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Empowering Young Voices: Prototyping Method for AR in Decolonisation Discussions

Mathias Caelenberghe, Mark Lochrie, Jack Burrows, Robin Das, John Mills, John Law
University of Central Lancashire, Preston, UK
{MCaelenberghe, MLochrie, JJBurrows1, RD-, JMills, JLaw3}@uclan.ac.uk

Misbahu Zubair
Manchester Metropolitan University, Manchester, UK
M.Zubair@mmu.ac.uk

Augmented Reality (AR) in museums and art galleries can support decolonisation discussions and engage young diverse audiences. This study explores involving young people in co-designing decolonisation practices, however, there is little research on involving young people in the decolonisation debate through personalising museum experiences based on their points of view. We investigated the potential of AR through a low-fidelity prototype, simulating AR worlds to foster inclusive narratives. Our collaboration with a local cultural institution involved a user study with participants interacting with a fictitious scenario, design values, contextualised information, and interaction cards. Observing our co-design process, we discuss how a AR can facilitate community-led discussions and preferred experiences.

Museum Augmented Reality. Research through Design. Decolonisation. Prototyping Methods.

1. INTRODUCTION

Ever since the Covid-19 pandemic in 2020, museums have explored new ways to reach audiences (McGrath, 2020). This necessitates having museum staff with digital skills and knowledge to work with new technologies and methods for digital audience engagement. Embedding digital tools, processes and methods is vital for cultural institutions to engage current and future audiences to improve museum experiences (Anderson, 2018; Harding, 2019). This coupled with a time of civil unrest across the globe with the rise of the Black Lives Matter (BLM) movement and wider socially progressive perspectives, has seen large groups of society question decisions, existence, and presentations of public institutions (Georgiou, n.d.; Sandis, 2016; Horton, 2018; DeBlock, 2019; Hunt, 2019; Van Broekhoven, 2019; Whittington, 2021).

However, larger metropolitan cultural institutions have the funds (Museums & Heritage, 2023) to invest in embedding technologies into their experiences and therefore, have opportunities to explore how digital technologies can be utilised in responding to public concerns (Abigail, 2014). It is important to note the interrelation between movements such as BLM and the process involved in decolonisation (Henry, 2021). The work presented in this paper, follows a Research through Design methodology (Zimmerman, 2014), investigating how digital tools can be developed to support the

decolonisation debate as a process surrounding the presentation of museum artefacts within non-metropolitan cultural institutions. The work that follows has been conducted with Blackburn Museum and Art Gallery which explores a novel low-fidelity ideation and prototyping method for Augmented Reality (AR). Aiming to understand the expectations and behaviours of audiences in widening narratives in presenting cultural artefacts within museum exhibitions. We are excited about the potential for documenting and presenting visions of decolonial views using an ideation prototype simulation.

Our objectives for this work contribute to the opportunities and challenges when designing AR experiences to facilitate *widening narratives*. For this work we define, *widening narratives* as a term to describe decolonisation to remove distress and any connotations associated with the phrase. Our research questions are: (1) What opportunities does AR offer for facilitating widening narratives towards an inclusive experience? (2) To what effect do young people perceive values in defining and ideating content for widening narratives?

2. RELATED WORK

This paper is situated in the field of Human-Computer Interaction (HCI), Augmented Reality (AR) and decolonisation practices within museum spaces. Based on previous literature, we have

developed a method that aids in the ideation of decolonised AR experiences to broaden museum debates around the decolonisation of exhibitions. This builds upon works by Nebeling (Nebeling et. al., 2018; Nebeling & Madier, 2019; Cárdenas Gasca et. al., 2022) and Ciolfi (Ciolfi et. al., 2008; Ciolfi et. al., 2016; Claisse et. al., 2017) within the sphere of prototyping with AR and museum interactions from an HCI perspective.

A museum's purpose is to collect, conserve and interpret tangible pieces of historical heritage. To provide the public with opportunities to access knowledge and understanding of important cultural facets. However, there is an ongoing debate as to what degree museums need to reform their curation practices to decolonise their collections (Georgiou, n.d.; DeBlock, 2019; Van Broekhoven, 2019; Whittington, 2021; Rutherford, 2021). There are clear arguments from people from the same culture that are for and against the return of artefacts acquired during colonial times (Sandis, 2016; Horton, 2018; Hunt, 2019). The beliefs and motivations of the researchers are to take a constructivist approach to this topic, creating a space to foster dialogue between audiences in what they believe, imagine and understand to frame the world around us. Therefore, this research seeks to understand the motivations and behaviours of local people in harnessing discussions for decolonising museum experiences. Decolonisation is more than repatriating artefacts, also involves addressing and recognising the importance of their historical existence and how museums address this will differ on the artefact, approach, and structures (Museums Association, n.d.).

As Hornecker and Ciolfi (2019) state, the rise of technology as a platform to entertain, educate and capture has resulted in museums adopting technologies to attain their remit in educating and engaging society. This is a highly active space for HCI researchers to study how audiences interact (Mery Keitel, 2012), behave (Hornecker, 2019), and learn in these public spaces. The significance of addressing and challenging museums' approaches in presenting and curating colonial heritage is unreservedly apt within society.

There exists a chance that the researchers unknowingly and without malice introduce colonial content to their research/design and therefore steps to mitigate these are critical in ensuring the validity of the data. To quote Audre Lorde, "*For the master's tools will never dismantle the master's house*".¹ This quote illuminates the essence of what is meant in the preceding paragraph. Perceived neutrality can breed complacency when curation methods rooted

in colonised ideas are mistakenly assumed to be decolonised.

The decolonial pathways laid forth by Alvarado Garcia et. al. (2021) aid in navigating the challenges of decolonising HCI research and design, addressing the different cultural power relationships that are still present. These pathways highlight the importance of understanding why things are done, how tools, methods and approaches are shaped, the challenging of what is perceived as right, inclusivity and reflecting and addressing power imbalances.

In the UK, the Museum Association (MA) is an independent body advocating for museums seeking to change lives through inclusivity, participation, and sustainability. In 2021, the MA released a campaign and toolkit to support museums across the UK to reflect and re-align approaches through a decolonised lens. In the toolkit, a manifesto advocates the need for inclusivity, safe spaces, sensory engagement, a place where the public can bring their 'whole selves', in creative experiences, and a place where everyone's story can be told. The toolkit is aimed at supporting museums to become aware of and challenge current 'colonised' processes and practices. Equally recognising it cannot be the sole directory for decolonising museums, but decentralising power and mechanisms is key to re-assessing decolonial efforts (Shiraiwa, 2022). Both the MA toolkit and Anderson et al (2021) advocate for a people-led curation process from design, content, narrative, storytelling, and presenting is vital in representing communities where colonial artefacts have originated. This aligns with co-design and human-centred design literature familiar to HCI scholars.

It is important to note, a people-led (user-centred) approach to understanding views of decolonisation requires novel approaches to being inclusive, accommodating, and respectful of everyone's point of view. The use of technologies to support inclusivity and User Generated Content (UGC) to foster such sensitive narratives is not new. With the invention of Web 2.0, which saw the rise of UGC platforms - social networks - users of social platforms have long been sharing views, tagging content, and conversing with and reporting users (Teresa & Sehl, 2017). Many social platforms that rely on UGC are increasingly being questioned on their monitoring process to ensure fairness and inclusivity in creating digital spaces for everyone. Online spaces such as Quora have already been studied as a space to allow individuals to decolonise identities through conversations (Das, 2022). One might argue social platforms have the capacity to create distress among users. This clearly needs additional considerations when using social

¹ Audre Lorde, *The Master's Tools Will Never Dismantle the Master's House*, Penguin, London, 2018

connections to sensitive topics but as Bala (2023) concludes, the use of discomfort in designing systems can improve a greater understanding of history as it can highlight the inequality between users, cultures, and environments. Furthermore, harnessing digital experiences within physical public spaces can offer benefits such as involving audiences in sorting, arranging, selecting, and empathising leads to new opportunities for the interpretation of issues and new perspectives. However, this all depends on the digital infrastructure to facilitate the staging of such content (Knudsen, 2013).

Augmented Reality (AR) offers an opt-in mechanism to experience the additional collection's content/narrative because the content is fixed to a physical location within a digital world. Audiences who do not wish to participate in the digital experience can still experience the space as it is designed. The digital component allows users to retrieve additional information and can be warned or guided prior to use. Offering a potentially safe space to engage and acknowledge stories in an alternative way (Cárdenas Gasca, 2022).

However, co-designing AR experiences with young people is challenging as identified by Ashtari (2020), as users lack the knowhow to contribute in a 3D space, struggle with the lack of support and design guidelines, the complexities in story-driven experiences and the user experience of how they will behave, what they should see, maintaining attention and for how long – contribute varying factors in the co-design process. This highlights, growing problems for non-technical designers when designing AR prototypes for interacting with and creating AR content. Key to addressing these problems is lowering the barriers to entry for young people contributing to the design of AR experiences through authoring tools focused on structure, scaffolding and guidelines in the support of story making (Glenn, 2020) and developing an inclusive and collaborative space to enable novice creators to express views and ideas and explore interactions in a 'safe' environment (Ashtari, 2020).

Recent work from Speicher et al (2021), into the prototyping AR landscape, categorises common approaches to prototyping AR scenes into three categories: physical prototypes, physical-digital prototyping and digital prototyping. With the target audience identified in this research and the significance and sensitivity of the topic, investigating the use of physical AR prototypes (Hunsucker, 2017) is core to the framing and understanding of this research. Many AR prototypes that focus on authoring content focus on building 3D environments to have users construct the

environments with tangible objects (Nebeling & Madier, 2019). In addition, Freitas et al (2020) discuss the prevalence of prototyping with physical mediums within the AR space. Other approaches redefine the notion of depth using flat layers (Cassidy, 2015; Sim, 2018), where the use of acetate is applied and overlaid onto the real world – giving a sense of depth in presenting augmented content. Whereas Maguire (2020) presents various scenario- and storyboard-based prototypes used in AR and VR applications, with the use of props in low-fidelity prototypes to onboard participants with the challenges associated with depth within AR/VR experiences. Concluding users felt positive towards prototyping AR/VR experiences in low fidelities when using props, scenarios, and storyboards.

3. METHOD OVERVIEW

The design of the first iteration of the low-fidelity AR prototyping tool takes inspiration from traditional UX research methods. By adapting and combining methods such as card sorting, think-aloud, usability testing, questionnaires, and semi-structured interviews our novel AR design approach explores the motivations and needs of museum visitors that aims to improve their museum experience.

In its current form, the method seeks to understand audience motivations for decolonisation. This study has identified families with young people have been as a key priority. This is the museum's directive to drive engagement with younger audiences due to young people's limited knowledge makes them less likely to have pre-existing points of view that might create an anchoring (Yasseri & Reher, 2022).

3.1 Method Design

The method design draws upon literature, primary data, and national bodies² to understand the challenges, opportunities, needs and motivations into decolonising museums. Thus, a set of principles have been designed from the MA manifesto that considers decolonising practices. Although the principles are abstract, providing a vision; a sense of direction for museum experts to follow. The principles that are relevant to this work are: challenge neutrality, build relationships, value all forms of knowledge and expertise equally and be creative. The principles guide the vision of producing a method to support decolonisation. However, they are too abstract for audiences to engage with. A set of design values were produced that were quoted and inspired by the MA toolkit (2021) around presenting items and interacting with items.

² Museum Association
<https://www.museumsassociation.org/>

The Egyptian exhibition has been chosen in this pilot study due to the presence of Egypt within the curriculum in year four of primary school. To avoid distress and preconceived notions of decolonisation – the term widening narratives was used in all public messaging and a fictitious scenario was adopted of exhibiting Tutankhamun’s mask in the museum. A fictitious narrative was adopted to remove and relieve participants from sharing distressing personal connections to lived experiences. Carey et al (2020) describe this Participatory Design method as a Foundational Fiction. Due to the topic’s nature and young people’s involvement in the co-design process, a young person participant information sheet was designed to provide all knowledge to young people to give assent and be inclusive for all participants in the age range of the research (9-18).

The aim of the study was to design a novel prototyping method to improve the digital experience, allowing young people and families to engage with museum content in a safe space to explore widening narratives. We anticipate that AR can widen narratives by engaging audiences in the decolonisation debates in inclusive, fair, and interactive ways. Where, the overall goal is to improve museum experiences for all audiences. To this end, we will explore the four different types of museum experience clusters, namely object, cognitive, introspective, and social experiences (Pekarik et al,1999), for inclusive and personalised museum experiences, by leveraging the opt-in capabilities of AR, to create safe spaces to foster debates and overcome any physical museum constraints.

To achieve this and answer the RQ we needed to understand how people perceive widening narratives for decolonisation and what priority of information was required to deliver this objective. Therefore, the novel method for role-playing a widening narrative prototype was created to simulate an AR experience that focuses on content and interaction rather than the technology constraints and opportunities. As outlined by Blackburn Museum and Art Gallery, a core demographic to focus on is young people and families. The following study outlines how young people will read, comprehend, sort, group and discuss their understanding and views of decolonisation, to widen narratives and create experiences for all.

3.1.1 Method Setup

To facilitate the method, one researcher is present who is controlling the data capture. The set-up involves a board with a photographed scene of the Egyptian exhibit, three decks of cards, design value cards; contextualised information cards; interaction cards. Each set of cards is used differently in the method. The design value cards are used in a card sorting technique to prioritise the top seven. As

Miller (1956) suggests humans can only process seven pieces of information effectively therefore we used a top seven. Each value (Fig.2) has a corresponding contextualised card (Fig. 3). The contextualised cards are used as building blocks to build up the scene with contextualised augmented content based on the values selected. For these cards, acetate (transparent sheets) was used to give the impression of augmented content within the scene. Finally, the interaction cards (Fig. 4) are used when other visitors participate in the study and wish to interact with other visitors’ content.



Figure 1. Study set up.

The testing session mimics Rettig’s (1994) approach of conducting low-fidelity tests of the observer, facilitator, and “computer”. To capture the interactions an overhead camera is set up with a microphone to record think-aloud and semi-structured interview reactions. The audio/video data capture is controlled by Open Broadcast Software with shortcuts to start/stop, bookmark and screenshot the study.

As the method involves co-design with young people, to ensure appropriateness the language and terminology used within the activity sheets, method materials and researcher script has been reviewed by a primary school teacher and museum experts responsible for working with younger audiences. This process involved documenting the rationale, title, theme and reframing for each design value. Every design value was accompanied by a contextualised statement to provide clarity in the reframing process.

3.1.2 Method Structure

The board design (Fig. 1) consists of three areas: design value placeholders (active/inactive), the scene and interaction card placeholders. The purpose of the placeholders is to encourage participants to place the cards back into the correct areas. The active and inactive elements to the boards are used when a new participant wishes to alter the set and therefore makes a reshuffle in the design values thus making changes to the priority of design values (inactive/active).

Fictitious scenarios are presented to participants on how Blackburn Museum and Art Gallery should proceed with new information about an artefact that has been donated to them. The scenarios investigate varying degrees of mindsets towards decolonisation and the participant should select one before proceeding – the scenarios are used to frame the method discussions. The four Scenarios (S) include: The museum keeps it in its collection and decides not to acknowledge how the object was acquired (S1), S2 (same as S1) but adds information to the display that provides context to how the object was acquired (S2), S3 same as (S2) but also agrees to share the object with other countries and S4 the museum decides to return the object to its rightful owner and creates a copy and displays this in its collection instead (S4). A baseline questionnaire is used to gather insights into audience motivations and experiences of past museum visits and to understand beliefs about decolonisation and values for facilitating inclusive approaches to museum experiences.

3.1.3 Method Assets



Figure 1. Sample of design values depicting the label, graphic, iconography and identification number.

The design values are used as discussion topics to enable audiences to think about decolonisation based on a scenario provided. The 17 design values were constructed based on the involvement of the item and beginning the method, participants will read/discuss, comprehend and sort based on their perceived value of each card. The top seven design values are then used to form the next part of the study (contextualisation and interaction).

The purpose of the contextualised cards is to populate the scene with augmented content for participants to interact with. The contextualised cards are placed on the scene by the participants, once read, comprehended, and grouped. This informs the research on how and where participants expect such content to appear in the AR space. The contextualised cards are associated with the design values and have been designed for ease, convenience and realism when running the method. Each colour-coded card (Fig. 3) uses an identifier and icon for the theme, has a hazy background to simulate floating content within an AR space and a relationship-type icon (1-1, 1-*) – which informs the

researcher of the number of contextualised blocks needed for setting the scene. In some instances, the participant is required to select one of the contextualised cards from many, whereas other instances require all associated cards to be placed on the scene. This has been designed this way to increase participant time on the task and to reduce clutter within the scene.



Figure 2. Sample of contextualised cards relating to the associated values used in the design method.

The interaction cards (Fig. 4) are designed to be used on a defined scene. The purpose of these cards is to understand how visitors will interact with augmented content. The 10 cards have varying purposes and act as prompts for the participant to interpret. The interaction modalities focus on how participants will interface with AR content ranging from prioritising, responding, and saving.

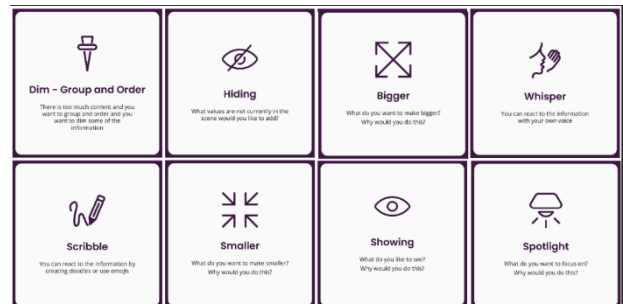


Figure 3. Sample of interaction cards used to determine how users will interact with augmented content.

3.2 Method Procedure

The facilitation of the method requires one researcher present to capture input and responses from participants. The method has been designed to be ran with one group at a time (typically consisting of young-person and a grown-up or friendship groups). On average the method takes 20-30 minutes to capture participant interactions and survey data.

In the first instance, the participant (P1) will comprehend and sort the design values based on

their perceived value. The values are located around the board with the seven top priorities identified by the placeholders along the left in outlined green and shaded. These seven values are then contextualised on the scene by the P1 using techniques such as grouping, overlaying, positioning etc. Finally, P1 is then prompted about the use of the interaction cards. After each study the scene is preserved for the next participant – resembling a shared AR space. Which is achieved by digitally capturing and setting up each time based on the previous participant input or in the case of the workshops conducted thus far saved throughout the day.

The next participant (P2) follows the method procedure in reverse. They start by utilising the interaction cards and interfacing with the scene. As the interaction cards are used (placed on the scene) – the researcher updates the scene accordingly. For example, if P2 uses the hide card, the contextualised card and design value is removed from the board, this demonstrates a disagreement on value. Equally, if P2 decides to show a new value block the scene is updated with the corresponding contextualised card. Other interaction cards such as Bigger and Smaller are simulated through role play by discussions on why and how. To this end, the next participant (P3.... Px) follows the method procedure in the same way as the previous participant. Each time building up a widened narrative from the previous participant. To represent dimming, various shades of transparent sheets have been designed to simulate the dimming of content. Furthermore, interaction modalities of scribble and whisper are achieved using blank acetates for participants to contribute responses in the form of UGC.

4. DATA ANALYSIS

4.1 Demographics

At time of writing, 30 participants have taken part in the study, consisting of 30 questionnaires and 16 ideation sessions (this discrepancy is due to the fact in some cases participants completed the ideation method in groups of two or three) and split over two locations. The first phase of the study was conducted in the museum on Saturdays throughout May-June and midweek in the May school half term (2023). The first workshop was facilitated on Saturday 27th of May, concluding on Saturday 10th of June which recruited nine participants. The second phase took place in a UX living lab (30 June) where 21 participants took part in the same method.

Between the 31st of May and 3rd of June there were creative and educational half term activities at the museum which increased the number of patrons. During which time, the workshop was facilitated in the Victorian Art Gallery of the museum where also

one of the half term activities was held. It was hoped that participants of these activities would also engage with the ideation method but from observations the audience for the displays and the activities have only a small overlap. Although as the Blackburn Museum and Art Gallery serves an ethnic diverse community, the study involved mainly white British participants (28) the remaining preferred not to answer. Of these, 11 identified as male, 18 as female, and one preferred not to say. All participants from the lab session were aged between 9-11, while six from the museum sessions were aged 12-14 and the remaining three were each aged 9-11, 15-16, and 16-18.

4.2 Decolonised Views

Most respondents gravitated to selecting scenarios that correspond to a decolonised view on the matter of museum heritage. Of which, 27 scenario selections were made and 48.15% chose to return the artefact, 3.7% gravitate between returning and sharing it, 18.52% would be open to sharing it, 7.41% are stuck between sharing it and acknowledging its colonial history, 11.11% would acknowledge its colonial history, 3.70% is uncertain whether to acknowledge it, and 7.41% does not think it should be acknowledged. From these early results we can indicate that people are interested in exploring a decolonised museum experience where they want a balance between repatriation and holding on to the artefact in question. One reason given for holding on to the artefact is that the story of the artefact is more than its history before its discovery but also its history after its discovery. The sorting of the values showed that participants want a story to be told from different sides, which points to a decolonised view.

We created a master list of values that was based primarily on the frequency of selection and where the frequency was equal then ordered on the score attributed value by ranking. On Individual rankings the highest rank was given a score of seven and the lowest a score of one. Our findings show the most important value is learning facts about the object, which aligns to the expectations of museum patrons is that the museum communicates the basic facts and information of the artefacts on display. However, knowing the origins, content, and narrative from different points of view was deemed significant. Participants expressed the need for evidence within the curation process to inform their understanding. All of which should be easy to understand.

Whereas, wanting to know that different people's views have helped tell the story was selected only once making it the least selected value. This was the same with wanting to see different people talk about the object and wanting to know that people where the object is from helped on the display. From the preliminary results we can determine that the card

sorting method is an engaging and efficient way of finding the most important values with young people. There is no correlation between the frequency of selection and the score except for the top three values.

4.3 AR Simulation

Our approach to collecting data from the contextual information and interaction card draws inspiration from role-play and think aloud methods. To perform thematic analysis (Braun & Clark, 2006) on the data, transcriptions were obtained from video and audio content. With this, we took a deductive, latent-level approach to analysing the data, recognising the complexities of the data, by exploring the data for well defined, predetermined codes and themes. Based on a codebook, defined prior, containing a set themes and codes, with detailed explanations and examples of the applying the code and theme to the data. The codebook includes positive and negative aspects of the data, to provide a more comprehensive understanding towards decolonial/colonial points of views. Due to the nature of the topic, and to reduce bias and subjectivity, a coding reliability thematic analysis (Boyatzis, 1998) was applied. This introduces an inter-coder reliability between coders, as codes are agreed upon before analysis, and therefore increasing the reliability and rigor of the approach, attempting to achieve consensus of meaning (Byrne, 2021). Once the codes and themes were agreed a readme and video walkthrough were produced to support the data cleansing, analysis, and reporting process.

The codes were generated based on the research questions, literature studied, empirical studies and prior knowledge. The codes then grouped based on whether the discussions raised interests/concerns with the method, experience, or content. Which helps to determine whether the data related to method integrity, participant approach or user experience for interaction and environment, content point of view and content justification for building the scene. The five themes and related codes used were: **Method Design:** *Content Clarification*, *Insufficient Knowledge*, *Method Clarification*; **Participant Method Engagement:** *Participant Decision Making Process*, *Collaborative Discussion with Adult*, *Collaborative Discussion with Young Person/s*; **User Museum Experience:** *Physical Environment*, *Social Interaction with other People*, *Learning and New Information*, *Self-reflection*, *Museum Fatigue*; **User Experience Critical POV:** *Content Agreement*, *Content Disagreement*, *Decolonised View*, *Colonised View*, *Acknowledges the need for Personalisation*; and **Content Experience:** *Value Rationale*, *Contextualised Information rationale*, *Positioning Content*.

5. DISCUSSION

The analysis demonstrates an initial understanding of the opportunities for AR to foster widening narratives. We gained knowledge on the effectiveness of a low-fidelity AR prototype in facilitating discussions of decolonisation and what aspects of content young people believe to be valuable when referring to decolonisation. Achieve through card sorting 'values and simulating AR experiences with contextualised information. We also learnt about how young people perceive ownership and fairness, contributing to what is meant by decolonisation. Whilst these findings are important in framing the work and positioning further work.

As most participants chose to return the artefact to the culture of origin and only a minority would not acknowledge the colonial history of the artefact. It tells us that most participants want a decolonised museum space. Many even did acknowledge that repatriation would be the correct thing to do, and one participant even said that while repatriation would be the correct thing to do, sharing it would give us the best of both worlds. Whereas another young person commented on the risk of sharing because it may get lost or damaged.

The value sorting has shown us that young people want to personalise experiences based on their views to read information on the facts and origin of the objects presented. Through the discussions, one participant alluded to the typical use of AR is to digitally overlay objects. But what if it was to remove physical objects from sight. This aligns with the understanding of decolonisation. If the user believes in repatriation, then the digital world should influence the physical environment and therefore should react and remove from sight in the AR world.

Furthermore, insights from the data, highlights the complexities of decolonisation and therefore the need for an empathetic approach. As throughout the discussions young people would look to their grown-up for affirmation or ask the researcher to repeat the activity. We found that several participants assumed the information they were selecting via the values was in addition to the pre-existing information currently available within the museum space. In future it could prove useful to inform whether this content is in addition or in place of the existing content in the museum space. We also found that when interacting with AR content, it took additional explanation to what was expected from the participants, as in the simulation the augmented content would react to the interactions, and although clear, were left open for interpretation. To improve this, we need to ensure that the participants have sufficient knowledge of AR and give examples of how they can use the interactions without leading them. Further, it was observed that younger

participants were less focused on using interactions that would create UGC such as scribble and whisper instead focusing on accessibility and useability. This requires further investigation, as other non-digital areas of museum practice where audiences express their creativity as a response to some information is popular amongst younger people.

Due to the ethnic makeup of the study, we cannot make any claim for a general museum audience, we can only claim that people identifying as white British put their trust in museums to provide them with accurate information. Based on the responses we have received through questionnaire and the value sorting; we can see that the majority do want a broader narrative and technology can play a role in this. Within this study we can define the opportunities for widening narratives using a low-fidelity AR prototype that serves to determine values and simulates a AR experience based on the conditions set by the participant. Several participants during the living lab session were very enthusiastic about designing their own AR app, this is most likely because AR is still relatively new for a general audience, which aligns to the lack of knowledge around the possibilities of what you can do within an AR world.

Further work is required into what methods and processes are required to design a widening narrative museum experience with children and families. We cannot take away the possibility that the sampled demographics in this study would hold a more colonial view than people who do not identify as white British. However, we recognise the significance of a greater sample size spread across various demographics of ages, family make-up and ethnicity. That said, the insights gained from the study is informing how museums should begin to rethink practices of decolonisation in widening narratives for the presentation of artefacts. Which includes how a mobile AR application can be deployed within the setting to harness the debates and personalise experiences documented in this paper.

6. CONCLUSIONS

This paper reports the design collaboration with a local museum and art gallery for an AR application to support *widening narratives*. The work set out to explore the opportunities and challenges for young people and families to co-design a novel inclusive experience around content and interaction. We draw analysis from the method design and thematic analysis of two user studies. To understand the decolonisation process from an audience perspective, value of how artefacts should be displayed, what content is needed to engage audiences and how audiences wish to interact and navigate various narratives in an augmented space. We observed that a low-fidelity AR prototype helped

participants feel safer to express their points of view knowing the ability to personalise experiences for themselves or shared back with the community. Finally, we recommend how a low-fidelity AR prototype can be utilised to harness a decolonisation debate.

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