (group launch) and asynchronous (drop-in, individual launch) screenings.

Exhibition Formats (continued)

Cinema Spaces:

Four venues conducted in-cinema screenings, with a total of 13 separate events (27 screenings). Almost all of these were free screenings of *Laika*, bookable in advance. The cinemas who ran *Laika* screenings found it the most obvious piece in the catalogue to screen – most like their regular offering, the closest piece of content to a linear film, and were thus able to promote it in similar ways.

Nerve Centre participated in the Sound and Space Study, showing the three films chosen for the study in three separate scenarios – two of which took place in the cinema (more later).

Partnership Events:

Leveraging their local partnerships, Sheffield's collaboration with DocFest and Queen's Film Theatre, Belfast's involvement in the Belfast XR Festival extended the reach of the programme. Leeds Young Film has a largely partnership-based model and an existing VR programme; participating in Xperience allowed them to consolidate and expand their offering. They found that the router and launch software provided by StoryFutures transformed their ability to use different spaces for VR experiences.

Spaces

Venues, often designed for different purposes, required careful planning to use available spaces efficiently for VR activities.

Smaller venues faced logistical challenges with kit storage and charging, even in terms of having adequate space for this. They had to develop organized solutions for keeping equipment ready during events despite this constraint.

Using spaces for VR sometimes meant losing potential rental income. This required venues to carefully balance the trade-off between maximizing revenue from space rentals and leveraging these spaces for VR, often leading to adjustments in their usual operations.

Most cinemas experimented with synchronized group screenings. While this required practice and coordination, several venues successfully mastered the process of onboarding, centering headsets, and launching experiences simultaneously.

There is more detail on spaces from our Sound and Space Study (Part 2 below).

What we learned...
FROM AUDIENCES

Audience Characteristics

Age:

Attendees spanned all ages, though there appeared to be lower engagement from those in their 30s. This could be due to the content or the demands of busy family life.

Gender:

There was a fairly even distribution between men and women, with a small distribution of people identifying in another way.

Sexual Identity:

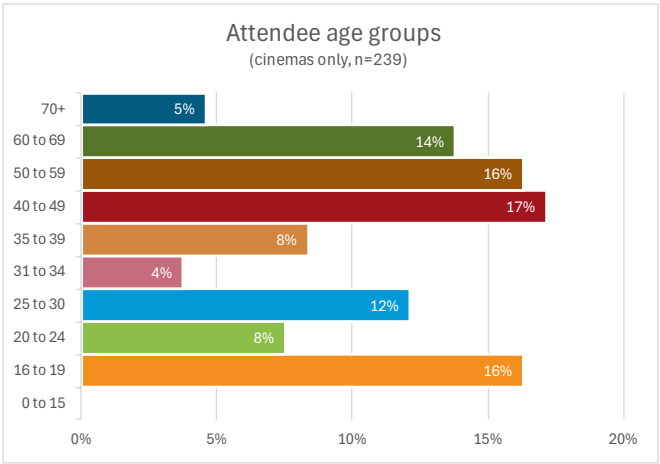
Although over 1/3 of participants preferred not to state their sexual identity, nonetheless we found small but significant levels of diversity amongst responses, and under half of participants identified as heterosexual.

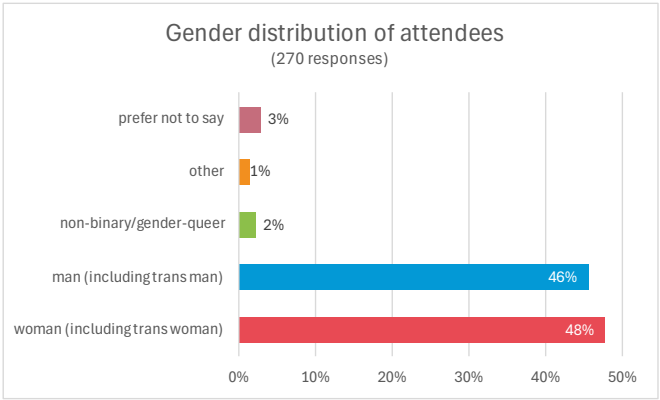
Disabilities:

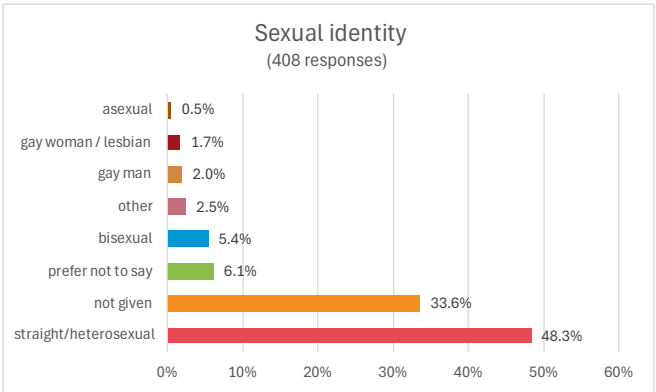
55% of respondents don't identify with any disability-related statements, suggesting they may not have a disability. Another 8% preferred not to say, leaving 37% who likely have some form of disability or long-term condition.

Socio-Economic Wellbeing:

No respondents identified as upper class. The events primarily attracted middle-class audiences, despite mainly being free. Other barriers may exist.





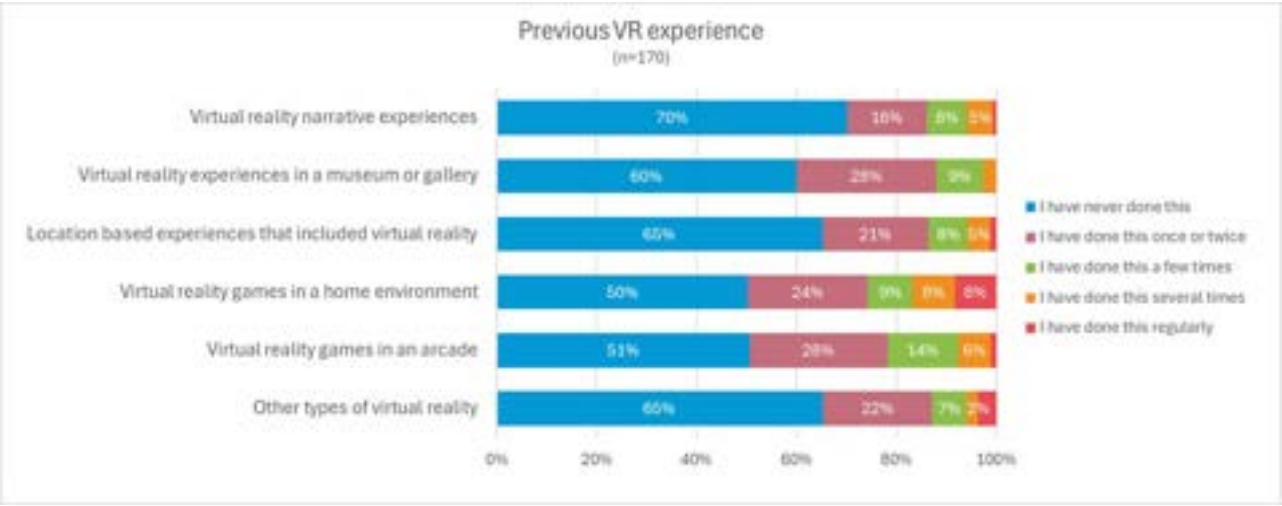


What we learned...
FROM AUDIENCES (continued)

Previous VR Experience

Half of the audience had tried VR games at home; just under half had used VR in an arcade, and about 40% in a museum/gallery. A small number owned their own VR gear (20%). Only 30% had experienced VR narratives before this event.

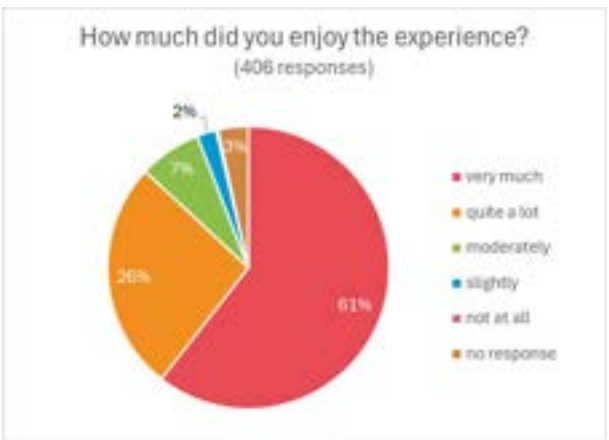
The key takeaway is that approximately half the audience had never experienced VR. The implication for venues is that more likely than not, their audiences needed more hands-on support as they often lacked literacy with the headsets and controllers. As well, this points to the continued need for content that is suitable for novices, even as audiences develop and more complex, interactive content becomes more feasible.



Enjoyment

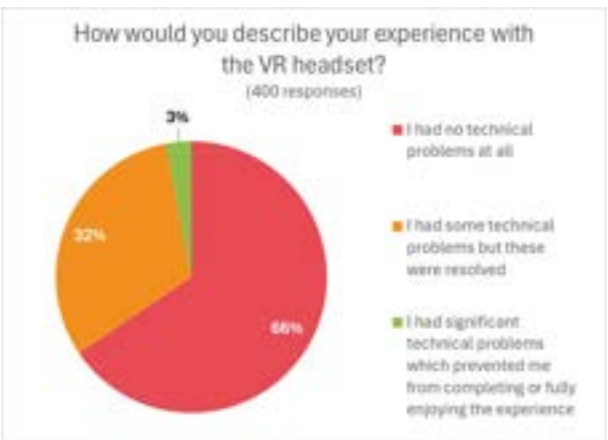
Enjoyment levels were very high across the board, with 87% of respondents indicating they enjoyed the experience 'quite a lot' or 'very much', and no one selecting 'not at all'.

Looking at those who did have previous VR experience, there was no significant difference in enjoyment levels, so despite any heightened expectations more regular VR users may have had, they still enjoyed the experience.



Technical Problems

Although venues were worried about the technical problems they experienced, the audience feedback shows that hosts handled these well; only 3% had serious problems, and for those 1/3 who had a few problems, this did not unduly affect their experience.

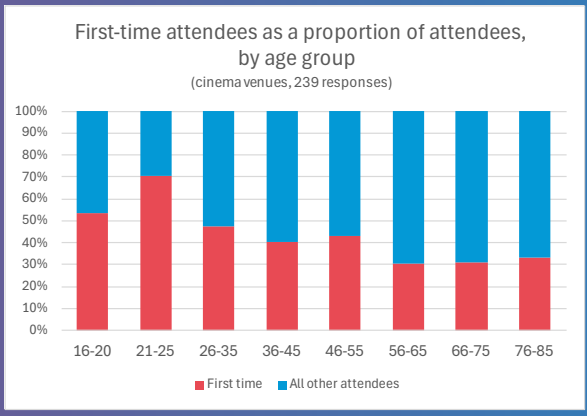


New & Repeat Audiences:

With VR drawing many new attendees, it's possible that existing cinema audiences aren't necessarily built-in VR audiences.

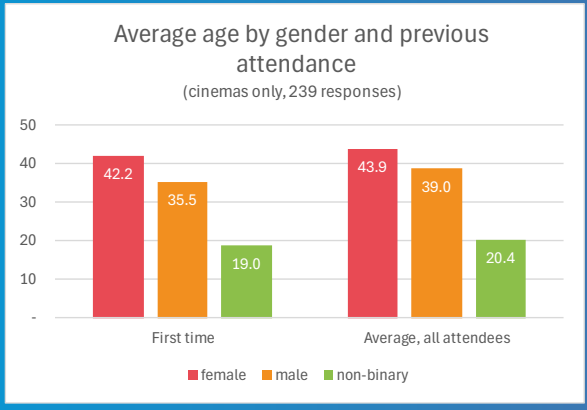
Furthermore, attracting new audiences is positive, but the challenge lies in converting them into regular attendees of other events (although as seen on page 15, there are potential affinities between cinema-going habits and VR attendance to be exploited). This is an opportunity for further research.

(Note that 88% of LYF attendees were first-time attendees, and thus their survey responses are not included in this graph as they skew the overall results.)



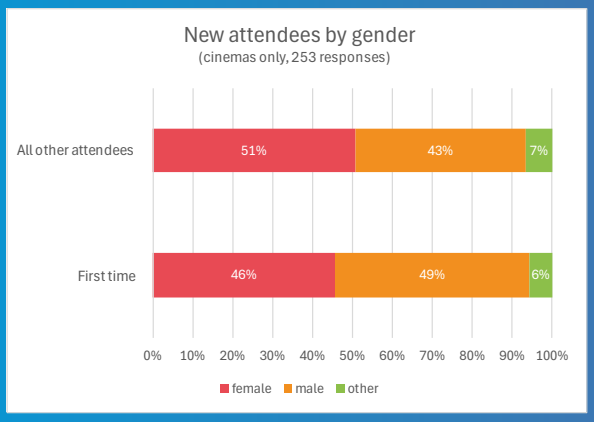
First-time attendees drew from younger audiences (53% of 16-20 year-olds and 71% of 21-25 year-olds).

This may in part be due to the outreach that was done in audience recruitment, but it may reflect higher interest levels in VR by younger audiences.



First-time attendees were correspondingly slightly younger on average than all attendees for each gender category. (Numbers in other gender categories were too low to calculate a representative average.)

New & Repeat Audiences: (continued)



There was a higher percentage of males amongst first-time attendees compared with audiences who had attended the venue previously.

46% of first-time attendees were female, whilst 49% were male.

Audiences indicated a strong likelihood of attending a similar VR event again. This demonstrates not only the positive experience they had but also the skilled and user-centred approach that cinema hosts took to ensure they had a positive experience.

Only 11 participants reported experiencing significant problems during the event.

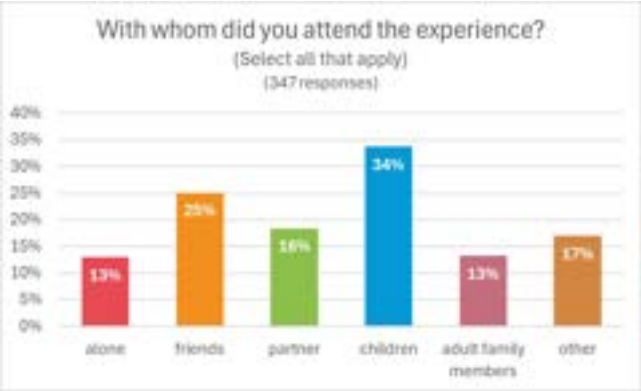
With only a small percentage encountering notable problems, most attendees are likely to return.

However, ensuring even a small percentage don't encounter problems can improve the overall satisfaction – a tricky prospect with unpredictable technology. The more experience hosts gain, the better they mitigate tech problems.

What we learned…
FROM AUDIENCES (continued)

A Social Experience

The vast majority of respondents indicated that they were attending with friends or family members, with only 13% indicating they had come alone. Like cinema, many people view attending a VR experience as a social event.



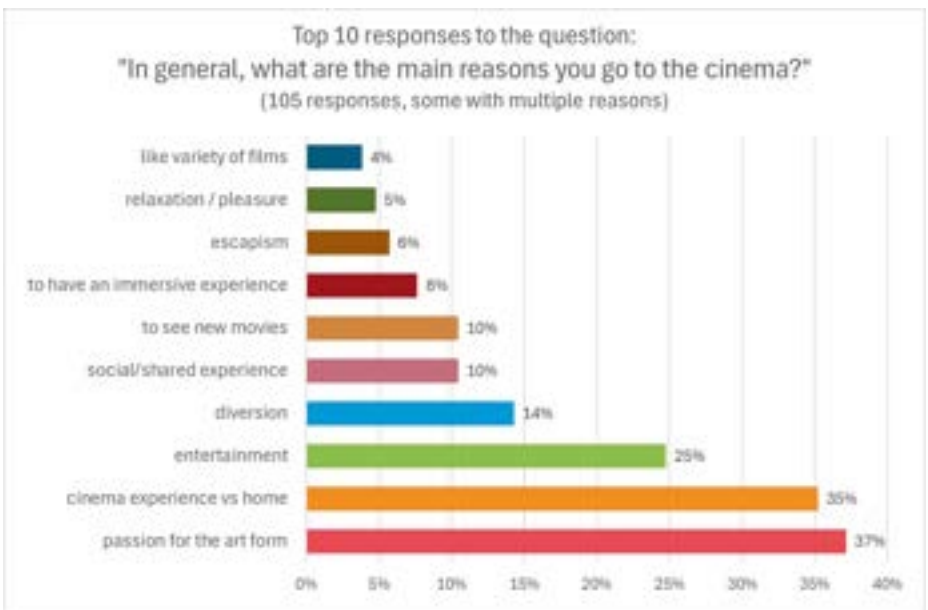
VR Audiences' Attitudes to Cinema

This sociality also emerged in an open-ended question we asked participants about why they attend the cinema, to see what reasons those who were also attracted to attend VR events provided. 10% of respondents said they wanted to have a social or shared experience at the cinema.

Appearing nearly equally as lead reasons were passion for the art form and to have a cinema-viewing experience as opposed to a home-viewing experience (e.g. to see a film on a big screen, or "To experience movies the way the creators intended"). Another relatively key reason for attending was diversion (14%) – an opportunity to be educated or to "kill time". Notably, 8% of respondents mentioned the immersiveness of cinema itself; potentially the immersiveness of VR would have extra appeal for these. Escapism and relaxation also appeared relatively frequently in responses, and the association of the cinema with new releases was also strong. All of these motivations have potential parallels and utility for VR screening.

Less-frequent but interesting themes also emerged in terms of people who enjoy new/different mediums (4%) or attend so they can watch without distractions (3%).

We also asked about their preferred film-watching space – of 96 responses, 69 (72%) indicated the cinema for reasons of the immersive experience and atmosphere (24), the larger screen size and better audio quality (7), the shared experience of watching with others (9), and the sense of occasion and feeling of an "event" (2). Meanwhile, 27 (28%) preferred home for comfort and familiarity (22), ability to control the environment and have fewer distractions (9 – presumably a different kind of distraction than those seeking to escape distractions at the cinema), and convenience and flexibility (e.g. pausing, getting snacks) (8). Whilst we cannot compare these results to a general cinema audience, the "home" responses beg the question as to whether or not these respondents would normally be drawn to the cinema, but yet are perhaps being drawn by VR.

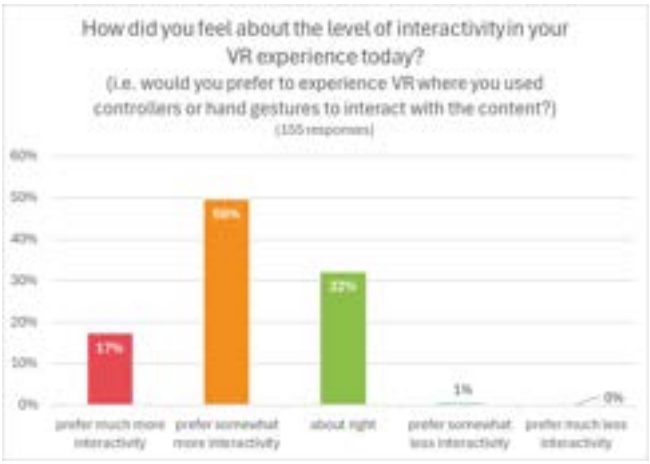


Meanwhile, the majority preferring cinema viewing nonetheless seem to have found affinity with VR.

What we learned...
FROM AUDIENCES (continued)

Interaction

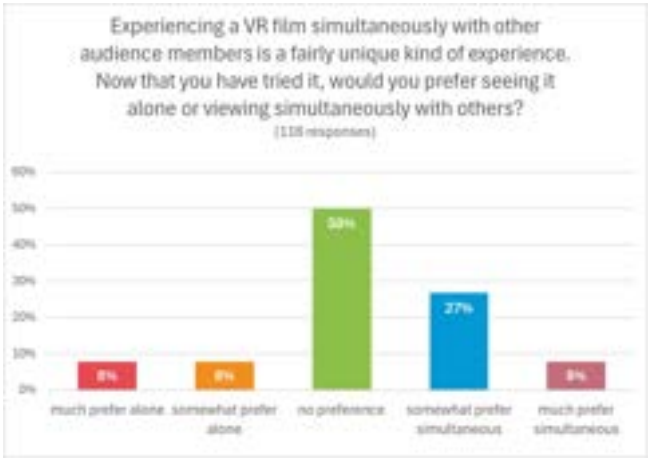
Much of the StoryFutures content screened had relatively low levels of interaction. Asked whether they would prefer more interaction, about 1/3 of respondents felt the level was about right; everybody else felt they wanted more interactivity. This likely aligns with people's expectations of VR.



However, observations from venue hosts suggest that many people might have had difficulty with more interactivity, and would likely need more support. We also checked this preference against the level of technical issues they experienced, and these were not a factor in their preference, suggesting that there is appetite, but programming may then need to accommodate extra time and support, as the challenge remains: can audiences handle complex interactivity, or does this need to be scaffolded? This is explored further in the Sound and Space study results, focusing on non-interactive experiences and how audiences perceive "interactivity": it could involve gestures or gaze rather than full movement.

Group or Individual Experience?

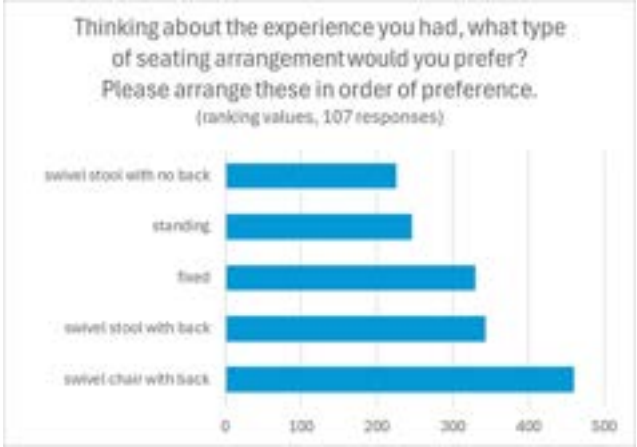
While many were neutral, there was some preference for simultaneous experiences. In comments, while many felt that they were still alone in a headset during the experience, and that it was therefore a somewhat individual experience, there was a sense that other people were present. Many cited the discussions that took place between films or afterward as a positive social element. Several compared this to cinema-going, for example:



> *"Physically I did not feel closer to those around me but I felt that I could immerse myself more in the stories and hence connect more with the messages. The way I like to experience film/cinema is usually in this way, followed by discourse afterwards and regain closeness with those physically around me then. So though I may have felt less close during the videos, I think gained a stronger closeness link post video."* (male, age 26)

Seating Preference

Audience feedback indicated a preference for seating with a backrest. However, cinema seat backs were sometimes too high, limiting mobility and comfort, especially when looking up or leaning. There was interest in swivel seating.



Most didn't feel safe standing in a room full of strangers, particularly novice users. This reluctance to stand might be influenced by the cinema setting, their newness to VR, or the desire to have a more relaxing experience. Cinema seating may be a useful scenario helping new audiences adapt to VR.

PART TWO:

Exhibition Scenarios in Depth –

THE SOUND AND SPACE STUDY

Alongside the Xperience evaluation, we recognised this project provided us an opportunity to explore in more detail the impact of the environment – and the specifics of the cinema environment – on VR experience. In particular, the cinema theatre and the use of ShowtimeVR created the possibility for a seated, synchronised experience, and the opportunity to try something that was beyond the scope of the *Laika* project – using communal surround sound. We did this by simply plugging a synchronised headset into the sound system via a minijack and muting the volume on the other headsets.

We had questions around the audience's associations with the cinema space, and wondered how communal a synchronised experience might feel in that space, with or without headphones. Would removing headphones give a more communal feeling? And if so, what possibilities might that open up for new kinds of VR experience?

To research this, we developed a structured study comparing the three viewing scenarios in terms of enjoyment, feasibility and audience experience.

The three scenarios were:

1) in the cinema using surround sound, without headphones
2) in the cinema using headphones
3) in an outside space (in this case a multipurpose bar space) with headphones.

Research Partner

Nerve Centre agreed to run a series of research events with all scenarios. Having a single venue deliver this ensured that processes were consistent across all three scenarios, varying only due to the setting and sound setup. There would be value in testing other scenarios for comparison (e.g. WMC's BOCs; LYF's outdoor screenings) as well as other types of content for future research.

Cinema - Surround

Cinema - Headphones

Outside - Headphones

PART TWO:
The Sound and Space Study – Key takeaways

The cinema theatre is a feasible and enjoyable space for VR

- Audiences have a predilection for having an immersive experience in a theatre with minimal distractions; this, combined with a comfortable and controlled environment, can make for a more immersive experience than one in a multipurpose space.
- Obviously not all content is suitable for a cinema space, and the goals of the experience will need to take exhibition context in mind. However, cinema theatres provide scale. Creatively, they are a relatively unexplored opportunity for audience development.

According to statistical analysis, the key factors for positive audience experience are…

- The content itself
- Seat comfort
- Audio quality
- Movement/voices of others (in some cases, see p. 22)

Elements that did not have a statistically significant influence on the audience experience included:

- age, gender, technical problems, sound source (headphones vs speakers), environmental sounds in the space.

According to survey responses, therefore, the environment in which VR is exhibited should have minimal impact on the experience, so long as seats are comfortable and audio quality is sufficient.

However:

- People were more satisfied with headphone sound in the cinema than in the multipurpose space.
- People were most comfortable in cinema seats versus chairs in the multipurpose space.
- People were less likely to be distracted by others' presence in a cinema than in the multipurpose space.

This suggests that audience expectations and the associations of the cinema space are particularly conducive to an immersive experience.

Audiences prioritise immersion over social interaction

- Audiences in this study indicated they would usually rather be focused on the content than on other people, and using headphones gave them the most immersive experience.
- Seat comfort is a high priority for audiences and an important factor in their immersion; they generally prefer not to stand, and so long as interaction and movement do not interfere with cinema seats, these are more comfortable and immersive than standing or sitting on stools or chairs.

The cinema theatre offers a scalable and social experience

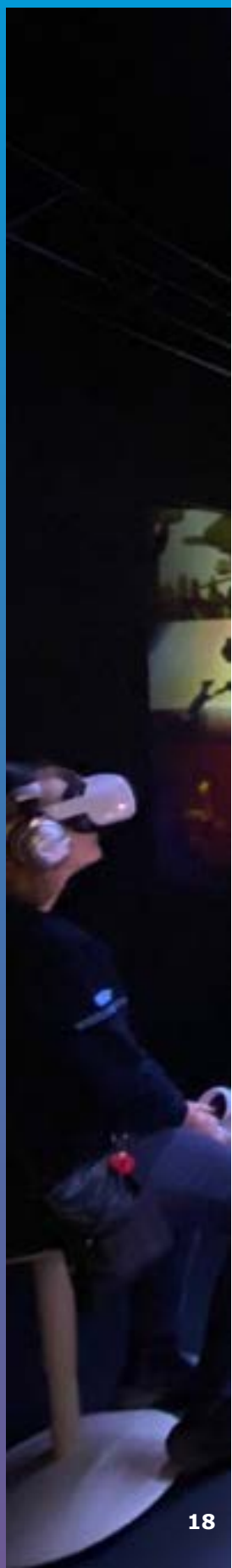
- Cinemas who trialled the synchronised cinema screenings were generally able to streamline procedures to be able to screen to approximately 15-18 people in a single screening, supported by 2 hosts.
- While they find the experience of being in a VR headset isolating to a degree, audiences found that the enveloping activities around the VR experience made it feel more like a shared event.

Surround sound offers possibilities for new kinds of VR experience

- While audiences preferred headphones in the cinema, they preferred surround sound in cinema over headphones in the multipurpose space.
- Using cinema sound creatively and purposefully for VR experiences could provide enjoyable, immersive experiences that audiences will value.
- Purposeful design is required for a more communal or connected experience that incorporates audience members' awareness of each other.

Novice audiences

It is worth noting that this research drew on the Nerve Centre's connections and audiences. Results are likely more typical of a novice audience than the typical 'film fest' VR audience.



THE SOUND AND SPACE STUDY
(continued)

Study Goals

Define value of screenings scenarios for audiences and the benefits/ disadvantages and frictions of each

Identify the value proposition of various screening scenarios for cinemas – provide a better understanding of the business model, resource required, programming potential

Identify the creative opportunity for VR makers – what possibilities are there for particular genres or stories if the distribution network supports specific conditions that audiences value?

Criteria for Selecting Content

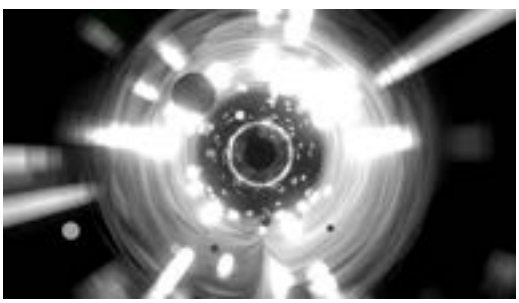
We chose content from our catalogue that would be suitable in both a cinema setting and in an open environment, using the following criteria:

- Suitable for synchronous viewing
  - Able to launch through ShowtimeVR experience management software
  - No user interaction required to start or progress the experience
- Visual format
  - 3D designed (not 360 video)
- Audio format
  - stereo vs spatial (i.e. minimum binaural sound, not overly affected by head position)
  - primarily nondiegetic sound (i.e. voiceover or ambient sound vs dialog or spatialised sound effects)

Selected Experiences

We chose *Monoliths*, with its poetic monologues about three northern UK environments; *When Something Happens*, a spoken word and musical experience about the history of the cosmos, and *Kindred*, an animated adoption story. In the research, these are indicated as S1, S2 and S3 respectively. We did not generally find significant differences between the three films, but where we did, these will be noted.

S1: Poetry
Monoliths – Pilot Theatre



S2: Spoken word
When Something Happens –
Boom Clap Play

S3: Narrative
Kindred –
Electric Skies

THE SOUND AND SPACE STUDY
(continued)

Research Process

- Get people into the space and seated.
- Provide information about the process and have them complete informed consent section of survey.
- Complete initial questions about themselves and their cinema and entertainment habits.
- View film one (S1) – complete S1 survey.
- View film two (S2) – complete S2 survey.
- View film three (S3) – complete S3 survey + questions about overall experience.
- In six of 15 sessions the researcher was present to run focus groups after the session.

Incentivisation

For the initial testing sessions, participants were provided free tickets to the event but not incentivised further. The original agreement was for Nerve Centre to run three sessions of each scenario. After an initial assessment of data, the project funded Nerve Centre to run one additional screening of each scenario, in which focus groups would also take place, to ensure we had sufficient data on each scenario for statistical analysis and to follow up qualitatively on initial findings. To aid recruitment and compensate these participants for the focus group time, attendees of these sessions were offered £25 Nerve Centre gift certificates (funded by the research project) for taking part.

It is worth noting that cinemas found gathering responses to the general audience survey that supported the overall programme challenging; audiences were willing to complete short, paper-based feedback forms but hosts had difficulty converting them to the more detailed web-based survey. As the Sound and Space Study was advertised as a research event and the survey embedded into the experience, there was nearly 100% survey completion.

The learning here is that cinemas could be an excellent test-bed for future VR content, but recruiting audience responses needs more thorough integration into any research process, and incentivisation may also be helpful.

Analysis

The study was developed collaboratively by the interdisciplinary StoryFutures Audience Insight team, as was the interpretation of results. Quantitative analysis was conducted by Maruša Levstek and Andy Woods, the team's psychologists. Qualitative analysis was completed by Laryssa Whittaker, the team's ethnographer and anthropologist.

Factors Considered

Gender by scenario:

All three scenarios had a similar demographic balance:

- 45-55% male
- 33-39% female
- 2-7% nonbinary
- 10-16% missing/prefer not to describe
- Age: mean 23-34 yo in each scenario, lowest mean in the outside-headphones (23.4)

Industry insiders:

In each scenario, a range of 20-40% identified as industry insiders in some way (working in film, TV, or cultural industries).

Technical issues:

Ranked by participants on a scale of 1-3 (none, some, significant), there was no difference between scenarios.

THE SOUND AND SPACE STUDY
(continued)

Results

Overall audience response – by film

To understand what affects audience response, we measured the following key variables: enjoyment; presence (to what extent they felt like they were part of the virtual world); and absorption (to what degree they were absorbed in the experience).

Because we were also experimenting with headphones versus surround sound, we also wanted to understand how people perceived audio levels (too loud/too soft/just right) and audio quality (to what extent the audio contributed to their enjoyment). We asked them to rate all of these for *each* experience on a scale from 1-5. The asterisked variables (*) in the below table indicate statistical significance in terms of the difference between the scores of each film.

Mean	Enjoyment*	Presence*	Absorption*	Audio levels	Audio quality*
All films	4.0	2.6	4.0	3.7	4.0
S1	3.6	2.4	3.7	3.6	3.9
S2	4.2	2.7	4.2	3.8	4.1
S3	4.2	2.6	4.1	3.8	4.2

Enjoyment, Absorption, and Audio Quality scores are quite high overall. The Presence levels are not very high, likely because these are short, passive experiences – perhaps this is to be expected. But the differences between the films were statistically significant – in other words, audiences felt most present, absorbed, and enjoyed most *When Something Happens* and *Kindred*. The small differences in audio levels were not statistically significant between films.

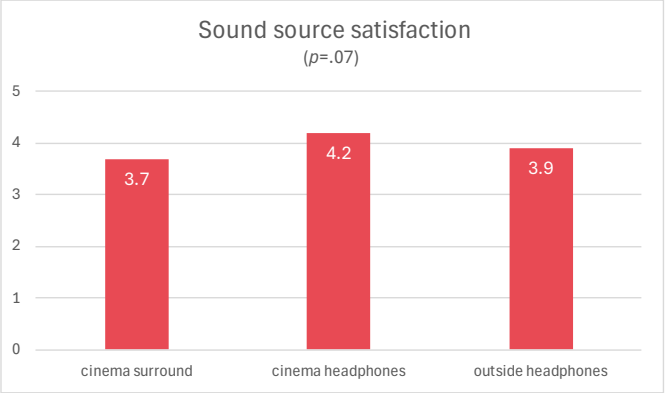
The table does not indicate the reasons behind the slightly lower scores across the board for S1 (*Monoliths*), a piece that has been very well-received elsewhere. Some speculations are that people might have related slightly less to the content, if perhaps those involved in the research were not the target demographic for this film; it was also slightly longer and less linear in comparison to the other two experiences. However, one very likely reason was also that because it was the first film, people were still adapting to the VR experience – by the time they got to S2 they had worked out the fit of the headset and were more comfortable.

We kept the playing order consistent as a control of the study, but further research that varied the playing order might help us to answer these questions.

THE SOUND AND SPACE STUDY
(continued)

Sound source satisfaction

A straightforward measurement of audience satisfaction with the sound source demonstrates greater satisfaction with headphones than with surround sound – although this doesn't tell the whole story, as the following results go on to demonstrate. The statistical significance of these results is marginal.



Examining potential variables that affect audience experience

We wanted to understand any potential interactions between a wider set of variables to take account of the multiple factors within audience experience. We brainstormed a list of potential factors that we thought could potentially be significant for an audience's experience, or that could potentially confound satisfaction with the sound source or any of the other factors we were trying to measure.

The factors we explored included a set of variables around the experience itself and the primary factors about the environment it was shown in; a set of demographic details about the audience; and specific questions about the sounds they might be hearing, to drill down into any differences between sound/space scenarios.

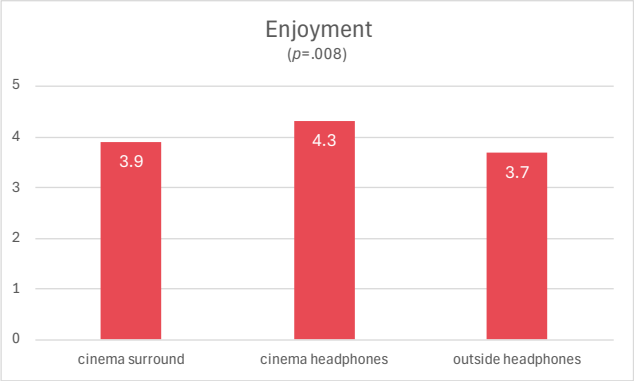
The research shows that most of these *don't* have an impact on the audience experience, but it is worth understanding them in the context of particular significant variables: enjoyment, presence, absorption, and connection. This detailed analysis follows.

THE SOUND AND SPACE STUDY
(continued)

Enjoyment by scenario

Comparing the three scenarios, mean enjoyment was highest in the cinema headphone scenario. The differences in enjoyment between scenarios were statistically significant. Thus, it seems like the cinema space is more appealing in general, but people feel like headphones work best in them, better than surround sound.

However, our statistical models examined a number of other factors in enjoyment to determine what else influences enjoyment.



Factors that matter for *enjoyment*

In our statistical model for enjoyment, the scenario (cinema-surround, cinema-headphones, outside-headphones) does not have a significant impact on enjoyment, nor do the audio levels or quality on their own. Most of the sounds were not significant for enjoyment.

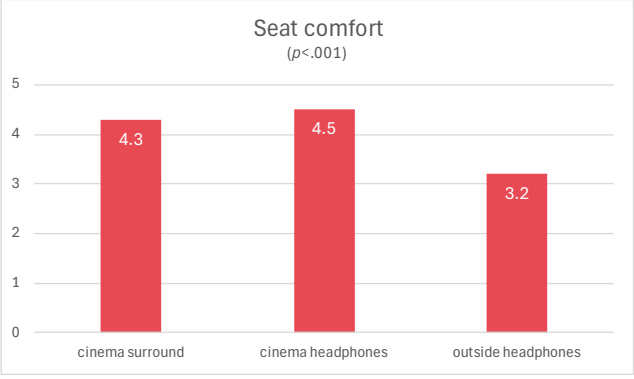
The film itself (experience) is significant, i.e. some were more enjoyable than others.

More comfortable seats also yield greater enjoyment. In the outside scenario, there were hard wooden seats, so seat discomfort may have reduced the audience's enjoyment in that condition.

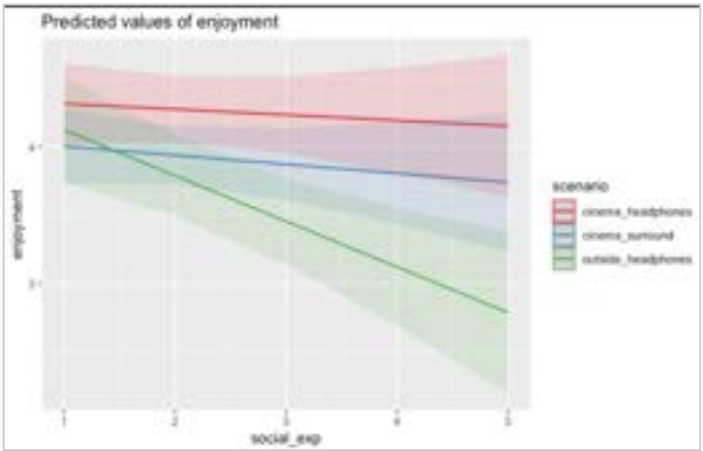
Interestingly, when people heard the voices of others (audience voices) during the VR experience, that increased enjoyment. This is in contrast to the social awareness variable – when people were more aware of others in the space, enjoyment scores were lower – but "social awareness" included hosts moving and helping others and any talking in the space. The fact that hearing audience voices increases enjoyment suggests an awareness of others' responses to the content.

Focus on: Seat comfort

Cinema seats were deemed most comfortable, to a statistically significant degree; interestingly, those seats are found even more comfortable by those wearing headphones. The fact that seat comfort was slightly higher in the "cinema-headphones" scenario may suggest that perhaps having a more "internal" experience in the cinema with headphones translates somehow to greater comfort, although the difference between cinema-surround and cinema-headphones is slight – an area worth further research.



THE SOUND AND SPACE STUDY
(continued)



Focus on: Social awareness

We examined whether people were more socially aware of others dependent on scenario, and what impact this had on enjoyment.

Overall, people were relatively unaware of others (overall 1.86 on a scale of 5, where no one rated awareness 5). However, the statistical model shows that increased awareness of others had a detrimental effect to enjoyment if they were in the outside event space (green line) using headphones – but did not have a significant effect in the cinema (red and blue lines).

This leads us to think about the qualities of the space itself. If enjoyment is generally higher despite social awareness of others in the cinema space, this may suggest that the norms of the cinema space better accommodate selective attention to those in the room in favour of focusing on the entertainment, whereas in a multipurpose space people might be more inclined to distraction. As well, the cinema has lowered lights, a carpeted space, softer seats and sound absorbing walls – things which may both actually dampen sound and also communicate expectations of a quieter environment to audience members. These audience expectations and associations with the space – the expectation to go into a cinema to perhaps lose oneself in a film – perhaps isn't "activated" in a space outside a cinema, and so audiences become more aware of the environment.

Factors that matter for *presence*

With the statistical model to predict presence, we identified few statistically significant predictors of presence, potentially due to low presence levels overall.

The film itself and the sound source had marginal, non-significant impacts on a sense of presence. This would be valuable to study in future research, exploring different kinds of content. Note that there was no difference in sound source satisfaction between cinema headphones and outside headphones.

Social awareness also had a negative effect on presence – perhaps as expected, since the more one is aware of others in a physical space, the less one feels present in a virtual space.

Factors that matter for *absorption*

Another model predicting absorption demonstrated statistically significant positive effects of audio quality, seat comfort and – curiously – the ability to hear movement of hosts or audience members on absorption. This final variable needs more research.

There were slight positive effects on absorption from satisfactory audio levels and the ability to hear others' laughter.

Negative effects were dependent on the film, awareness of others around and hearing other sounds from within the space (doors, A/C etc.)

THE SOUND AND SPACE STUDY
(continued)

Audience reflections on *closeness* and *connection*

Answers to a question on the sense of closeness with others showed that participants did not experience a high degree of connection with each other, regardless of scenario: score means were 2.7-2.8 on a scale of 1 (fully disagree) to 5 (fully agree) with the statement, "This experience made me feel closer to those around me".

However, qualitative results showed a more nuanced picture. Within the film, they felt alone and absorbed in the experience. Some even indicated they felt secluded or isolated. However, a sense of connection comes from the enveloping activities – the discussions before and after films, that make it seem more of a shared event. Some shared that the discussions were enjoyable and created a sense of connection even if not during the experience.

> *"I feel that the cinema experience involves a viewer sitting in a static position but wearing the headsets reduces your sensing awareness and awareness of surroundings. That takes away from the sense of a communal experience. However, the experience provokes a lot of discussion afterwards which creates a sense of communal experience in reflection."*
> (female, 44, cinema surround)

One of our hypotheses for this study was that people might have a more communal experience in the cinema surround scenario, where their sense of sound was more open to those around them. It seems not. However, the expectations and reactions of audiences seem to align much more with cinema habits, where they want the ability to focus solely on the content during the experience, and to envelop the experience socially. At any rate, it seems the visual stimulus is primary and creates a sense of isolation. Should a producer wish to create a more communal experience using cinema surround sound, it seems there would be a need to overcome visual isolation, perhaps by experimentation with other senses or intentional incorporation of this goal into the experience, perhaps encouraging people to speak aloud or respond in some other way.

Frictions and duration

We heard the usual feedback from audiences about heavy headsets, nausea and eyestrain: VR headsets themselves remain the greatest source of friction and continue to place limitations on the length of time audience members can tolerate wearing the headset.

This has programming implications; breaks between experiences may be valuable to many audience members. The development of longer-form content may need to incorporate short "intermissions" for people to rest their eyes and heads.

> *"I think that having pauses between 3 films works well. Longer sessions would be too much, this felt right. I liked the variety and content of the 3 films. It showcased different approaches to VR which was interesting."*
> (female, 31, outside headphones)

Further study

In terms of understanding the effect of a range of variables on immersive experience, it would be worth testing a larger variety of VR experiences. In particular, it would be worthwhile testing more interactive, asynchronous experiences and incorporating variables into these models to predict enjoyment, absorption and presence.

Additionally, there is more scope for sound research. The sound of the VR pieces we used was designed for headsets, not cinema sound systems, and although projecting via minijack through the cinema speakers provided a satisfactory experience, clearly it would be worth testing soundtracks engineered for the superior capabilities of a cinema sound system.

THE SOUND AND SPACE STUDY: Implications for VR exhibition

Conclusion: The most feasible and enjoyable scenario is...

In this study of content that had low levels of interactivity, and were largely passive VR storytelling experiences, the most enjoyable and feasible exhibition scenario was that of the **cinema with the headphones**. People did also find the cinema with surround sound a feasible option, but may have been slightly less immersed in this environment. The audience in the cinema is more inclined to be focused and absorbed, may be more tolerant of sounds around them when they are about the experience, but more affected by unrelated noise.

Obviously not all content is suitable for a cinema-headphones or cinema-surround scenario. However, these results have revealed the affinities between *immersion* and the cinema space. Audiences may bring with them their experience of sitting back to be entertained and focused on quality content in the cinema, and this, along with practical matters such as the comfort of cinema seats, seems to spill over into a positive audience experience.

In terms of cinemas' role in future VR distribution, Xperience has revealed that there is more collaboration needed between VR producers and exhibitors to plan and deliver VR experiences – particularly for VR that is more interactive or requires a larger space for users to engage. Therefore, cinemas will, on one hand, need to continue to innovate in their use of space and marketing, hosting and onboarding practices.

On the other hand, the audiences' affinity for the cinema theatre space, and cinemas' own affinity for film-like content (i.e. the popularity of synchronised cinema screenings of *Laika* in the programme) suggests that synchronised screenings in cinema theatres provide a scalable, feasible route for developing the VR audience. For VR filmmakers seeking to captivate an audience and tell a compelling story with beautiful artwork and sound design, it is a viable exhibition model.

Creative possibilities

Creatively, while the cinema space presents some limitations in terms of interactivity and field of view in the design of VR experiences, it also presents some creative opportunities that this study has shown will likely be very appealing to audiences:

Interaction and social experience

- Designing something for this scenario that could provide a different kind of social VR experience by incorporating audible audience response into the experience; results suggest this may amplify enjoyment and a sense of connection.
- Can provide a different kind of "interactive" experience, not about locomotion but meaningful (small scale) interaction (that does not disrupt experience progression so that synchronisation is maintained) with controllers, hand gestures, or gaze.

Soundtracks for cinema speakers

While people indicated slight preference for headphones, cinema speakers provide opportunities for different kinds of VR experiences:

- High quality soundtracks designed for the capabilities of cinema surround sound systems could exploit the ability to direct sound in the space around the audience.

Layering sound

- Sound sources could be combined and layered, where audiences have a headset sound source heard via headphones or perhaps silicone earmuffs that let in more external sound.
- Audiences could hear diegetic, intimate sounds from a near sound source and more ambient or environmental sound from cinema speakers.

Recommendations

The Xperience programme has helped the partner venues to build an important set of skills for exhibiting VR within their communities. They have all now trained staff, experienced a number of programming scenarios, and connected with new and existing audiences who are hungry for more content.

Resource for an ongoing VR network

This work, however, requires resource, and venues will need some or all of the following to continue to develop their VR offering:

- Access to content that they can screen at low/no cost to build audiences.
- A collective, network, or organisation to act as distributor, helping to set fair rates for creators and venues that will help them build a business model for screening VR.
- Resource to continue to network with each other, share best practice and perhaps collectively curate or commission content.
- Integration of the funding of VR with support for the exhibition of VR.
- Partnerships with industry to underpin this development (Meta, other tech companies).

At present, venues see the benefit of offering VR as showing themselves to be vanguards of a new art form and type of experience, exposing their audiences to the possibilities of immersive storytelling. However, Xperience has shown that cinemas have the potential to be a valuable part of the immersive ecosystem, providing a missing route for audiences to engage more regularly with immersive content, contributing to developing VR audiences. In this way, they could be a vital resource to the emerging immersive industry.

Marketing

Marketing VR remains a challenge to be solved collaboratively between producers and venues.

- Work needs to be done to help producers understand the kind of audiovisual content that venues need to market their experiences, and this needs to be factored into the production budget and timeline.
- More research and sharing of best practices between venues is needed to understand how to reach new and existing audiences. For example, efforts to use social media to promote the VR programme proved more difficult and less effective than desired.

Need for multiple levels and types of content

- Whilst audiences indicate that they want more interactivity, in fact (so far) many are often quite satisfied with less interactive experiences. In particular, while so many users are novices, there is a need for high quality experiences that tell great stories without the need for a lot of interaction; instead, developers can take advantage of the encompassing 3D nature of VR to help audiences achieve a kind of presence and focus on content that they can't even get through film. There is value in beautifully-made, 'passive' VR content – for new audiences, and for people who would just like to sit back and 'lose themselves' in a beautiful experience or a great story.
- More interactive and longer-form content will be eagerly received by audiences, particularly as they become better acquainted with the medium, but will require greater collaboration between producers and venues in terms of:
  - Providing hosting guides
  - Design of exhibition space
  - Developing marketing plans
  - Determining pricing models

Scalability

- Scalability of experiences is still a challenge, and synchronised experiences offer opportunities for scalability.
- Cinema theatre spaces can be very amenable to audience experience, allowing a comfortable and scalable experience, with the selection of appropriate content and the development of more content that can work in this space.

Appendix: Guidelines for Cinema Exhibition

The Xperience network continues to exist beyond the end of this pilot and could serve as a distribution network for new and existing VR experiences. The tables on the following pages represent guidelines emerging from the Xperience programme in terms of technical and design specifications suitable for the exhibition spaces at these venues. These guidelines could be used to help with commissioning, developing and programming content that works in specific spaces that these cinema and arts hubs offer.

The guidelines are the result of not only the Sound and Space Study but also the experience that the venue staff gained through the programme. They thus represent the huge learning curve that staff had – no one had an encompassing view of these considerations at the beginning of the programme. These guidelines are a starting point and can be expanded for other design factors that take into consideration the timing, sound and spatial elements of exhibition.

These guidelines can also assist developers. Development of non-linear, 3D and interactive forms of VR requires a lot of design decisions, and some options play out better in some exhibition contexts than others. If the exhibition context is known, it can impact the design choices; likewise, with these guidelines developers can consider optimal exhibition contexts for their distribution plans.

It is worth noting that there may be exceptions to these guidelines as they have been developed based on existing content; there is certainly room for experimentation, especially as new types of experiences are developed, so the guidelines are best considered a framework for thinking through how different factors might affect user experience.

The guidelines follow on the next two pages – a first page of guidelines for VR exhibition in general, and a second page specific to the setups currently used by Xperience venues.

The design features of a VR experience, and the goals the developer has for the piece, call for certain exhibition formats. Some design choices may make group experiences more suitable, and others may be better for individual experiences. Some VR pieces may be able to be played through in an entirely synchronised experience; others will have timing (or other) variations that mean synchronised experiences are not possible.

The table below is relevant to any VR exhibition scenario. It suggests which timing setup may work best, or be most feasible, according to different design features. It also suggests which timing setups work best with particular experience goals.

Timings			
	Synchronous: experiences launched via ShowTime simultaneously and run on rails to finish at the same time	**Simultaneous:** audience members are all doing the same experience but they may not be launched at the exact same time, or may have run-time variations due to interaction, and therefore start or end at slightly different times	**Asynchronous:** experiences launched independently; people may be watching different experiences or interactive experiences
Design features			
Embedded start mechanism	not feasible	feasible	feasible
On rails - no variation to play time	feasible	feasible	feasible
Interactive elements affecting play time	not feasible	may be feasible but any resulting variation in time needs to be considered (e.g. how does it impact a group experience? can audience members exit before everyone has finished? etc.)	feasible
Interaction with objects via controllers or hand tracking	maybe, but only if this doesn't affect play time		feasible
Interaction with objects via gaze			feasible
Allows/encourages movement in 3D space via movement in physical space			feasible
Allows/encourages movement in 3D space via controllers			feasible
Experience goals			
Primary experience goal	immersion	immersion and/or interaction	immersion and/or interaction
Primary social goal	group experience	group or individual experience	group or individual experience

This table notes which sound setups will work best depending on sound design features. Note that certain sound setups are suitable for particular timing setups.

Sound setup			
Design feature	**No headphones – surround sound from one common source, individual headset volume off** (suitable for synchronous experience only)	**No headphones – built-in individual headset speakers** (may be suitable for simultaneous or asynchronous experience if there is enough space between participants, but test thoroughly to ensure 'sound clash' between headsets is not distracting)	**Individual headphones** (suitable for synchronous, simultaneous, or asynchronous experiences)
Soundtrack contains high levels of dialogue	may not be satisfactory, test for sufficient synchronisation	may be too distracting, test for sufficient synchronisation	feasible
Soundtrack mainly nondiegetic (e.g. voiceover, ambient sound)	feasible	feasible	feasible
Stereo sound	feasible	feasible	feasible
Spatial sound	may not be feasible if there is a high degree of spatialisation that would be disorienting to individual headset wearers	feasible	feasible

In the Xperience programme, there were three main space + sound setups. This table combines the design features from the previous page to consider how VR experiences might be exhibited within the common Xperience venue setups (thus there is some repetition). The assumption is that for groups, the experiences are launched with software such as ShowtimeVR.

Space + Sound Setup			
	Cinema - Surround Sound (No Headphones)	**Cinema - Headphones**	**Multipurpose Space - Headphones**
Design feature			
Embedded start mechanism	unlikely to be feasible	feasible	feasible
On rails - no variation to play time	feasible	feasible	feasible
Interactive elements affecting play time	not feasible	maybe, depending on how much of an effect on playtime	feasible
Interaction with objects via controllers or hand tracking	avoid or test thoroughly	avoid or test thoroughly	feasible
Interaction with objects via gaze	feasible (if no effect on playtime)	feasible	feasible
Allows movement in 3D space via movement in physical space	not feasible	not feasible	feasible
Allows movement in 3D space via controllers	avoid or test thoroughly that there is sufficient physical space to use controllers in the cinema seats	avoid or test thoroughly that there is sufficient physical space to use controllers in the cinema seats	feasible
Field of view	180 degrees	180 degrees	any
Sound design			
Soundtrack contains high levels of dialogue	avoid or test thoroughly	feasible	feasible
Soundtrack mainly nondiegetic (e.g. voiceover, ambient sound)	feasible	feasible	feasible
Stereo sound	feasible	feasible	feasible
Spatial sound	avoid if it only projects the orientation of one headset of the group of headsets	feasible	feasible
Experience goals			
Primary experience goal	immersion, comfort	immersion, comfort	immersion and/or interaction
Primary social goal	group experience (enhance with social activities planned into event)	group experience (enhance with social activities planned into event)	group or individual experience
Possible enhancements	cinema screen and sound pre-/post-experience; cinema sound during experience	cinema screen and cinema sound pre-/post-experience	additional props or sets for 'scene-setting' and onboarding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