RECOMMENDATIONS FOR VIRTUALISING HOLOCAUST MEMORYSCAPES

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FOREWORD

Virtual reality and augmented reality experiences play an increasingly significant role in Holocaust memory and education as professional memory institutions continue to explore the affordances of integrating digital technologies into visitor and user experience. There is a rapidly expanding list of projects experimenting with cinematic virtual reality, photogrammetry, digital mapping, 3D modelling, 360-degree on-location survivor testimony as well as a growing portfolio of augmented and mixed reality mobile and tablet applications.

Principally being implemented as spatial technologies, several memorial sites and museums are exploring the possibilities of creating 3D graphic reconstructions of former sites of Nazi persecution in AR/VR such as the digital reconstruction of Falstad Concentration Camp, the Here: Spaces for Memory App at the Bergen-Belsen Memorial Site, the Sobibor AR exhibit, the project Auschwitz VR as well as the 360-degrees-walks at Neuengamme Concentration Camp Memorial. Going further, some digital initiatives are using VR/AR/MR technologies to zoom in on historical documents, testimonies and artefacts, notable projects include the ARt AR App at the Dachau Memorial Site and Museum which revivifies historical and contemporary drawings and paintings in-situ at the present-day site, the Anne Frank House VR which invites visitors to navigate the annex through a series of digital objects, and The Last Goodbye VR experience which foregrounds survivor testimony within Majdanek, the similarly survivor-driven Walk with Me at The Melbourne Holocaust Museum and numerous films that shape the Illinois Holocaust Museum and Education Center's The Journey Back exhibition space.

While it is important to note that VR technology is not new and has existed for more than 30 years, it is only recently that the technology has become more widely accessible in the heritage and museum sectors (in part, due to the affordability of headsets and devices in the domestic market). The proliferation of VR and AR projects within the sector, then, raises critical questions regards the opportunities for digital Holocaust memory practice and education while also bringing to the fore issues of curation, contextualisation, visitor experience and accessibility.

This report serves as an important first step in this work. It was created as part of the research project 'Participatory Workshops - Co-Designing Standards for Digital Interventions in Holocaust Memory and Education', which is one thread of the larger Digital Holocaust Memory Project at the University of Sussex. The participatory workshops project have focused on six themes, each of which brought together a different range of expertise to discuss current challenges and consider possible recommendations for the future. The themes were:

- AI and machine learning
- Digitising material evidence
- Recording, recirculating and remixing testimony
- Social media
- Virtual memoryscapes
- Computer games

In this report, you will find the recommendations and a suggestion of who could bear responsibility to take each of these on; a summary of the workshop discussions; and a list of the participants who contributed to this work. There will also be a complementary action plan published alongside this report. The recommendations and discussion presented here summarise participant opinions, which might not reflect the opinions of project leads or any individual participant in full, or all participants in consensus. Whilst we have offered participants the opportunity to review and discuss the development of these guidelines, we have tried to retain differing perspectives rather than suggest there was homogeneity in opinion. The discussion presented is an aggregation of professional opinions informed by a diverse range of experiences and expertise. We present ideas collectively, rather than attributing specific points to participants. All participants are, however, acknowledged as contributors to this report.

This document does not claim to be the last word on using virtual, augmented or mixed reality for the sake of Holocaust memory and education, rather we recognise that this is very much the beginning of a longer conversation. We hope that the immediate recommendations suggested in these guidelines will help organisations and individuals to prioritise the work needed to most effectively make use of these technologies to deal with the difficult material related to the Holocaust.

Dr Victoria Grace Walden

Project Lead
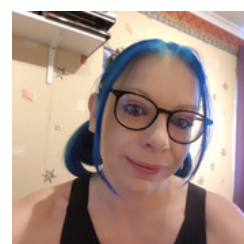
RECOMMENDATIONS

For each of the recommendations we outline here, we also suggest who could take responsibility for this work. They are addressed at a wide range of stakeholders from the tech industry to Holocaust organisations, academic researchers to funding agencies. Where a recommendation is part of the project team's next steps action plan, we have noted 'Project Leads'.

01

01 — Project Leads

Collate existing approaches to impact analysis in visitor and wider research studies from institutions willing to share and disseminate these on a sector-wide Hub. Analyse existing practice and create an impact analysis template and support.

02

02 — Project Leads

Create an advisory board and technological tasking group to develop working papers, hypothesis and project outlines which can be discussed within the Holocaust sector and can be used to present initial designs that make use of the computational potentials of VR/AR and MR.

03

03 — Project Leads

Establish a working group of those who have already developed VR, AR or MR Holocaust projects, to share challenges, failures, and lessons learnt – disseminate the findings of the group to the wider sector through the hub. Develop upon this working group with further mechanisms for sharing of practice through open and reusable data including evaluation and media.

04

04 — Project Leads and Holocaust Organisations

Convene an international cross-disciplinary group of participants to take part in innovation sprints hosted by Holocaust institution(s). This would provide a space for responsible experimentation, enhance digital literacies within the sector, and continue debate about the wider issues explored in this report, particularly with regards to impact data, user groups, inclusive-design, and educational frameworks.

05

05 — Holocaust Organisations and Creators

Challenge the assumptions that VR, AR and MR are best used for reconstructing historical spaces. Prioritise experience design, active and experiential learning, and historical enquiry.

06

06 — Project Leads

Create training resources to enhance digital literacies related to VR, AR and MR for those working in the Holocaust sector as well as Holocaust literacies for digital creators.

07 — Funding Bodies

07

Re-evaluate funding models for digital interventions in Holocaust memory and education, reorientate them to long-term, sustainable, sector-wide digitisation plans rather than short-term projects which prioritise specific platforms. Highlight the value of open data and open source, making it a requirement for grants where sensitive to do so.

08 — Funding Bodies

08

Provide funding for sector-wide impact analysis of VR, AR and MR projects. This should include analysis of the implications of interactions, usability, what users learn/ take away from the experiences about the history of the Holocaust, and ethical challenges.

If you are interested in working towards any of these recommendations, we would welcome you to contact Project Lead Dr Victoria Grace Walden (v.walden@sussex.ac.uk) with the Subject Line: XR Recommendations. We are keen to track the impact of the report after publication, support ongoing work in this area, and may also be able to put you in contact with other organisations interested in similar actions to support collaborative work.

DISCUSSION SUMMARY

The following pages summarise the workshop discussions which informed our recommendations. Each sub-section identifies one of the priorities agreed by participants at the beginning of workshop 1 (see the methodology that follows this section for more details on our approach).

1.   Working Definitions

The workshop commenced with the sharing of some basic definitions of key terminology, but not without recognising that these definitions were shaped by the Project Team's disciplinary backgrounds and that one of the issues we face in bringing digital technology into historical and educational spaces is the challenge of communicating across disciplines, in which the same terms may be attributed different meaning. Nevertheless, it was felt starting from a point of shared definitions was useful in stimulating discussion.

Virtual Reality (VR) – we approach the question of the interaction of humans with virtual and mixed reality systems from the perspective of traditional psychophysics, where in a controlled fashion physical sources of sensory stimulation are replaced by artificial ones that are tightly controlled by the experimenter (Bernardet et al. 2011; Verschure and Wierenga 2021).

Augmented Reality (AR) – technologically mediated layers appearing over the physical world, e.g. the technology augments or enhances our lived-world environment.

Mixed Reality (MR) - augmented reality but blending lived-world and computer-generated object interactivity.

Extended Reality (XR) – umbrella term for VR/AR/MR.

Interactivity – in relation to digital technologies, refers to computer systems being responsive to user input / to other computer systems, and vice versa. Often used to express a symbiotic relationship between computational and human agents. One issue that interactivity raises for experiences is what meaning is embedded in any interaction? E.g. how do we think purposefully about embodied (inter)action in tasks and environments beyond what Anna Reading (2003)referred to as simply pushing buttons?

Immersion – while often used as a term to refer to virtual reality, e.g. 'immersive technologies', it actually has a long pre-digital history associated with affective experiences designed to create illusion or to interpellate views as a propaganda tool (Walden 2021).

Presence – is a state of consciousness that may be concomitant with immersion, and is related to a sense of being in a place (Slater, Mel and Wilbur, 1997).

Gamification – in media studies, this term is more often used to refer to the use of game logics to encourage competitive, repetitive behaviours which interpellate users to act like consumers. In this sense, it is differentiated from more productive, explorative notions of 'game' and 'play'. In contrast, pedagogical thinking tends to more frequently use this term in reference to any type of game-like activity for learners.

One of the key points raised in the workshop was that we must avoid using technology for technology's sake and rather ask ourselves what are virtual/ augmented/ mixed reality specifically good for? Some suggestions about their affordances included:

-    **Spatial technologies.** Encouraging engagement with space, helping people to simultaneously navigate the space they inhabit whilst also presenting information in it.

-    **Encourage active, experiential learning.** Offering opportunities for embodied and personalised experiences which can productively enhance learning. As such, they can be powerful modulators of memory, bringing brain, body, space and historical content into relation with one another.

-       **Multi-vocal.** VR/AR/XR technologies offer opportunities to layer historical information, zoom in and out of stories and traverse spatio-temporal boundaries between sites. They have the potential to include multiple perspectives, voices and narratives which can encourage reflection on varying degrees of proximity and distance to the past and highlight historical complexity and ambiguity whilst challenging simplistic and canonic narratives.

-       **Modular and responsive computational environments.** Continuously able to be updated, they have the power to bring to any user's attention a diverse range of individual objects, which can be redistributed, rearranged, and recalled in potentially any number of experiences. There is also the potential to connect experiences between multiple users and/or sites.

-       **Multi-sensory.** Most VR/AR/MR projects foreground the visual, whilst olfactory, auditory, and haptic forms of immersion have been less considered. Nevertheless, immersive experiences work best when they engage at least two senses and this should be encouraged in project design.

2.   Trauma, Emotion and History

A recurring theme in the workshop was the perceived tensions between the oft-repeated suggestion that VR can be an 'empathy machine' (Chris Milk's 2015 Ted Talk) and 'time machine' providing powerful emotional encounters with the past, and the aims of Holocaust education, which often seeks to engage learners by framing historical sites, narratives and objects through **personal stories.** Some participants debated the focus on emotion, referring to studies which indicate that certain emotions have different effects on memory and that **negative emotions may lead to a confabulation of context** (see Burgess et al. 2011; Bisby and Burgess 2013). Thus, the challenge for Holocaust education in this context is integrating new media technologies which enhance learners' ability to confront traumatic scenarios without encouraging visceral trauma by giving them the sense that they can 'walk in the footsteps' of those who experienced this past. Indeed, such illusions of mimicry not only risk over-identification with historical figures but in the German context, violate the 1976 Beutelsbach Consensus, a set of three central didactic guiding principles for pedagogical practice which include Überwältigungsverbot – a prohibition to overwhelm.

This led to some discussion about point-of-view:

- What role(s) can designers assign to the users and who's point of view should they be encouraged to occupy within an AR/VR/MR experience?

- What assumptions are built into the design even at the simple level of the skin colour in which their hands are made visible or the sounds which their (imagined) footsteps make?

- Do we ask users to occupy the roles of specific historical victims/perpetrators in VR experiences, to place themselves in historical scenarios such as Witness: Auschwitz, Journey through the Camps, or to invite them to investigate historical photographs like The Liberation AR App at the Dachau Memorial Site and Museum or excerpts of testimony in the Anne Frank House VR App?

- Is it more appropriate (ethically) to position users in the role of present-day witnesses to survivor testimony as is the case within VR experiences such as The USC Shoah Foundation's The Last Goodbye , The Illinois Holocaust Museum's A Promise Kept and Don't Forget Me as well as Eva A-7063?

Participants went onto discuss the integration of recommendation systems to inform role-taking in AR/VR/MR experiences and identified three key questions which should shape how these are designed: where am I? (close/distant) who am I? (role and perspective) and who am I with? (are there others, what is our relation/interaction). There was a consensus that **there is productive potential to enable users to transition between roles and occupy various perspectives.** The fragmentary quality produced through a multiplicity of voices has been acknowledged by scholars such as Walden(2019) with regards to the **Oshpitzin AR App** and Schult (2020) writing on **Christoph Mayer's The Invisible Camp – Audio Walk Gusen.**

This final question raises pertinent issues of the role of the actual (historical) witnesses and the contemporary distanced or (non-) witness, which might be productively discussed when planning VR, AR and MR designs. It was noted that any perceived 'encounter' in historical situations with these technologies is always far more comfortable that the difficult, violent and traumatic experiences of those that were there (for discussion on 360-degree interactive survivor testimonies see our report Walden and Marrison et al. 2023). **The user can always take their headset off, put down a device, or leave an installation space**; their historical counterparts did not have such easy escapes. It was felt that visitors/users require a certain level of digital literacies to understand the significance of such experiences.

At the same time, there are challenges regarding historical authenticity and accuracy. Holocaust educators want learners to understand what happened in the past, but too much historical realism might trigger the visceral trauma they also want to avoid. Nevertheless, it was recognised that **there has been a tendency to focus on using virtual and augmented reality to reconstruct or recreate concentration and/or extermination camps (and other Holocaust landscapes).** Yet, those institutions who have engaged in this practice have confronted an ethical dilemma about the limits of representation: while most want to engage in historical photorealism (although some decide to resist this, such as <u>Bergen-Belsen</u>), the vast majority have decided against including humans in their reconstructions. In part this decision is also technologically driven, as designers recognise the difficulties of creating realistic human representation within VR/AR/MR which run the risk of **drawing users into "the uncanny valley"** (see <u>McMahan et al. 2016</u> for example).

It is also shaped by concerns about historical accuracy and ethical issues particularly regarding the representation of emaciated humans and corpses (concerns that have long been discussed in the context of Holocaust exhibitions but take on new relevance with immersive media). This discussion about simulating experiences and the reconstruction of historical spaces raises pertinent questions about alternative approaches, particularly with regards to artistic interpretations and the affordances of animation in this context. Indeed, it was agreed that we should be thinking more widely about the possibilities: **How can we move beyond existing tropes in Holocaust representation?** What can these particular technologies do for Holocaust memory and education that existing pedagogies, practices, and sites cannot? How can we use them in ways that remain sensitive to the topic?

It is not surprising that to date, memorial sites and museums have primarily used these technologies to create photographic/cinematic simulations of the past. As is common with emerging media, **we are seeing a phase of replication** (as seen with early film mimicking theatre before finding its own expressive grammar). The field of media archaeology has shown us that "new media" is rarely new but is instead inherently linked to its predecessors. Indeed, <u>David Bolter and Richard Grusin</u> have influentially argued that all media is remediation, and that digital media remediates pre-digital formats (2000, p.15). In this way, it is useful to consider <u>Kate Nash's</u> (2022) proposal to understand interactive documentary, and by extension AR/VR/MR technologies in this context, as "both evolutionary and revolutionary".

While there were some concerns about the potential 'novelty' effect for visitors as organisations may feel compelled to try out the latest 'trends' in digital innovation, it was recognised that those creating VR, AR and MR experiences understand these technologies in specifically computational ways as distinct from cinema. The core issue, however, is that curators across the heritage sector have less understanding of their technological potentials and **this lack of digital literacies, coupled with communication difficulties across sectors and disciplines, is partly what has hampered moving beyond historical reconstruction.**

A counter-perspective to historical realism was offered in the term 'experiential realism'. This suggests that immersion can create 'experiential richness' by situating users in seemingly all-encompassing spaces. The real here then refers to the actual engagement of the body and mind, rather than referring to photographic reconstruction of the past. It is a phenomenological rather than representational realism.

Although these debates are not entirely new, indeed they have been explored in relation to Holocaust film (Walden 2019), participants recognised specific ethical concerns related to the immersive experiences potentially offered by VR, AR and MR. In contrast to watching a film, the user of immersive works is not a 'fly-on-the-wall' or distant viewer watching from the outside, rather the very aim of these projects is to position the user as one of the main characters in the experience.

Some participants felt that this was the model of VR and AR experiences, which can provoke heightened emotional states and give the sensation (or perhaps better 'illusion') that you have lived through the encounter visualised around you. There was much debate about this, however. On one hand, some participants with experience of creating VR and AR noted that the design aim can be to create a 'story-living' experience through emotion rather than simply 'story-telling', whereas others declared that emotional engagement did not form the central ambition of their projects.

In fact, some participants went further to suggest immersive environments can sometimes foster adrenaline which can be mistaken for emotions. Such heightened affect then, does not necessarily correlate with specific emotive responses to the content, but rather might be interpreted as such. Again, there was some debate about the significance of emotion to learning in this context. One point raised was that too much emotion can subvert critical thinking and move into the direction of propaganda or manipulation. On this topic, one participant shared their research on The Eye as Witness VR Exhibition at the National Holocaust Centre and Museum, UK as a particularly good example of striking a balance. **The experience encourages users to arrive at an intellectual realisation (that most photography was captured by the perpetrators) through an embodied experience facilitated by VR.** In short, the user discovers that their position within the experience is rendered possible through occupying the perpetrators' gaze, which may produce emotional resonance while at the same time encouraging a critical stance to interrogating historical sources.

Some solutions for addressing the issues identified were proposed:

-       The need for **contextualising VR/AR/MR experiences at museums and memorial sites.** Some participants noted the abrupt transition with both black box 360-degree installations and Head-Mounted Displays. They usually need special rooms and/or dedicated technology which disrupt the flow/ narrative of exhibitions, and users are suddenly thrust into a distinct environment only to quickly return to the exhibition space. Some kind of **on-boarding activity** which introduces pedagogical aims, historical context as well as helping users to feel confident with the technology would ease the transition and could be followed by a reflective space or activity. One example where this is already in action is the Melbourne Holocaust Museum.

-       Beyond the immediate transitions in and out of these encounters, several participants noted the need **to think in terms of 'experience building': how does any VR/AR/MR experience work as part of a wider learning programme, museum or site visit?** This will also help curators decide whether it is needed or not. A poignant question for curators to consider in this respect is: What would a visitor miss if the immersive experience was not there? (Rather than asking what it could add.) On a practical level, a more integrated design could also mitigate issues with the loss of interest in the activity noted by some participants due to long-wait times on site.

- It was also highlighted that **remote encounters are distinct from on-site visits – both of which could integrate VR/AR/MR elements** – and that any experience design work must take both types of visitors seriously. Re-creating exhibition spaces for those who cannot visit in person could offer more innovative ways of exploring artefacts, curatorial decisions, 'unseen' parts of the exhibition, and constructions of historical narratives rather than simply simulating a 'walk-through' of an in-person experience.

- Rather than using VR/AR/MR to reconstruct historical environments, it was suggested that **the focus in designing these experiences should be on foregrounding interpretation and the constructed nature of mediation – the very issues raised in quality history education and media literacies.** This also offers opportunities for being transparent and highlighting existing gaps in historical knowledge. Following this line of thought, another suggestion encouraged provoking distance rather than closeness to the past, referencing The Book of Distance VR experience as an example to consider.

- Another approach was to consider how the emphasis on affective and emotional connections might best serve rational evidence-based enquiry opposed to overidentification with historical figures. E.g. **encourage users to be immersed in a learning experience in the present rather than a simulation of the past.** In other words, invite visitors to experience how the memory of the past is being constructed and curated in different contexts rather than simulate the historical events themselves.

- Adding to this, another participant suggested a **focus on the construction of agency**, as this can shape the emotional and affective response rather than solely focusing on the content. For example, choices within the experience of using the VR/AR/MR could create feelings of surprise, frustration, or heighten the level of self-consciousness. One such approach would dispute the body/mind or affect/cognitive split, and rather than consider emotional or experiential engagement as potentially overwhelming (and thus arguably unproductively), harness it to encourage rational pursuit.

3.   Personalised Learning

Moving beyond suggestions that immersive technologies create hermetically sealed environments which provide visitors/users with the same experience, the discussion turned to the need to harness the affordances of these computational technologies to create individualised learning experiences.

It was generally acknowledged that **there are a diverse range of visitors (both on-site and online) to Holocaust museums and memorial sites**. Some join as part of formal learning programmes, others do not. The knowledge that visitors come to sites with is incredibly varied and participants from the United States noted that general museum visitors tend to have acquired most of their information about the Holocaust from popular culture. Likewise, the reason visitors come is equally diverse, for some these visits take the form of personal, familial, or national pilgrimages motivated by feelings of moral obligation, whereas others visit because they have an interest in history and/or 'dark tourism'. Most Holocaust sites also attract international crowds meaning visitors come with predetermined ideas about the significance of this past shaped by national memory politics. One size then, does not fit all. Concern was raised about the rising visibility of Holocaust trivialisation, distortion and denial and the mounting evidence suggesting the failures of Holocaust education to date, as documented, for example by UCL Centre for Holocaust Education, UK in their 2016 national report as well as by the Conference on Jewish Material Claims Against Germany, who commissioned Schoen Consulting to conduct a national research study on Holocaust awareness in the United States in 2018, this was followed by studies in other national contexts which yielded similar results.

The affordances of VR, AR and MR were considered productive for informing a new paradigm for Holocaust education that foregrounds individualised learning. It was felt by some participants that there is still some resistance across Holocaust institutions to seeing this moment as an opportunity to rethink the foundations of Holocaust education. One participant argued that the way we commemorate the Holocaust today has its roots in the post-war years, and Holocaust education has developed long-held traditions. They argued that many historians working for Holocaust organisations prefer physical archives to digital tools, but the former, whilst vast, are often not available to the general public whilst the latter could be used to make the material more widely accessible.

The Holocaust is an incredibly complex history, or rather, a constellation of multiple overlapping complex histories. The histories of any specific memorial site can be cognitively overwhelming for visitors, who often can only dedicate a few hours there. Curators and designers need to start with a sense of what the core knowledge is that all visitors/users should leave with (e.g. what do they need to know to have a basic understanding of the site/ history) and where this knowledge will come from (e.g does the permanent exhibit provide this externally or does this need to be factored into the experience?). Next, they need to consider, how can we keep a diverse range of users engaged? Developing user profiles or personas is a useful design approach to begin with – considering a range of different backgrounds, learning preferences, motivations etc.

However, there are risks in profiling users in this way, which could lead to unfair assumptions made about them – there is a massive debate about this in relation to recommendation systems (see for instance, Paraschakis 2016; Milano et al. 2020; Lupton 2021). Nevertheless, such systems have the potential to draw users' attention to content that is either similar to that which they have already selected to explore or to direct them into new and unexpected directions which challenge the perspectives they have already seen. This would help to avoid a sense of information overload by offering some level of curation for users whilst also creating an active learning experience, which provides them with choices regarding the route they explore.

A compromise is needed between 'what every visitor needs to leave here knowing' and 'creating a completely distinct experience for each visitor'. Moreover, as expressed above, there is a need to integrate the technology into the pre-existing museum and/or memorial exhibits to enable the technology to enhance (not replace) visitor experience. In turn, this can also liberate the VR/AR/XR experience from needing to deliver a complete history lesson and rather zoom in on specific voices, themes or narratives that can raise critical questions for the user.

There was general support for this type of approach with one participant considering the curiosity loop of personalised learning, suggesting that if you create just the right 'rabbit hole' that individuals feel compelled to explore further then you can open them up into the wider context. Such an approach has the potential to **move beyond master narratives of the past and rather places visitors/ users within the complexities of the Holocaust in an experience during which they might discover contradictions and uncertainties.** It also offers the possibility to highlight the interconnections between sites, e.g., if they are visiting a specific concentration camp, the visitor could come to understand better the fact that this is not a standalone site, but part of a whole networked system. Nevertheless, we should also be aware that such algorithm-led curiosity journeys have been criticised in relation to platforms like YouTube and blamed for facilitating exposure to radical and extreme content for a small sub-set of users (see Hosseinmardi et al. 2021; Chen at al. 2023). Thus, such experiences must be designed with care.

A current EU project, MEMORISE, is aiming to digitise existing memorial content to make it accessible to the general public in new ways. To achieve this, state of the art technologies are being applied, including semi-automated, AI-based services to process the data (e.g., text recognition, labelling, translation) and present it to users. The project makes full use of the types of user profiles discussed on the previous page. The outputs will include a smartphone app, as well as augmented reality solutions, and a web platform. These will be complemented by a series of best practices and guidelines to accelerate the usage of such digital technologies in the context of cultural heritage.

Another participant described the potentials of using VR/AR/MR as offering set pieces of curatorial knowledge and objects – like pebbles in a river – and then enabling users to find their own route down the river to find them. Such an approach would firstly, **recognise the potential for these technologies to present modular content**, which the game engines behind experiences can rearrange 'on-the-fly' and secondly, would enable active learning as users would have to piece together fragments and investigate the connection between them opposed to creating an immersive closed story. Such an approach would move away from any illusion of a historical whole truth towards opening up debate and critical thinking.

This discussion opened up the possibility that VR/AR/MR projects do not have to be anchored to specific museums and memorial sites. Rather, the creation of a virtual space can offer experiential opportunities to engage with the complex histories of the Holocaust by connecting between a wide variety of physical places, people, objects and journeys through this past.

Going further, another suggestion was to **consider the user as designer.** This would involve **teaching games, playable or immersive media design as a learning activity.** Institutions could start with the question: what is the most significant thing(s) you would want to express to users/visitors? Then invite learners (or visitors more broadly) to become involved in the design process, sharing knowledge and deciding what should be included. Such experiences have the potential to create impact for visitors, engaging them with heritage content and practices, as well as nurturing high-level historical thinking. Such an approach would also minimise the funding and maintenance issues caused by introducing hi-tech VR 'productions' into museum exhibitions.

The Scottish organisation <u>Gathering the Voices</u> has done work along these lines by creating game jams involving Holocaust survivors and students (although not using VR, AR or MR). <u>Lessons of Auschwitz</u> – a volumetric VR illustration by Moscow school students in collaboration with VR-artist Denis Semionov and Phygitalism Studios is an example of a memorial project using these technologies, but this type of work could be taken further by Holocaust institutions. Another approach, beyond the Holocaust context, that institutions could learn from is the work of **<u>African Digital Heritage</u>** and their work on reconstructing the Mau Mau camps run by the British in Kenya. The project sees reconstructing as a process, in which older community members not only inform the images with their testimonies (often shared for the first time with the project), but are shown the designs at various stages of development to assess them (see <u>Walden and Tayiana 2022</u>). The approaches suggested here follow wider trends in pedagogy: **they empower participants to explore and discover things for themselves**, rather than offering the prescriptive content of traditional classrooms or research approaches. This is the "active learning" approach consistent with constructivism. As such they resist what critical pedagogue <u>Paolo Freire (1970)</u> referred to as a 'banking model' of education, in which students are considered more receptacles of knowledge to be deposited in their brains by the educator.

One of the barriers to developing advanced, personalised learning experiences with VR, AR and MR is **the lack of available digitised sources.** As one participant noted, you need a dataset of a reasonable size to provide meaningful experiences for a diverse range of visitors. Yet digitisation projects have often been driven by curatorial need (e.g. what is required for a specific online exhibition) rather than a recognition in the value of wide-scale digitisation in itself. Memorial sites were also described as 'islands', often resistant to connecting their data with other organisations.

Whilst there are some examples of open data projects in Holocaust education, for example: Verbrannte Orte, there remains hesitancy about such 'openness' and a lack of digital literacies, resources, and capacities within institutions about how to move forward with this, even where there may be enthusiasm to do so. One of the frustrations repeatedly aired by those working in Holocaust organisations (in both this workshop and others) has been the existent models of funding. **The dominant approach to funding digital interventions is short-term and project-based which forces organisations to produce 'finished texts' which mimic exhibition curation but in digital formats.** Large-scale, cross-institutional digitisation is less well supported. Likewise, wider financial support for enhancing digital capacity within organisations is rare.

4.   Design

One participant summarised **the main barriers to advancing VR, AR and MR development in Holocaust memory and education as funding, knowledge and courage.** These are of course somewhat interlinked. Without funding, as noted above, there is not the support available to inform better knowledge about digital technologies within the sector or the time and space to allow organisations to take risks to try things out that might fail. Funders want to see finished, functioning projects (often only providing up to 12 months funding).

There currently exists very little funding to support Holocaust institutions and creatives to experiment and learn through trial and error beyond small-scale projects. Indeed, there have been several, mostly unfinished initiatives by companies, students and educational institutions, such as 101% and IsayWeb's Witness: Auschwitz, the MA project Fragments by students Akim Dolinsky and Itamar Simon Duschnitzky, or Journey through the Camps developed by the start-up Stitchbridge (now called Ortainteractive) for a technology study room at the Carnegie Mellon Universityin Pittsburgh.

Whilst current funding models might finance the production of experiences and the architecture or devices to host them, they do not support the long-term maintenance. **Front-of-House staff now have to become responsible for onboarding visitors to technological experiences and for logging issues and recharging devices.** Sometimes, they even have to search for abandoned devices owned by the institution which have been disregarded by unengaged visitors. **IT teams must support hardware and software updates, but planned obsolescence means institutions reach a point when their apps will no longer function, and the project disappears into the ether.** Digital publishing rights are also distinct from permissions for exhibitions, which means some apps have had limited licences such as the aforementioned AR project, The Liberation and therefore can only exist for a short time.

One approach to the current short-termism was for larger institutions to build into their funding bids offsite programming and travelling exhibitions. However, these can come with financial and technological burdens for the smaller institutions receiving them. This also does not solve some of the wider maintenance issues and may in fact exasperate them, as the responsibility is spread across more individuals. **An alternative suggestion was for heritage institutions to stop thinking in terms of completed projects (e.g., digital media as 'closed texts'), but collections with components that can be updated, adopted and transferred.** This way they have a life longer than the application or project in which they are initially shared. Components can be semantically linked within experiences – this resists the traditional hermetically closed model and engages with the continual emergence (through updating) that distinguishes computational media experiences from broadcast and cinematic ones. The interactivity of each experience can be captured as a blueprint initially presenting potential ways to connect the components.

This way of planning will necessitate a complex shift in the way museum professionals think about exhibiting content to publics. They have traditionally relied on linear narratives and followed 'waterfall' project management approaches used to plan broadcast media productions and exhibitions. Conceptualising and developing digitisation in this way would also address issues of sustainability as the focus would move away from platform-specific 'experiences', allowing digitised content to be more easily archived and transferred between experiences (just as material objects are moved between different exhibitions). There is also the potential to use game engines to update on-the-fly, however, maintaining this independently of the equipment is challenging. It is worth noting that while the metaverse was supposed to support this, its development is currently being hindered by corporate silos.

Another issue is the tension between, what was referred to in another workshop as 'museum time' versus 'technology time' (see: Recommendations for Digitalising Material Evidence of The Holocaust). Heritage institutions work at a slow pace, whilst the digital mediascape is constantly changing. This can feel overwhelming for professionals working in the GLAM (gallery, libraries, archives, and museums) sector; however, it can also be overcome by **thinking in terms of computational logics rather than about specific platforms or technologies, i.e. by embracing the modularity of the digital for example by prioritising the digitisation of a wide variety of objects in collections and creating additional digital content**. All of which can then be called upon as components for a range of later VR, AR and MR experiences.

One of the institutions represented in the workshop was the United States Holocaust Memorial Museum, which has the unusual advantageous situation of having a Future Projects department – a small team whose time is dedicated to exploring technological possibilities. They were able to share their design approach. Given their remit as a department, Future Projects are able to take a technology-led approach, e.g., starting from the place of 'What can we do with this specific technology? How can we use it? What can we learn about it through exploration? Starting with prototyping with external partners and then testing iteratively with audiences. Such an approach is not going to be suited to most institutions and starting with the organisation's core pedagogy values or charter might be more appropriate, e.g. What do we want visitors to learn? What is our remit? Then, what technologies/ tools can help us achieve this?

One example given was the AR incorporated into the Tower in the USHMM'S permanent exhibition. The team started by asking visitors what their questions are about this space, and then from here considered what the museum felt visitors needed to know here and what they might want to know. A repeated point of interest for visitors was who are the people in the Tower's photographs and what happened to them. This initial visitor research informed a strong storytelling approach to the project, which was embedded within the institution's larger educational goals and helped the app to address misconceptions.

There is still an assumption that young people need technology and we often hear the much debunked term 'digital native' applied to the younger generations. This assumption leads to design work that prioritises younger audiences whilst marginalising others. VR, AR and MR experiences can also be prohibitively inaccessible to certain user groups, especially those traditionally underrepresented in museum spaces, such as those from social-economically deprived backgrounds (if they need to have the latest mobile phone or headset themselves to access the experience) or those with certain disabilities. In the European Union and United Kingdom, there are digital accessibility laws with which any digital 'publication' by a public institution must comply. Universal Design for Learning has been one framework offered that attempts to not only adhere to but extend beyond this legislation to support accessibility or diversity by design, rather than as add-ons. An important starting question for those leading on the design of VR, AR and MR experiences then is: **How can we design this experience by centralising those users usually on our periphery (those underrepresented)?** How do we conceptualise an experience where they are the primary user?

Diversity by design, however, is not only relevant at a content level. One participant noted that most machine learning systems (including those used to inform XR experiences) have been trained from the perspective of Western (and often white male) perspectives which affects the outcome of data presented, for example with recommendation systems. This participant suggested **a need for diverse participation in systems design too – from building the systems, collecting the data, and carrying out pilot studies with a diverse range of users rather than assuming imagined ones.**

Both at the level of individual organisations and sector-wide, there is still a feeling that we are trying to figure out what VR, AR and MR are good for in this field. Currently, there are a lack of guidelines (which we hope this report and complementary action plan will go some way to remedy). **The sector also needs support to help institutions communicate with designers so that their projects can be led by their pedagogy and other aims rather than by the technology (and/or the limitations or approach of any specific external partner), and to help them communicate across disciplines in ways that encourage designers and developers to really explore the computational possibilities available.** Sometimes design processes can be stilted by presumptions about what the medium is or what it is capable of. There was a sense that the sector would benefit from a schema to guide their development process rather than any dictate offering a framework on VR, AR, MR storytelling (or 'story living'). As one participant noted, the 'Hero's Journey' model for filmmaking had become quite restrictive. One way to support more productive use of these technologies in the field is to acknowledge the need for interdisciplinary design approaches and co-creation. Development and design teams should include historians, academics, designers and importantly a diverse range of potential user groups.

The final issue raised in relation to design was impact. Whilst it is all very well designing historically nuanced experiences that personalise learning and technologically innovative (if this are one's aims), if users don't actually engage with them then the whole process has been somewhat pointless. A quick search on app stores shows a relatively low engagement with mobile-available AR apps for Holocaust histories. One way to maximise potential impact is to include a range of user groups in the development and design processes as mentioned above. Another suggestion was to make teachers aware of these resources who can recommend them to students as a way to start thinking about this history and its relevance in the present, and can embed them in their education programmes.

However, these will always be a sample and can never represent all users. Most long-term impact analysis can be challenging for institutions, particularly within existing funding frameworks which tend only to support the production and dissemination of 'products'. Impact research can then fall by the wayside due to a lack of resources, but also a lack of clear guidance or standards on how to effectively measure impact. There are existing standards within the social sciences (adopted by the Future Memory Foundation team, see Verschure at al. 2021) and the humanities – quantitative and qualitative, respectively. Some larger institutions do carry out extensive visitor research, however they expressed hesitancy about whether visitor's enthusiasm for digital experiences was shaped by the novelty of the technology or actual impact. Wider questions were raised about what museums and memorial sites actually want the impact to be for visitors – is it related to empathy or relatability with victims? Pedagogical? Acquisition of historical knowledge? Ethical (e.g. 'never again')? Understanding the human condition? Should it serve as a warning or inspire fear? These questions highlighted **the need to write impact measures into a project from the outset – if a project is driven by specific pedagogical aims or institutional remit, then it is easier to measure impact than if it is driven by a desire to use the technology.** It was felt that investment in extensive, quality impact research would benefit the sector. This could be a research framework that is applied to projects sector-wide, allowing for comparison between institutions and projects which could better enhance future developments globally rather than within any single organisation only.

Overall, it was felt that more connectivity across the sector was needed. Furthermore, rather than only sharing best practice and celebrating developments in digital work, **more spaces were needed for sharing challenges, failures and lessons learnt, and for problem-solving collaboratively.** There was a consensus that these recommendations should be further developed through a series of conferences, trans-disciplinary working groups (particularly connecting science, technology and the humanities) and workshops to continue to discuss and develop research which should be made accessible to those working in the sector.

METHODOLOGY

This report was formulated through a participatory workshop series, shaped by the following activities:

Participants were invited to introduce themselves and offer a brief position statement before the 1st workshop in the Padlet tool. Participants were encouraged to view each other's statements in advance of session 1.

In the 1st 2-hour workshop, participants were asked to agree on priority topics. Then they were divided into 'expertise' groups to explore these topics. Then into 'mixed' groups to share their ideas.

In each group, at least one of the project leads took on the role of minuter. These minutes were then thematically analysed and organised into a draft of the discussion section of this report. The themes were not imposed on the minutes, rather they emerged from the priorities selected by participants in the discussions.

The draft report was then circulated to participants before workshop 2.

In a 1.5-hour workshop, participants were then asked to provide feedback on the document to ensure it fully captured everyone's contributions.

The final document was circulated for review before dissemination.

As much as possible, recruitment for the workshop focused on seeking a wide variety of different expertise in relation to both Holocaust memory and education, and XR, with some participants knowledgeable about both and others more about one than the other.

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Please do get in touch if you would like to contribute to actioning any of the recommendations in this report.