This is a peer-reviewed, accepted author manuscript of the following research article: Kist, C 2024, 'Discursive AI infrastructures: envisioned and overlooked museum futures', Proceedings of the Association for Information Science and Technology, vol. 61, no. 1, pp. 194-204. https://doi.org/10.1002/pra2.1020

Discursive AI Infrastructures: Envisioned and Overlooked Museum Futures

87TH ANNUAL MEETING OF THE ASSOCIATION FOR INFORMATION SCIENCE & TECHNOLOGY | OCT. 25 – 29, 2024 | CALGARY, AB, CANADA

AUTHORS SECTION

Kist, Cassandra University of Strathclyde, United Kingdom | Cassandra.kist@strath.ac.uk

ABSTRACT

Prompted by recent innovations, artificial intelligence (AI) is increasingly being discussed across the museum sector regarding its implications for institutional roles and practices. However, AI in particular, is an ambiguous term, a 'black box' which is capable of containing and reflecting numerous values and ideals (Crawford, 2021). This paper positions discourse around AI as a 'discursive' infrastructure, capable of not only embodying ideals but also shaping and justifying certain institutional practices and roles. This paper thematically analyses 115 pieces of grey literature produced and shared by professional governance bodies in the museum sector from 1995-2023, mainly across Canada, the United Kingdom, and the United States. In doing so, it identifies four preliminary themes encompassing shifts in discourse over time which give shape to a contemporary discursive infrastructure. This prompts timely critical reflections of museum professionals and stakeholders on both imagined and overlooked public roles, responsibilities, and practices of the museum in relation to AI.

KEYWORDS

Discursive infrastructure; AI imaginaries; Museums; Artificial intelligence; Museum futures

INTRODUCTION

Whether stemming from governments, public organisations, or museums to more unofficial social sharing across friends, family, and colleagues, discourse (written or spoken communication) can be *powerful*. Together, pieces of discourse can act as an infrastructure: an invisible social, semiotic, and material/immaterial foundation which motivates, guides, and justifies certain work. Currently, there is increasing interest in the adoption and use of artificial intelligence (AI) in the cultural heritage sector as evidenced by recent funding initiatives, the rise in popularity of cultural heritage-oriented AI networks such as AI4LAMs (libraries, archives, and museums), research on AI, and grey literature centred on AI published by professional museum bodies. Identifying and understanding current discursive infrastructures can enable *timely* critical reflections on if/how cultural heritage discourse around AI reflects and perpetuates a certain role of the museum and associated practices. Unpicking this discourse, simultaneously, can prompt the sector to identify overlooked futures, in terms of alternative public roles and practices of the museum in relation to AI.

Therefore, this paper investigates discourse around AI stemming from high-level professional museum bodies that guide best practices in the sector, mainly in the United Kingdom, Canada, and the United States. It examines publications both centred specifically on and tangentially mentioning AI from professional museum bodies from 1995-2023 and considers these individually as capable of contributing to larger discursive infrastructures (Y. Rao, 2023). Infrastructures are assemblages of material, social, and semiotic dimensions that can invisibly and subliminally (re)produce certain values, perspectives, and imagined futures (Larkin, 2013; Y. Rao, 2023). As such, infrastructures can create boundaries and dynamics of power, enabling certain forms of work to happen and

hindering others. Infrastructures on one hand, can be static and stubborn towards change, and on the other hand, they are perceived to be constantly changing, growing, and becoming (Erickson & Sawyer, 2019; Karasti & Blomberg, 2018). Therefore, it is often recommended that researchers look both backwards and forwards when delineating infrastructures and considering their potential impact on practice (Marttila & Botero, 2017; Star & Ruhleder, 1996, p. 103).

Through an analysis of grey literature produced over 28 years, four central themes in discourse circulated by professional museum bodies are identified. These themes which encompass shifts in discourse over time (over the timeframe of the material analysed (1995-2023)), provide valuable insight into how the museum's role and associated staff practices are currently envisioned and (re)defined in relation to AI. This in turn, enables the preliminary identification of predicted and alternative museum futures. Shifts in discourse within the themes discussed, encompass changes to who is perceived to have agency in the sector, how the museum is envisioned as caring for its publics, the role of the museum as educator – particularly in relation to innovative technologies, and finally how AI's (in)humanness is valued by the sector. Before diving into the analysis of grey literature, this paper first, provides background on current applications of AI in museums and theorises the roles of the museum in relation to AI technologies, and the potential of broader discourse in this regard, to act as an enabling and limiting infrastructure.

BACKGROUND: DISCOURSE AND THE ROLE(S) OF MUSEUMS IN RELATION TO AI

Discourse around AI can reflect and perpetuate certain values and ideals, influencing a range of different practices. As pointed out by others, 'AI' is a broad term that encompasses a range of technologies, datasets, materials, and practices, and through this ambiguity, AI can be an influential concept standing in for certain values, ideals, and imaginaries (Caramiaux, 2023; Crawford, 2021). The ideals associated with AI can impact institutional approaches to these technologies including adoption, avoidance, hostility, and associated practices and uses. This is evidenced for example, with the rise in popularity of other technology, such as social media in the early 2000s, which was idealised for its participatory and democratic potential for the cultural heritage sector and simultaneously evoked anxieties regarding the loss of the 'expert', 'truth' and 'trust' (Baggesen, 2014; Malde & Finnis, 2016; Walker, 2016). Recent research has shown that while cultural heritage institutions are increasingly adopting AI, they are likely in vastly different stages of AI maturity. As reflected in the *Assessment Framework* created by the *Initiative for Applied AI* (2023) and as summarised by Thiel (2023), in a museum context, maturity includes action areas such as 'ambition, use cases, organisation, expertise, culture, data, ecosystem, execution' (p. 92). However, institutions have and are using AI in a range of ways: Bareither (2023) recently shared that their student assistant Julia Molin identified 586 examples of AI in museums and the heritage sector, with most occurring between 2016-2021 (p. 99).

AI is being applied internationally across the museum sector including for the 'back-end' work of museums and 'front-end' experiences of visitors/users (Hufschmidt, 2023). Caramiaux (2023) identifies four main ways cultural heritage institutions use AI, including for information and collections management, engaging audiences, managing visitor experiences, and using AI to create. The 'back-end' for instance, may encompass using AI to tag and categorise collections (Villaespesa & Crider, 2021), AI may be used for digital curation by recognising and classifying images, and AI may use visitor information to predict resources needed for certain exhibitions (Digital Meets Heritage, 2017). In terms of the front-end, several AI initiatives are intended to support visitor and user experiences by enabling visitor input, visitor choice or pathways through collections or the museum space, and broadening access to online collections.

However, there are several core challenges regarding AI applications inside and outside the museum sector, including its potential to hallucinate (provide fake information), perpetuate biases, respond in ways that are insensitive or inappropriate, and create challenges around copyright/authorship and privacy/security of users' data (Cox, 2022; Hagendorff, 2020). Museums have a long history of addressing issues related to inclusivity, accessibility, bias, trust, and representation which overlap with challenges associated with AI. Institutional

approaches and frameworks for dealing with such issues, as pointed out by Huang and Liem (2022), could potentially help re-frame and overcome similar ethical problems in computer science. This includes for instance, using community participation methods as a part of AI development (Huang & Liem, 2022). Recent exhibitions and literature also point to the museum as a valuable location for enabling public learning around AI and its impacts due to being adept at putting complex topics and themes into social, cultural, and ecological contexts or 'systems'(National Museums Liverpool, 2021; Science Gallery London, n.d.). According to Hagendorff (2020) this systems approach is a current gap in AI ethical guidelines: 'almost no guideline talks about AI in contexts of care, nurture, help, welfare, social responsibility or ecological networks' (p. 103), and 'what is often lacking is a consideration of the wider contexts and the comprehensive relationship networks in which technical systems are embedded' (p. 103).

The literature and recent practices discussed here, at the intersection between AI and cultural heritage, position museum institutions as having a certain 'edge' in addressing ethical challenges and enabling public learning around AI. Yet further challenges are also evident, including a need for new literacies across museum staff, the ability to keep up with institutional and public expectations of digital experiences, and pressure from a lack of funding that frequently impacts digital activities (One Further, 2022). Moreover, how professional bodies view the museum in relation to and in light of AI can impact current and future practices and institutional roles. Discourse and its implications for cultural heritage practices and the museum's role has previously been of interest to researchers: Wong (2015) for instance, investigates the word 'community' as an object of discourse. They analyse how, as an object of discourse, community is rooted in and perpetuates certain values pertaining to an idealistic view of what constitutes a community shaped by the intersection of practice and social media in the museum sector. Other cultural heritage studies point to the power of policies and the embedded discursive shifts therein as shaping the relationships between museum, the state, and citizen (Beel, 2009).

Building on these perspectives, infrastructures can be a useful frame for understanding the potential links between discourse, discourse objects, discursive shifts and its associated implications for practices and the museum's role. Infrastructures can be created and sustained through social norms, values, and practices – part of which is material and immaterial constituted by spoken and written words (Y. Rao, 2023). This paper takes inspiration from the understanding that discourse can constitute infrastructures, and in turn, underpin current and future institutional roles and practices. Infrastructures, however, are also developed during research, they are identified through close attention to contexts by the researcher. In doing so, I commit to sharing these observations in order to cultivate critical reflexivity regarding the ongoing development of the museum in relation to AI, with recognition that the discourse analysed here is just one small facet of larger networks of literature and practices.

METHODS

This paper, through a longitudinal perspective, undertakes a qualitative analysis of grey literature including blogposts, online resources, conference summaries, and news around AI with a focus on Canada, the United States, and the United Kingdom, from the following professional museum bodies who govern best practices: the Museums Association (MA), the International Council of Museums (ICOM), the Canadian Museums Association (CMA), and the American Alliance of Museums (AAM). These bodies were chosen due to the commonalities in practice and theory that cut across them, and the perception of these professional bodies as acting from a higher top-down policy/best-practice level (as opposed to state or province level), the accessibility of their webpages/resources, and that their resources are available in English. The search was undertaken using each organisation's website search, using the following terms: 'AI' and 'artificial intelligence', 'large language models', 'robots', 'chatbots', 'conversational agents', and 'machine learning', in various ways testing out the Boolean language rules of these website pages. The resulting number of outputs (115) is visualised in Figure 1. Data collection ended Sept. 5, 2023, and the dates of the literature collected span 1995-2023 with a spike in publications over 2017-2019.

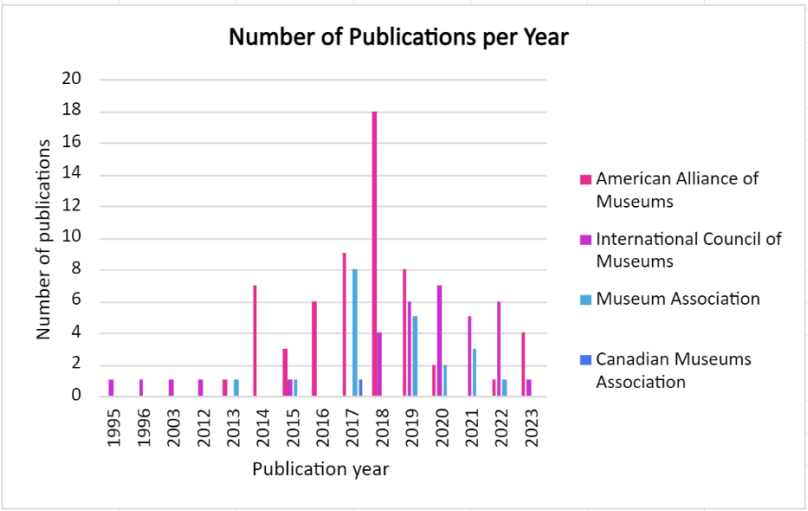

Figure 2. Number of publications from museum bodies between 1995-2023

From the literature, a spreadsheet was created which was used to organise extracts from the data encompassing a summary of the literature (written by the researcher), the title of the piece, the associated professional body, and the reference. The title and summary were then analysed, guided by the four stage protocol (initialisation, construction, reification, and finalisation) of Vaismoradi et al.'s (2016) thematic analysis. First, a close reading of the literature, and the associated notes, and title was undertaken (initialisation stage). Several codes were then applied to the notes and title associated with each piece of grey literature (construction stage). Subsequently, in the second round of coding some of these codes were collected under larger categories/subthemes due to similarities, bringing the codes closer to abstraction (construction stage). Then in connection and in contrast to each other, these categories were grouped into four main themes (construction stage). Within these themes, any marked shifts or static changes across the categories were observed over the period of the grey literature analysed and discussed here based on how they reflect and construct the museum (its practices and role) in relation to AI (reification stage and finalisation stage). An example of one theme and its associated subthemes and codes are shown in Figure 2.

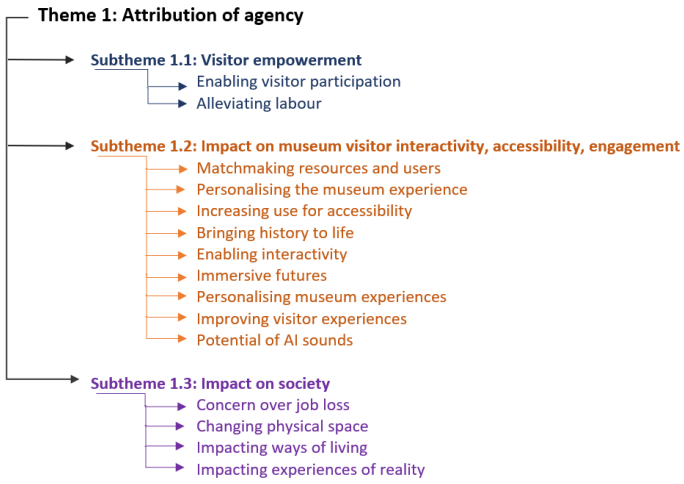

Figure 2. An example of a theme, its subthemes and codes

Regarding limitations of the research: professional museum bodies provide only one 'top-down' dimension of a potentially multi-faceted discursive infrastructure, that can be expanded on by grass-root groups in the sector, conferences, and other publications. Further, the focus on Canada, UK, and the US highlights a certain perspective, where additional discourses from other countries may be complementary or contradictory which can also impact museum roles/practices across the sector. However, due to the pivotal governance role of these museum bodies in guiding and informing practices, these pieces of literature hint at current trends and shifts in discourse around AI that can underpin practices, particularly across the UK and North America. The AAM engaged the most with AI, having a blog dedicated to future envisioning, titled *Future Fridays*. This is potentially unsurprising as the US has been acknowledged as a powerhouse for AI innovations and AI companies, including in the cultural heritage sector (Hufschmidt, 2023). Comparatively, the CMA has very little grey literature or resources available on their webpages tagged with the search terms. This in turn, could also highlight a gap in top-down governance of AI in the Canadian cultural heritage sector, which may be filled by more local or provincial museum bodies. Despite the predominance of the AI discourse analysed as being American, we gain insight into the inter-relation between these professional bodies and how their discourse may shape museum roles and practices.

From reviewing this literature, I suggest that there are four central themes each reflecting minor shifts in discourse over time, including 1) the attribution of agency; 2) how the museum cares for its publics; 3) the museum's educational role; and 4) AI's (in)humanness. These themes, and shifts in discourse therein, are necessarily overlapping and entangled with each other. Together, they provide preliminary insight into one facet of current institutional roles and practices around AI in the museum sector, hinting at potential future trajectories and enabling the identification of overlooked museum futures.

Findings

Who is in control? Towards a distributed agency

Across the grey literature, AI is frequently positioned as *influential*, even *powerful*: there is a teetertottering in the discourse between warning of AI's detrimental effects on the cultural heritage job market and employment, and comparatively, praising the wide range of possibilities it could afford staff and visitor experiences. However, while this powerful positioning of AI is very prominent in the early 2000s, it shifts towards a more distributed agency, with discourse increasingly emphasising the active role of the museum and other stakeholders. For instance, a blogpost which echoes several others, by the AAM titled *Will You Lose Your Museum Job to a Robot?* speculates on the negative employment challenges AI poses (Merritt, 2013). When talked of in this way, AI becomes positioned as an imagined force that has immense agency, and the museum is passively impacted for better or for worse by AI. Another strand, however, appears increasingly from 2014 onwards which positions the museum as working *with* AI. For instance, another AAM post in 2018 is titled *Museums and AI: Could Robots Be Your New Coworkers?* (S. Rao, 2018). While this can be interpreted as concern regarding AI replacing staff, this piece of literature and other similar articles are more about museum staff working *with* AI's potentials and ethical limits to support museum work. These pieces of literature advocate for museum staff to identify the usability of AI, to be cognizant of the line between its usefulness and ethical challenges, and simultaneously investigate if it is or can be mission aligned (Merritt, 2014b; Museums Association, 2019). From this perspective, the power of AI is no longer black and white or idealistic or detrimental but rather AI becomes depicted as an imperfect tool which the museum can draw on and work around to fit its social purposes.

Along with this change in discourse on agency, and the positioning of the museum as active agent, the literature also highlights and advocates for the museum to actively work with various stakeholders to address the potentials and challenges of AI. For instance, the ICOM article *Smart Museums to Face the Crisis* advocates for the museum to be 'smart', adaptable, and specifically, interconnected: working with various stakeholders (Croizet, 2021). In this way, an agency not only shifts from AI to the museum, but also becomes distributed across AI, museum, and stakeholders. As discussed in and overlapping with the following section, AI is also positioned as a tool for users

and visitors to contribute and participate in heritage making – again emphasising this distributed agency. This perspective aligns with and propagates contemporary perspectives out with the grey literature analysed here on the relationships between museum, cultural heritage, visitors, and users as necessarily collaborative, co-creative, and participatory (Black, 2020; Morse, 2020; Simon, 2010). Thus, this theme reflects and contributes to a discursive infrastructure which positions power as being shared across multiple actors, technological, in-human, and human.

From visitors in the museum to visitors out there

The relevance of AI for a wide range of museum work, from collections management, preservation and conservation to interpretation and storytelling is a common discussion across the grey literature (Andrew, 2019; Atkinson, 2021; Cascone, 2019; Stevens, 2019). While visitor experiences in relation to museum work is implied in this discussion, there is also a central discursive change in how visitor experiences around AI are explicitly discussed. This encompasses a shift in concern regarding the impact of AI on visitors' experiences inside the museum, to concern for their experiences more broadly in society. Specifically, AI is initially valued for enabling new forms of interactivity and visitor empowerment *in* the museum, in that these tools will enable visitors to engage and contribute to cultural heritage in new and innovative ways (Ahmadi & Azmoudeh, 2022; Merritt, 2017a, 2018b). For instance, an article in 2012 references both AI and other digital tools discussed at one of the ICOM's annual conferences, suggesting that these enable virtual museums to invite 'visitors to become critics and contribute their own contents' (Hernández, 2012, p. 227).

Regarding the potential that AI affords visitors inside the museum, AI is also idealised for its potential to personalise engagement by collecting visitor data and scoping their interests to in turn, refine their experiences (Merritt, 2013, 2014d; Sullivan, 2017). For example, in the article *Trend watch: Rise of Chatbots*, the author discusses examples of chatbots being used across the sector, highlighting their potential for both tailored information and personal experiences (Sullivan, 2017). Moreover, AI, particularly conversational agents are discussed as bringing history to life in affective and personal ways inside the museum. For instance, both the AAM and MA discuss examples within which museum institutions and their collaborators bring historical figures to life by impersonating them through AI technologies, such as a hologram of the artist Salvador Dalí, enabling immersive interaction (Merritt, 2019b).

However, over the period of literature studied, increasingly, there is a consideration for not just visitors' experiences within the museum, but also more broadly the impact of AI on people's everyday lives and experiences in society. For instance, in an article by the AAM titled, *Labor 3.0: New jobs, or a jobless future?* (Merritt, 2016a), the author contemplates how museums can support critical and practical employability skills in the wake of unemployment created by AI, even suggesting museums become a hub for start-ups and entrepreneurs. Further, there are traces of reflection and discussion regarding how AI is impacting the way people live and experience reality (ICOM, 2020a). A central question asked in a document regarding the first world museum forum in 2020 from ICOM was, 'How will the use of AI affect the society and thoughts of human beings?' (ICOM, 2020b, para. 3)

This is indicative of an increasing concern regarding the social role of museums and highlights a prevalent value across the sector in adapting and catering for the social wellbeing of changing publics and society. This discursive shift is reflective of museums' increasing porousness but also, the value attributed to their networked nature. A concern for caring not just for visitors but also for different publics and in particular social contexts, contributes to a discursive infrastructure that reflects and perpetuates a museum that is not only about something but for someone. This parallels literature out with this analysis, which idealise museums that are driven by social missions, that support different publics, and have social impact (Janes & Sandell, 2019; Smed, 2020).

Museum learning: from educator to facilitator

A third narrative unfolds across the literature – one that casts museums as dynamic hubs for igniting visitor curiosity and learning. Museums are described as not only facilitating learning about cutting-edge AI technologies but also

using these technologies to empower visitors to learn about other cultural heritage topics. Within this narrative, the museum becomes positioned increasingly as facilitator, provocation-ist, and as an experimental space. One of the first mentions of AI collected as part of this research, was from ICOM in 2003 discussing museum public programs in university settings which emphasised early on the important role of museums in engaging and educating publics on technological advancements and innovations (Pickering, 2003). Museums have long had a role in educating their publics on new technologies and innovations, and this role is emphasised later in the literature analysed, paralleling increasing consideration for the impact of AI on society (Andrew, 2022; Mills, 2021). For instance, in one article by the AAM, the author discusses how in a world impacted by AI, museums will have to combat forgeries and public distrust, contributing to public and grade school education and enabling critical thinking about conflicting truths (Merritt, 2019a).

A few other thematic strands suggest the 'how' of this educational pursuit positioning the museum more as a facilitator and an experimental space for critical reflection and innovation. For instance, one MA article highlights the potential of enabling users to reuse data in hackathon settings, resulting in innovative outputs such as chatbots, games, and prototyped wearables (Knott, 2017b). Within this narrative the museum is also positioned as enabling visitors to ask critical reflective questions on the use of AI (Mills, 2021). From this perspective, these changes in discourse around AI are creating a foundation for and encouraging more active visitor learning which privileges the role of the museum as facilitator and as a dynamic space for provoking critical questions.

Boundaries between human and machine

Within the grey literature, a certain delicate discursive balance is also observed – a perpetual oscillation between the value and challenges of AI as 'human' and vice versa, as 'inhuman'. However, it is at the intersection of this debate that another discourse seems to disrupt this binary thinking, which is the value of this conflict for visitors' critical reflections and the role of the museum for an AI society.

In the grey literature, AI is valued for its humanness for its emotional intelligence, and its increasing ability to foster 'humanistic' conversations. In an article from ICOM titled: *Museotherapy: Promoting inclusiveness, health and wellbeing*, the authors advocate for the increasing need to understand emotional intelligence, due to the rise in artificial intelligence: 'I am convinced that understanding our emotional intelligence is as essential as artificial intelligence. Over and above our cognitive and intellectual knowledge, it is essential to create a school of perception. This is what differentiates human beings from robots' (Bondil, 2019, p. 64). Despite this differentiation between humans and robots, the AAM suggests 'for chat bots, one emerging real-world application is emotional support. For example, MIT's Media Lab has launched Koko a social media network designed to enhance emotional well-being' (Merritt, 2016b, para. 5). The ability of AI to have an emotional intelligence is also connected to its ability to enact human conversation, which is perceived as supporting visitors' comfort and willingness to interact and engage with cultural heritage (Merritt, 2014b). Such an ability for instance, is suggested to even one day enable visitors and AI to discuss art (Merritt, 2018a).

Simultaneously, the biases, racism, and mistakes inherent in AI systems are described as reflecting, encapsulating, and perpetuating the negative aspects of being human. As stated in one article by the AAM titled *Museums and AI: Is there a ghost in the machine?* The author suggests 'the term artificial intelligence obfuscates the inherently *human* nature of the technology. This points to problems inherent in AI: Labour challenges and abuse, and racism/bias: Labor challenges aren't the only systemic social problems replicated within AI. Biases like racism are inherent to everything people produce, which includes technology' (S. Rao, 2019, para. 8)

On the other hand, the in-humanness of AI is seemingly valued for its potential to enable access to cultural heritage (Merritt, 2014c), create immersive and personalised visitor experiences (Ahmadi & Azmoudeh, 2022; Merritt, 2017b), improve museum work in various domains, to create experiences at a distance (particularly during COVID-19) and act as an arbiter or mediator between cultural heritage and visitor/user (Merritt, 2014a). An article from the

AAM on machine learning and the future of authentication suggests 'we may need to learn to trust the analytical ability of machines - such as its potential for checking authenticity of art, and thinks in some ways AI could be due to its analytic thinking: an unbiased arbiter' (Merritt, 2014a).

In particular, AI is valued for its ability to 'think' or 'see' differently from humans – it is valued for being able to expose missingness, patterns, biases, or gaps in collections and collections data. One example recounted in the grey literature illuminates this potential in particular: a project between the Turing Institute and the British Library is discussed in which AI is applied to collections data, with the authors highlighting its potential to reveal new patterns but also overlooked gaps in an institution's collection (Ridge, 2019). It is here, we begin to see the last theme emerge and contribute to a discursive infrastructure in the museum sector at the intersection between valuing and de-valuing the perceived 'human' and 'inhuman' potential of AI.

The museum as a locus of art, culture, and society is framed as having a pivotal role in drawing on AI's way of 'looking', to in a way, overcome the complicated binary between human/in-human by prompting reflections on what it means to be human. The MA, summarising a project called Recognition between Reuters and Tate, described this role of the museum through the quote of a Tate staff member: "when you try and make a machine understand images, you inevitably ask 'how does a human understand images?' (Knott, 2017a). As described by the CMA this reflection on humanity that the museum can prompt is central to wellbeing in a digital driven information society, 'a deep personal connection to humanity can inspire visitors to place that ideal at the centre of their identity and carry it with them wherever they go' (Grimes, 2017, para. 31). Such discourse contributes to an infrastructure that positions museums as having an important role to play in prompting critical reflection on what it means to be human, to connect people to their humanity, and question binaries between human and machine.

DISCUSSION

Envisioned museum practices and roles in relation to AI

Through a lens of infrastructure, we gain critical and timely insight into how discourse may underpin the museum's current and future role and associated practices in relation to AI. This includes three main themes encompassing shifts in discourse in relation to a concern for agency, how the museum cares for its various publics, the museums' role in education, and finally, how the museum values AI and its '(in)humanness', suggesting futures that are aligned with contemporary literature and perspectives on the museum and its roles.

These shifts frame the museum and stakeholders as having a valuable role in leveraging AI to be aligned with social missions, as opposed to museums being passively impacted by AI's positive or negative effects. This agency not only belongs to the museum but also other actors and stakeholders positioning the museum as a collaborator and situated within a network. Moreover, the grey literature emphasises a contemporary caring role for the museum, in which the museum is not only concerned for visitor experiences in the museum, but also the needs of different publics in a society being shaped by AI. The discourse also positions the museum as educator, specifically, by enabling visitors to ask critical questions and get hands-on in exploring and experimenting with data and technology. Finally, the discourse hints at the potential value of the museum in sparking critical thinking on what it means to be human, prompted by discussions regarding how AI enables 'new ways of seeing' and in turn, how we reflect on and understand how we as humans 'see'.

These changes in discourse could perpetuate certain museum practices and roles in light of AI – emphasising certain values in the sector in relation to agency, social impact, and education. Specifically, it reflects values pertaining to a constructivist learning model that prioritises active action and meaning making of visitors in the learning process (Falk, 2016), of a social and participatory role of both museums and stakeholders in addressing social issues created by AI (Simon, 2010; Smed, 2020), and finally, envisions museums as a valuable space for reflecting on ways of being – understanding both self and others (Sandell, 2007), including AI. In turn, this discursive infrastructure, while reflecting contemporary values and ideals that align with other forms of museum literature, could overshadow

alternative roles and practices, prompting critical reflection on where things are going and what museum futures might be missed.

Overlooked museum roles and practices in relation to AI

One early piece of literature from an ICOM newsletter, before AI and its many innovations expanded and exploded in public knowledge, reflected on, and debated how both museums and art might *impact* AI (Sledge & Bryan, 1996). This perspective flips the discourse most prominent in the grey literature, that agency is shared between staff, AI, and other stakeholders to work with AI as an *imperfect tool*. Instead, the prior perspective positions museums with their unique knowledge and expertise as actively changing, maybe evolving, and creating AI, becoming a locus for innovation. This was recently reflected in the book *AI in Museums* (Thiel & Bernhardt, 2023), in which Theil (2023) suggests museums could be valuable innovators using their own data to create culturally specific learning models. As similarly suggested by computer scientists (Huang & Liem, 2022), museums may hold a certain edge in addressing associated ethical challenges, due to having immense experience challenging exclusion and bias in cultural heritage data and representation. Museums may, therefore, draw on associated methods such as collaboration and participation to actively shape AI and address associated ethical challenges with stakeholders. For instance, cultural heritage hackathons and labs could address public concerns such as the use of AI not only for cultural heritage but also for healthcare, policing, and everyday information seeking. The museum is potentially a unique space for these activities not only due to their rich datasets and experience in facilitating participation but also their ability to place technology in historical, social, and political contexts (Duetsches Museum Bonn, 2023; Kunstmuseum Stuttgart, 2023). As such, different forms of museum knowledge may be valuable for creating and shaping AI, and addressing the ethical and social challenges it poses.

In the analysis, the grey literature also hints at the value of museum knowledge for prompting visitor discussion and reflection regarding what it means to be human in light of AI. However, AI in this discourse seems to still be conceptualised as something ‘other’ which overlooks its many pieces, practices, data, and technology that is inherently entangled with human intervention. As proposed by Caramiaux (2023) helping uncover and position AI as a socio-technical infrastructure (networks of interconnected elements) or as Bareither (2023) describes, as an assemblage (ensembles of social/technical actors and their relations), can demystify AI moving beyond valuing and devaluing its supposed (in)humanness to enable richer public understanding of its complex messy relation to human activity and agency. One compelling example that could be a method for provoking reflection on the entanglement between human agency, AI, and context is by visually tracing the anatomy of an AI system, such as the visual case study of Amazon’s Echo by Crawford and Joler (2018).

On the other hand, as mentioned in the analysis, museums may become dynamic community spaces to support publics who are affected by social changes brought by AI such as by providing support and tools for employment. While hinted at in the grey literature, a more in-depth envisioning and exploration is needed to understand what organisational systems and which stakeholders will be needed to on the one hand, sustain a dynamic hub for re-envisioning ethical/responsible AI and on the other hand, for supporting publics impacted by AI innovations. While I started this sub-section by emphasising the value of museum knowledge, new organisational systems will be needed to support both museum knowledges and other forms and modes of knowing and expertise including those of computer scientists, community members with lived experiences, and policy makers, to continuously adapt to and address challenges that arise from AI. As suggested by Bareither (2023), AI can be considered an assemblage, constituted by numerous actors, and the museum will need to decide what role it will play in response to the innovations and societal impacts of AI, and if and how they will draw on museum knowledge to enact a role as an educator, innovator, or as social advocator/catalyst.

CONCLUSION

Recognising that discourse can be powerful, this paper undertook a critical analysis of grey literature published and or shared by high-level professional museum bodies that govern best practices, with a focus on the United Kingdom,

Canada, and the United States. In doing so, it identifies four preliminary themes encompassing small shifts in discourse over time which may contribute to a discursive infrastructure that underpins and justifies both current museum practices and roles and extends into museum futures. The analysis represents just a small facet of discourse in the museum sector, to prompt critical reflection on the 'now' and re-imagine if/how practices around AI in the sector may transition and transform. I have identified and suggested some overlooked futures in relation to the discourse, to in turn, provoke critical reflection. I emphasise in comparison to the analysed discourse, the value of museum and stakeholder knowledge: museums in conjunction with their stakeholders can not only be a part of enabling public learning around AI, and understandings its limits and potentials, but also actively changing AI and addressing the social challenges it creates.

GENERATIVE AI USE

I [the author] used Chat-GPT to produce and compare alternative introductory paragraph sentences in my findings section, to see how it could improve the writing/flow by prompting: 'can you make this sentence more dynamic?'. This often produced dramatic sentences that over-exaggerated the findings: therefore, I incorporated only minor editorial changes by switching out one or two words for the Chat-GPT suggested synonyms, and hope the reader has found the writing entertaining but minimally dramatic. AI was *not* used in the analysis of the literature/data. I assume all responsibility for the content of this submission.

REFERENCES

Ahmadi, F., & Azmoudeh, M. (2022). UNIVERSITY MUSEUMS AND METAVERSE SPACE. *ICOM International Committee for University Museums and Collections*, *14*(2). http://umac.icom.museum/wp-content/uploads/2022/08/UMACj-14-2-Prague.pdf

Andrew, D. (2019, October 21). Interview with Wilbert Tabone, MUZA, Malta. *ICOM UK*. https://uk.icom.museum/interview-with-wilbert-tabone-muza-malta/

Andrew, D. (2022, May 30). What Exactly Is a 'Museum of the Future'? *ICOM UK*. https://uk.icom.museum/what-exactly-is-a-museum-of-the-future/

Atkinson, R. (2021). UK's first digital art gallery to open in Coventry. *Museums Association*. https://www.museumsassociation.org/museums-journal/news/2021/12/uks-first-digital-art-gallery-to-open-in-coventry/

Baggesen, R. H. (2014). Augmenting the agora: Media and civic engagement in museums. *MedieKultur: Journal of Media and Communication Research*, *30*(56), 117–131. https://doi.org/10.7146/mediekultur.v30i56.8964

Bareither, C. (2023). Museum-AI Assemblages: A Conceptual Framework for Ethnographic and Qualitative Research. In S. Thiel & J. Bernhardt (Eds.), *AI in Museums: Reflections, Perspectives and Applications* (pp. 99–113). transcript Verlag.

Beel, D. E. (2009). New Labour and the Museum in Scotland: Social Inclusion and the Citizen. *Scottish Geographical Journal*, *125*(3–4), 344–352. https://doi.org/10.1080/14702540903364377

Black, G. (Ed.). (2020). *Museums and the challenge of change: Old institutions in a new world* (1st ed). Routledge, Taylor & Francis Group. https://www-taylorfrancis-com.ezproxy.lib.gla.ac.uk/books/edit/10.4324/9781003043010/museums-challenge-change-graham-black

Bondil, N. (2019). Museotherapy: Promoting inclusiveness, health and wellbeing. *City Museums as Cultural Hubs: Past, Present and Future*. CAMOC Annual Conference, Kyoto.

Caramiaux, B. (2023). AI with Museums and Cultural Heritage. In S. Thiel & J. Bernhardt (Eds.), *AI in Museums: Reflections, Perspectives and Applications.* (pp. 117–130). transcript Verlag.

Cascone, S. (2019, September 9). Artificial Intelligence Is Revealing Secrets About How the Ghent Altarpiece Was Made—And Damaged. *American Alliance of Museums*. https://www.aam-us.org/wire/artnet-news/artificial-intelligence-is-revealing-secrets-about-how-the-ghent-altarpiece-was-made-and-damaged/

Cox, A. (2022). The Ethics of AI for Information Professionals: Eight Scenarios. *Journal of the Australian Library and Information Association*, *71*(3), 201–214. https://doi.org/10.1080/24750158.2022.2084885

Crawford, K. (2021). *The Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*. Yale University Press.

Crawford, K., & Joler, V. (2018). *Anatomy of an AI System*. Victoria & Albert Museum Design, Architecture and Digital Department. https://collections.vam.ac.uk/item/O1500029/anatomy-of-an-ai-system-digital-poster-kate-crawford/

Croizet, F. (2021). *ICOM Voices: Smart Museums to Face the Crisis*. International Council of Museums. https://icom.museum/en/news/smart-museums-to-face-the-crisis/

Digital Meets Heritage. (2017). The National Gallery predicts the future with artificial intelligence. *Digital Meets Culture*. https://www.digitalmeetsculture.net/article/the-national-gallery-predicts-the-future-with-artificial-intelligence/

Duetsches Museum Bonn. (2023, May 23). *Neue KI-Anwendungen zum Ausprobieren und Entdecken*. https://www.deutsches-museum.de/bonn/aktuell/neue-ki-anwendungen-zum-ausprobieren-und-entdecken

Erickson, I., & Sawyer, S. (2019). Infrastructuring as Bricolage: Thinking Like a Contemporary Knowledge Worker. In M. Kornberger, G. C. Bowker, J. Elyachar, A. Mennicken, P. Miller, J. Randa Nucho, & N. Pollock

(Eds.), *Thinking Infrastructures* (Vol. 62, pp. 321–334). Emerald Publishing Limited. https://doi.org/10.1108/S0733-558X20190000062020

Falk, J. H. (2016). *Identity and the Museum Visitor Experience*. Routledge. https://doi.org/10.4324/9781315427058

Grimes, J. (2017). *Why? People, not Objects, are the Future*. Canadian Museums Association. https://www.museums.ca/site/people_not_objects

Hagendorff, T. (2020). The Ethics of AI Ethics: An Evaluation of Guidelines. *Minds and Machines*, *30*(1), 99–120. https://doi.org/10.1007/s11023-020-09517-8

Hernández, F. (2012). Putting the visitor first. *Empowering the Visitor: Process, Progress, Protest*. ICOM International Committee for Museology 34th ICOFOM Annual Symposium, Tunis. https://icofom.mini.icom.museum/wp-content/uploads/sites/18/2018/12/ISS_41__2012__Tunis_red.pdf

Huang, H.-Y., & Liem, C. C. S. (2022). Social Inclusion in Curated Contexts: Insights from Museum Practices. *2022 ACM Conference on Fairness, Accountability, and Transparency*, 300–309. https://doi.org/10.1145/3531146.3533095

Hufschmidt, I. (2023). Troubleshoot? A Global Mapping of AI in Museums. In *AI in Museums: Reflections, Perspectives and Applications.* (pp. 131–148). transcript Verlag.

ICOM. (2020a). *ICOM-US Museum Definition Task Force Report 5-17-20*. ICOM. https://icom.museum/wp-content/uploads/2021/01/ICOM-US-Abstract-2-Supporting-Doc_-MDTF-Membership-Survey-Feedback-1.pdf

ICOM. (2020b, November 19). ICOM Korea—National Museum of Korea to hold the 1st World Museum Forum. *ICOM ASPAC*. https://icom-aspac.mini.icom.museum/icom-korea-national-museum-of-korea-to-hold-the-1st-world-museum-forum/

Initiative for Applied Artificial Intelligence. (2023). *AI Maturity Assessment*. Applied AI. https://www.appliedai.de/tools/ki-reifegrad

Janes, R. R., & Sandell, R. (Eds.). (2019). *Museum activism*. Routledge. https://doi.org/10.4324/9781351251044

Karasti, H., & Blomberg, J. (2018). Studying infrastructuring ethnographically. *Comput. Supported Coop. Work*, *27*(2), 233–265. https://doi.org/10.1007/s10606-017-9296-7

Knott, J. (2017a). The imitation game: Tate engages audiences with a project that compares art with photojournalism. *Museums Association*. https://www.museumsassociation.org/museums-journal/in-practice/2017/02/14022017-the-imitation-game/

Knott, J. (2017b, May 31). *Digital domain*. Museums Association. https://www.museumsassociation.org/museums-journal/features/2017/05/01062017-digital-domain/

Kunstmuseum Stuttgart. (2023, February 4). *SHIFT. AI and a future community*. https://www.kunstmuseum-stuttgart.de/en/ausstellungen/shift

Larkin, B. (2013). The politics and poetics of infrastructure. *Annual Review of Anthropology*, *42*(1), 327–343. https://doi.org/10.1146/annurev-anthro-092412-155522

Malde, S., & Finnis, J. (2016). *Let's Get Real 4* (Report from the Fourth Culture24 Action Research Project) [Research report]. Culture24. https://www.keepandshare.com/doc/8182262/let-s-get-real-4-report-pdf-9-1-meg?da=y

Marttila, S., & Botero, A. (2017). Infrastructuring for Cultural Commons. *Computer Supported Cooperative Work (CSCW)*, *26*(1), 97–133. https://doi.org/10.1007/s10606-017-9273-1

Merritt, E. (2013, February 7). Will You Lose Your Museum Job to a Robot? *American Alliance of Museums*. https://www.aam-us.org/2013/02/07/will-you-lose-your-museum-job-to-a-robot/

Merritt, E. (2014a, April 8). Machine Learning and the Future of Authentication. *American Alliance of Museums*. https://www.aam-us.org/2014/04/08/machine-learning-and-the-future-of-authentication/

Merritt, E. (2014b, May 1). Robots! Are Rosie, Voltron, Bender and their kin finally coming into their own? *American Alliance of Museums*. https://www.aam-us.org/2014/05/01/robots-are-rosie-voltron-bender-and-their-kin-finally-coming-into-their-own/

Merritt, E. (2014c, August 19). Update on the 2014 Trends: Robots!!!! *American Alliance of Museums*. https://www.aam-us.org/2014/08/19/update-on-the-2014-trends-robots/

Merritt, E. (2014d, October 30). Thursday Thought: Getting Personal. *American Alliance of Museums*. https://www.aam-us.org/2014/10/30/thursday-thought-getting-personal/

Merritt, E. (2016a, May 1). Labor 3.0: New jobs, or a jobless future? *American Alliance of Museums*. https://www.aam-us.org/2016/05/01/labor-3-0-new-jobs-or-a-jobless-future/

Merritt, E. (2016b, August 12). Futurist Friday: Empathetic AI. *American Alliance of Museums*. https://www.aam-us.org/2016/08/12/futurist-friday-empathetic-ai/

Merritt, E. (2017a, April 28). Futurist Friday: Cognitive Couture. *American Alliance of Museums*. https://www.aam-us.org/2017/04/28/futurist-friday-cognitive-couture/

Merritt, E. (2017b, July 20). AI and the Future of History. *American Alliance of Museums*. https://www.aam-us.org/2017/07/20/ai-and-the-future-of-history/

Merritt, E. (2018a, June 29). Futurist Friday: Argumentative AI. *American Alliance of Museums*. https://www.aam-us.org/2018/06/29/futurist-friday-argumentative-ai/

Merritt, E. (2018b, September 28). Futurist Friday: Poetic Lions. *American Alliance of Museums*. https://www.aam-us.org/2018/09/28/futurist-friday-poetic-lions/

Merritt, E. (2019a, April 17). TrendsWatch 2019: Truth, Trust, and Fake News. *American Alliance of Museums*. https://www.aam-us.org/2019/04/17/trendswatch-2019-truth-trust-and-fake-news/

Merritt, E. (2019b, May 10). Futurist Friday: Deepfake Dali. *American Alliance of Museums*. https://www.aam-us.org/2019/05/10/futurist-friday-deepfake-dali/

Mills, E. (2021, May 14). *Amazing exhibitions to see as we head #BackToMuseums*. Museums Association. https://www.museumsassociation.org/museums-journal/news/2021/05/amazing-exhibitions-to-see-as-we-head-backtomuseums/

Morse, N. (2020). *The Museum as a Space of Social Care*. Routledge. https://doi.org/10.4324/9781315461403

Museums Association. (2019). Voxpop. *Museums Association*. https://www.museumsassociation.org/museums-journal/opinion/2019/06/01062019-vox-pop-digital-tech/

National Museums Liverpool. (2021, May 18). *AI: More than Human*. National Museums Liverpool. https://www.liverpoolmuseums.org.uk/whatson/world-museum/exhibition/ai-more-human

One Further. (2022, October 20). *The Cultural Content Report 2022*. One Further. https://onefurther.com/blog/cultural-content-survey-2022

Pickering, J. (2003). *Museum public programs in a university setting*. http://umac.icom.museum/2003/pickering.html

Rao, S. (2018, December 26). Museums and AI: Could Robots Be Your New Coworkers? *American Alliance of Museums*. https://www.aam-us.org/2018/12/26/museums-and-ai-could-robots-be-your-new-coworkers/

Rao, S. (2019, February 6). Museums and AI: Is There a Ghost in the Machine? *American Alliance of Museums*. https://www.aam-us.org/2019/02/06/museums-and-ai-is-there-a-ghost-in-the-machine/

Rao, Y. (2023). Discourse as infrastructure: How "New Infrastructure" policies re-infrastructure China. *Global Media and China*, *8*(3), 254–270. https://doi.org/10.1177/20594364231198605

Ridge, M. (2019). Digital: Making digital collections more accessible. *Museums Association*. https://www.museumsassociation.org/museums-journal/opinion/2019/02/06022019-digital/

Sandell, R. (2007). *Museums, prejudice and the reframing of difference*. Routledge. https://doi.org/10.4324/9780203020036

Science Gallery London. (n.d.). *AI: Who's Looking After Me?* Science Gallery London. Retrieved 28 February 2024, from https://london.sciencegallery.com/ai-season

Simon, N. (2010). *The participatory museum*. Museum 2.0. https://participatorymuseum.org/read/

Sledge, J., & Bryan, N. (1996). Let a Thousand Flowers Bloom: The Great Leap Forward in Museum Information. *ICOM CIDOC Newsletter*, 14–17.

Smed, A. C., Bernadette Lynch, Klaus Petersen, Sarah (Ed.). (2020). *Museums and Social Change: Challenging the Unhelpful Museum*. Routledge. https://doi.org/10.4324/9780429276903

Star, S. L., & Ruhleder, K. (1996). Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces. *Information Systems Research*, *7*(1), 111–134.

Stevens, A. (2019). Trendswatch | Machine learning. *Museums Association*. https://www.museumsassociation.org/museums-journal/features/2019/09/02092019-trendswatch-ai/

Sullivan, N. (2017). Trendswatch: Rise of the chatbots. *Museums Association*. https://www.museumsassociation.org/museums-journal/features/2017/06/01062017-trendswatch/

Thiel, S. (2023). Managing AI: Developing Strategic and Ethical Guidelines for Museum. In S. Thiel & J. Bernhardt (Eds.), *AI in Museums: Reflections, Perspectives and Applications* (pp. 83–98). transcript Verlag.

Thiel, S., & Bernhardt, J. C. (Eds.). (2023). *AI in Museums: Reflections, Perspectives and Applications*. transcript Verlag. https://doi.org/10.14361/9783839467107

Vaismoradi, M., Jones, J., Turunen, H., & Snelgrove, S. (2016). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, *6*(5), Article 5. https://doi.org/10.5430/jnep.v6n5p100

Villaespesa, E., & Crider, S. (2021). A critical comparison analysis between human and machine-generated tags for the Metropolitan Museum of Art's collection. *Journal of Documentation*, *77*(4), 946–964. https://doi.org/10.1108/JD-04-2020-0060

Walker, D. (2016). *Towards the collaborative museum? Social media, participation, disciplinary experts and the public in the contemporary museum* [PhD thesis, University of Cambridge]. https://www.repository.cam.ac.uk/handle/1810/253771

Wong, A. (2015). The Complexity of 'Community': Considering the Effects of Discourse on Museums' Social Media Practices. *Museum and Society*, *13*(3), 296–315. https://doi.org/10.29311/mas.v13i3.332