
Article

The Power Behind Choice: Cultural Heritage Organizations' Ability to Address Information Literacy Through Engagement with the Public

Jessica BrodeFrank

University of Illinois Chicago, University Library, Chicago, IL 60607, USA; jbrodefr@uic.edu

Abstract

Cultural organizations, like museums, libraries, and archives, are trusted spaces for discovery, innovation, interrogation, and encouraging agency and exploration. They go beyond the physicality of objects, focusing on dissemination of knowledge as the very mission of the organization. By adopting this mission around using collection items, crowdsourcing projects, and programming to expose digital literacy concepts like bias, algorithms, and more, institutions have a new opportunity to become essential to life-long learning geared towards this second quarter of the 21st century. Through hands-on experiences that expose the bias and choice in all description and knowledge creation, these organizations can reinsert human-in-the-loop frameworks into machine learning and artificial intelligence platforms.

Keywords: artificial intelligence; bias; critical heritage

1. Introduction

Cultural heritage organizations, like libraries and museums, have always been sites of negotiated authority [1] and, as such, are uniquely situated as trusted information sources that can address literacy skills like bias detection and mitigation, fact checking, prompt writing, questioning, and understanding cultural impacts.

One of the most basic and iconic functions of a museum in particular is the exhibition. The fulfillment of the museum's mission to disseminate knowledge about its collection has traditionally been based upon this exhibiting function. One thing that defines an exhibition in a modern museum, over those of the Wunderkammern of the 17th century, is that there is an educational narrative. A curator (or team of curators) will interpret the objects for the guest and present a story, a narrative. The act of display is, in effect, a weighted decision about what to value in terms of not only what gets put on display to the public but also how the narrative is built within that display [2] (p. 33). An archive is created through appraisal. This is the work that an archivist conducts to decide which 2–5% of an entire institution's papers and data is deserving of preservation [3]. Just as museums and archives have struggled with language and authority in providing the access to their collections that the public expects, and which, by their nature, they owe to the public, libraries have also been accused of limiting representation, and, in turn, retrieval, based on biased systems of classification. In more recent years, even libraries and archives

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have created displays and exhibitions, and all three types of cultural heritage organizations are enacting choices behind the scenes regarding public declarations of information.

Whether it be the curator, librarian, or archivist, cultural heritage organization staff is often seen as the authority within the organization. “The question of curatorial authority: how a curator might exert authority over an institution, collections, objects, knowledge, and public understanding—and furthermore how such authority is tested, challenged, and limited”—can be seen in the entirety of the cultural heritage sector by how collections are described to the public [4]. “An element of such authority is the sense of trust in the museum and its curatorial expertise. As Susan A Crane notes: ‘Museums are not supposed to lie to us; this act seems like a breach of faith. Assuming that our own memories are fallible, we rely on museums as well as on historians to get the past ‘right’ for us [5] (pp. 1–2).’ In many ways, museums and cultural heritage institutions, in general, are dependent on this trust from the public. The standing that staff have in academic communities and the standing that institutions have in the public mind are what allow the assertion of intellectual authority, the command over knowledge, as authoritative experts describe what objects are [5] (p. 1).

The American Historical Association found that as of 2022, Americans trust history museums more than most other sources for history [6]. Importantly, the American faith in museums is primarily predicated upon Americans’ belief that objects and documents cannot lie to them, which, as noted by the American Historical Association, is itself a misunderstanding of professional historical interpretation practices. Since the 1990s, researchers like Rosenzweig and Thelen [7] have shown museums to be one of, if not the most, trusted sources. Today, this trust needs to be seen in light of the belief of Americans that museums offer “unmediated experiences”, spaces where they can do their own research, which 64% of Americans prefer to “receiving information from an expert [6]”.

Over the last decade, cultural heritage institutions have seen a change in access: digital technology has drastically changed public expectations and behaviors around accessing cultural heritage collections. Technology is no longer considered separate from our material reality, and the digital is now inextricable from how organizations communicate. Within cultural heritage organizations, digital cultural heritage has emerged to refer to digitally created or digitized cultural materials, including the preservative process of digitization and digital preservation, including the tools, processes, and policies needed to ensure long-term access to these materials [1].

This is important, as online visitors are growing into a more diverse and distinct audience segment for cultural heritage organizations [1]. In order to serve this new audience, organizations have looked for emerging technologies to assist them in making digitized and born-digital collections usable and navigable. Databases are essential for storing and managing the vast amounts of collections housed by cultural institutions, including not only digital surrogates but also associated research data and metadata [1].

The importance of metadata cannot be understated. Metadata is the discovery layer, essential for the successful preservation of and access to collections in the digital space. Metadata ensures that datasets, collections in this case, accurately represent the content they seek to include [5]. Not only is the metadata useful to organizations for collections management and public services, but it is also what most technological systems, from databases and search engines to the new generative AI platforms, rely on [8]. Internally amongst cultural heritage professionals and professional researchers, there is understanding and literacy around archival standards for description and cataloguing, but these skills are not taught to the public at large. Studies show that users often do not come to collections looking to discover items by provenance, and, in fact, the commitment to these professional standards in public access spaces has driven general users to other platforms. Studies on library catalogues and archival portals have shown that for the last fifteen years,

most users start their search for information with third-party platforms like Google or Wikipedia, only coming to libraries and archives for known items [8]. Today, this problem has been exacerbated by generative AI tools, with Columbia University reporting that in 2025, a quarter of users stated that they started their research using platforms like ChatGPT-4 [9].

Metadata is what determines whether something is discoverable, as it makes content legible to machines, and without metadata, algorithms that have become part of everyday use to the public would no longer work. Metadata not only shapes search results on platforms like Google but also trains AI. As Tammy Lee states, “Metadata is the upstream leverage point—the layer where meaning, context, and authority get defined in the first place [10].” It is with metadata that cultural heritage organizations have the chance to amplify diversity and tackle needed conversations with the public on information literacy skills.

On 27 June 2024, the Institute of Museum and Library Services (IMLS) released *InformationLiteracy.gov*, a website with specialized tools and resources designed for cultural heritage organizations such as libraries and museums to engage diverse communities in developing critical information literacy skills [11]. In 2022, the U.S. Congress and White House invited the IMLS to explore ways to improve information literacy across the country, noting a need nationwide.

The largest museum associations throughout the world began shifting priorities for museums in the first quarter of the twenty-first century to better align with museums as spaces for engagement, denoting a change in museum missions that can also be seen in changes from the American Library Association. Museum policy advocates from the Museum Association (MA) and the International Council of Museums (ICOM) prompted museums to step up their focus on audience engagement, recognizing that museums needed to be more than a vault. At the 26th ICOM General Conference held in Prague, the new definition of a museum was approved as follows:

A museum is a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets, and exhibits tangible and intangible heritage. Open to the public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally and with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing [12].

The emphasis on operating ethically and with the participation of communities is important and brings new mission-centric activities to the forefront of museums, as this definition is not only used by museums to define their behaviors and strategic plans but also by government and nonprofit funding agencies in determining funding priorities and requirements. Importantly, this definition can be seen in collaboration with the American Library Association definition of a library:

A library is a collection of resources in a variety of formats that is (1) organized by information professionals or other experts who (2) provide convenient physical, digital, bibliographic, or intellectual access and (3) offer targeted services and programs (4) with the mission of educating, informing, or entertaining a variety of audiences (5) and the goal of stimulating individual learning and advancing society as a whole [13].

Taking on stimulating individual learning and advancing society as a whole is a massive goal, but when viewed with the need to be done ethically and with the collaboration of communities, cultural heritage spaces become a uniquely suited space for trusted conversations on issues pressing today. Why should cultural heritage institutions take on this work? In many ways, this question will be raised within this paper as a continuous choice

by cultural heritage organizations made to maintain trust with communities and to continue building reciprocal relationships. Importantly, these organizations are also uniquely situated as spaces that have contended with processes and tasks tied to bias, selection, and choice.

Libraries and museums have been making decisions on basic tasks like collecting, preserving, organizing, and displaying information since the seventeenth century [2]. As the AAM Core Standards [14] set up, trust is also impacted by the ability to be transparent about decisions made. One way that trust is being lost among the public is by the lack of transparency about how institutions work, why they work in these ways, and what the goals for this work are [3] (p. 179). This has spawned a new field of study: critical heritage studies.

2. Materials and Methods

A 21st century method, critical heritage studies attempted to consolidate the disparate interests in heritage studies across libraries, archives, museums, archeology, and more. Critical heritage studies describes a body of scholarship that moves beyond heritage studies as a field traditionally focused on technical issues and practice into one that emphasizes the political, cultural and social phenomena of cultural heritage itself [15]. Critical heritage studies encompasses research on the choices made about what to conserve and why, the politics of heritage management, the relationships between commemorative acts and public memory, and the process of heritage management articulation across unequal relations of expertise and power [16]. Critical heritage studies has changed the emphasis of heritage studies from the conservation and preservation of heritage to complex questions regarding the power that heritage entails and produces [17].

As a field, critical heritage studies attempts to shift the emphasis in cultural heritage away from simply how, where and which heritage is conserved towards an emphasis on why these decisions are made and the effects that these decisions have [16] (p. 1365). By focusing on the role of heritage in assembling and making futures based on the choices made about what to preserve from the past, the field focuses attention on the power and knowledge created by these choices [18]. This emphasis on choice is critical in discussions about information literacy, making critical heritage studies essential to organizations looking to answer the charge of the IMLS to tackle information literacy within cultural heritage organizations.

Within the generative AI age, cultural heritage is increasingly negotiated as “a past practice that is (re)constructed in the present [19].” This same approach of reconstructive intervention has led to the human-in-the-loop (HITL) approach to AI, which has been successfully implemented in various cultural heritage projects [19]. Many studies have shown that this approach, which inserts humans back into the workflow, addresses challenges posed by standard AI models struggling with content. The key to the approach is to provide context to algorithms; human annotators can add metadata tags to images, provide information about time periods, add cultural context, and identify potential biases present in the dataset [19]. It is the assertion of this paper that crowdsourcing projects using cultural heritage collections are essential and should be integrated into AI workflows. Not only do these projects bring trusted, vetted collections and data into AI models, but they do so with the active participation and support of their communities, adding not just content but context.

By taking a critical heritage studies approach, in conjunction with action research, the case studies of Te Hiku, Masakhane, Zooniverse, and CHURRO-DS illustrate how human-in-the-loop (HITL) approaches in cultural heritage projects, a community crowdsourcing intervention, improve the accuracy and relevance of AI-generated content, leading to the enhanced preservation and accessibility of historical collections, while en-

gaging users in interactive experiences that lead to opportunities for critical information skill development. HITL in cultural organizations sits squarely in line with action research models as well [20]. Action research is employed when the project team (or researcher) is interested in the ways in which knowledge is actively constructed from experience, the creation of the “know-how [21]”.

To gain a better overview of current theories about and strategies related to human-in-the-loop (HITL) approaches in cultural heritage projects, a systematic review of the literature in the fields of archival studies ((Mostofian and Foka 2025) [22], (Papadouris 2025) [23], (Christodouloupoulos et al. 2025) [24]), critical heritage studies ((Harrison 2020) [18], (Gentry, Kynan, and Smith 2019) [15], (Lähdesmäki, Thomas and Zhu 2019) [17], (Message, 2026) [24]), and computer science ((Luthra and Zijlma, 2025) [25], (Noble 2018) [26]) was conducted. The importance of including these resources was to critically confront the Western-centric bias pervasive in written and academic discussions of cultural heritage. For each resource and case study, the focus is on what forms of bias or strategies to mitigate bias were present and how engagement with the public was utilized.

Throughout this paper, case studies will be used to discuss how cultural heritage organizations across the globe have begun tackling emerging technologies to create new public spaces, break down long-standing barriers to cultural information access, highlight and tackle historic biases, and recognize economic, social, and cultural inequalities, as well as environmental impacts [1]. Practitioners across the world, including from Egypt, Ethiopia, Iraq, Kenya [1], the United States [27], the United Kingdom [28], Canada, New Zealand [1], and more, have begun reporting on these projects, helping to create a diverse example set to draw from within this paper and beyond.

3. Case Studies

It is essential for trust within cultural heritage spaces that inclusivity and diverse cultural perspectives are considered from the outset when using technology like artificial intelligence. Providing resources and platforms for local initiatives, facilitating global collaboration and sharing best practices between Western and non-Western institutions allow AI to be leveraged to enhance the preservation and interpretation of cultural heritage in such a way that it is inclusive and respectful of cultures, allowing for transparency in decision making that continues to foster trust in institutions [1]. By working with communities directly, like many collaborative research models centered around citizen science and crowdsourcing do, it is possible to ensure that technology is used in beneficial ways in a wide array of communities and to contribute to a more equitable digital presence and future.

It is important to divert shortly for a discussion on digital public engagement, touching on a two-decades-long field of research that includes collaborative research, citizen science, citizen history, crowdsourcing, and more. Tim Berners-Lee made early notes on the social web and its creation of silos of information that are only accessible under the conditions set by the entity that manages the site, and on the hindering of innovation that occurs from this locking up of information [29].

In much the same way that cultural heritage authority is based on the trust of the public, so too is the “Wisdom of the Crowds” [30] model that has led to modern crowdsourcing, citizen science, and collaborative community engagement models. If the public does not trust that there is diversity of thought, independence in working and thinking, and a decentralized system, then it makes no sense to work in this manner. Looking to science as one of the best examples of the “Wisdom of the Crowds” model of collaboration, it is important to note that this collaboration is imperative because of the specialized nature of scientists now, who often know one thing extremely well but find it difficult to know everything that they may need to for a specific project. In much the same

way, specialization in cultural heritage means that a curator may not know the needs of the public in the ways that an educator might, or know the terms being searched online, like a website manager may track. Collaboration, for both the scientist and the cultural heritage institution, allows for the incorporation of many different kinds of knowledge, and for the ability to do so in an active and engaging way [30].

Public participation, including crowdsourcing, will never be a salve for bias, as every single participant comes to these interactions and projects with their own biases; however, by incorporating the public into the process, it is possible to reflect the diverse perspectives of the community at large and not just a single institutional bias. As Allen Colin noted in 2013, “people continue to supply a depth of understanding that we don’t see machines achieving any time soon [31].” It is this depth and diversity that are best addressed by the strengths of socially constructed, or crowdsourced, metadata [32]. The more that metadata systems reflect the diversity, variations, and coinages in the nomenclature of their objects, the better they support the discoverability and relevancy of the objects [33]. In 2025, it is imperative to think of crowdsourcing and community engagement in line with the work made possible by artificial intelligence as well to increase access.

Already, artificial intelligence and generative AI in particular have been used in analyses of cultural heritage destruction [32,34] and the recreation of lost artifacts [35]. It is central, however, to keep a citizen science, collaborative mindset within projects using artificial intelligence technologies, as failing to include local cultures can worsen existing inequalities. Many examples of case studies already utilizing AI through strong community engagement have proven that by incorporating communities into these projects, AI applications can be culturally representative and inclusive.

3.1. *Masakhane*

Masakhane is a grassroots organization whose mission is to strengthen natural language processing research in African languages for Africans and by Africans [36]. Almost 7000 languages are spoken worldwide, and over two thousand of these are spoken on the African continent; yet, of the over 130 languages offered by Google Translate, only 13 are native to Africa [37]. Additionally, this lack of representation for African languages extends to the lack of Wikipedia pages and the lack of speech recognition technologies on smartphones. These language exclusions have had serious implications, including during the COVID-19 pandemic, when most publicly accessible scientific information was available only in English or other European languages and not in native African languages [37].

Language barriers as well as the use of scientific language to colonize, subjugate, oppress and marginalize communities has left a deep distrust of science in many African communities, something seen around the globe by colonized communities. Masakhane was created to address inequities, bridge linguistic and cultural divides, and involve Africans in technological advancement directly, bringing 100 natural language processing and machine learning experts together to build natural language processing in native African languages. The Masakhane group has built a machine translation tool (*masakhane-mt*) that allows science communicators to share research across the African continent, creating translations of research papers released on *AfricArxiv* into six languages: isiZulu, Northern Sotho, Yoruba, Hausa, Luganda, and Amharic [38]. Additionally, the “Know Our Names” project uses an international and multidisciplinary team of researchers to work with the Named Entity Recognition (NER) tool for 20 African languages to identify African names, places, and people for information retrieval, adding valuable metadata to increase discovery [38].

The Masakhane project is an example of the need for human-in-the-loop intervention when dealing with artificial intelligence models. The UK Department for Culture, Media

and Sport and the Department for Science, Innovation & Technology [39] ran a comparative exercise in 2024 to investigate the reliability of using generative artificial intelligence to produce evidence reviews, similar to institutions who have looked at AI for cultural heritage cataloguing. In this UK-based study, a comparison was made between a review produced by “human-only” and another that was deemed “AI-assisted”. Findings showed that the AI-assisted output was ultimately completed almost 23% faster than the human-only output; however, this same finding showed that the initial draft produced by AI required more revisions and human intervention than the human-only version did [39]. This study ultimately found the following:

“Despite the promise of AI for speeding up this process, the UK government guidance notes that ‘output from generative AI is susceptible to bias and misinformation.’ The known tendency of the technology to also ‘hallucinate’ false facts means it is currently unclear whether its application would indeed translate into genuine efficiency gains [39]”.

3.2. *Churro*

Outside of issues around AI in terms of accuracy and hallucinations, there is also a noted issue amongst cultural heritage institutions using artificial intelligence, and machine learning in particular, to transcribe the textual content of collections. Handwritten text recognition (HTR) is more challenging than the born-digital type due to the vast diversity in handwriting styles, calligraphic traditions, and conventions [24]. Variations in abbreviations, spellings, and even physical formatting make pre-modern documents particularly difficult for machine learning to transcribe properly. The majority of optimal character recognition (OCR) technology benchmarks do in fact primarily target modern documents [40].

This led the Stanford University team to develop a new vision-language model (VLM), focused on historical datasets. With over 99,000 documents from 46 different language clusters, CHURRO-DS (v0.2.0) is the most diverse historical dataset to date [24]. CHURRO-DS combines human-generated metadata into the VLM, with each image paired with a full-text annotation, ensuring accuracy in the transcription while better training the VLM.

CHURRO-DS was compared to Gemini 2.5 Pro and was found to surpass the Gemini 2.5 Pro model by 6.5% with regard to the transcription of handwritten documents (CHURRO at 70.1%; Gemini 2.5 Pro at 63.6%) [40]. In fact, in comparison to Gemini 2.5 Pro, the fine-tuned CHURRO-DS model performs better on 18 of the 21 languages included in the model, trailing behind Gemini only in Arabic, Persian, and Norwegian [40]. Importantly, CHURRO-DS is currently lacking any collections from the African continent, but the incorporation of collections from the Masakhane platform, those transcribed by Africans for Africans, could be integrated into a platform like CHURRO-DS, both strengthening the CHURRO-DS model with more diverse datasets and producing more access to these collections.

3.3. *Zooniverse*

When viewing AI as a tool that works in tandem with human experts, the potential for the technology is visible. Looking at the success of Masakhane, the importance of bringing people into machine learning is evident. The technology will only improve, but if the tasks and code do not reflect human needs and critical thought, the platforms will never achieve their full potential. As this UK study states, “Human-generated evidence reviews are already as good as they are ever going to be ... AI-assisted evidence reviews are currently the worst they will ever be—the technology will only get better [39].” AI should not be seen as a replacement for human thought or critical skills but rather as a

tool to help researchers quickly interrogate details, clarify points for potential misunderstanding, and probe weaknesses and strengths.

Cultural heritage organizations become a meaningful part of their communities through conceptualizing heritage differently. Collaboration with communities is essential in building trust and, additionally, opportunities for engagement and growth with the community. As stated by Bashforth et al.:

We believe that folk engage with heritage everyday probably, in truth, in spite of, and not because of, heritage professionals. If we use the metaphor of heritage as a river that flows every day then one choice is to contain the river and constrain its possibilities and box off opportunities. However, for us, it is the ecology that sustains the river, which is critical. The more streams that feed into the river, big or small—all carrying stories, all playing their part in making the river flow—the better. Then the river, and its ecosystem flourishes and begins to sustain the places and spaces through which it flows [21].

What counts as expertise has been radically contested and in constant flux for the last thirty years, with ideas from public and community expertise being added to policy documents such as the Historic England Conservation Principles [41] and Museum Association Code of Ethics [42]. Today, this is viewed as a two-way street, as there is a reciprocal need for information. Community groups and the general public need, and want, professional and expert knowledge, but professionals now also seek legitimacy for decisions made by engaging with communities [21].

This engagement with the community is central to the purpose of cultural heritage institutions, especially in encouraging, facilitating and supporting learning through formal education, informal life-long learning, training, and more [43] (p. 412). For the last two decades, the World Wide Web has allowed institutions to reinvent themselves as physical and virtual spaces in which people engage and learn, occupying space in both the real and virtual worlds, which allows institutions to occupy “centre stage in cultural cyberspace [44].” From this space, it is imperative that these organizations that hold the public’s trust and are charged with the preservation and dissemination of knowledge step up to become places that develop learners’ knowledge and understanding of needed skills in the world today. This returns us to the matter of using artificial intelligence transparently.

One way to achieve this transparency is through HITL workflows that feature and focus on interactions between project teams and public volunteers. *Communities & Crowds* was an AHRC-funded collaborative project run from 2021–2024 in a collaboration between volunteer researchers and staff at the National Science and Media Museum, National Museum of Scotland, and Zooniverse teams at Oxford University and Adler Planetarium in Chicago [28]. In a 2026 article written by the project team, it is contended that the careful co-creation of spaces for conversation and critical reflection was essential to the successful operation of the online crowdsourcing projects on the Zooniverse platform [28]. The *Talk* platform was already established on Zooniverse, but additional spaces and technology were developed as part of *Communities & Crowds*, allowing for different forums for conversation and reflective practice, including QuickTalk and the Community Catalog [28].

In 2024, I published my doctoral dissertation [44], which included an evaluation of the Zooniverse-hosted *Tag Along with Adler* project, which specifically included an evaluation of the *Talk* board functionality. Here, the argument was around the use of crowdsourcing projects as a way to not only enrich collections information and increase entry points to collections but also to engage and build relationships with the public and

the audiences of institutions. All comments made on the *Talk* boards were grouped into categories, done in line with Grounded Theory. This work demonstrated that 18.8% of all comments on the *Talk* boards focused on issues around the Zooniverse functionality; however, this also included comments from users around the effectiveness of the AI training models used in the *Tag Along* project, Google Cloud Vision (google-cloud-vision-2.0.20) and the iMET tagger (vision-classifier-imet-attributes-v1) [44].

The new functionality in Zooniverse not only allows users to now quickly ask about practical questions through QuickTalk (Project Builder 2025), which now allows comments prior to completing the classification, but also to view institutional metadata related to collections they are classifying through the Community Catalog. The Community Catalog incorporates the institutional metadata and participant-generated tags, with Talk threads for each item, aggregating all community and subject information into a single page for volunteers [28].

Creating spaces for critical reflection on the act of participation is key to the success of not only the crowdsourcing of projects but also the integration of data into artificial intelligence models, a key step in the HITL workflow advocated here.

3.4. Te Hiku

In the wake of colonialism, and as a direct response to British imperialism in the 1800–1900s, the indigenous community in New Zealand risked the loss of their native *te reo* language. The native people, the Maori, suffered under colonial rule for generations. Beginning in 1867 with the Native Schools Act, English was made the only language taught in schools, with Maori children subjected to beatings and shaming for speaking their own language [45] (p. 409). By the time New Zealand reversed this policy, over 120 years later, there were few *te reo* teachers left to keep the language alive, let alone resuscitate it.

Te reo speakers plummeted from 90 percent of the Maori population to just 12 percent by the time these laws were reversed [45] (p. 409). The loss of a language is a tragedy at an unimaginable scale. The loss of language extends beyond a single form of communication, as language encodes within itself the history, culture, and knowledge of people [45] (p. 409). The importance of language is what led AI researchers to gravitate towards large language models in the first place. But, in fact, these models now accelerate language loss [45] (p. 410). Very few languages are spoken by enough people and documented sufficiently online to fulfill the data needs of these AI models. In fact, of the over seven thousand languages still in existence today, almost half are considered endangered by UNESCO, with less than 2% supported by Google Translate, and only 15, or about 0.2%, supported by ChatGPT-4, with accuracy rates of about 80% [45] (p. 410). The problem will only worsen without direct intervention.

For the Maori community, this intervention came from Peter-Lucas Jones and Keoni Mahelona, who turned to AI as a tool for helping a new generation of Maori to revitalize their *te reo* usage [46]. As the CEO of Te Hiku Media, a public radio station that broadcasts in *te reo*, Jones had access to a wealth of archival audio recordings of people speaking *te reo*, over twenty-year's worth. Jones turned to Mahelona, who was responsible for Te Hiku's web presence, to find a solution for transcribing the audio to help learners follow along and use the archive to learn *te reo* as a supplement due to the loss of fluent speakers to serve as teachers [45, 46].

Mahelona's solution was a carefully trained *te reo* speech recognition model. Using artificial intelligence, Te Hiku would be able to transcribe its audio repository with only a few speakers. Built using the open-source NVIDIA NeMo toolkit for ASR and NVIDIA A100 Tensor Core GPUs [47], diverging from the majority of AI models seen today, Te Hiku was determined to only carry out this project if they could guarantee three things:

consent, reciprocity, and the Maori people's sovereignty [46] (p. 411). Differing from the Silicon Valley model of AI development, this approach instead mirrors that of crowdsourcing. Within academic crowdsourcing, such as that adapted already by cultural heritage institutions [48], the process is dependent on users becoming active contributors whose experiential knowledge informs the design, metadata enrichment, and reinterpretation of cultural heritage resources [49].

Te Hiku began by consulting the Maori community and their elders to determine whether their proposed model was even something the community wanted. They would seek contributions only from those who fully understood what the data would be used for and willingly agreed to participate while ensuring that the data itself would continue to be a resource for future community benefit without being co-opted by projects that the community did not consent to. As Mahelona stated, "Data is the last frontier of colonization ... AI is just a land grab all over again. Big Tech likes to collect your data more or less for free—to build whatever they want to, whatever their endgame is—and then turn it around and sell it back to you as a service [45] (p. 412)".

Without compromising on their principles, the Te Hiku project (<https://kaituhi.nz/>) gathered 310 h of high-quality transcribed audio from some two hundred thousand recordings of roughly 2500 *te reo* speakers. The community was willing to donate their data upon understanding the project, and even with only 310 h of transcription, Te Hiku was able to sufficiently develop the first *te reo* speech recognition model with 86% accuracy rates [50].

Te Hiku showed another way to develop AI. Models can be small and task-specific, trained on data contained within. They do not need to rely on endless scrapping, the widespread exploitation of workers, or the running of massive supercomputers. "The creation of AI can be community driven, consensual, respectful of local context and history," according to Hao [45] (p. 413). By utilizing community-driven models like crowdsourcing and adapting to small, task-specific models, AI has a place within the knowledge preservation framework.

4. Discussion

As the previous section demonstrated, and any recent usage of technology services would show, artificial intelligence is the unavoidable buzzword throughout the world right now, including in cultural heritage spaces. AI, and more specifically generative AI, has been integrated by many software and technology companies, such as Google [51], Zoom [52], JSTOR [53], and WorldCat [54]. In fact, since his inauguration, Donald Trump has put the full force of the United States government behind the American AI sector, encouraging and emboldening the sector, OpenAI and its competitors at a breakneck pace outside current governmental oversight standards [45] (p. 423).

Karen Hao warns of consequences that could extend beyond labor exploitation, environmental fallout, and public health crises if the development of AI continues at the current pace and trajectory, harbingering a return to empire and a fall from democracy [45] (p. 424). Communities are already pushing back. Protests against extractive data centers, lawsuits by artists and writers over AI theft of creative property, and even strikes from workers against AI-enabled labor exploitations are pushing governments at all levels to establish legislation and regulation around AI use [45] (p. 424), with individual states in the United States now enacting bans on data centers due to public outcry [55]. The prevalence of this technology has not only changed expectations and reactions for the public but is also changing how cultural heritage organizations engage in their mission-centric work.

Testing has already begun to gauge the effectiveness of generative AI chatbots (in particular: ChatGPT, Gemini, and CoPilot) in library cataloguing practices [56]. A 2025

study published by the *ALA Library Resources & Technical Services* journal looked at the effectiveness of the aforementioned chatbots to assign Dewey Decimal Classification, Library of Congress Classification, and Library of Congress Subject Heading terms and numbers. Overall, the performances of all three generative AI chatbots were found to be poor, particularly when assigning classification numbers [56]. The authors noted that frequent errors resulted from the chatbots assigning overly broad numbers, or numbers for incorrect topics, with an occasional “hallucination” or made-up classification as well.

A 2023 study by researchers at Oklahoma State University looked at the reliability and usability of ChatGPT to harvest keywords, assign classification numbers, and choose Library of Congress Subject Headings. Though small in scale, the study found that ChatGPT struggled to create Dewey Decimal Classifications and Library of Congress Classifications, with 50% of generated data being incorrect and 17% being hallucinated [56]. However, this study did show initial promise for using these tools, ChatGPT in particular, for providing valid Library of Congress Subject Headings. These studies found that at the moment, these tools cannot do much to reduce the time and training needed for subject cataloguing, but the use of artificial intelligence may be better suited for other tasks imperative to cultural heritage organizations.

Starting in September of 2023, OpenAI rolled out capabilities for image recognition in ChatGPT [57]. Users are able to upload an image and ask the chatbot to describe the image, a functionality that has been around outside of generative AI, including in Google Cloud Vision API, from 2018 onwards [58]. This machine vision technology has been proven to enable automatic inspection and analysis [59]. The integration of this technology into more platforms as part of the push for AI integration provides an opportunity for organizations to use these tools for generating alternative text (alt text) for their collections, making them digitally accessible to users [59].

Alternative text is important to keeping the internet accessible, providing a stand-in for content when an image fails to load, helping with search engine optimization, and now even helping ensure proper training for generative AI models by including additional metadata. As part of the Web Content Accessibility Guidelines (WCAG), alternative text is required as part of the first success criterion. This has made alternative text a necessity for many cultural heritage organizations who need to be WCAG-compliant, including university, federal and state-run institutions. Despite being one of the most notable issues affecting web accessibility, the process and methods of implementing alternative text on the web are still lacking [60]. Even those institutions with the best intentions often find themselves overwhelmed by the backlog of images on websites requiring alternative text or confused by the process and requirements for alt text [61].

Alt text requires significant labor, as is true for cataloging. Though to this point, using AI tools for cataloguing has not proven successful; there has been more success and promise around using computer/machine vision to help create alternative text. AI chatbots can describe most images accurately and can even read images of text and provide translations, helping to describe what a sighted visitor would see when looking at an image [58]. Importantly, this is not typically information provided in cultural heritage cataloguing, which often focuses on context. Used in tandem, the official catalogue record can help provide additional context to an AI-generated alt-text description, still requiring human-in-the-loop intervention but providing a pathway towards using the technology effectively to increase access to collections.

Looking at the case study projects, it is clear that artificial intelligence is at its best when it has a clear mission for use and when it is used with the cooperation of the community, and not just cooperation, but shared governance. Something cultural heritage in-

stitutions have been navigating for centuries has been the maintenance of trust with their communities to enable their stewardship of history and knowledge. Museums, libraries, and archives have updated their missions, changed their offerings, and adapted to the needs of both their communities and the realities of the current world, making them not just trusted community institutions but also particularly adept at the kind of transparency needed today.

Based on the Te Hiku, CHURRO-DS, Zooniverse, and Masakhane case studies, the emphasis for cultural heritage institutions when approaching AI should be on adding collections to the right model. Scaling trends within large language models have focused on a “bigger-is-better” AI paradigm; however, this is not only unsustainable but also exacerbates bias issues, centralizing decision making and meaning making to a few actors instead of the society at large [62]. Additionally, the validity of current evaluations of industrial models (like Claude, GROK, and ChatGPT) requires caution, as the datasets used to train these models are not publicly accessible for the sort of scrutiny that would allow someone to identify the suitability of a given evaluation [62].

As Ithaka reported in 2025, understanding how AI systems generate information reinforces that no source is inherently authoritative without context [63]. The contention of this blog is that cultural heritage organizations have been sites for mediated, cooperative, meaning making for centuries and, as such, have a unique position in the public trust to use their own biases and limitations as conversations to raise awareness with the public. AI biases and limitations similarly reflect that *all information* reflects its creators’ perspectives and purposes, requiring the active evaluation rather than the passive consumption of information [63]. Based on the ACRL’s Framework for Information Literacy for Higher Education from 2016 [64], this shows the ways in which cultural heritage institutions, and the companies and technologies that support them, have already begun looking at the role of AI.

This returns us to the call from the IMLS in 2024 for cultural heritage organizations to take up information literacy within their missions and charges. A recent study from researchers at MIT’s Media Lab has returned concerning results regarding the way that the use of generative AI chatbots, in particular ChatGPT, harms and degrades critical thinking abilities [65]. Looking at Bostonians between the ages of 18 and 39, the MIT studies found that when asked to write several SAT essays over the course of months, those that were allowed to use OpenAI’s ChatGPT in place of nothing at all or a search engine such as Google got lazier with each subsequent essay, often resorting to copy-and-paste by the end of the study [65]. Not only did use of generative AI tools result in laziness, but users also reported increases in feelings of loneliness, and their outputs were noted as “soulless.” All members of the group that utilized ChatGPT delivered extremely similar essays, lacking original thought and relying on similar expressions and ideas provided by the platform [65].

These recent studies point to an increasing reliance on AI, which may increase efficiency in the interim but threatens to potentially reduce critical thinking, creativity, and problem-solving skills across the workforce, something that puts the current safeguards of inserting human-in-the-loop frameworks at risk. If humans lose the skills of information literacy, there is no one to check the artificial intelligence on accuracy, let alone issues like bias. As the *Columbia Journalism Review*’s Tow Center for Digital Journalism reports, AI models incorrectly cited sources in more than 60% of queries, reinforcing the continued need for human intervention and oversight [66]. Cultural heritage organizations can continue to be a main source of trusted critical thinking skill growth for the public, ensuring that human-in-the-loop safeguards remain effective.

5. Conclusions

As Cameron and Kenderdine critiqued [67], cultural heritage institutions often use their missions and purposes to promote themselves as places for life-long learning, but when populations feel that the institution is controlling knowledge and gatekeeping expertise, a patronizing attitude is felt that goes against the grain of the agenda. With the public used to having individual agency literally at their fingertips during this internet age, it is important for the institution's self-directed learning to support this in ways that collaborative, community-driven experiences like crowdsourcing can do.

By adopting a mission around using collections items, crowdsourcing projects, and programming to expose digital literacy concepts like bias, algorithms, and more, institutions have a new ability to become essential to life-long learning geared towards this second quarter of the 21st century. Increasing emphasis and discussion around issues like bias, selection, choice, arrangement, descriptions, and other daily tasks of the institution helps to demystify many of the unseen processes done by algorithms, including generative AI models. Studies by the Australian Centre for Evaluation showed that exposure is the best inoculation against AI hype [68]. In a study conducted using Microsoft's Copilot, the ACE found that trial participants saw an almost tenfold increase in the perception that AI technology was of little to no use, soaring from 6% pretrial to 59% post.

As 28% of Americans now use AI tools weekly, Americans are also now more likely (40%) to say that the effects of AI will be negative, both on society and on their lives [69]. With the internet's carbon footprint on the rise, now contributing approximately 2–4% of global emissions [70], and the enormous water footprint for cooling centers now totally the annual water withdrawal of half of the United Kingdom [70], it is also imperative for cultural heritage organizations, as sites of community engagement, to address these very real concerns with their users. Post-pandemic studies show that the public wants their cultural heritage organizations to address matters like climate change, income inequality, and racial injustice [71]. All of these matters are tied into the ethical decision to use artificial intelligence, creating a strong call for cultural organizations to become active sites for critical literacy building with these emerging technologies.

Creating projects that focus HITL intervention within machine learning artificial intelligence models provides the opportunity to create platforms powered by collections and owned by cultural heritage organizations, with an emphasis on accessible datasets and transparent interactions with the community. Bigger is not necessarily better, and cultural heritage organizations can focus on transparency when choosing the models to integrate their collections with [62]. Incorporating the public into the metadata creation process, selecting AI models with open training models, and emphasizing participatory experiences allow cultural heritage organizations to provide trustworthy access to collections for the public while providing valuable literacy training for the technology that is now integrated into the public's daily lives.

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