The Museum is Dreaming: Re-Imagining the Museum through Feminist Values and Data Practices in Design Fiction

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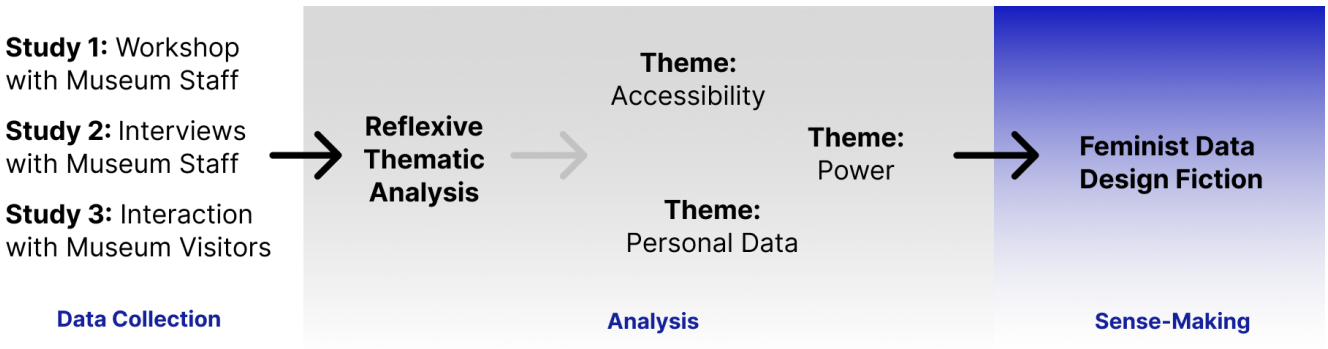

Figure 1: Overview of how *"The Museum is Dreaming"* was created.

ABSTRACT

Museums and galleries are in a constant process to generate and maintain meaningful, long-lasting relationships with visitors. With the exponential increase of accessible and novel technologies, they are now understood as key mediators of this practice—particularly as the collection and utilisation of personal data re-conceptualises what visitor engagement might look like. However, this shift comes with its own challenges: Creating data is not a neutral undertaking: It is always at the risk of entrenching already existing marginalisation within cultural spaces, as well as creating new forms of oppression. This paper presents a design fiction that is 1) based on previous research conducted with museum staff and visitors, and 2) generated and evaluated through feminist values as a guiding framework. Through the combination of these approaches, data streams and methods, we outline the potential of technology to aid or inhibit the concepts of accessibility, power, and personal data in a museum. Finally, we outline *Feminist Data Design Fiction* as a potential approach and several design implications to make the museum a more pluralistic place—for data collection and beyond.

*We contributed equally to the research and can list ourselves as first author respectively.

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CCS CONCEPTS

• **Human-centered computing** → **Accessibility theory, concepts and paradigms**; *visitor centered design*; • **Social and professional topics** → visitor characteristics.

KEYWORDS

Speculation, Design Fiction, Accessibility, Intersectional Feminism, Museums, Cultural Production, Personal Data

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(1) [...] Your AweSpex are a few years old now, one of the earlier models that had some trouble with fastening to the bridge of the nose, but yours are still going strong. With a simple tap, the holographic lenses flare up in front of your eyes and show an interactive overlay that integrates with your environment. You idly flick through your notifications from the day; dismissing some of the generic messages you see from various companies flashing up they fly past your window. You notice a notification from the MuNa application. There's a new exhibit within your parameters that might interested you. The museum is one you know well; you hadn't realised they were already opening a new show. Time flies. (Excerpt from *"The Museum is Dreaming"*)[1].

1 INTRODUCTION

Museums are established cultural heritage spaces and institutions connecting people to the art world: They can offer insights and education on historic and contemporary issues alike [39, 63], and

[1]The full text can be found as a supplemental material.

they can inspire visitors to introspect on their life experience and make positive, community-focused changes [4]. By engaging visitors with experiences, museums allow for cross-cultural, critical meaning-making [45, 66, 70] to provide long-term value for the individual person and on a much larger, community-wide scale [18, 50]. Museums transmit culture, knowledge, social status and power between peers: In turn, the museum visit becomes a self-actualising act [11, 76, 80].

Given the ubiquity of technology in people's lives in the Global North [2], museums in this geopolitical area have also embraced it—both as a facilitator for visits, and as a medium to display in itself [5, 67, 99]. As a result of these developments, the days of *"just"* looking at objects in glass cabinets are being contested and augmented [24, 38]. In order to continue to reach out to as many people as possible and maintain their relevancy and importance, museums in recent years are increasingly turning to technologies to enhance The Visitor experience [24, 64, 99]—whether that is through interactive exhibits [45], mixed reality interfaces [17, 51], museums companion apps [52, 68] or digitising archives [77]. Within this context, museums often turn to research to conceptualise and understand technology as an integral part of themselves [24, 64, 72]. Examples include Ryding et al., who report on *"The Gift"* app, through which museum visitors *"create personal mini-tours for specific others"*, by *attaching* self-recorded audio clips to exhibits [82];Tennent et al. who created and studied *"Thresholds"*, *"a virtual reality (VR) recreation of the world's first photographic exhibition"* experienced simultaneously physically and in VR [95] and Fenu and Pittarello, who designed and investigated an augmented reality experience for the Svevo museum in Italy, which engaged visitors through storytelling with the life and work of writers in in- and outdoors locations [40].

Within these pluralistic contexts, collecting and making sense of the personal data of visitors has become an everyday activity in cultural institutions: To personalise museum visits to the individual or group [33, 41, 74], to understand and engage visitors as co-producers of culture [92] and to understand and research their visitors in greater depth [49]. Indeed, personal data, defined as *"...any information that relates to an identified or identifiable living individual. Different pieces of information, which collected together can lead to the identification of a particular person, also constitute personal data"* [23] is an increasingly important topic within cultural spaces due to its ability to represent us. Through representation, it grants power to the individual or institution capable of utilising it. Therefore, who personal data is shared with and for what purposes becomes a contested ground of shifting power structures. Further, the dramatic rise in data collection practices comes with a decline in conscientious, mindful data collection and an exponential increase in risk of exploitation as frameworks and legislation struggles to keep up [93, 94]. With this exploitation, marginalised communities find themselves at even greater risk than many others—and often with less resources and capacity to avoid data-induced harm [58]. These unfair practises become increasingly problematic when they are absorbed into the moral orders that dictate accountability and appropriateness [97], encouraging data subjects to accept opaque practises and data-violence [58, 93]. Despite these risks, museums are often obligated to collect, store, and utilise personal data on visitors and broader audiences both to understand their own role and function, but also as a service for external funders [83, 84]. As funding for cultural institution across countries is volatile [103], and always at risk of cuts [9, 78].Therefore, museums have to continuously justify their own existence [37]. Data becomes an important factor to sway funders' opinions: Museums that can evidence visitor engagements or other metrics are more likely to continue their operations [28]. Measuring an increasingly broad range of data around visitors is a complex and contested practise, requiring the museum to strike a difficult balance between resource-intensive data collection for funders, and collecting meaningful data useful to the museum.

These difficult concessions are complicated further by the inherent and systemic power structures at play on all levels from the individual to the societal: Museums are contested, complicated and non-neutral spaces full of tensions [47, 79, 85]. They are and were used to present specific narratives [70], and to re-enforce already existing social structures, marginalisation and oppression [75]:

Museum can reproduce (including but not limited to) racist, sexist or ableist motifs [16, 62, 79, 104], that support (neo)colonial and (neo)imperialist ways [29, 31, 57]. Museums can engage in *"othering"* [96], by presenting people(s) in dehumanising, stereotypical and/or fetishistic ways [46, 104], e.g., by showcasing stolen artefacts instead of returning them to their respective owners and making reparative actions [31], or through *symbolic annihilation* [98], which systematically erases and denies the existence of certain people(s) [20, 69]. Instead of creating relationality, museums can actively further disconnection and division: For example, museums can expect visitors to have a certain education [50], they may not accommodate human differences in terms of physical or intellectual ability [61, 102] or they do not represent all people(s) in their content [65]. For many, these factors make the difference between repeated engagement with museums and deciding that arts and culture are not a space in which the potential visitors belong—whether these barriers are put in place on purpose or not. Within this complicated context of cultural power dynamics, technologies and data collection are not neutral actors, but we must consider them as opinionated activities and tools [37, 72].

As a result of museums' complicated histories, people have long worked on re-conceptualising and re-imagining what the museum could be like [15], as an actor or space for inclusion, social justice and collective futures [47, 85]. An example for such explorations includes Rousell et al., who conceptualised *"Blotwalk"*: An interactive experience which *"mark[s] colonial blindspots, exclusions, and dispossessions in the museum's gallery spaces and collections"*, and asks The Visitor to question and contest the museum's rigid position of authority, as a *"white public space"* re-enforcing Western, capitalist norms [81].

Contesting and destabilising dominant structures is often underpinned by a strong articulation of values and worldviews. One of these potential conceptual building blocks for museums is feminism: As a practise, approach and form of activism, feminism seeks to understand current oppressive structures, and it aims to create an egalitarian, equitable world for people of all genders and beyond, including non-human lifeforms [4, 87]. It has long been identified as a meaningful concept for museums [6, 16, 56], to *"complicate the [museum] canon"*, as described by Callihan and Feldman [16]. An example for such work engaging with a feminist framing in explicit

terms can be found in Clover et al., who created *"The Feminist Museum Hack"* which sought out to *"expose, decode and disrupt the hegemonic gendered messages in the images, displays, curatorial statements, labels [...]"* within the museum's everyday infrastructures. The authors developed a set of critical questions to engage people with during their museum visits, to discover the pervasiveness of patriarchal forces within the institution [21]. Similarly interested in unsettling the museum in feminist ways, Grácio et al. organised a bottom-up series of feminist talks called *"Bringing the Margin to the Centre"* in a prominent art museum in Portugal. These talks offered a collective dialogue about museums, and encourages visitors to re-interpret normative artworks through postcolonial, feminist and marginalised lenses [48].

Bringing all of the aforementioned concepts together, it becomes clear that museums, technology and data are shaped by culture, but also shape culture in turn. As we have begun to sketch out, this interplay of accessibility, power, and personal data creates a rich design space for designers, developers and researchers alike to reconfigure, deconstruct and contest what a museum is, and could be through data, technology and an explicit articulation of values. In this paper, we seek to add to this scholarship by embedding feminist values within speculative practices, and extending it through data collected within a museum context: Expressed research questions (RQ), this paper asks ...

- **RQ 1:** What could feminist data practises in the museum look like?
- **RQ 2:** How can we speculate with data collected in museums to generate potential futures for them?

We sketch out answers to these RQs by (re-)imagining what the technology-supported, data-collecting museum could be through a design fiction (DF) [10, 71]. As a piece of speculative text, *"The Museum is Dreaming"* is informed by 1) data, which was collected through three separate, previous engagements with museums, and 2) Bardzell's elaboration on feminist values within human computer interaction research—both as inspiration for the DF, and as a tool to evaluate it [4]: We call this approach *Feminist Data Design Fiction* (FDDF). Through the creation, discussion and deconstruction of this FDDF, we seek to highlight the creative, generative and interdisciplinary potential of museums' data to not only construct understandings of their status quo, but also of the museums' potential futures. Similarly, we highlight and further ground feminism as a supportive guide for continuous development of *"the museum"* as a concept and space.

Having contextualised our work within this *Introduction*, we continue this paper with elaborating on our methodology: We outline our epistemology, and provide a deep dive into which people, and museums we worked with; how we collected and made sense of data through these engagements. After elaborating on our findings, we unpack *"The Museum is Dreaming"* (TMiD) in detail in the *Discussion* section, and evaluate it through a feminist lens. Finally, we sketch out design implications for museums to embrace being feminist (data) practises, and *Feminist Data Design Fiction* as a potential addition to feminist ways of making, thinking and caring within human computer interaction (HCI) and beyond.

2 METHODOLOGY

2.1 Epistemology

Our research utilises a *situated-phenomenological* approach that understands reality as a construct of lived experiences [54]. Thus, the knowledge we create is situated, relational and contextual [7]. Here, *situatedness*, as conceptualised by Haraway, refers to an understanding of science as an active undertaking that is embedded, and influenced by personal, cultural and societal forces [53]—including the experiences and worldviews of all people involved in the research [7].

2.1.1 Lens: Intersectional Feminism. We rely on the lived experiences of our participants and each other to present and analyse our data, viewed through a feminist lens that platforms and highlights the voices of marginalised and minoritised communities. The feminism presented and used in this paper is one of many feminisms (plural) that co-exist, clash and inform each other [4, 16, 35]. *Concretely, we draw from intersectional feminism:* As a pedagogy, concept and theory, it draws from a vibrant, long-standing history of activism, knowledge production and resilience by Black people, people of colour and Indigenous peoples; to make sense, critique and fight the oppressive systems that influence their everyday lives [22]. Intersectional feminism focuses on how dominant discourses control, marginalise, or silence groups of people, including through the internalisation of powerlessness [35, 44]. Within this context, data and technology are not neutral actors that exist in a value-free vacuum: They are not passive results of a design process, but actively negotiated and influential aspects of our everyday life.

We anticipate that you, the reader, may not be familiar with such an epistemology, or feminism as a *"thing"* in general: *How does one approach, make sense and evaluate such research?* We seek to be explicit about the values that underpin all activities presented in this paper. We lean and learn from feminist work cultivated within HCI: Bardzell describes how a *"generative integration"* of feminism into HCI can *"support creative activity and novel problemsolving approaches"*, and articulates six potential *"qualities"* to guide this process [4]:

(1) **Pluralism** *"refers to design artifacts that resist any single, totalizing, or universal point of view"* [4]. Pluralism acknowledges different needs and ways of living, shaped by factors like personality, personal beliefs, local community, culture and/or society. Pluralism asks us to design carefully and specifically for contexts, people and their circumstances.
(2) **Participation** *"refers to valuing participatory processes that lead to the creation and evaluation of design prototypes"* [4]. Instead of assuming an expert position that designs from the top down, participation asks designers to engage with stakeholders and the very people that the artifact is being designed for.
(3) **Advocacy** refers to designers thoughtfully engaging with the ethical dilemma of being able to cause harm through their creations through both unintentional or conscious design choices. Advocacy encourages a process of self-reflection, feedback and accountability to ensure emancipation rather than patronisation for users.

(4) **Ecology** *"integrates an awareness of design artifacts"* and their effects on the world [4]. Designs are influenced by existing systems and influence them back. Therefore, ecology requires a nuanced investigation of contexts, an involvement of stakeholders and decision-makers and a thorough, iterative evaluation of what is being created.
(5) **Embodiment** asks that we do not replace the people using designed artifacts with abstracted 'users' presented as overly rational, rigid, inflexible, stereotypical actors. Bardzell describes embodiment as a need to *"push in the direction of gender commonalities and differences, gender identity, human sexuality, pleasure and desire, and emotion"* [4].
(6) **Self-disclosure** *"calls users' awareness to what the software is trying to make of them, and it both introduces a critical distance between users and interactions, and also creates opportunities for users to define themselves for software"* [4]. Instead of presenting artefacts or systems as opaque, unexplainable black boxes, self-disclosure urges to communicate openly *how* and *why* a system works the way it does, so that the people using it can critique it and make it their own.

We understand these qualities not just as *generative* or *iterative* values, but we understand them as potential *evaluatory* criteria, too. We encourage you, the reader, to keep them in mind while you read this paper and its supplemental material. It may be unusual for a paper to directly address you, the human being, reading these words. As the work we present in this paper is about museums as spaces for meaning-making and collective ways of imagining future(s), we write this paper in the tradition of the *humanistic essay*, and Humanistic HCI more broadly [3]. Concretely, this means that we see you, the reader, not as a passive recipient of words, but as an active sense-maker of them; this paper seeks to inspire, challenge and provoke you, but ultimately to empower you to *relate* to it—through your own personal contexts, life experiences and cultural, societal participation.

2.1.2 Positionalities. As researchers, we are also part of these oppressive systems—both in a perpetuating and receiving role [26]. To present our work transparently in a self-reflective manner, we sketch out our researcher positionalities: *We are both white, queer, and non-binary people with PhDs, who work as researchers at universities located within the Global North; coming from the United Kingdom (HC) and Germany (VS) respectively. We have been privileged throughout our lives to experience cultural spaces and museums from an early age on. Both of us have personal experiences with disability, distress and/or illness. We are friends and colleagues.* We are aware of the reductive nature of these profiles, but we hope that they allow people to empathise with our standpoints, whilst also holding us accountable [19, 55]—be that through agreement or critique.

2.2 Approach: Feminist Data Design Fiction

In this paper, we are keen to explore what feminist data practises in the museum could look like. Here, we refer back to our *RQ 2—how can we speculate with data collected in museums to generate future potentials for them?* With our epistemological stance outlined, we seek to explain how we wrote, conceptualised and evaluated the design fiction *"The Museum is Dreaming"* (TMiD), in order to find potential answers. Instead of stepping through the process in a strictly chronological way, we establish important concepts and contexts first to showcase our decision- and thought processes: *1) We explain what design fiction is, as a concept and method. 2) We describe the context for the museums that we worked previously with, and outline how we conducted research with them. 3) We introduce the data resulting out the aforementioned research, and analysis thereof.* Throughout these steps, we signpost our decision-making: DF, as a method, draws on the rich historical cross-over between fiction and innovation [60] to create a world-state in which the reader can suspend their disbelief about what is currently technologically possible. Since it is a piece of text at its very core, DF also benefits from its accessibility—both for the creators to think beyond current technologies, but also for the reader to interpret and reflect on those provocations in a broader setting within their own frame of reference (e.g. culture, environment, personality, or upbringing) [1]. Therefore, DF–as an act of sharing imagination–is a powerful method that enables consideration of the social, psychological, and ethical paradigms of technology development [60] in critical and reflective ways. An overview of how *TMiD* was created can be found in *Figure 1*.

2.2.1 Context: Overview of Studies with Museums. The work in this paper is grounded in engagements with cultural institutions in the United Kingdom (UK). Four museums and galleries are represented in the data corpus; all involved in the PhD research projects of the two lead researchers, and two of whom were industry partners supporting the PhD projects. Museums and galleries were all involved in workshops and activities explicitly exploring power and personal data as part of data collection: ***M1*** *is an international contemporary art museum.* ***M2*** *is the UK's first and only video game museum.* ***M3*** *is a University based museum and gallery.* ***M4*** *is a culture and arts museum and creative space.*

We drew from the data corpus of three studies conducted with museum staff and visitors to inform the creation of our FDDF *(see Table 1)*. Ethics for each of the three studies were approved by the University of Nottingham ethics committee:

- **Museum Workshops (Study 1):** The workshop was conducted in October 2019 with four staff members from three museums; M1, M3 and M4. This open-ended workshop aimed to establish findings regarding attitudes surrounding power, and how personal data is collected, used, and understood within the sector.
- **Museum Interviews (Study 2):** Six members of staff from M2 were interviewed between 2018 and 2020. These semi-structured interviews aimed to understand the museum as an institution, as well as the unique interactions afforded of staff and visitors within the site.
- **Visitor Interactions (Study 3):** Workshops with 29 museum visitors were organised for early 2020, and were subsequently undertaken as a remote study during the COVID-19 lockdowns in the UK. Museum visitors were engaged through shared online activities and sense-making in collaborative, digital whiteboards. These interactions aimed to explore The Visitor experience via inquiries into power and personal data.

Study	Lead Researcher	Method	Data Collected	Analysis
1	Cameron	Participatory workshop	Audio, Visual	Feminist thematic analysis, visual ethnography, affinity mapping
2	Spors	Semi-structured interviews	Audio	Feminist thematic analysis
3	Cameron	Participatory workshops, embedded within remote communal spaces	Audio, Visual	Feminist thematic analysis, visual ethnography, affinity mapping

Table 1: Overview of studies. This table outlines the conceptual underpinnings of each study whose data is featured our FDDF.

2.2.2 Data Collection and Analysis. Workshops and interviews were recorded, and subsequently transcribed by the respective lead researchers. Remote interactions from the communal whiteboards were captured as text and screenshots. Each of the three studies contribute important insights into our research questions, namely what are the current and speculative data practices embedded in the museum and how they can be re-imagined. We made sense of our data through reflexive thematic analysis (RTA): This method is an oft-used qualitative practise that enables deep, meaningful connections and understandings of a data set to be drawn out. Vital to the process of RTA is immersing yourself into the data, defining meaningful units for analysis (themes), and self-reflectively iterating over the uncovering patterns and overarching themes [12–14]. Braun and Clarke [14] note, in their own reflection of the RTA framework published in 2006 [12], that true RTA requires meaningful engagement with the theoretical and philosophical assumptions surrounding the data and analysis. In part, this requires a clear articulation of the researchers' positionalities and how they inform and enrich the analysis process [14] *(see 2.1.2)*.

The RTA, conducted through a feminist lens, aimed to make visible the implicit and explicit values, opinions, and concepts found within the data sets to inform a process of speculative future making that was both relevant to and insightful of existing museums and those researching them. The RTA was conducted inductively, that is, without predefined themes for codes to be sorted into. However, we acknowledge in line with the nature of RTA that our philosophical and ontological approach naturally shapes how the data is understood and dissected and that no true RTA can be purely inductive. In order to analyse the data sets, the two authors first discussed together what initial, inductive analysis of the data sets had revealed and what topics this paper might explore. We individually conducted a feminist thematic analyses (FTA) on our respective data sets based on these deliberations *(see Table 1)*. Then, we discussed the preliminary theme sketches and conducted a series of further *'passes'* [12] together to find and finalise common themes and threads.

3 FINDINGS: FEMINIST THEMATIC ANALYSIS

The FTA presented three major themes that would shape the design fiction: accessibility, power, and personal data. As we share quotes from participants, we use pseudonymised names to refer to them along with a label indicating which study they participated in.

3.1 Theme: Accessibility

Accessibility here means making museums open, available and accessible to all people, including disabled people, marginalised people, or people who otherwise struggle to access venues intellectually, socially, or physically [61]. The theme arose across the data sets in the form of discussion around restrictions or barriers, communication, recommendations, and adaption. All the museums represented in the data were conscious of certain types of accessibility such as physical space for mobility restrictions, interactivity appealing to different demographics, and intuitiveness of exhibits:

> *You find families can be one there for quite some time, because it's so much fun, it's so easy for everyone to play, it's so accessible, everybody gets what's going on straight away.* (Will, Interview with M2, Study 2)

However, each museum also had their own blind spots or limitations on how accessible their content was. One museum, for example, described deliberately providing minimal contextualising information for each exhibit so as to encourage visitors to generate their own interpretations. This practice can increase accessibility for those with the ability to interpret the pieces, but also acts to be exclusionary to those without the necessary knowledge and skills to do so. This dilemma was also recognised by visitors who described both frustration at being unable to cognitively or intellectually access certain content, and frustration with being patronised and told how to feel.

The museums all favoured diversifying and expanding their target audience for purposes of accessibility, but described struggling to reach out to a broader range of visitors:

> *If we had an infinite marketing budget, we could attract everyone, which would be nice. And in time, you know, we'll hopefully start attracting more of those other groups that we're not, you know.* (Will, Interview with M2, Study 2)

The analysis also unearthed that whilst diversification was a priority for the museums, in reality it was rarely brought to actualisation:

> *I'm constantly saying like, this is the period where we're going to do a whole load of focus groups and really identify those people that aren't engaged and use that to refine our offer etcetera, etcetera, it always gets bumped down the list.* (Matt, Museum Workshop, Study 1)

This was similarly seen in discussion around marginalisation where taken-for-granted *'facts'* within the museums' everyday context were unearthed and there was further acknowledgement of

marginalised demographics struggling to engage with the museum space. Much like diversification, reaching out to marginalised communities showed to be a priority, but one which always fell to the wayside in the face of other things:

> *...but I guess from my perspective, it's that whole thing of... Yeah, it's quite labour intensive to go out, find somebody, bring them to your organisation, and then convince them that it's for them.* (David, Museum Workshop, Study 1)

This was confirmed by a number of visitors who noted either experiencing, or being aware of, marginalised and minoritised peoples feeling unwelcome in museums. This was described in a huge number of ways varying from not providing adequate seating within exhibit spaces, to not showcasing content relevant to their experiences, to feeling judged and surveilled by other visitors and staff. Accessibility was shown, therefore, to be a rarely-broached priority across a broad array of different paradigms; physical, intellectual and social.

3.2 Theme: Power

Power is defined here as the ways that control is embedded and demonstrated through taken-for-granted assumptions, behaviours, and interactions. Power was discussed broadly across concepts of data, audiences, museums, institutions, education, and more. This theme showed a high level of awareness amongst staff of power inequality and commitment to tackling that inequality on scales ranging from within the institution to on a much larger, societal level. However, it also demonstrated that museums had unanswered questions regarding how power is experienced and demonstrated, and whether it should even be a priority of the museum to do so:

> *...we don't take a public stand on a particular thing, like, like we will comment on stuff, but we don't put ourselves out there currently. And again there's internal discussions about whether we should be doing this or not"* (Max, Interview with M2, Study 2)

Indeed, museum staff often expressed feeling that they were limited in how they experienced and interacted with power due to external factors like resource pressures and commitments to their funders. However, staff were also often dismissive of the potential power of visitors, demonstrating an attitude that visitors were inevitably subjects of power within the museum setting, rather than active participants. This was described as frustrating for visitors who overtly described wanting to be involved in discussions held within museums, wanting to be challenged and held accountable by and within the museum. One important example was in regards to audience feedback reflecting in curatorial practices. The museums each had unique means of understanding and approaching curation that was integral to their sense of identity. Two of the four institutions carefully incorporated audience feedback into curation practises, whereas the other two did not use audience feedback for curatorial reasons:

> *...that's just a finger in the wind, and it's nothing more than that (...) I don't think we'd ever turn around to them and say 'what artists do you want us to bring' and build it around that...* (Chris, Museum Workshop, Study 1)

Other questions that arose from discussion of power included how museums conduct practices such as marketing, outreach, and curation, including whether visitors should be involved in the generation of such things and how the museum interprets legally grey areas. Overall, power was shown to be a contemporary discussion, and one which each museum engaged with differently. Further, despite the limitations highlighted, all also agreed that further work needed to be done to understand power imbalance and work with their communities to tackle it.

Visitors also demonstrated some awareness of power, acknowledging that museums chose how to present information in a way that could shape how they learned, as well as more physical displays of power such as forcing visitors to exit through the gift shop. Despite a reasonable level of awareness of power disparity, participants also described ways that they reclaimed power in the museum space, for example by deliberately ignoring signage or mocking exhibits with their peers.

3.3 Theme: Personal Data

The collection and usage of personal data within the museum was contentious and varied. Questions were raised by participants around how data capture should be conducted, how visitors should be informed of data capture, what data should be used for, and what conversations museums should facilitate.

Current data capture practices within the museum were shown to be ill-defined and haphazard, often being done incidentally and without notification to the data subjects. Museum staff highlighted knowing that some of the practices being conducted were morally and legally grey, but defended their actions as being not-for-profit and without viable alternatives. Visitors showed high levels of awareness that data was being collected, but were unsure *what, how, or why.* For visitors, the opaqueness associated with data collection practices was inevitable and typical of modern organisations, although visitors also showed a higher willingness to share personal data with museums due to their not-for-profit natures. Visitors were more willing to share data with organisations they trusted, and if they could see a benefit from their sharing either for themselves or others.

Beyond the example shared above regarding curation, audience feedback, along with other audience data collected, was utilised by the organisations in numerous other ways. Indeed, the analysis showed that all of the museum staff had clearly considered their stance on data collection and usage both officially and on a personal basis, but that the museums felt themselves disempowered in regards to data practices. This was because for all of the museums present, data collection was prioritised according to funder demands, and individual organisational needs regarding data practices were frequently left unmet. Despite these limitations, all museums demonstrated an active priority of protecting visitor data and making sure that data collected served a useful and justifiable purpose, albeit making such decisions *for* visitors, rather than with them:

> *...one of the conversations I've had time and time again at the gallery is 'why are we asking that question, what*

> *happens to that information', if it just goes into an annual report for trustees, don't want to ask the question, if it's gonna be really functional and useful for the organisation, then we had a good conversation about whether that question should be asked.* (David, Museum Workshop)

Each of the three themes highlighted in the FTA; accessibility, power, and personal data, are intertwined with one another and are shared here as a non-comprehensive overview of the themes we take forward into our FDDF as we re-imagine the museum.

4 "THE MUSEUM IS DREAMING" AS FEMINIST DATA DESIGN FICTION (FDDF)

In this section, we elaborate on our process of writing TMiD, and outline how we extended design fiction by centring feminist values and research data in the process. Through the process of conducting the FTA and discussing the results, it became apparent that simply detailing the themes that we constructed would not necessarily lend itself to contribute to the radical changes made possible within the current, shifting cultural landscape for museums and HCI researchers alike. Instead, we found ourselves re-imagining the museums, drawing on our patterns around museum desires and needs, shifting visitor priorities and so forth. Therefore, we drew on design fiction to vocalise potential futures that envision transparent data collection, mutual trust, and enhanced relationships between venue and visitor mediated by technologies. The *"The Museum is Dreaming"* was written cooperatively by the two lead authors. The iterative process of writing, re-writing, condensing, expanding, and finalising the FDDF was completed over the course of a week. The FDDF drew heavily on themes from the reflexive thematic analysis and our own experiences, critically shared and embedded within the writing. Very consciously, the FDDF is not presented as a utopic, far-flung and distant glance at a world we wish to see realised; but rather a world communally generated by us *and* the participants, embedded within the structures of our existing world. Because of this, we focus primarily on aspects of the museum experience that The Visitor is privy to seeing; our reflections on all themes detailed below are done so at the level of The Visitor. Overt reflection on more hidden elements of power and data are reserved for future works. In order to ensure our FDDF was fully cognisant of the principles of feminism embedded in its core, we drew on the work of Bardzell [4] to inform its creation *(see 2.1.1). To take our data and make it meaningful in the context of re-imagining the museum, we explored the findings of the FTA, applied Bardzell's six qualities of feminist HCI [4], and created a fictional account of a future museum visit.* We also drew from elements of our data corpus that explicitly explored the speculative applications of personal data as a tool for empowerment from the perspective of The Visitor. Through the holistic combination of data and feminist principles, we generated a FDDF that follows our protagonist, *the Visitor*, through a technologically-mediated museum visit experience. A brief overview of each section is presented here. The full version of the FDDF can be found in the supplementary material: *The Visitor receives a notification on their augmented reality AweSpex glasses of a new museum exhibit opening that is related to their interests (1). The notification is from the Museum Navigation app, MuNa, in which The Visitor can access comprehensive records of their previous museum visits and update their museum-related interests and motivations. The visitor reflects on their MuNa profile and visit history (2), discovers a new exhibit recommendation (3), and is offered personalised, contextualising information about the exhibit (4). MuNa suggests content tags associated with the exhibition (5), and our visitor attends the exhibit (6). Upon accessing the museum exhibit, The Visitor is assisted by technology to increase their physical, cognitive, and mental engagement with the museum in various ways. First, The Visitor's AweSpex calibrates (7) while The Visitor reflects on their physical limitations (8), choosing a museum buddy robot to join them (9). The visitor sits on the museum buddy and engages with a collage artwork (10). The MuNa app offers additional information for the artwork causing The Visitor to reflect on their job (11). The museum buddy checks in on The Visitor (12), prompting The Visitor to move on via a generated trajectory (13). The visitor chooses a trajectory that "teaches something new", leading them to the monarch's exhibitions (14). At the end of the visit, The Visitor returns the museum buddy (15), donates to the museum, and leaves (16). The visitor returns to MuNa to engage with the suggested media (17), and reflects on their visit while updating their personal archive (18). They survey the data summary of the visit in MuNa and donate their personal data to the museum (19). They reflect on data-sharing practises with the museum and their mutual benefit and makes plans for future engagements with the museum (20).*

5 DISCUSSION

Before discussing our work as a whole, we outline several limitations to contextualise our work within. Then, we outline our insights, and opportunities based on our constructed understandings.

5.1 Limitations

As outlined in *2.1*, the work showcased in this paper was undertaken from a phenomenological-situated perspective, that values the individual's experience as a way to do science, and create understandings. The people involved in this research do not represent museums, or visitors as a whole, but they are cultural institutions within similar contexts, all based in the UK. As such, different researchers working with different partners and participant would arrive at very different understandings—including different ways of applying the feminist values featured here within design fiction. Here, we point back to the *humanistic nature* of this paper [3]—in the hope that it inspires, challenges or moves you, the reader, to add to this set of pluralistically constructed knowledges. Similarly, we acknowledge that many technological interventions are critiqued for failing to accommodate groups of visitors, despite this being the primary way that visitors engage with museums. Our design fiction does not overtly address group dynamics either, instead prioritising the perspective of our single visitor. We hope that the provocations raised by this speculative work promote a different way of thinking about data, power, and space, and thus group dynamics play a limited part in those questions.

5.2 Insights: The Museum is Dreaming

In this paper, we presented *"The Museum is Dreaming"*, a design fiction, which speculates about a potential future of an art museum. We created and evaluated it through an engagement with 1) feminist values *(see 2.1.1)* and 2) data that we previously collected through three studies involving staff from four museums *(see Table 1)*. Concretely, our data-informed DF draws on a FTA of interviews and workshops conducted with museums and visitors, not as a view of *how* the future could be achieved, but of *what* could be achieved—by foregrounding *accessibility (see 3.1)*, *power (see 3.2)* and *personal data (see 3.3)*. Here, we return to our initial research questions: *"1) What could feminist data practises in the museum look like?"* and *"2) How can we speculate with data collected in museums to generate future potentials for them?"* Within the studies that informed TMiD, our visitors desired information about artists and exhibits related to interests, relevant accessibility information, suggestions of related media, personalised routes around the galleries, and means to document and reflect on visits. For visitors, these recurring themes offered important ways to explicitly benefit from a data exchange, reclaiming ownership and power from their personal data through meaningful interactions. We were also cognisant of existing power structures, and embedded the express needs and desires of our museum staff regarding personal data collection and usage to ensure our imagined museum was *mutually* beneficial. This included the need for accurate, consensual behavioural data that explored the motivations, behaviours, and outcomes of visitors.

5.2.1 Feminist Evaluation of "The Museum is Dreaming". We interpreted and integrated Bardzell's six qualities into our paper most notably in our re-imagining of future museums through FDDF—by speculating what a museum *with* feminist data practises could look like. We evaluated our own work through this lens and associated qualities, through 1) individual and 2) collective readings and discussions of TMiD. We document this process in *Table 2*: We agreed that concepts were only counted as evidenced, if both of us could point them out in and through the text. We encourage you, the reader, to evaluate the FDDF with this framing, and values in mind, and to ask questions such as: *Are these principles found within the FDDF? Are they incorporated well and expanded on? Are all of them represented?* Before diving deeper into our reflections, we note our intention that our definitions and conceptions of power, data, and marginalisation (as well as how they interact) are made transparent through our re-envisioning of the museum experience.

5.2.2 Reflection on Accessibility. In the presented fiction, our anonymous visitor engages with their chosen exhibit before (1-5), during (6-16), and after (17-20) their trip to the physical museum space. Through their Museum Navigation app (MuNa), accessed via the AweSpex interface, they engaged with the museum in a variety of ways that made their visit more personalised, engaging, and informative. An important part of this was enhancing the accessibility of both the space *and* the content. *Accessibility was very prevalent in the FDDF, presenting in 17 of the 20 vignettes.* Museums can be alienating physical spaces containing vast spaces, displays tailored for 'average' visitors, and dotted with unspoken, undefined *micropractices*—which can be particularly alienating and inaccessible for visitors with physical or neurological disabilities [50, 61, 65, 102]. However, the physical infrastructure of the museum has not, in our fiction, been altered (8-17). Funding limitations and historical preservation were considered for this design choice, as well as providing space for users who wish to engage with the museum traditionally and without augmentation. *Rather, we envisioned ways of making existing spaces more accessible–both virtually and physically.* By using the *'museum buddy'* (9-15) to access tailored routes and a means to rest between exhibits, we draw on our own experiences to provide potential solutions. Again, the physical infrastructure of the museum space has not been compromised by the introduction of dedicated hardware, but mundane hardware enhanced by specific software enables our visitor to engage with the museum despite being less able to perform the micropractices embedded and assumed within the space [42]. This is demonstrated through offering seating (10), personalised routes (14), and equal access to the exhibit pieces (11). We find that this primarily draws on three of Bardzell's [4] qualities; pluralism, advocacy, and embodiment. Accessibility concerns are also present in the assumptions and hidden micropractices of intellectual and cultural engagement. One of the key barriers to engagement for a number of potential visitors is not being able to find an entry point to understand the information presented [30]. Often, this disproportionately affects lower income and communities of colour [8]. The MuNa app therefore offers a tailored list of potential media to prepare for the visit (4) and to further evaluate the visit afterwards (18-20), encouraging The Visitor to equip themselves to engage with the exhibits on offer. This kind of engagement works to surreptitiously but effectively enable visitors to educate themselves on the content without feeling foolish by having to ask questions that might be deemed 'basic' or 'ignorant' (12). For The Visitor, who was unfamiliar with some of the content, easier, digestible media offered this access point and enabled them to engage meaningfully with the exhibits on display (5), something that has been noted to increase relevance and repeat engagement [101]. The app also suggests media that to instigate critical thought (6). This holds value for all visitors; engagement with the arts must be challenging, it must encourage critical thought: To do so necessitates exposure to different paradigms: MuNa enables The Visitor to reflect on what they have learned and experienced via the personal archive. Maintaining the archive during the visit and editing it afterwards (19) prompts a more involved understanding of the exhibits [34, 73] (12; 20). It also enables The Visitor to draw further analysis, parallels, and contextualisation between the content on display and the wider world/their own life than perhaps can be offered by typical museum infrastructure and signage [50, 102]. Re-enabling The Visitor in this way as an active inquirer reduces the barriers to museum-facilitated engagement and learning by tailoring the content to the specific visitor's needs, knowledge, and personal experiences; creating space for communities traditionally alienated from the museum as well as expanding the experience for traditional visitors.

5.2.3 Reflection on Power. Power was explicitly explored in 14 of the 20 vignettes. MuNa offers a middle-man application through which both visitors and venue can communicate and foster trust. The app works to re-empower visitors, and make museum process transparent and accessible (participation, advocacy, self-disclosure). Throughout their visit, our visitor is frequently made aware of the

Table 2: Overview of Links to Bardzell's Feminist HCI Qualities within our FDDF. This table highlights feminist HCI qualities that are reflected within our FDDF: X reflects that the quality is featured.

FDDF	Summary	Pluralism	Participation	Advocacy	Ecology	Embodiment	Self-Disclosure
1	New exhibition notification	X	-	-	-	X	-
2	Re-visit MuNa profile	X	-	-	-	-	X
3	Personal preferences in MuNa	-	X	X	-	-	X
4	Pre-Visit material	X	-	X	X	-	-
5	Personal tags associated with exhibition	X	-	X	-	X	X
6	After work visit + museum welcome	X	-		-	X	-
7	Indoor tracking calibration	X	-	X	-	X	-
8	Experience of pain + capitalism	X	-		-	X	-
9	Museum buddy	X	-		-	X	-
10	Closeup + Sitting on buddy	X	-	X	-	X	-
11	Physical change of museum	X	X	X	-	X	-
12	Museum buddy check-in	X	-	-	-	-	-
13	Personal museum trajectory	-	X	-	-	-	-
14	Exhibition about monarchs	X	X	-	X	X	-
15	Rest of the visit	-	-	-	-	-	-
16	Museum donation prompt	-	X	-	-	-	-
17	Additional media in MuNa	X	X	X	-	X	-
18	Personal reflection in MuNa	X	X	-	-	-	-
19	Data donation	X	-	X	-	-	X
20	Visit reflection	X	-	X	-	-	X

re-distributed power of the museum both in overt and taken-for-granted moments. For example, The Visitor has full control over their MuNa profile throughout their entire experience—from first choosing to engage with the app (3) to deciding whether to donate their data to the museum at the end (20). This has the effect of clearly placing agency and control in the hands of our visitor as to what is shared, and importantly, what is not. MuNa also places great stock in the concept of consent; important for advocacy, embodiment, and self-disclosure. From the transparency of the data collection (19), to the content warnings (5), to the ways that the exhibits are potentially consumed (11)—The Visitor at all times has the capacity equal to the museum to monitor and personalise how they engage with the exhibition. *Traditionally,* curation could be defined as a top-down endeavour by *"expert"* museum staff [59, p. 199] to decide how to present topics and content. In our fiction, curation happens both in this traditional way, but also on a much more personal, flexible and iterative level by actively engaging The Visitor meaningfully in the process. Our visitor can identify interests via their MuNa profile and reflect on options offered by the museum regarding their personal level of knowledge and sought-out dis/comfort (advocacy). The museum is still acting as an educator and as a space to engage with culture, history and new perspectives, but in a more transparent, personalised way (self-disclosure) to reflect that different people arrive at the museum with very different backgrounds and needs (pluralism). The museum, then, is presented a challenge to offer this personalised curation, not to disempower themselves as sole curator, but to re-empower The Visitor and their knowledge as important too; pulling on all six of Bardzell's qualities. This must be achieved in a way that still challenges The Visitor to think beyond their comfort zone, whilst also leaving room for self-reflection and judgement (12). MuNa does just this, prompting a more involved understanding of the piece through enabling connection building between the exhibit and The Visitor's life experiences [34, 73], *without* the museum needing to tailor their content. This way of interfacing with an artwork was partially informed by our frustration with text-heavy exhibition brochures and inaccessible audio guides that only superficially or broadly engage with artefacts. We acknowledge that personalisation is not a catch-all fix for curatorial processes. However, meaningful, transparent personalisation can also be imbued with qualities capable of tackling these risks, for example paying particular attention to pluralism, advocacy, ecology, and self disclosure [4]. The personal archive of each visitor offers further ways for power re-distribution to become embedded long-term, beyond the walls of the physical museum. Allowing visitors to archive their thoughts, new knowledges, and tactile memories encourages further reflection away from the (re-)curated space of the museum. The redistribution of curatorial power does not come without cost. For personalisation to truly enable an individual to engage with exhibits deeper, to understand different perspectives as well as building on their own, and to create a space where different voices can be welcomed, fostered, and enabled requires a far deeper understanding of an individual visitor than traditionally possible. For this understanding, personal data must be shared and understood.

5.2.4 Reflection on Personal Data. Data collection within our fiction happens in 18 of the 20 vignettes. Our visitor built themselves a profile for MuNa containing basic demographic information and interests (2) that the museum can access to profile and monitor demographic attendance with the appropriate permissions (pluralism, embodiment, self-disclosure). This kind of data is vital for museum funders, but also offers key insights for museums. Importantly, all of these tailored engagements in MuNa are done with full knowledge

and consent of The Visitor *and* museum, who clearly understands what their data is used for and why (19) building mutual exchange and trust. Importantly, the app also gives The Visitor opportunity to correct, delete, and add to the data held about them (particularly important for marginalised identities), which in turn makes the data more useful to the museum whilst also encouraging control and agency for The Visitor [32, 86]. Vitally, The Visitor also becomes more knowledgeable about their rights as data subjects and broader existing data practises. The visitor has been made fully aware of the data collection process and is capable of wielding their own power and agency to choose what is disclosed to the museum (19). Importantly, our visitor is able to access the range of benefits offered by the data collection (personalised trajectories (14) and deeper engagement with exhibits (11) regardless of their choice to share the data with the museum at the end of their visit; instead the information is stored by default to the app. This brings depth to the decision to share data. This empowerment comes at no cost or risk to the museum, but the museums still stands to gain should The Visitor donate their data. This transparency and agency fosters trust between the three players. Increased trust means increased likelihood of The Visitor sharing their data. The processes engendered in our FDDF encourage the re-distribution of power in ways that do not hinder any party, but open up opportunities for meaningful relationships to flourish. Re-enabling The Visitor as an active inquirer through personalised, accessible methods dramatically reduces the barriers to museum-facilitated engagement and learning by tailoring the content to the specific visitor's needs, knowledge, and personal experiences. However, in the process of building a museum visiting experience that creates transparent, meaningful engagement, we have fallen into the trap as writers of assuming normalised, ubiquitous technologies that could potentially fall into the category of 'surveillance' tech. We mitigate this through the trust placed by not just ourselves, but by the visitors also, in fair, transparent, and open data collection processes. We rely on the integrity of our imagined app to truly embody these principles.

5.3 Design Implications: The Feminist Museum is Dreaming Datafully

Creating and evaluating *"The Museum is Dreaming"* through/as FDDF led us to construct insights for future research, and the wider research community. We articulate these ideas as open-ended design implications, separated into two sections: First, we discuss the future and potential of Feminist Data Design Fiction (FDDF) as a design approach. *Second,* we elaborate design opportunities for embedding feminist values further into museums, and reflect on future potentials for data within museums.

5.3.1 *Design Implications: Feminist Data Design Fiction (FDDF).*

- **FDDF as a Collective Feminist Design Practice:** As researchers, we talk to each other: To exchange ideas, to compare notes and to learn from each other. The value of working closely with others has long been established as an essential component of rigour in the work we do, e.g. through concepts like interoperability. Here, we want to highlight the experiential factors of working with, thinking with and dreaming with others. We see FDDF as a complimentary practice to already existing ways of speculating, and working with each other in interwoven, relational ways. Through TMiD, we began to understand our research data, feminist values and lived experiences as a rich material to work with. Here, we wish to add ourselves to a long lineage of crafting and making as a method of inquiry [90, 91] and care [27]—whether through quilting [89], sketching [91] or other artistic pursuits [90].
- **FDDF as a Pluralistic Process in Flux:** As we described in *2.1*, feminisms—in plural—are heterogeneous field full of different tensions, pedagogies and understandings. For writing and making sense of TMiD, we centered Bardzell's conceptualisation of intersectional feminist values. However, future applications and reconfigurations of FDDF could be rooted in a different feminism, or a different set of values altogether: Here, we see great potential to engage with pluriversal design [36], design justice [25], entanglements [43] and/or other relational ontologies [100] that provide a counterweight to design approaches serving hegemonial interests and its violence.
- **FDDF as a Relational Mapping Tool**: Speculative ways of working allow for an exploration of values, opinions and wishes in a creative fashion [71]. While asking people what to change within any given museum might provide honest answers, it is likely that the responses stay within the realm of what is currently realistically achievable and constrained by what people think a museum ought to be. To break these limitations, collaborative *"the sky is the limit"* activities might bring forth salient points that for many reasons might not have been voiced before—especially when considering the museum to be a domain of *"experts"* only. Here, we see design fiction, and other speculative approaches, as a rich soil to plant values and data and their implications and configurations in. The creation and evaluation of TMiD surfaced concepts for us, as authors, that we had not been able to access or map before to this degree. We identify the very act of interweaving data, relationality and values as being necessary to create the space, and materiality for these ideas to be identified.

5.3.2 *Design Implications: Feminist Values and Data in the Museum.*

- **Creating Data through Feminist Processes:** The aforementioned data has to be a active part in how a visitor tailors their museum visit. Meaningful engagement before, during and after the visit personalises the experience and gives space for self-reflection. In turn, this develops agency, disseminates power of interpretation, and increases accessibility. For those with limited relevant knowledge or who are deemed marginalised, it allows them to actively decide how they would like to approach exhibits, how to analyse them, how to interpret objects and artefacts, and to learn from those interpretations [50, 65, 102]. Additionally, enabling participation and sustainable deviation from accepted micropractices practically and mentally opens up the museum space to The Visitor. Generating clear access points and modalities for all visitors, but particularly marginalised visitors, can go on to highlight access points into other areas

of society, generating wide-reaching impact [30]. In return, the institution is able to collect more reliable and robust data to return to their funders and for internal use.

- **From Data Extraction to Data Ecology:** Data is not a neutral, static resource, but the result of negotiations and interactions. As such, we encourage designers and researchers in museums to recognise The Visitor as a co-data researcher, instead of just being a data subject passively agreeing to privacy policy. Within a mutual, transparent dialogue, we seek potential for the museum and The Visitor to engage in *data-ing and un-data-ing* [88]—to create data across different spaces, media, roles and temporalities *together* with The Visitor. Here, we propose the metaphor of *data ecology*, as a pluralistic, multi-dimensional and productive engagement to *"cultivate"* and *"share"* data instead of common extractive ways of framing data engagements as *"mining"* or *"harvesting"*.

6 CONCLUSION

In this paper, we present and evaluate *"The Museum is Dreaming"*, a *Feminist Data Design Fiction* (FDDF) that re-imagines a museum visit and data exchange in an accessible, mutually beneficial way for both visitor and museum—based on data from three previously conducted studies, and an explicit articulation of feminist values. Based on the insights gained from this endeavour, we conceptualise FDDF as an approach to extend or augment the speculative practise of design fiction through an explicit integration of feminist values and research data. Finally, we conceptualise how FDDF may be of aid to designers and researchers working with museums, and how collecting data in the museum could be undertaken in more equitable and just ways—by making the interplay between accessibility, power, and personal data visible.

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