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UX values framing: an authoring tool to capture children's values for widening narratives

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This study highlights a value-led investigation into children's (aged 9–18) views on decolonising museum experiences. The paper presents the challenges and opportunities associated with using a low-fidelity Augmented Reality authoring tool (User Experience Values Framing) to personalise museum experiences. The tool captures children's values by employing a Value Sensitive Design approach, in addressing issues of representation, power imbalances, and cultural responsiveness in museum technologies. Through four empirical studies, the research examines the motivations behind visiting museums, value preferences, and the emergence of values amongst children. It sheds light on the effectiveness of involving children in the design process of an Augmented Reality authoring tool, highlighting their perspectives on decolonisation narratives and the desire for personalised and inclusive museum experiences. The studies highlight the importance of capturing and integrating values related to decolonisation into museum exhibition design, emphasising the needs and preferences of young audiences. Despite limitations, the insights gained offer valuable guidance for museums seeking to create more inclusive and equitable cultural exhibitions.

RESEARCH HIGHLIGHTS

- The importance of involving children in decolonisation and the varying degrees of capturing values in facilitating discussions.
- Combining traditional UX methods with a novel interactive UXVF activity to simulate and capture a richer understanding of participant perspectives.
- Afford agency amongst children for personal growth to reflect on their values towards understanding decolonisation.
- The importance of considering predefined and emerging values and how these emerging values are captured and integrated into the museum experience.
- Insights into the impact of integrating research into museum environments, working with professionals through co-design to become part of the research team in assisting with deploying and supporting the research endeavour.

Keywords: *values; value sensitive design; authoring; evaluation; decolonisation; museum; user experience; widening narratives.*

1 Introduction

Since the rise of the Black Lives Matter (BLM) movement and wider socially progressive perspectives, we have seen large groups of society question decisions, existence, and presentations of public institutions (Georgiou, 2019, Sandis, 2016). With this, museums are particularly targeted as they portray histories that can be considered prejudicial and conflicted. One often cited tension relates to colonisation especially as it associates with the BLM movement (Henry, 2021).

Museums, traditionally seen as custodians of history through the collection (Whittington, 2021), conservation, and interpretation of artefacts (Rutherford, 2021), face growing calls for decolonisation of their practices (Georgiou, 2019). This complex debate transcends singular perspectives (Hunt, 2019, Van Broekhoven, 2019), as individuals within the same cultural backgrounds hold diverse views (DeBlock, 2019, Horton, 2018) on the repatriation of artefacts acquired during colonial eras (DeBlock, 2019, Sandis, 2016). Decolonisation encompasses more than just the physical return of artefacts; it requires acknowledging the historical context surrounding these objects and demands that museums adapt their engagement strategies for each item, approach, and institutional structure (Museum Association, 2021). Consequently, the term decolonisation holds various meanings to different organisations, stakeholders, societies and communities. Many museums believe that decolonisation necessitates the deconstruction of knowledge that aims to broaden the narrative (Jilani, 2018). This means that, alongside artefacts, multiple voices are presented, and diverse perspectives are shared extending accessibility to artefacts and creating more inclusive and reflective experiences.

In the UK, young people are not champions of the British Empire; polls by YouGov (2014, 2019) demonstrate a change over time with a thirty-percentile drop observed in young people's supportive attitudes towards that particular time of British History. Gaining a deeper understanding of young people's critical views of colonial histories is highly valuable to cultural institutions

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such as museums as they seek to engage with children and young people while presenting a more nuanced picture of colonial history. Considering the rise in younger and family audiences who visit museums (Arts Council England, 2023), museums need to understand children's views and motivations for visiting (Bowyer, 2022), to continue to attract and retain younger audiences for the future (Burns, 2022).

In considering the design of innovations with respect to sensitive subjects such as decolonisation, it is important to address the values of both the audience and the original culture represented. This is particularly important in museums as they traditionally reflect narratives that neglect or misrepresent diverse viewpoints (Georgiou, 2019). Value Sensitive Design (VSD) is an approach that ensures that human values are accounted for throughout the design process. It achieves this by incorporating ethical considerations into technological development (Friedman & Nissenbaum, 1996). The key concepts for this work include:

- Incorporating viewpoints throughout the design process so that audiences feel included and represented.
- Recognising and addressing power imbalances by actively working towards evaluating voices within narratives.
- Promoting culturally responsive design using appropriate languages, imagery, and storytelling methods. That aims to foster a more respectful and engaging experience for all.
- Facilitating dialogues between audiences and curators, to broaden and empower communities to reclaim their narratives.
- Promoting ethical considerations, diverse representation, and cultural design.
- Building a more inclusive and equitable future for all (Georgiou, 2019).

Value Sensitive Design has been critiqued for lacking standards (Yetim, 2011) and methods, especially in regard to value discovery (Le Dantec *et al.*, 2009). For researchers and designers working with children and young people, the ability to discover values differs by age; in Shaw *et al.* (2024) children's values are pulled from designs of wheelchairs by using a child centred interpretation lens; Nouwen *et al.* (2015) distilled values by using laddering methods with adults' statements when designing with parents. Working more directly with children, Elsayed-Ali *et al.* (2020) used the Rokeach Value Survey with 8–12 year old children, who were then asked to design for their own selection of values in a fifteen minute paper based design activity. The limitation of this approach, when compared to our own work was that the children could pretty much ideate anything, and so the design activity was less bounded, and conflicts of values was not included. Card based approaches in design are not new (over 100 are detailed in Roy & Warren (2019)), in many instances they are used to support value sensitive design—these were used with parents in Pothong *et al.* (2024) and have sometimes been used with children and teens—examples include Tango Cards for tangible interactions (Deng *et al.*, 2014), We-design-for-steam cards (Arvanitakis *et al.*, 2024), maker cards (Root *et al.*, 2019)—in these cases and most others cards are the only prompt used with the children and values are not incorporated alongside the design ideas.

The novelty of our approach to value sensitive design is that we provide a method that allows children to explore design from a value centred perspective with a view to the design of augmented reality overlays in physical contexts.

To summarise, the complexity of decolonising museum content, the different viewpoints of different generations, and the acknowledgement that decolonisation is a sensitive subject requiring a careful and empathetic approach. The complexity of this problem makes it difficult to create an all-inclusive experience, even if the museum or cultural institution has the intention of making it all-inclusive.

Our work in this area has been conducted with a local museum in Blackburn, Lancashire, UK. Blackburn is an ethnically diverse town and its museum is concerned with bringing value to the diverse community. To support the museum/art gallery in this endeavour we have devised a novel low-fidelity authoring tool to explore the eventual design of an Augmented Reality (AR) prototype for personalising museum experiences. Our tool, and its associated method of use, the "User Experience Values Framing" (UXVF) method, aims to understand the expectations and behaviours of audiences, in widening narratives by representing cultural artefacts within museum exhibitions from various viewpoints. Our work is with children between the ages of 9–18. Note that in the related works that follow, children and young people are sometimes discussed interchangeably—for simplicity of reading we will refer to all the individuals we have worked with as children—our reasoning is based on the UK legal system of defining a child up to the age of 18.

Our research will answer the following questions:

1. What are the challenges and opportunities associated with using low-fidelity Augmented Reality (AR) authoring tools to personalise museum experiences, focusing on widening narratives and engaging young audiences?
2. What are the implications of incorporating a VSD approach in developing museum technologies, addressing the issues of representation, power imbalances, and cultural responsiveness?
3. What role does dialogue play in understanding and addressing value tensions surrounding decolonisation when developing museum technologies?

We present here our method (the "User Experience Values Framing" (UXVF) method) as a contribution to HCI and we demonstrate its use in the context of decolonising museum experiences for young audiences. Our work furthers understanding of digital museum engagement (Claisse *et al.*, 2017, Hornecker & Ciolfi, 2019), while focusing on the growing calls for decolonising museums (Georgiou, 2019), on surfacing the complexities involved, and on the need to consider diverse perspectives by building upon key works situated in VSD (Borning & Muller, 2012, Friedman *et al.*, 2013). We explore how technology and interactions—particularly AR—can be used to create inclusive and engaging decolonisation narratives and add to the discussion on co-designing AR experiences with children (Ashtari *et al.*, 2020, Sim *et al.*, 2018), while also empathising the benefits of involving children in the design process and highlighting the importance of using appropriate methods and tools to ensure children's voices are heard and represented (Fitton & Read, 2016, Read *et al.*, 2014). Our use of the VSD (Friedman, 1996) approach is considered, discussing how human values, particularly when designing for diverse audiences, can be applied and can emerge throughout a design study (Friedman *et al.*, 2002). Finally, we explore the limitations of the VSD framework and offer some potential solutions to address these when working with children.

The originality of this research is in the involvement of children in the value-led design of a personalised AR experience to facilitate discussions around decolonisation by contributing a novel design method, protocol, and analysis of children's values in widening narratives. This paper outlines the process by which a low-fidelity authoring tool can be used to capture values by

eliciting and provoking responses. We show how HCI research and practice can play a crucial role in creating decolonised museum experiences, that resonate with young audiences and contribute to a more inclusive and equitable cultural landscape.

To summarise, existing research is limited in that it focuses on decolonisation in non-museum spaces (Smith *et al.*, 2020), or focuses on the design practices and values of the designers (Dolcetti *et al.*, 2021). These play an important role in this work. However, for decolonisation efforts to be successful, all stakeholder's and audiences' values should be considered and inform the design (Harding *et al.*, 2019). With that, a broad pool of participants was intended to gain such a rich diverse understanding of decolonisation from a child's perspective, which conforms with existing recommendations (Kameas & Polymeropoulou, 2020). Although the recruited participants largely fell under the same ethnic background (White 80%) and are from the same geographical area. The work presents an authentic recruitment of participants and notes any differences between demographics—with 17% identifying as Asian/Mixed, we observed no significant differences between participant responses of value selection or interaction decisions. However, the imbalance of demographics are the limitations of the work and should be taken into consideration when reading this work and open up the opportunity for future research.

2 Related Work

Museums, traditionally seen as guardians of history, face growing pressure to decolonise their practices (Georgiou, 2019). The following related work in Museum HCI explores this complex debate, discussing the arguments surrounding the repatriation of colonial artefacts and the evolving role of museums in cultural reform. To ensure the investment of future generations in cultural heritage, all audiences need to be considered; an important audience is children who are avid visitors to museums and cultural spaces. In Design Methods, Wicked Problems, and Children we discuss work with children as designers of museum experiences and explore what others have done to capture and represent values. As museums explore the use of technology to enrich museum experiences, empowering children with voices, and harnessing and respecting their values, is crucial In the last section of this review, design frameworks for VSD and augmented reality are explored in order to give the reader an understanding of the novelty of our own UXVF approach.

2.1 Museum HCI

Decolonisation is a term that is used to refer to the undoing of colonialism (Betts, 2012). In 2021, The UK Museums Association (MA), appreciating that there is no one-size-fits-all solution to decolonise each museum and each colonial artefact, launched a campaign and accompanying toolkit to assist museums in critically examining and revising their decolonisation approaches to find the best way to decolonise.

The toolkit advocates for museums to become platforms where diverse narratives can be shared and heard, a sentiment echoed by Georgiou's "The Decolonisation in British Museums: Reflection and Potential Guidelines" Georgiou (2019). While acknowledging the limitations of their toolkit—as a singular resource for achieving comprehensive decolonisation—the MA emphasises the significance of decentralising power and establishing mechanisms for ongoing re-evaluation of decoloniality (Shiraiwa & Zabalueva, 2022). Further the MA toolkit argues that collaboration is critical to decolonisation as it enables informed and inclusive decision-making (Museum Association, 2021), creating an open space where difficult issues can be explored and all involved can feel safe in sharing their thoughts and feelings is one of the ways this can be achieved. The toolkit and works from Anderson *et al.* (2021) convey the importance of being people-centred and value-driven in the curatorial process (from design and content selection to narrative development, storytelling, and presentation). Additional guidelines from Georgiou (2019) promote identifying the institution's role within society, critiquing what the term decolonisation means and exploring how museums become "truth" tellers and need to continually research their audience to monitor and measure their place within the community. The guidelines in Georgiou (2019) encourage "re-thinking" practices and include but are not limited to:

- Collaboration: the use of forums to share concerns with stakeholders and build relationships across institutions.
- User Generated Content (UGC): including the audience in the process by, for example, "writing labels or telling a story about a colonial object of the museum" or by providing spaces e.g. empty rooms where audiences can decide what content and experience is replayed.
- Value capture: enabling audiences to feedback on their experience and values, stating what they liked/disliked and rating various statements.
- Child specific approaches: linking material to school curricula to enrich the learning experience through things like virtual games.

These guidelines, and the MA toolkit sit well with the principles of co-design and human-centred design, which are fundamental concepts within the field of HCI. Understanding the diverse perspectives on decolonisation necessitates innovative methods to ensure inclusivity, accommodation, and an empathetic approach to respecting all viewpoints—which aligns with UCD philosophies, the utilisation of technology to foster inclusivity and encourage the creation of content from users—UGC—is fundamental to HCI and with the rise of Web 2.0 and the subsequent proliferation of UGC platforms, such as social networks users are familiar with sharing views, tagging content, engaging in dialogue, and reporting content creators (Teresa & Sehl, 2017). Research has explored online spaces like Quora as platforms for individual decolonisation of identities through conversations (Das & Semaan, 2022). While it is undeniable that social media has the potential to induce distress among its users, Bala *et al.* (2023) suggest that strategically leveraging discomfort within the design of systems can ultimately contribute to a deeper understanding of history, by highlighting the existing inequalities between users, cultures, and environments. Decolonisation is not limited to museum design and content, many authors have explored it in social sciences and elsewhere. In HCI the "decolonial pathways" outlined by Garcia *et al.* (2021) provide valuable guidance in navigating the complexities of decolonising HCI research and design, particularly regarding the persistent imbalances in cultural power dynamics. These pathways emphasise the importance of:

- Understanding the rationale behind existing practices and how tools, methodologies, and approaches are shaped.
- Reconsidering and challenging established norms and questioning what is perceived as "correct".
- Changing actively working towards reshaping practices and structures to be more inclusive.
- Expanding by embracing and incorporating diverse perspectives and knowledge systems.

- Reflecting continuously by evaluating and addressing power imbalances to ensure equitable and inclusive practices.

Early attempts in museums towards decolonisation varied considerably with some narrating simply the repositioning of pictures (Chaterera & Nyawo, 2013) or the removal of words (in this case the phrase Golden Age (Rossi, 2020) from Amsterdam museum)—more nuanced approaches have involved actions more aligned to the above described principles like the use of spaces for exploration (Giblin *et al.*, 2019), with visitor labelling (Nashashibi, 2003) or with bespoke exhibitions intended to deliver a more diverse perspective as described in Minott (2019). In this latter work, Minott describes how a temporary exhibition in Birmingham, though well intentioned, was limited in its effectiveness in so far as it was really only portraying the value set of the museum curators that built it (in aspects like how things were labelled and described) but also that the "cost" of maintaining this temporary exhibit rendered it only useful and relevant for a relatively short period of time.

Technology affords many advantages when engaging museum audiences. To digitally recreate (Richardson, 2019) and augment to engage audiences (Loureiro, 2021). A technology that affords the most access is Augmented Reality (AR). This is due to the ubiquity of AR capabilities within audience personal devices. This alone, affords AR to become the most frequently used technology within the museum spaces—as it presents a compelling tool to offer optional access to additional content and narratives related to their collections. Since AR content is anchored to physical locations within a digital realm, users who choose not to engage with the digital experience can still enjoy the physical space as intended. This technology allows for controlled access to supplementary information, with the option to provide warnings or guidance before users engage with the content (Cárdenas *et al.*, 2022). Potentially, creating a safe space for audiences to explore and acknowledge sensitive stories in a novel and alternative manner.

In 2018, Hereniko (2018) proposed AR as a means to give different narratives about art in a museum, and more recently AR has been critiqued for its usefulness for opening up GLAM (Galleries, libraries, art galleries and museums) venues for a wider population (Gunn *et al.*, 2024). It has been shown to be an effective way to better represent indigenous histories (Conway *et al.*, 2020, Paananen *et al.*, 2023) and has been used to show artefacts in a "virtual" rendering of their original situation (Nofal *et al.*, 2018). Of note in these studies is the way in which any AR augmentation is designed, in the case of Nofal *et al.* (2018) the challenge is almost entirely technical with programmers creating a space onto which a physical object is situated but where AR is used to convey information or meaning about an artefact, care needs to be taken to ensure such content is appropriately designed.

AR is a cost-effective approach for smaller museums, as it leverages the ubiquitous mobile device (Ofcom, 2023) to deliver content, making it easy for the audience to interact with such content. The presentation of content and the content of content are both areas where design matters. With over 800 participants Roberts *et al.* (2018) explored three different ways to present labels/information about exhibits and commented that while positioning was important to foster collaboration and to help the audience engage with the artefact. The same work did conclude however that the content (as in the words and meanings) of any augmentation could limit the open-mindedness of the enquiry. Human centred design of such content is seen in Gunn *et al.* (2024) who call for co-creation of extended realities, and Paananen *et al.* (2023) who used co-design sessions—however, the extent to which such approaches adequately expose the designers to others' perspectives, and in particular different values, is not all that clear.

2.2 Design Methods, Wicked Problems, and Children

There is considerable interest in engaging with children in the design of museum experiences, not least because children are frequent visitors to museums but also because there is considered to be great value in hearing their voices in design. Children have been consulted as part of a design process (Culén *et al.*, 2013, Dockett *et al.*, 2011), they have been working in co-design workshops to create experiences, like Cesário & Nisi (2022) where 150+ teens were involved in designing a game. In Cassidy *et al.* (2015)children co-designed AR content using transparencies as a design approach to show layers. Candello *et al.* (2020) describe an extensive study of museum "content" design in which adults design for children using ideas like role-play.

In the context of our work, we are aware that children desire a more nuanced telling of history (YouGov, 2019). These nuances have a direct relationship to the wicked problem space of decolonising museums. They require new approaches when working with children to generate empathetic and meaningful solutions. Studies have shown that collaborating with children, in primary school and as young as 9 years old can be effective in addressing wicked problems (Bailey *et al.*, 2019, Lam & Low, 2016). Lam & Low (2016) state that children *"are capable of generating interesting and elaborate ideas to solve a wicked problem, with little teacher intervention or direct instruction"*.

We also note that the CCI and HCI community places great emphasis on the appropriate inclusion of children in design activities and, aligned with this, on the design of useful methods and techniques to engage with children in co-design. Children's inclusion can inspire adults in design (Mazzone *et al.*, 2008) and their ideas may not always need to be taken literally and indeed need to be carefully interpreted (Frauenberger *et al.*, 2012). When involving children in co-design around wicked problems, it is important to remember that anchoring bias affects children, the same as adults (Yasseri & Reher, 2022). It can be assumed that children have less pre-existing knowledge of the wicked problem—cultural knowledge—so it is important to provide children with information that provides all the nuances that are present in history, as well as make certain to listen to what they believe is important as well as what values they adhere to in order to incorporate these within the museum space (Muntean *et al.*, 2017). When considering adults are the ones who will typically design and build products children will use (Mazzone *et al.*, 2008), there is a great empathises on capturing the children's requirements and values especially as they differ in their cognitive development from adults. To ensure that the ideas children contribute are heard, several roles; tools; and methods have been developed to ensure inclusivity and representation. (Read *et al.*, 2016a, 2014).

In a review of including children in design from 2011–2019 (Kawas *et al.*, 2020) reported trending domains where children support CCI research activities and highlight potential pathways for future work that are of relevance to this paper. These included:

- Social Interaction and connectedness: developing social skills, collaboration, and knowledge exchange.
- Learning: literacy, inquiry, and reflection.
- Self-expression: constructing narratives, supporting creativity and imagination.

- Personal growth: developing personal identities and a sense of autonomy in the world.

The same paper also highlighted the "adult" values that seemed to underpin such work—these being:

- Affording child agency and empowerment: empowering children through participation by providing free choice, considering the power dynamics, and prioritising the young person's needs.
- Child-centred research processes: a young person first approach, ensuring the positive, equal, and transparent process.
- Encouraging broad participation: striving for inclusivity and diversity. Highlighting the need to base research on "the diverse lived experience of children and the necessity of creating appropriate research methods".

Many design methods have been developed to support the challenges of enabling novice designers to contribute to understanding digital worlds (Ashtari *et al.*, 2020). Speicher *et al.* (2021) explore several approaches to prototyping AR experiences, including physical prototypes, physical-digital hybrids, and purely digital iterations. In onboarding participants, physical prototypes (Hunsucker *et al.*, 2017) have been key in educating and informing participants within the space. Works from Nebeling & Madier (2019a) highlight the construction of 3D environments using tangible objects, allowing users to contribute to the authoring process. Whereas, Freitas *et al.* (2020) emphasise the prevalence of prototyping with physical mediums within AR design. Some studies involve children in the evaluation phase of AR prototypes rather than active involvement throughout (Read *et al.*, 2014), while others, like Cassidy *et al.* (2015) engage participants in the ideation/creation phases of the use of AR within a co-design context. In this work, they introduce the use of flat layers with elements like acetate to create a sense of depth and present augmented content in these varying layers.

Studies have shown that users respond positively to low-fidelity prototyping tools, particularly when utilising props, scenarios, and storyboards (Maguire, 2020). That said, with any of these design methods users may lack the technical expertise to contribute meaningfully to a 3D space, struggle with limited support and design guidelines, and face complexities in aspects like story development, user experience (UX) considerations, and maintaining user attention (Ashtari *et al.*, 2020). These factors highlight the growing challenges faced by non-technical designers when creating AR prototypes for user interaction and content creation. To address these challenges, Glenn *et al.* (2020) propose lowering barriers to entry through user-friendly authoring tools focused on structure, scaffolding, and storytelling support. Additionally, Ashtari *et al.* (2020) emphasise the importance of fostering an inclusive and collaborative environment that empowers novice creators to express ideas and explore interactions within a "safe" space.

A VSD approach holds particular importance when empowering young voices within co-design. This may address the concerns and challenges discussed when designing novel methods for children to engage in research

2.3 Designing with Values

Values are what an individual perceives as important, they represent strong beliefs that evolve (Rokeach, 1973). Therefore, values become guiding principles that inform our actions, judgements, and decisions and become part of what makes us unique (Harper *et al.*, 2008). Values influence our behaviours, become our motivations, and define our needs. Understanding and studying values in HCI is not new, typically works surrounding values are presented within sub-disciplines such as computer ethics; informatics; supported cooperative work and participatory design (Elsayed-Ali *et al.*, 2020). The significance of embedding values in the design process has been addressed within the HCI community (Cockton, 2005, Flanagan *et al.*, 2005) and many approaches are arguing for values in the design process, in particular, but not limited to, values within, a participatory design process (Iversen & Leong, 2012); and values in design (Friedman, 1996, Silverstein *et al.*, 2006). Friedman (2004) coined the term Value Sensitive Design (VSD), which posits that we consciously need to understand human values from an ethical standpoint when designing digital technologies.

Understanding the role values play within CCI design processes is gaining in popularity but it is challenged by the perceived competency of young people to be able to express abstract ideas (Zaman & Abeele, 2010). However, this is not limited to children, even adults struggle to demonstrate what is important to them (Cockton *et al.*, 2009). In some cases adults try to interpret the values of children with varying success; Skovbjerg *et al.* (2016) explored how misrepresentation of values and assumptions may occur among researchers and children. Ongoing work in CCI (Antle *et al.*, 2014, Nouwen *et al.*, 2015, Van Mechelen *et al.*, 2014) seeks to explore the extent children's values and views are incorporated in the design process. Bleumers *et al.* (2015) achieve this through the planning and execution of identifying, capturing, and relating values through various phases. The phases focus on different aspects of value creation, discussion, and relationship toward technology—using a conceptual, empirical, and technical framework—to investigate values in the boarder sense. This differentiates from the works of Kinnula *et al.* (2018), which examine the roles that children play in the design process and stipulate that value creation analysis is important when considering what empowers and motivates children to participate. Laddering is another technique used to investigate values (Zaman & Abeele, 2010), this involves interviewing people to uncover motivations and values with an initial question on behaviour, object, or emotion, followed by why questions to encourage participants to rationalise their reason. It is through the repeating why, that a deeper understanding is achieved.

A VSD approach to design will provide advantages when working with children by empathising and understanding (Bleumers *et al.*, 2015) and aiming to incorporate values throughout the design process (Bermudez *et al.*, 2023). This ensures the final product aligns with what matters to children (Kinnula & Iivari, 2021), which, in a museum context, should lead to more engaging, respectful and beneficial experiences for all. In addition, a VSD approach aligns with co-design in its iterative nature, providing continuous feedback and refinement throughout (Elsayed-Ali *et al.*, 2020). It addresses any vulnerabilities by focusing greatly on ethical considerations and by fostering a safer space for discussions and design ideas to flourish (Donia & Shaw, 2021). Following this approach, the creation of novel technologies and interactions are not only functional but embed people's unique needs, perspectives, and what matters to each other (Bleumers *et al.*, 2015) resulting in a more ethical, inclusive, and beneficial technology experience for all.

However, since its conception, VSD has received several criticisms through the years (Alsheikh *et al.*, 2011, Saab, 2008). Notably in 2012, Borning & Muller (2012) raises four key criticisms with associated solutions:

1. Universal values: The first key criticism is that VSD adheres to the idea that there are universal values across all human cultures, this can be seen as problematic (Bickel, 2006, Ess & Sudweeks, 2001, Piecowye, 2006). Believing that there are universal values can lead to the belief that groups, cultures, or religions are the keepers of those values. Who then can take it upon themselves to hold every culture to these values—which would be a form of colonialism (Borning & Muller, 2012). Yet if all values are cultural what right does a cultural group have to criticise the practice of another culture? (Borning & Muller, 2012, Walker & Dearden, 2005). To broaden the scope of VSD it has been argued that there needs to be a collection of case studies, heuristics, and lists that are relevant for a broad range of cultures and contexts (Borning & Muller, 2012).
2. Lists without Contexts: When a list of values is offered for consideration, the values embedded in it lack the context in which they were created (Borning & Muller, 2012). The context and cultural viewpoints wherein these values were created need to be explicitly stated. This context also includes who holds these values, explicitly supported values of the researcher, stakeholder values, designer values, or the values of the participant. Therefore when creating these lists the context needs to be explicitly stated.
3. Voice of Participants: The third criticism relates to the voice of the participants. As the researcher is placed between the participants and an audience there is a risk of unintentional ventriloquism (Alcoff, 1991, Kyng & Mathiassen, 2003)The problem here is not that the researcher has a hidden agenda but that everyone is capable of unintentionally well-meaning ventriloquism. By giving participants, the right voice through direct quotes, they are given a voice, and the audience is able to differentiate between the voice of the participant and that of the researcher.
4. Positionality of Researchers: The fourth criticism relates to the voice of the researchers. Self-disclosure is not standard within HCI, unlike in other disciplines such as collaborative ethnography (Lassiter, 2005). The criticism lies in that not knowing the values and the standpoints of the researcher can introduce limits to what the researcher can perceive and understand (Borning & Muller, 2012). As their standpoint will inform how they evaluate and interpret the participant's voice. These are the researcher's values and standpoints and should be disclosed especially where there are huge gaps in the values of the participants and the researcher. Iversen & Leong (2012) state the importance of mediation to elicit stakeholder values during the design process. This can be achieved using a blend of implicit language in discussion/dialogues whereby people discuss values directly and indirectly related—providing wider context to the value-led approach. Whereas Flanagan *et al.* (2008), describe this as a three-phased approach that includes delivery, translations, and verification of values. This way value conflicts between the participants and the researchers will become apparent, which is especially important in intercultural situations where there could be key differences between the base values of the researcher/s and participant/s. Designers need to keep both cultural and individual values in mind during the design, this means that while members of a specific culture group have shared values, they also have their values that are different from the broader group (Viberg *et al.*, 2023).

More recently, Friedman *et al.* (2021) published eight grand challenges relating to VSD, which were collated from a large community workshop representing various science and design disciplines from across Europe and the US. The workshop highlighted key areas with questions relevant to this research such as; evaluating the VSD methodology as a whole—*How could value requirements for VSD projects be formulated, particularly to account for value tension?, What range of approaches could be employed for meaningful evaluation?, How could value-sensitive design projects be assessed for whether they realize their aims of supporting specific values?*—and framing and prioritising values—*How can values within a value-sensitive design investigation be framed so they say and mean the same thing to all parties? How are values grounded in non-rational (as opposed to irrational) aspects of human experience such as affect, feelings, moods, and emotions?* Furthermore, there is the need to acknowledge the possible power dynamics at play within research that is conducted (Borning & Muller, 2012). These power dynamics can range from the power difference between the researcher and participant but also among the participants themselves. Within any social group, certain power dynamics at play influence what information they're willing to part with, whether it's a social group of family members, friendships or any other. What is impossible to fully acknowledge, is the full power dynamics at present within any situation. It is important to acknowledge that these may be present.

Given Friedman's challenges, our work seeks to address these criticisms particularly those concerning the voice of participants, lists without contexts, and positionality of researchers. By both developing a design method for enquiry but also be delivering research results relating to children's values in the context of decolonisation and museum design.

2.4 Limitations within Current Methods

Recent work argues the possibility of nurturing children's agency and activism through digital technology design (Iivari & Kinnula, 2024). This can be complemented by integrating critical literacy into children's computing education (Iivari *et al.*, 2024). This poses the question of how are children's views and ideas captured during the design process (Read *et al.*, 2016b).

At the time of writing, researchers had not found a method that incorporates these previous two points into a design method that captures values for decolonisation. The current literature does not focus on capturing children's emerging values during discussions nor does it investigate how values manifest themselves in the authoring process of digital content. That said, it has been acknowledged that children can contribute to the decolonisation discussion (Giblin *et al.*, 2019, Smith *et al.*, 2020), but leave many questions on how children's values should be captured during this process. In other works where values are captured, these are typically from designers of heritage projects (Dolcetti *et al.*, 2021). When working with younger people in decolonised participatory design practices, the creation of a safe space facilitates a common understanding and narrative (Smith *et al.*, 2020). Eriksson *et al.* (2022) argue that including children in the design process can aid in teaching them more abstract concepts in a more tangible exponential manner, which can lead to a deeper understanding of these concepts. Further, this will result in design decisions that are better supported and more well-reasoned. Currently, design methods have started integrating this, but it is not universally integrated nor do those that implement it fully take full advantage of it.

Finally, most AR prototypes focus on the interactions and the designing of AR, not the low-fidelity capturing of what

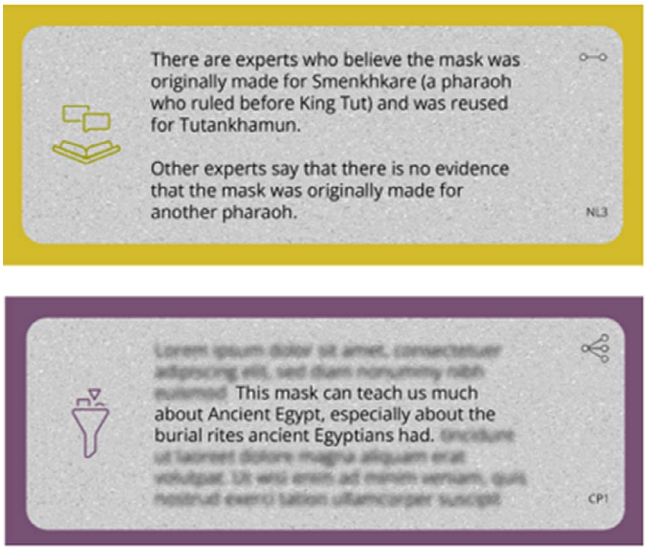

FIGURE 1. Sample of contextualised cards relating to the associated values used in the design method. **Alt Text: Two example cards demonstrating contextualized information in an ideation method. One card is clear, while the other has blurred text to simulate partial information.**

participants expect within an AR space. Existing methods focus on exploring whether an existing idea would work in an AR environment (Billinghurst & Nebeling, 2022, Nebeling & Madier, 2019a,b, Nebeling *et al.*, 2018, Nebeling & Speicher, 2018) or how users interact with the environment (Billinghurst & Nebeling, 2022, Nebeling & Madier, 2019a) and not necessarily how content is authored for AR.

2.5 Contributions

By delving deeper into the motivations and behaviours of how local communities actively participate in decolonisation discussions. This research seeks to contribute to a more nuanced understanding of the evolving discourse surrounding decolonisation and its transformative potential for the museum experience. Our research builds upon significant work within the area of CCI, by harnessing values in co-design through developing a novel method for engaging children in capturing, presenting and simulating personal values within an AR world and sensitive topic. The work addresses the VSD criticisms led by Borning & Muller (2012) by providing a broad range of responses and becoming an enabler of emergent behaviour, context is provided with every value in that the method simulates choices made throughout with contextualisation, protocols are shared by researchers to ensure participant voices are captured, heard, and analysed, which reduces researcher bias and finally, as the method requires participants to build on other people's input, recognising the value in individual and shared values are recorded and analysed to ensure researcher and participants voices are disclosed. 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. These points are addressed further in the forthcoming sections.

By following this approach, we aim to build a technological solution that facilitates a decolonised lens to encourage personalised museum experiences. That re-imagines how museums diversify and include audiences in their exhibits, to ultimately provide cultural reform in how narratives of colonial pasts are presented, consumed, and created.

UXVF Aims to combine existing guidelines and existing techniques into a novel method to extract both predetermined and emergent values from young people. Additionally ideation focuses on exploring possible ideas an not testing existing ideas within AR space. As stated before the UXVF method was designed in order to capture both predefined values as well as emergent values, values that the researchers did not anticipate. The multiple steps of UX VF aid in scaffolding participants' existing knowledge and introducing new knowledge in order for the participants to have a well substantiated opinion of a complex subject. Further These steps are also designed create a safe space where young people feel free to express themselves without having to fear judgement. It is posited that this will lead to a richer data set and will aid and a more complete view of the opinions of participants on decolonisation.

3 User Experience Values Framework (UXVF)

We have devised a novel method called User Experience Values Framing (UXVF) to facilitate value-led decolonisation discussions with children. The method blends traditional UX research methods, such as card sorting, think-aloud, usability testing, questionnaires, and semi-structured interviews. The work has taken place at a local museum in Blackburn and its current audience and a controlled study in a User Experience (UX) living lab with recruited participants from local schools/colleges. While previous works identified guidelines (Georgiou, 2019), principles (Museum Association, 2021), challenges (Borning & Muller, 2012, Sim *et al.*, 2018), and opportunities (Bleumers *et al.*, 2015, Kawas *et al.*, 2020). The work addresses the following challenges:

- Designing a UX method to capture children's values in an engaging activity that feels safe to explore without prejudice.
- Allowing novice users of AR to participate in authoring content (designing, grouping, sorting) within an augmented space.
- Recognising the importance of self-expression.
- Affording agency for personal growth in reflection, inquiry, and literacy.
- Involving children as participants
- Creating a safe and inclusive environment by providing a clear framework for avoiding overwhelming complexity and using age-appropriate languages within the method design.
- Revealing a value-led inquiry and how values are interpreted, interacted with, and influenced while exploring a decolonised narrative.
- Applying traditional UX methods with a novel interactive board activity to simulate and capture a richer understanding of participant perspectives.

UXVF is a "use method", a context of use with a story and a value laden situation and a set of artefacts; a board and three sets of cards, Value Cards, Contexutalised Cards, and Interaction Cards

Each of the artefacts has to be made specific for the context but the "use method" is not really context dependent.

Before using UXVF, the designer has to understand the specific context of use by drawing upon literature, primary data (like observations, interviews, or surveys) and national bodies[1] to

[1] MA https://www.museumsassociation.org/

FIGURE 2. UXVF Process. **Alt Text: A horizontal process flowchart with arrows showing steps in the UXVF process, including welcome, consent gathering, motivation framing, authoring, values, simulation, interaction, and wrap-up.**

understand the challenges, opportunities, needs, and motivations of the specific context.

3.0.1 Value laden narrative

A Value laden narrative is used to frame the situation. This should set a scene in which there are a set of different choices that can be made based on the information given in the narrative. In designing the narrative it should briefly explain how something is how it is—and with some dubious possibilities, followed by a set of scenarios that could follow given what is known. In our case we constructed a story about how Tutankhamen's Mask was was acquired through illicit (colonial) means. We then designed four response scenarios describing how the local museum should proceed with new information about an artefact. Our four Scenarios (S) were:

S1 The museum keeps it in its collection and decides not to acknowledge how the object was acquired.
S2 (same as S1) but adds information to the display that provides context to how the object was acquired.
S3 same as (S2) but also agrees to share the object with other countries.
S4 The museum decides to return the object to its rightful owner creates a copy and displays this in its collection instead. By providing these scenarios as opposed to letting the imagination of the participant-driven scenario, we envisioned that participants would have an easier way of articulating how they would respond to the scenario. Therefore driving the motivations throughout the task.

3.0.2 The Board

Designing the board (and the Contextualised cards) requires a space/subject for the design experience to situate in. In our case, as we were designing for a museum, we chose the topic of Ancient Egypt as this is present within the curriculum in year four of primary school in the UK and it would be easy for children to imagine a museum with such artefacts in it. The board is where all the interaction takes place and the design includes the scene at the centre of the board (Figure 3.1), Value card placeholders that surround the board from left to top where active Value cards (Figure 3.2) are positioned in the row or column closest to the scene (shown with green edges), the red edged spaces are for inactive Value cards, and a space is saved on the right hand side for Interaction cards that are only revealed towards the end of the design activity (note there will be more on active and passive Value cards below when the procedure/"use method" is described). The purpose of the placeholders is to encourage participants to place the cards back into the correct areas. This not only is used to efficiently analyse the interactions, but also to keep the board clutter-free when in use. The active and inactive elements of the board 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).

3.0.3 Value Cards

In UXVF, values are represented using single sided "Value Cards" (Figure 4), which each contain an icon, and words, relating to a value statement. Cards can incorporate colours to show how they might belong to an associated set, and contain an identification number used in associating values and contextualised statements.

In our specific case, we originally identified 30 values from the MA toolkit (Museum Association, 2021), which seemed a large number to work with, so we examined these and shrunk the list down to 17 values, which we then discussed with primary school teachers to verify comprehensibility—during this phase the teachers' input was invaluable for improving some of the wording and visual representation.

3.0.4 Contextualisation cards

Contextualised Statement Cards (Figure 1) are printed on acetate to recreate the sense of depth within a low-fidelity AR view and are linked to, and represent values, used in the contextualisation phase. The contextualised statements are used in scaffolding the process of understanding values and how people interact with such values.

3.0.5 Interaction Cards

The interaction cards (Figure 5) are designed to be used within the scene. The purpose of these cards is to explore how visitors/audiences will interact with augmented content in terms of actions such as prioritising, responding, and saving. The cards have varying purposes and act as prompts for the participant to interpret. The interactions chosen were defined by touch and gesture modalities observed in literature including creative user input techniques (Gwilt & Wilde, 2022), user-defined gestures for AR (Piumsomboon *et al.*, 2013) to touch gestures for children (Fiorino *et al.*, 2019). Furthermore, how these interactions might relate to prioritisation of content, i.e., hold and drag to move away from the focal point, would highlight a disagreement with the content taking centre place. These cards contain an icon relating to the interaction and a prompt to scaffold participants in discussing their uses. They are used in the interaction phase of the study (interaction). The variety of interactions demonstrates various actions that can alter the field of view based on one's values.

Although the interactions are defined, we recognise the importance of allowing participants to interpret the modality. Therefore participants can provide further insights into how they would approach consent with a previous user's values by how they interact with the content. They demonstrate what actions (tools) one might use to show this agreement or disagreement. It is through this, that we can infer how communities with varying values might share commonalities and which values are considered edge cases that have a greater response within the community. For example, if someone defaces a contextualised statement using the "Scribble" interaction we obtain a different view of that value as opposed to someone using the "Smaller" interaction to minimise its value.

3.1 UXVF in Use

Before using UXVF there is some work needs doing in advance. The pre steps are listed here:

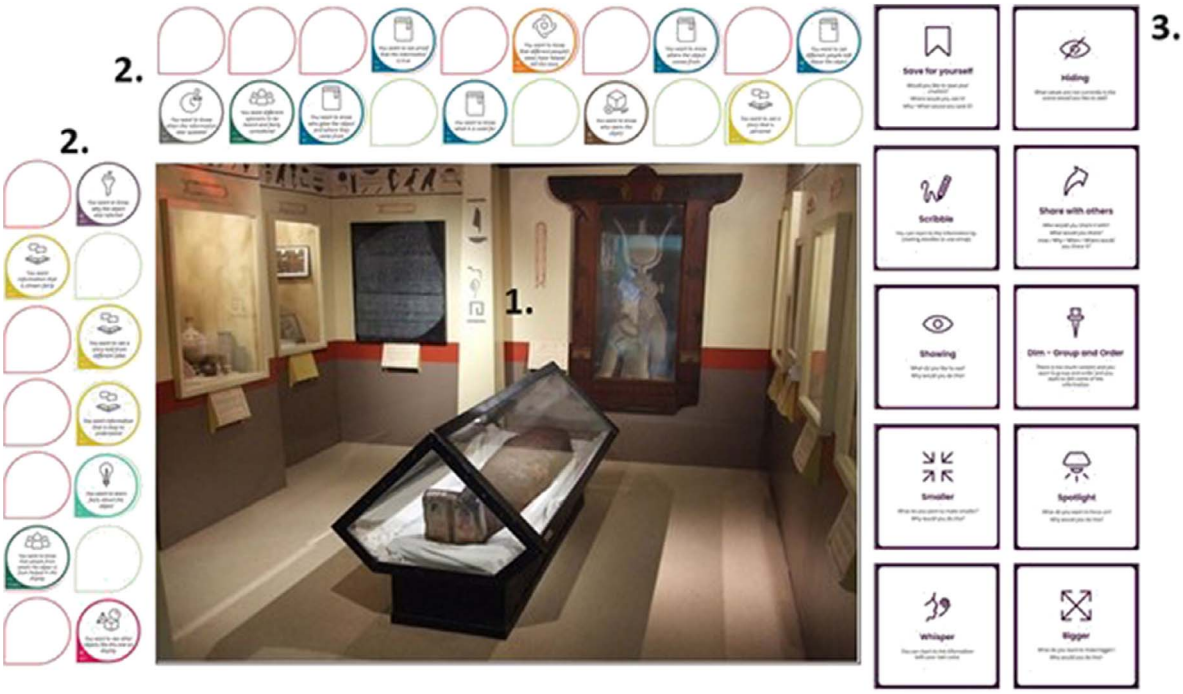

FIGURE 3. The Board. **Alt Text: An example of the board with the scene at the centre. To the left and above value cards in both active and inactive slots and to the right the interaction cards.**

FIGURE 4. Sample of design values depicting the label, graphic, iconography, and identification number. **Alt Text: Eight value cards arranged in two rows. Different Icons and text is present on the cards.**

1. Design value cards suitable for the context of work—check with child experts as to the way they should be described/depicted—make value cards 2. Design and make Interaction cards suitable for the context 3. Choose a focus for study, design the board scene and build the board, build the Contextualisation cards, design the Value laden narrative 4. Pilot (in our own case), when piloting the study two important things were found—the first was that the 17 value cards we had chosen were found to be too many and were overwhelming and so we chose to limit the number of active cards in each session to just seven—this avoided cognitive overload (Miller, 1956)—and the second was that study could take quite a long time especially with onboarding and so we developed a video to make onboarding easier for children and to ensure consistency over several iterations of use.

When running the method, the researchers inform participants that there are no wrong answers or wrong ways to participate. This is performed so that the participants do not feel they have to give a specific answer that is perceived as "correct" but their own opinion. Additionally, when participants signal uncertainty they are not pressured into responding.

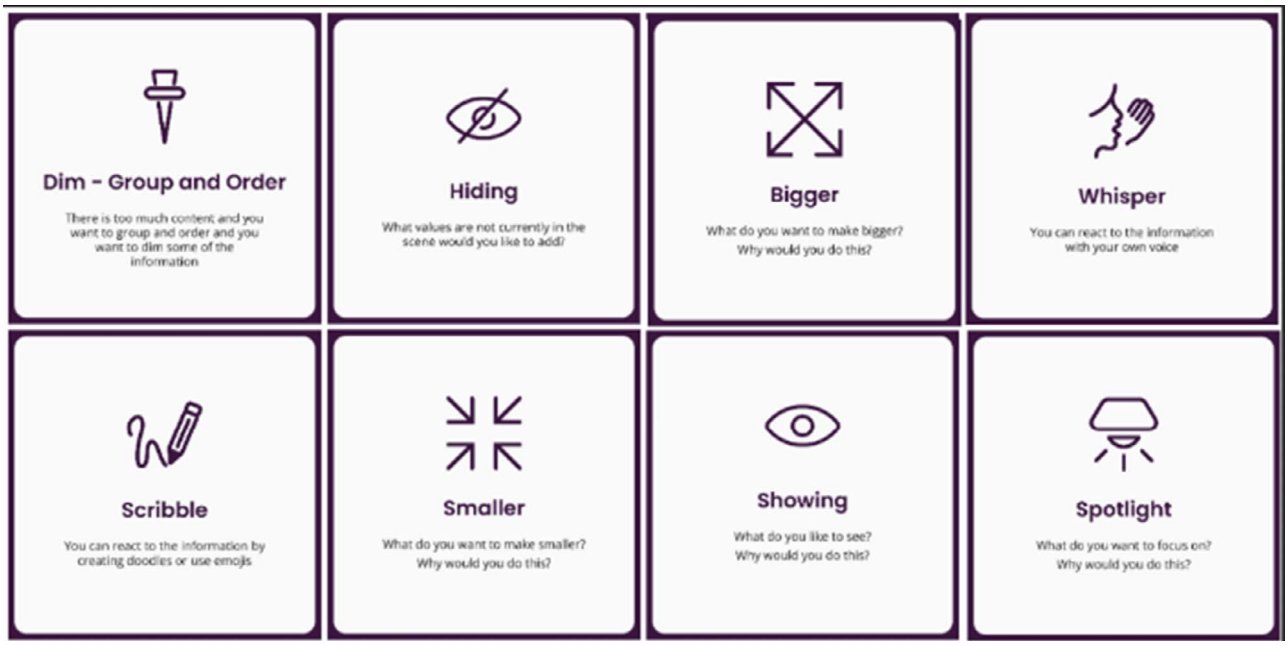

FIGURE 5. Sample of interaction cards used to determine how users will interact with augmented content. **Alt Text: Eight interaction cards arranged in two rows. They contain different interactions with unique icons.**

TABLE 1. Workshop schedule.

Step No.	Time	Duration	Objective	Technique/Items used	Phase in the Method
1	0 Min.	2 Min.	Method introduction, purpose, impact and rationale	/	1. Welcome and Why
2	2 Min.	7 Min.	Method presentation, consent obtained through reading the information sheet Participants are presented with the baseline questionnaire	Written questionnaire if needed for insights	2. Consent and Insights Gathering
3	9 Min.	1-2 Min.	Selection of one of the four scenarios		3. Motivation Framing
4*	10 Min.	7-8 Min.	Constructing of the top seven of values, to gauge what values are important to participants	Value Cards, Board, and Talk aloud method	4. Values
5	17 Min.	7-8 Min.	Placing Contextualised information cards onto the scene to simulate content in an AR space	Contextualised information cards, Scene, and Talk aloud method	5. Simulation
6	24 Min.	7-8 Min.	Using the interaction cards on the scene's content to determine how participants imagine these could be used	Interaction cards, Scene, and Talk aloud method	6. Interaction
7	31 Min.	4 Min.	End session	/	7. Roll of/Roll on and Pack-up

*Note: For the second participant onward the order is as follows - step 1, step 2, step 3, step 6, step 4, step 5, and step 7

There are eight phases (Figure 2) for a UXVF method to work these are as follows:

1. Welcome and Why: introduction to the project and researchers and clarity about their participation so children understand the purpose of their involvement and how their input contributes to the wider narrative of any project. This is achieved through a prerecorded onboarding video.
2. Consent and Insights Gathering: Consent and assent is obtained depending on the age of the participant. This is achieved by a typical participant information sheet, consent, and assent form. A baseline questionnaire, or just chatter, can be used to gather insights about the children, viz. audience motivations and experiences of past museum visits and to understand beliefs about decolonisation and values for facilitating inclusive approaches to museum experiences. For the purpose of this research, the authors use the term child to represent someone younger than 18—which aligns with UK law deeming someone under the age of 18 to be an adult. As this method involved children legal consent was obtained from their legal guardian. That said, we asked for the child's assent—the participating child was provided

with a simplified version of the information sheet, which covered the major points of their rights as a participant. The child was then asked if they wanted to participate, acknowledged through the assent form, noting that they could stop participating in the study at any time.

3. Motivation Framing: Here the Value laden narrative is given, it could be presented in a video or simply spoken aloud, and each child chooses one of the scenarios that in our case demonstrated varying mindsets towards decolonisation.
4. Values: During this phase, participants will read/discuss, comprehend and sort the values on the board based on their perceived value of each. From this, seven values are prioritised (Miller, 1956) to avoid cluttering the view and to adequately contribute during the allotted time. These seven values are then considered "active", which means their contextualised statement counterparts are then added to the scene and placed by the board. While having the participants order all values would give more complete data on their perception of the values. It was found that this would clutter the view and therefore limit the interaction and extend the time it would take to run through the method and as a result, the participants would lose interest quickly.
5. Simulation: Each value (Figure 4) has a corresponding contextualised card (Figure 1), which is used to populate the scene with augmented content for participants to interact with. The contextualised cards are read, comprehended, and then placed on the scene by the participants, which informs the researcher on how and where participants expect such content to appear in an AR space. Each colour-coded card (Figure 5) 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. If the different contextualised cards are mutually exclusive participants will be asked to place one of the contextualised cards onto the board, if they are not participants may be place them all on the scene.
6. Interaction: During the simulation of the AR experience, interaction cards are used to reveal value tensions. As the participant interacts with the board, they discuss their perspectives of the values placed by the previous participant. Participants are presented with the cards in pairs of similar cards (i.e. bigger and smaller, etc...) they are then given the appropriate time to read and interpret the actions. If it is found that they show signs of uncertainty or hesitation on how to use these interactions the researcher would go through the actions asking, "Would you use this interaction?". "How might you use this interaction?" or "What does this interaction mean to you?".
7. Roll off/Roll on and Pack-up: An important part of UXVF is understanding which values are unique and which are shared amongst audiences. The method introduces the notion of sharing—comprising other people's values. As one participant completes the tool, the state is saved as a starting point for the next participant with the various values previously selected.

4 Evaluation of UXVF—Method

The following section outlines how the UXVF method was evaluated and details how participants were recruited, the format of the evaluation study, the materials used, and the procedure followed.

4.1 Participants

As aforementioned, for the purpose of this research, participants will be referred to as children due to their legal status as non-adults. A total of 65 children were recruited for the study, participating in a combination of 65 questionnaires and 26 sessions (discrepancy arises as some participants completed sessions in groups of 2–3). Of the 65 children 80% were White British\Other, 11% identified as Asian, 6% were Mixed race, and 3% preferred not to say. Other than age, there were no constraints on permitting children to participate in the study. In terms of experience, 33% of children said they visited museums between once a month and four times a year, 42% visited museums at least once or twice a year and 26% either did not respond or didn't visit museums. For those children who visited museums, their primary motivations for visiting were to be informed (20%), educated (23%), and entertained (36%).

The study was conducted across two locations, on-site at the museum and within a UX lab at the University.

4.1.1 *Museum Workshops (May–June 2023)*

The initial phase recruited participants who were visiting the Blackburn Museum and Art Gallery, on Saturdays throughout May-June 2023, with additional sessions during the school May half-term (May 31st–June 3rd 2023). During this time, nine participants were recruited during the first workshop from visitors to the museum. The workshop aimed to engage participants in educational activities running in parallel, but audience overlap was minimal. Participants aged 9–18 years old were primarily white British (28 participants including grown-ups) and were 64% female and 39% male, the remaining preferred not to say. Selection of participation was achieved by either directly approaching visitors to the museum and by visitors enquiring with the research team about the project.

4.1.2 *MESS Day experiences (June 2023–June 2024)*

The second phase of the study was conducted at the University's User Experience Living Lab, between June 2023 and June 2024, which involved 56 participants from local schools and colleges as part of MESS Day experiences (Horton *et al.*, 2012). Selection of participants was achieved through convenience sampling at MESS Day experiences—where local schools/colleges were invited to attend a range of child-related research activities. Of those who attended, 77% identified as White, 20% (Asian and mixed ethnicity), and 3% preferred not to say. Participants were aged from 9–11, 12–14, and 16–18, they represented an equal gender split 40% Male, 40% Female, 4.62% preferred not to say, and 1.54% identified as "Other".

4.2 Materials

The method comprises of an onboarding video to welcome and inform children of the study, the purpose of the research and the tasks involved. This is accompanied by the participant information sheet, consent and assent forms. Before the interactive tasks begin, children are asked to complete the baseline questionnaire that seeks to understand their motivations for visiting museums and engage children n thinking about decolonisation. At this point, children are required to think about ownership, fairness and the framing for thinking about tackling decolonisation through fictitious scenarios.

Once completed, children were introduced to the UXVF authoring tool. A low-fidelity authoring tool comprising of the scene board and cards representing values, contextualised statements

FIGURE 6. Study set up. Alt Text: A photograph of a table in a museum showing the board with the values and interaction cards ready to be used. There is a webcam pointed down at the board with a microphone to the side.

and interactions. Other materials used by the research team for evaluation purposes included: a Logitech pro personal video camera to record video footage in 1080p, an external Logitech Yeti microphone to capture the think-aloud audio from participants and reduce background noise, Open Broadcast Software (OBS) to capture the recording in preparation for analysis and notebook for researcher observations.

4.3 Procedure

The session mimics the approach from Rettig (1994) 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 (OBS) with shortcuts to start/stop, bookmark, and screenshot the study.

At the beginning of each session, children received a prerecorded introduction to the study. This was achieved through the onboard video. The onboarding video welcomed the participant into the study by explaining the purpose of the study, the ethical considerations and the topic. At this point, participants were encouraged to ask questions before completing a short baseline questionnaire to capture a baseline of their motivations and experiences of museum visits. While the participant completes the questionnaire the facilitator prepares the authoring tool ready for use. The board is set up facing the participant with the scene and interaction cards already placed on the board. The value cards are placed next to the board to the left of the participant's view and the contextualised cards are placed outside the participant's view. The facilitation of the method requires one researcher present to capture input and responses from the participants. The method has been designed to be run with one group at a time (typically consisting of a child and grown-up or friendship groups). On average the method takes 20–30 minutes to complete all tasks.

The fictitious "Value laden" scenario involving Tutankhamun's Mask was then supplied and children were asked to choose a response. This primed the participant to think about values and how they have interacted within museums.

The participant is then presented with the value cards, which they will comprehend and sort based on their perceived value. The values need to be sorted and placed around the board with the seven top priorities identified by the placeholders along the left in outlined green and shaded placeholders. The remaining values are distributed along the top of the board. The participants are given the contextualised cards corresponding to the values they've selected, which they then place upon the scene using techniques such as grouping, overlaying, positioning etc.

During the contextualisation phase, the participant is prompted about the use of the interaction cards and how these might be used to interact with the augmented content. The participant selects an interaction and discusses how it might be used within the scene created and places the card within the scene to demonstrate its usage.

After each study, the scene is preserved for the next participant—resembling a shared AR experience. This is achieved by digitally capturing the previous participant's input or saved throughout the entire session. The preservation is achieved through OBS image capture functionality. The next participant follows the method procedure in a different order. They are onboarded and complete the baseline questionnaire the same. However, they begin with the interaction phase rather than values using interaction cards and interfacing with the scene that was created by the previous participant. As the (new) interaction cards are used (placed on the scene)—the researcher updates the scene accordingly. For example, if the latest participant plays the "hidden card", the contextualised card and value, placed on the board by the previous participant, are removed from the board; this demonstrates a disagreement on values.

4.4 Design

Our research focuses on validating the UXVF method and exploring to what extent the method can assist children in talking about values in fun and playful ways. We are interested in evaluating the effectiveness of the method in terms of outputs (is the method useful for capturing values?), usability (can children successfully participate), usefulness towards the end goal for museums (does it provide useful data that could inform design?). Therefore our study is concerned with the following variables:

- Participant responses to the fictitious scenarios
- Selection and prioritisation of values using the UXVF authoring tool
- Use and placement of interaction cards within the augmented scene
- Contextualisation of values using techniques such as grouping, sorting, and positioning, etc.
- Responses to and the modifications of the scene created by previous participant contribution

In carrying out the evaluation we also wanted to explore the relative effectiveness of two different aspects of the UXVF method; order of using cards and group vs. individual. To that end we followed a 2x2 between-subjects design with the following independent variables and levels:

- Procedure variation: whether children started with values or with interactions
- Group composition: whether children participated alone or in groups of two or three

The variation to the procedure was such that every second participant started the authoring tool with the interaction cards rather than the values. The variation to group is self explanatory.

5 Evaluation of UXVF—Results

5.1 Approach

The study employed a data collection approach inspired by role-play and think-aloud methods, where participants interacted with

TABLE 2. Study and participants overview.

Study	# of Participants	Location	Ethnicity (%)	Gender (%)
Museum	9	Museum	White (100%)	Female (89%), Male (11%)
Mess Day 1	21	University lab	White (90.48%), Unknown (9.52%)	Female (47.62%), Male (47.62%), Unknown (4.76%)
Mess Day 2	26	University lab	White (92.31%), Mixed (7.69%)	Female (46.15%), Male (42.31%), Unknown and Other (11.54%)
Mess Day 3	9	University lab	Asian (77.78%), Mixed (22.22%)	Female (44.44%), Male (55.56%)

TABLE 3. A table showing frequency, score, and rank data for each value.

Value	Rank	No. times selected	Score	Percentage
You want to know the facts about the object	1	21	113	87.50%
You want to know where the object came from	2	18	55	75%
You want information that is easy to understand	3	15	57	62.50%
You want to see a story told from different sides	4	13	52	54.17%
You want to see proof that the information is true	5	12	55	50%
You want information that is shown fairly	6	11	41	45.83%
You want to know when the information was updated	7	11	50	45.83%
You want to know what it is used for	8	10	37	41.67%
You want to know who gave the object and where they came from	9	10	42	41.67%
You want different opinions to be heard and fairly considered	10	9	33	37.50%
You want to see other objects like this one on display	11	8	45	33.33%
You want to know why the object was selected	12	7	13	29.17%
You want to see a story that is personal	13	7	31	29.17%
You want to know that people from where the object is from helped in the display	14	6	20	25%
You want to know who owns the object	15	5	17	20.83%
You want to know that different people's views have helped tell the story	16	3	8	12.50%
You want to see different people talk about the object	17	2	3	8.33%

contextual information and interaction cards, while verbalising their thoughts. A thematic analysis approach (Braun & Clarke, 2006) was taken to analyse the (transcriptions obtained from video and audio recordings). 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. This acknowledged the data complexity but focused on pre-defined codes and themes derived from a pre-established codebook.

The rationale for this approach was to understand the rich implicit and dynamic values, contexts, and interaction approaches (RQ2 and RQ3). A thematic approach goes beyond what is explicitly stated and identifies reoccurring themes that emerge from the study. A theme can be anything from how the method is facilitated, to conflict between participants, ideas, insights, etc. Through the analysis of values and the simulation of the technical, insights are gained into how participants approach the scenario. This revealed their thought processes, decision-making patterns, and how they interacted with the method materials. The analysis performed also, measured the effectiveness of the UXVF method by comparing the emerged themes with the initial objectives for conducting the method. Furthermore, a thematic analysis approach enabled the research to be facilitated in pairs/groups as further discussions, reflections; provocations; and experiences, were had within groups, which provided a deeper understanding of the values, expectations, and motivations for individuals to experience a decolonised museum.

A codebook—constructed before analysis—contained a set of themes and codes with detailed explanations and examples for application to the data. It encompassed both positive and negative aspects to ensure a comprehensive understanding of decolonial and colonial perspectives. To mitigate bias and subjectivity inherent in qualitative research, a coding reliability thematic analysis approach (Boyatzis, 1998) was adopted. This involved achieving inter-coder reliability through pre-analysis consensus on codes, thereby enhancing the study's rigour and aiming for consensus of meaning (Byrne, 2021). Once finalised, a readme, and video walkthrough were produced to facilitate data cleansing, analysis, and reporting. Code generation drew upon research questions, reviewed literature, empirical studies, and prior knowledge. Codes were then grouped thematically based on whether discussions reflected interests/concerns regarding the method, experience, or content. This facilitated the categorisation of data pertaining to the identified themes (see empirical investigation).

To achieve the successful integration of human values in the design process, the tripartite methodology (conceptual, empirical, and technical investigations) from Friedman *et al.* (2006) was applied.

5.2 Results

Results are presented from 65 participants from the four different sessions outlined earlier. Participants were aged 9–18, and visitors of museums, either with a grown-up or friends. The key findings were that:

1. Over 70% favoured scenarios reflecting a decolonised museum approach, including repatriation and acknowledging colonial histories (Table 4). When comparing these results with the results that came from the "We Are Bristol" commission report (Burch-Brown *et al.*, 2022), this shows that

TABLE 4. A table showing the frequency scenarios selected.

Scenarios	Total selected	Percentage
Scenario 1	4	6.45%
S1-2[1]	1	1.61%
Scenario 2	10	16.13%
S2-3[1]	2	3.23%
Scenario 3	12	19.35%
S3-4[1]	1	1.61%
Scenario 4	32	51.61%

[1] Participant gravitated between scenarios.

children have a generally positive response to decolonisation and depiction of history and historical artefacts
2. There was a balance between returning artefacts and retaining them for storytelling purposes.
3. Participants favoured learning priorities such as facts, origins, and ease of understanding.
4. The UXVF method proved effective for identifying important values with children.

Numeric data was captured where appropriate; for example, the table below shows the proportion of times the four scenarios form the Value laden scenarios were chosen by the children.

5.3 Conceptual Investigation

The relevant values considered throughout the design process were identified from the Museum Association toolkit (Museum Association, 2021). These values formed the basis for the study. The values were used as part of a card-sorting method that enabled participants to comprehend, group, and prioritise. During this time participants explored various potential conflicts when working collaboratively either directly (as a pair) or indirectly (from the previous participant's input). The card sorting and think-aloud method explored how the values might be presented in the simulation of the AR prototype. This phase identifies important values and potential challenges (conflicts) before the technical implementation.

5.4 Empirical Investigation

The identified values data was analysed based on selection frequency. When frequencies were equal, ranking scores were used (Table 3). Learning information about the object received the highest ranking, reflecting museum patrons' basic expectation of clear communication. However, knowing the origins, content, and narratives from multiple perspectives was also deemed significant. Participants emphasised the need for well-presented evidence to support understanding. The table headers' score and percentage have the following meanings:

- Score is the total sum attributed across the different top seven rankings, if a value was placed at #1 it gave a score of seven if the value was at #7 it was given a score of 1.
- The percentage signifies how many of the top seven rankings it is present.

Based on these preliminary findings, card sorting proved to be an engaging and efficient method for identifying the most important values for young museum patrons. Notably, a correlation between selection frequency and score was not observed except for the top three values.

However, further investigation is needed to explore the reasons behind the low selection rate for understanding the role of diverse perspectives in the narrative. Additionally, studies employing larger sample sizes and potentially utilising different age groups could yield valuable insights into museum experiences and decolonisation.

5.5 Technical Investigation

The technical investigation bridges the gap between the identified values and the technology feasibility if realising them in the context of decolonisation. The motivation for this is to translate the values into design features. In particular, the role technology plays in facilitating these values. This phase also includes balancing the desirable with the feasible given the technological possibilities and external limitations. During this, the VSD methodology highlights how values translate into the digital transformation—i.e., where innovation is required, or values are adjusted to align with realistic technical capabilities. The technical investigation highlighted potential conflicts between desired functionalities and how they might impact different values. This enables balance and prioritised features that maximize positive value alignment.

5.5.1 *Insights*

The analysis was performed by the researchers in pairs, reviewing one another's themes and codes. During the analysis, the following six themes and related codes were used (Table 5).

The transcript data captured during the method was analysed against the above themes and codes (Table 6; Table 7). With "Participant Method Engagement" being the most coded theme (212) and "Collaborative discussion with young person/s" being the most often coded code (114). In addition, the analysis tool in this study uses the NVivo application to give word cloud analysis. NVivo was used to assist in understanding the qualitative data to organise, analyse, map, and visualise the data. The coded transcripts were then processed in a word cloud to represent unstructured text that has been processed (extracting timestamps, voice labels, English stop words) and calculate the frequency of the word's occurrences (Lee, 2020). This technique was used to visualise and analyse the data. Words with high occurrence frequency are depicted larger and each word is in a different colour. Figure 7 shows the results of the analysis, the words most frequently used—with specialisation grouping similar words—such as, "think", "see", and "know" appearing most frequently. These words can be classified by how children want to interact with museum spaces. Furthermore, they are often supported by "information", "artefact", and "facts".

5.5.2 *Predefined vs. Emerging Values*

Building upon previous work (Caelenberghe *et al.*, 2023), a revision of themes and codes was deemed necessary. The "Content Experience" theme and its three codes (value rationale, contextualised information rationale, and positioning content) lacked granularity in differentiating between pre-defined and participant-generated values. There was a lack of distinction and insufficient meaning to capture a true representation of the data—as previously we noticed many emergent values develop during discussions and the codebook didn't accommodate this. Therefore, the theme was renamed to "Values," with associated codes adjusted to reflect the difference between values derived from the museum association's toolkit (pre-defined) and those that emerged organically from participant input.

This revised thematic framework provides a more nuanced understanding of how participants interacted with both pre-established and newly generated values within the museum context. Previous data was then re-coded against the new theme and codes.

TABLE 5. A table to show the themes, codes, and descriptions used during Thematic Analysis.

Theme	Codes	Description
Method Design	• Content Clarification • Insufficient Knowledge • Method Clarification	This theme focuses on the integrity of the method, capturing clarity within how the method was communicated and how complete the information was about the delivery of the method to ensure the method can be applied effectively.
Participant Method Engagement	• Participant Decision-Making Process • Collaborative Discussion with Adult • Collaborative Discussion with Young Person/s	Participant engagement refers to how well the participant/s engaged with the method. In particular the participatory decision-making process between participants. Noting any behavioural challenges or opportunities
User Museum Experience	• Physical Environment • Social Interaction with other People • Learning and New Information • Self-reflection • Museum Fatigue	This theme provides a holistic view of the museum experience, acknowledging the interplay between various factors. It goes beyond just looking at exhibits; it considers the physical space, social interactions, opportunities for learning and reflection, and even the potential for fatigue. This theme captures the various aspects that contribute to a visitor's experience at a museum. The codes delve deeper into specific elements that shape this experience: Physical environment refers to the tangible aspects of the museum space, such as the layout, lighting, exhibits themselves, and accessibility features. These elements can impact a visitor's comfort, engagement, and overall enjoyment. Social Interaction with Other People highlights the role of social interaction in the museum experience. This could involve interactions with friends, family, fellow visitors, or museum staff. These interactions can enrich the experience by fostering discussion, shared discovery, or simply a sense of community. Learning and New Information captures the visitor's desire to gain knowledge and expand their understanding through exhibits and museum resources. Self-reflection acknowledges that the experience can go beyond simply acquiring information and can lead to personal contemplation or a deeper connection with the exhibits. Museum Fatigue recognises the potential downside of spending extended time in a museum environment. Factors like information overload, physical exertion, cognitive distress or crowded spaces can lead to fatigue and hinder the overall experience.

TABLE 6. A table to show the themes and frequency of coding used within the analysis.

Theme	Codes	Description
User Experience Critical POV	• Content Agreement • Content Disagreement • Decolonised View • Colonised View • Acknowledges the need for Personalisation	The theme encourages a critical examination of UX by considering different viewpoints. It goes beyond just ensuring functionality and usability; it emphasises the importance of culturally aware design, inclusive content, and the ability to cater to individual user preferences. Content Agreement and Disagreement highlight potential conflicts in user expectations (aligning/mismatching their needs). This can be due to factors like unclear information, irrelevant content, or a lack of user-friendliness. Decolonised View and Colonised View delve into the cultural lens users bring to their experience. A decolonised view seeks to challenge traditional perspectives on design and content. A colonised view, on the other hand, might reflect a more dominant cultural influence that may not resonate with all users. Acknowledges the Need for Personalisation and recognises the importance of tailoring UX to individual user needs and preferences. It acknowledges that a one-size-fits-all approach might not be effective and highlights the value of designing for user diversity.
User Experience Interaction	• Interaction Accessibility • Interaction Discovery • Interaction User Generated Content	These codes relate to the interaction with the user. Interaction from how accessible the system is, how usability the system is and what enriches the experience. Accessibility refers to the ease with which users can navigate and interact with the system. It ensures that users can access and use the system effectively. Interaction Discovery focuses on how users find and learn about the different ways they can interact with the system. It includes elements like clear instructions, intuitive design, and discoverable features that help users understand the system's capabilities. Interaction User Generated Content is the ability of users to create and contribute content within the system. It encompasses functionalities that allow users to share their thoughts, experiences, or creations, potentially enriching the overall experience for themselves and others.
Values	• Emerging Context Value • Emerging Content Value • Pre-defined Context Value • Pre-defined Content Value	Theme renamed from Content Experience and codes refined to represent emerging values developed during discussions from the first study. This theme focuses on the interplay between established values and the context in which they are applied. The codes provide a framework for analysing how values translate into specific content: Emerging codes represent situations where both the context and the value itself are new or evolving. Defining appropriate content in these situations requires careful consideration and might involve ongoing discussion and refinement. Pre-defined Context Value and Pre-defined Content Value codes represent established values applied in well-understood contexts. These situations involve applying clear-cut rules to familiar scenarios.

TABLE 7. A table to show the codes and frequency used within the analysis.

Theme	Frequency
User Experience Critical POV	67
Participant Method Engagement	212
Values	51
Method Design	50
User Museum Experience	53
User Experience Interaction	11

TABLE 8. A table to show the codes and frequency used within the analysis.

Code	Frequency
Content Clarification	6
Insufficient Knowledge	9
Method Clarification	35
Participant Decision Making Process	38
Collaborative discussion with adult	60
Collaborative discussion with young person/s	114
Interaction Accessibility	45
Interaction Discovery	42
Interaction User Generated Content	24
Physical Environment	2
Social interaction with other people	10
Learning and new information	33
Self-reflection	1
Museum Fatigue	7
Content Agreement	9
Content Disagreement	7
Decolonised View	35
Colonised View	7
Acknowledges the need for personalisation	7
Unforeseen Experience	2
Emerging Context Value	0
Emerging Content Value	3
Pre-defined Context Value	5
Pre-defined Content Value	43

Furthermore, it failed to distinguish if these values stemmed from content or context. To address these limitations, the revised coding scheme was developed. A key distinction is made between:

- Emerging Values: These are values not anticipated by the researchers and fall outside the study's predefined terminology. An example could be "accessibility for differently-abled people."
- Predefined Values: These represent researcher-defined and established values within the study. Examples include: "You want to learn facts about the object", "You want different opinions to be heard and considered", and "You want to know who owns the object"?

Emerging values can also be distinguished based on their relationship to content and context:

- Emerging Content Values: These could represent missing elements from the predefined list or reframing of existing values.
- Emerging Context Values: These pertain to broader issues related to usability or accessibility that impact the presentation of information.

Additionally, a distinction is made between values related to:

- Content: These values pertain specifically to the content of the museum experience (e.g., artefacts, information panels).
- Context: These values relate to the broader decolonisation theme within which the content resides.

By combining these two sets of qualifiers, content/context and predefined/emergent, a more nuanced coding scheme was established. This new framework encompasses the original three codes while enabling a more detailed interpretation of participant-generated values.

6 Discussion

The results demonstrate an initial understanding of the opportunities for facilitating decolonisation discussions with children. This work builds on the MA toolkit (Museum Association, 2021) and the decolonisation guidelines from Georgiou (2019). In particular, the involvement of children in expressing values relating to content and how digital content should be interacted with.

The following section addresses how through a co-design approach children's values were studied concerning decolonising museum experiences. We gained knowledge on the effectiveness of a low-fidelity AR prototype method (UXVF) to facilitate discussions of decolonisation by understanding how to design for children's values. This was achieved through card sorting, think-aloud, and role-play methods. These findings are important in framing the work and positioning further work. When referring to participants we follow the following style guide:

- BMP[X]: Local Museum Participant [Number]
- BMP[X]-A: Local Museum Participant [Number] Adult
- IMP[X]: Imaginarium lab Participant [Number]
- IMP[X]-A: Imaginarium lab Participant [Number] Adult

Where "BM" stands for Blackburn Museum and P relates to the participant. The "-A" refers to the adult accompanying the participant. As for the Imaginarium workshops, we used the "IM" abbreviation, with the same subsequent initials for participants and adults.

The following section discusses values in terms of their origins. Values can either originate from a predefined context i.e., discussion points/assets from the method or emerging that have occurred during the process. From conducting the method, we have identified early observations with a relationship between predefined and emerging values and those values played out in the interaction methods such as scribble or whisper—for how children wish to interact with augmented content based on their values. For example, there was a clear disinterest in scribbling over another person's content. Or where a participant who values an authentic multi-voiced narrative does not want others to contribute using UGC (scribble or whisper) BMP1-A—*"I don't know who Charlie aged 9 is. I don't know where his credentials are on a, but I can't imagine his opinion, is that important" [sic]*—this is either a strong mapping to values and actions or is a case of a participant saying one thing but in practice doing something else (Harmon-Jones & Harmon-Jones, 2007). This is further explored in the limitations section of this research.

6.1 Framing

To frame the results, it is important to understand the motivations behind museum visitation and preferences regarding audience experiences. Data from the baseline surveys across all four sessions revealed that entertainment is the primary reason

for visiting local museums. Followed, closely by education and information seeking. While the survey did not explicitly define "entertainment" it is reasonable to interpret it as encompassing any activity that is "fun". This aligns with the role of museums as spaces for leisure and engagement and not just education. Clearly, the desire for information emphasises the educational value proposition of museums. Visitors seek knowledge about the museum's purpose, content, and focus.

Furthermore, the survey indicated a strong preference towards decolonised spaces. A majority of participants (51.61%) expressed a desire to repatriate artefacts to their places of origin, acknowledging the colonial histories associated with such objects and recognising the ethical dilemma repatriation represents. One participant's response expressed that repatriation is the correct course of action with some form of sharing agreement in place *"I mean, yeah, it's the best option if people want to see the mask or the original mask. They can't. I'm acknowledging it. and also sharing it with its rightful owner"* BMP8. Whereas, another child commented on the risk of sharing *"If you like taking it to all different places, it's like a lot of work and it might get stolen"* IMP21.

6.2 Value Preferences and Emergence

The value sorting activity revealed a preference for personalising experiences among children. A significant majority (87.50%) expressed interest in tailoring information to specific interests, factual details, and object provenance (75.00%). Discussions highlighted an openness to adopting technologies such as AR to enhance the museum experience. One suggestion involved the use of AR to digitally remove physical artefacts as a provocation to reflect a preference for repatriation manifested in the digital world, *"…like Snapchat, these filters like that. So, you can have like things that are not there, but when you, if you look at it from your phone you can see them"* IMP30. 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 digital world. This is consistent with other research (Burch-Brown *et al.*, 2022) that studied decolonising and equalising history. Children want a decolonised view of history and culture.

The concerns raised by researchers on the effectiveness of VSD (RQ2) have been addressed through the empirical phase of the VSD approach (Bleumers *et al.*, 2015). Whereby emergent values were elicited (Iversen & Leong, 2012) and contextualised through role-play (RQ1 and RQ3). The study's contribution lies in fostering value emergence, value objection, and value comprehension through discussions, simulation, and interaction activities. Analysis of the value sorting activity identified three key priorities for visitors:

1. Object information (facts).
2. Object origin knowledge.
3. Explanations clear and accessible

These factors were consistently selected by over 60% of participants, suggesting their significant importance to the target demographic. Due to the competency challenges when designing for values. Contextualised information—associated with values—and the simulation activity were introduced to scaffold participation. These were facilitated using the value and contextualisation cards, enabled by negotiation among participants (Iversen & Leong, 2012). These cards served as a valuable tool for ensuring continuous reflection on stakeholder values within each group and subgroup. This ensures that the first criticism Borning & Muller (2012) is that no one group is the sole owner of these values but recognises that there are shared values across groups. As aforementioned, the values were created from the MA toolkit and context around this was supplied to participants. That said, participants were allowed to respond to pre-defined values (agree/disagree) and/or create their own. The third criticism lies within the procedure of data capture. In this study, the researcher uses a script to prompt participants during the simulation. These prompts are structured so that no additional researcher follows the same line of questioning for each participant. Furthermore, the design of the method was split into phases that constrained what the participant should do. Firstly, to card sort, followed by observing the presentation of information and finally, interacting with the content. All of these points are recorded and later analysed by the research team. The final criticism relates to the self-disclosure of the researcher/s and research. It is important to note that the authors have different cultural backgrounds one Flemish and the other English, both support discussions on decolonisation within the museum space. This is also extended to the wider stakeholders within the project (academic and professional).

Therefore, we recognise that the design of the method inspired by the MA toolkit (Museum Association, 2021) and Georgiou (2019) guidelines combined with our shared values and cultural backgrounds may have influenced the design of the method. That said, this was addressed during the research with clarity in the participant information sheet and onboarding video—announcing as part of the process that there isn't a correct or incorrect answer and that participants should feel at ease was key to the delivery of the method. The use of direct values, in-direct contextualisation cards and interaction assisted in the blending of the implicit language used (Iversen & Leong, 2012). Through the phases, researchers would provide context to the values while enabling participants to shift, alter and re-arrange their thoughts. This can be similarly described to Flanagan *et al.* (2008) three phases approach—delivery of values, contextualisation discussions (translations), and verification through role-play (interactions). Through the interaction cards, participants can modify the board at any time, giving participants the autonomy to change situations based on their values. Recognising the importance of individual and group values.

The four studies identified the following interactions to enable participants to feel in control. These were consistently selected across all study groups. The interactions with equal frequency, suggesting three potential valuable user interaction modes were selected, these were:

- "Bigger" emerged as a tool promoting accessibility, as evidenced by BMP2's statement: *"…Just make it like you can make anything bigger… Like, if you have problems seeing. Like, if you just want to have a closer look."* Which was echoed by IMP42, highlighting the desire for magnified views to enhance readability. This focus on accessibility implies a preference for museums that cater to a diverse audience with varying visual/audible needs. Similarly, the "dim–order" interaction served accessibility purposes. BMP2-A—prone to information overload—valued its ability to manage information presentation, stating: *"I like that One [pointing at Dim–Group order interaction] as somebody who gets overwhelmed with Information it is a wonderful tool"*.
- The "spotlight" interaction served as a prioritisation function, allowing users to focus on key content. As BMP7 stated, *"Well, if it's like important, it's like important information. When you put a spotlight on it."* IMP29 echoed this sentiment, suggesting its use for highlighting *"a really cool thing."* Participants desired

the ability to spotlight content they deemed important, while also appreciating museum-curated spotlights guiding them towards crucial information. This behaviour reflects a dual desire: to curate and share personally deemed significant information, while also being receptive to expert guidance.

- A "scribble" interaction facilitated note-taking functionality and information exchange. IMP28 expressed a willingness to share information and opinions, stating: *"…But I'd let people allow to draw their opinions on a certain board… they could write their own opinions and see other peoples and read them."* Similarly, IMP30 utilised "scribble" for revision purposes, highlighting: *"…if you're revising you can just scribble on them [The contextualised information]. See that see things that you want to show."*

Exploring the notion of community, analysis on sharing with others or saving for themselves was discussed. Although narrow, "share with others" was chosen the most (19 times) compared to "save for themselves" (15 times). Important to note is that in all but one case if "save" was selected, share with others was also selected. Sharing modalities range from public dissemination as expressed by BMP1 *"I would say probably share it with other people [referring to the scene they've created]."*. While others would use the share function to share interesting information *"I think there should be like a share with others on like Bits of text. So, you were planning to go [with a friend] for like, a revision sort of thing. You can like, send it to them."* BMP2.

Through user interaction selection, three core values emerged: accessibility and usability, social interaction, and information prioritisation. These values were unforeseen by the researchers, highlighting the importance of remaining receptive to participant viewpoints and lived experiences throughout the research process, to avoid imposing preconceived notions.

Participants also prioritised the decluttering of information within exhibits. Strategies for the digital interface included stacking information for sequential viewing—IMP33 *"So you could colour code it… like you could have like that [Places the green coloured CI on the scene]. Three greens and you swipe. And then you've got like the yellows [removes green CI and places yellow CI on the board]…"*—or placing information peripherally with a visual cue indicating its presence, as demonstrated by other participants—using a swipe gesture for off-screen content. This focus on decluttering aligns with the concept of museum fatigue, where information overload is a contributing factor. The participant preference suggests a desire for uncluttered interfaces that prioritise the ease of information discovery over overwhelming initial presentations.

The four studies saw groups of participants partake in the research. Those participants visiting the museum were recruited at random and those who were recruited via the controlled studies. All studies provided the same process for onboarding into the research, along with consent/ascent. In this context, when comparing the similarities and differences, the reasons for visiting museums are the same—entertainment, education, and information are the three main reasons people attend. With a 4% difference in museum visitations across the differing demographics. A Key difference observed was in the scenario selection, where children who identify as white are more likely to choose a repatriation scenario (50%). Whereas non-white participants, Asian, and mixed preferred a scenario where the artefact is shared among museums (44%). Additionally, in matters of ownership, 81.82% of non-white participants thought that they still owned an object even though it was taken. In this context, only 55% of white respondents echoed this sentiment. There is also agreement that if something was rightly given to you, you have ownership of it (88.89%) and that if something wasn't given to you, you do not have ownership of it.

In terms of the value selection across the different demographics and different locales, four values were consistently chosen in the top seven—with *"wanting to know the facts of the object"* always being prioritised as the main selected value. Further recurring values were *"easy to understand information"*, *"proof of the veracity of the information"*, *and "the origins of the artefact"*. That said, there were differences in value selection. These lie in that non-white participants wanted to know when the information was last updated, the certainty that the people of whose culture the object belongs to contributed to the display, and that the information is shown fairly. In contrast, white participants also noted they would like to *see other similar objects on display, what the object's function is*, and they want to know the history of the person who donated the object—to give more content to the object on display.

There are no notable differences in the selection of the interactions. That said, the reasoning for the selection of interactions can differ. Of the participants who identified as non-white, two discussed, how they would feel uncomfortable in scribbling over other people's content and therefore any UGC interactions wouldn't interest them. Other participants who selected scribble may have not thought the same about scribbling over other people's content. Therefore, the possibility exists that more people share this sentiment. Additionally, it may occur that participants who did not choose to share with others may have selected this from a similar standpoint.

To conclude, we feel the subtle differences between participants show no significant differences, where gender and ethnicity aren't necessarily the motivating factors for how they contributed to these insights, but perhaps age plays a more important role in determining values.

6.3 Limitations and Future Work

The limitations of the work are based on participant selection. The participant pool was geographically homogeneous, consisting of individuals from the North West of England. The concerns about the potential bias towards colonial perspectives with the sample are valid. That said, the studies did demonstrate a mix of ethnic groups with the majority identifying as White (80%), 17% Mixed/Asian, and 3% preferred not the say 2. The studies consisted of a blend of children from all backgrounds. For instance in Mess Days 2 and 3, children from low socioeconomic backgrounds were recruited, which means at least one of the following support mechanisms was true: children received free school meals, education maintenance allowance, education health, and care plan or within care.

The researchers do not argue that the results of these studies can be generalised to the broader context, this is due to the limited demographic range these are only applicable to the locale where the participants are from. However, it does show that it is possible through this method to elicit the values from the participants, that it can aid in generating discussions, and that it can inform and introduce participants to a previously unknown subject (decolonisation).

The results reveal the complexities of the decolonisation effort, which highlights the need for an empathetic approach. In some instances, children sought affirmation from older adults when making decisions. Additionally, where a participant revealed a lack of understanding due to infrequent visits, assumptions were made on the information they selected to act in addition to or replacing existing content. Future studies should explicitly

clarify whether UGC serves as an addition or replacement for existing museum exhibits. Furthermore, this research observed a preference for accessibility and usability features among younger participants, with less focus on interaction methods that generate UGC (e.g., scribble, whisper) and more on modifying content to suit individual needs (e.g., bigger, spotlight, remove). This finding warrants further investigation, particularly considering existing research by Piscitelli & Penfold (2015) that highlights the popularity of non-digital creative expression within museums amongst younger audiences.

Future work is necessary to explore the methodologies and processes required to design museum experiences that incorporate widening narratives in collaboration with children and families. Additional research is needed to validate the efficacy of this method, to facilitate discussions on widening narratives for varying topics. This work focused on Ancient Egypt due to the age range of participants and museum exhibition. The generalisation of the method could be researched further to investigate whether the claims extend beyond the exhibit outlined. That said, the museum demonstrated a keen interest in redeploying the method for their "manufacturing and industry" exhibit, focusing on cotton manufacturers during the Industrial Revolution. One way this could be achieved is by empowering additional stakeholders (e.g., curators, donors, volunteers, trustees) in the wider aims of the research (Davies, 2008), to investigate which exhibits work with this method. Integrating the museum closer will strengthen the connection to the community (Georgiou, 2019).

Moreover, we also propose surveying cultural institution experts to understand their perspectives on values and how these align with audience values and to understand the individual needs of stakeholders such as curators on the openness enabling audiences to redefine narratives (structures, presentation, and perspectives).

Finally, we recognise the importance of evaluating this method's effectiveness as a tool for supporting value identification with children. This evaluation should involve museum and art gallery professionals, HCI researchers, and individuals with a vested interest in understanding values towards decolonisation.

Despite the limitations, the insights gained from the study offer valuable guidance to museums as they navigate the decolonisation space. Which are to understand how children perceive decolonisation narratives and how to create a more inclusive museum experience. This can be achieved by reframing and re-evaluating efforts to decolonisation practices and exploring novel means to widen narratives. This study paves the way for exploring how audiences will respond to a mobile AR application to facilitate discussions and personalise experiences documented.

7 Contributions

Within the context of this special issue, our contribution is primarily empirical, providing new data on the effectiveness of a value-led approach in facilitating decolonisation discussions with children. We present a methodology for capturing children's values around decolonisation within museum experiences. Our findings are valuable for designers, HCI researchers and museum professionals. Previous work explored guidelines (Georgiou, 2019), toolkits (Museum Association, 2021), and frameworks for facilitating decolonising museums and working with children and their values. Our work extends this knowledge by applying a VSD framework in capturing values from children to foster decolonised discussions to enhance museum experiences. Therefore, the main takeaways are as follows:

- The importance of involving children in decolonisation and the varying degrees of capturing values in facilitating discussions.
- The documentation of applying a tripartite VSD methodology (Friedman *et al.*, 2006) framework to capture values from children used in fostering decolonisation discussions. Which addresses the criticisms and limitations that discourse has presented.
- The design and approach provide a safe space for exploring without prejudice, promote self-expression and establish social interaction and connectedness between children and wider audiences. Combining traditional UX methods with a novel interactive UXVF activity to simulate and capture a richer understanding of participant perspectives.
- Afford agency amongst children for personal growth to reflect on their values towards understanding decolonisation and how that affects experiences with cultural artefacts and information.
- The importance of considering predefined and emerging values and how these emerging values are captured and integrated into the museum experience—providing greater detail and clearer explanations of object information and clarity of origin. Moreover, how these values translate into design features for a decolonised museum experience, considering various stakeholder needs and technical limitations.
- Insights into the impact of integrating research into museum environments, working with professionals through co-design to become part of the research team in assisting with deploying and supporting the research endeavour. Thinking broadly about how such discussions can be fostered and harnessed to provide a richer and more personal museum experience for all.

The assets for the UXVF can be downloaded from.

8 Conclusion

Decolonisation involves addressing historical injustices, power imbalances, cultural control and systemic inequalities that have existed for centuries. The decolonisation debate encompasses social, political, economic, and cultural dimensions, which can be considered a wicked problem. With diverse stakeholder perspectives and a lack of clear direction, Wicked problems are complex, multifaceted, and difficult to solve.

Involving children is extensive within CCI research. From ideation (Mechelen *et al.*, 2018, Van Mechelen, 2016) to evaluation (Hall *et al.*, 2016, Read, 2015, Read *et al.*, 2023) activities, children have the opportunity to collaboratively implement and improve society. Engaging children in the multifaceted decolonisation debate can result in fresh perspectives. As future stakeholders, they are empowered to define what is just, equitable, and inclusive. This was achieved in our project by creating an agency to understand and validate history encouraging critical thinking and empathy.

We found that while many CCI papers involve children as co-designers, there was a lack of research that addresses children's values when designing for wicked problems. We present a value-led design collaboration with a local museum and children. The work sets out to explore the opportunities and challenges for children and families to co-design an experience around content and interaction for incorporating values into the design process. We drew analysis from the method design and an evaluation of three user studies. We argue that to understand the decolonisation

process from an audience perspective, the value of how artefacts should be presented, what content is needed to engage audiences, and how audiences wish to interact and navigate various narratives in an augmented space.

Through our value-led design method, we observed the importance of involving children in decolonisation to freely express their views, challenge predefined values and discover emerging values through the simulation of the method. Throughout the studies, empowering children and creating agency was fundamental for personal growth. To comprehend, situate, and reflect on values towards understanding decolonisation and how that might affect people's experience with cultural artefacts and information.

Finally, we present the limitations of the research and offer recommendations. That highlights opportunities, for developing user-friendly UX methods for children in harnessing values to support the decolonisation debate and adoption within museums.

Overall, the research highlights the importance of capturing and integrating values, relating to decolonisation, into the design and implementation of museum experiences, with a focus on engaging and meeting the needs of children. Further research is recommended to explore and refine the findings presented in this paper, considering larger sample sizes, diverse age groups, and varying subject matter.

Data Availability Statement

The data underlying this article cannot be shared publicly due to the fact that this permission for this was not sought in the parental/participant consent form.

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