IJASTE | International Journal of Academic Studies in Technology and Education

Year 2025, Vol. 3, No. 1, Pages 38-52 www.ijaste.com

OPEN ACCESS

# Participatory Experiences as Digital Literacy Intervention: Using Cultural Heritage Collections to Build

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**Article Info**

***Article History***

Received:
5 December 2024

Accepted:
20 June 2025

***Keywords***

Digital literacy,
Crowdsourcing,
Participatory experiences,
Cultural heritage

**Abstract**

Diverse communities have been forming and interacting online for over three decades, and cultural heritage organizations have the opportunity to enhance user experiences by experimenting with new strategies for user engagement that build community and attract new audiences. Cultural Organizations are spaces for discovery, innovation, interrogation, encouraging agency and exploration of not just objects but also the very missions of the organization. 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. The Consolidated Appropriations Act of 2022 directed the Institute of Museum and Library Services to explore ways to improve information literacy within communities. As acting director of IMLS at the time, Cyndee Laundrum stated, "we want to empower these trusted library and museum professionals who play a critical role in helping improve digital, financial, and health literacy to serve the needs of diverse communities." This paper will look at lifelong learning, and participatory culture, in museums, archives, and libraries, providing examples of projects that have expanded access to collections, increased web accessibility through alt-text generation, and tackled digital literacy through hands-on use of AI models.

**To cite this article**

BrodeFrank, J. (2025). Participatory experiences as digital literacy intervention: Using cultural heritage collections to build. *International Journal of Academic Studies in Technology and Education (IJASTE), 3*(1), 38-52. https://doi.org/10.55549/ijaste.63

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## Introduction

By the mid-2010s, social tagging projects were seen by many as a "buzzword out of vogue," (Hyperallergic, 2017) and many projects that were still active struggled to attract participants. The initial context for crowdsourcing in museums, of tagging as a means to increase retrieval, as advocated by Vander Wal and others, had lost steam with museum professionals. The resources (monetarily, technologically, and staff time wise) that it took to run these projects had many people in the field in the 2010s shifting away from running these projects in favor of experimenting with machine learning and AI models they believed held the promise of tagging visual elements like color and subjects. As Colin Allen noted in 2013, "people continue to supply a depth of understanding that we don't see machines achieving any time soon" (Allen, 2013). It is this depth and diversity that are best addressed by the strengths of socially constructed, or crowdsourced, metadata. The more metadata systems reflect the diversity, variations, and coinages in the nomenclature of their objects, the better they support discoverability and relevancy of the objects.

### Redefining Participation in Cultural Heritage Organizations

Over the last 15 years, notable practitioners and scholars have supported the use of crowdsourcing in museums, and for metadata creation, as a way to expand access points for searchability and discoverability, but also to diversify these access points for better representation and varied contexts. In the late 2010s and early 2020s, this evolved again to begin thinking of crowdsourcing's value as its experience as well. This shift in building and planning crowdsourcing projects around engagement and experience falls in line with the questions on motivation for participants raised previously, but also in the longer standing discussion of museums as spaces for learning and action.

The largest museum associations throughout the world began shifting priorities for museums in the twenty-first century to better align with museums as spaces for engagement. 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 in the last decade, recognizing museums needed to be more than a collection to be viewed. This push for engagement in museum spaces was in many ways fueled by the Web 2.0 shift of consumers to producers, with the public no longer visiting museum spaces as passive observers, vessels to be filled, but instead looking to engage directly with collections in experiences that are "digital, participatory and informed" (Barnes & McPherson, 2019). Within this recognized need for museums to shift, to become more engaging and co-productive, crowdsourcing of metadata can be seen anew as an extension of the museum's mission for interactive learning.

Cameron and Kenderdine, and Fahy all discussed the need for active visitors and hands-on interactivity as a part of the museum experience. In 2001, Fahy noted the importance for incorporating hands-on participant driven experiences in museums was in part due to these experiences increasing retention for learning objectives, stating, "whilst we only remember ten percent of what we read, we remember ninety percent of what we say and do" (Fahy, 2001). Ross Gibson and Zahava Doering conducted research in the early 2000s to 2010s looking into the experiences that visitors found satisfying in museums. Gibson saw the museum's strongest mission-centric activity, and in fact power, to be that of alteration where an opportunity to experience what it is to be other alters the person's perspective of this otherness. And Doering et al. found that the most satisfying experiences for guests often revolved around "gaining new information or knowledge" and "seeing the real thing (as in an object)" (Pekarik, Doering, & Karns, 2010). Crowdsourcing projects allow the public the opportunity to see real objects in the collections, often those that are not currently on physical display, and to help add new information to these objects' metadata while themselves experiencing the new experience of participating in the cataloging process.

Michael Haley Goldman and Eric Schmalz suggested in 2020 that more institutions should prioritize the benefits that the crowdsourcing process itself has for volunteers as part of the fundamental purpose of these projects' creation. By placing more of an emphasis on the crowdsourcing process itself as opposed to focusing primarily or exclusively on the end results such as data collection, access, or transformation, there could be a stronger defense of the resources and staff time these projects cost museum staff to run, as mentioned by Severson.

There was early support for the process of metadata tagging in particular, but crowdsourcing in museums at large, being a key component and motivation for running such projects, as opposed to only focusing on the output goals. As early as 2009, the steve.museum team published reports looking to answer questions on participants' motivations and incentivizations. The report highlighted that the majority of the public who were considered frequent contributors noted that they participated most for "fun" and were in fact not interested in increasing findability of collections or connecting with others (Leason, 2009). This was seen by the team to indicate that tagging was an engaging activity in itself, and users enjoyed the experience, lending early support for designing crowdsourcing projects with the expressed goal of creating an engaging experience.

Senseney, Koehl, and Nay's study in 2019 found that primary motivators included filling skills gaps or skill development, as well as developing an expertise or community around a given topic – two motivations based on the experience of the project more than the outputs created (Senseney, Koehl, & Nay, 2019). In the 2021 work "The Collective Wisdom Handbook: Perspectives on Crowdsourcing in Cultural Heritage" by Ridge, Blickhan, and Ferriter, participants in GLAM crowdsourcing consistently listed that contributing to a bigger

cause was a primary motivation for their work. However Ridge, Blickhan, and Ferriter found that motivations could include extrinsic motivations such as a grade, a score, or a record; intrinsic motivations such as fun, socializing, community, or interest in the subject; and altruistic motivations such as the above stated contributing to a bigger cause (Ridge, Blickhan, Ferriter, 2021).

Similarly, Perry Collins, a senior program officer at the National Endowment of Humanities Office of Digital Humanities, stated in 2015 that institutions should always consider public engagement with a collection as its own end goal to any crowdsourcing effort. In line with Goldman, Schmalz, Doering, and Gibson, Collins emphasized the process itself, stating, "The goal is not only to create hundreds of thousands of tags. A major goal is also to engage people in the digital humanities and in library collections. While the quality of what they do matters a lot, I think the process of what they do matters a lot, too" (Enis, 2015).

It is the values and missions of cultural heritage institutions that position them in the opportune place to invite public participation according to former Library of Congress researcher Trevor Owens. Owens supported the shift in mentality away from considering crowdsourcing to outsource labor to a crowd, and instead as a way to invite participation of that crowd into the creation and development of the public good where the process is as important as the tags created (Owens, 2013). Perhaps at the forefront of this shift has also been the British Library's Mia Ridge.

As early as 2013, Ridge was advocating cultural heritage institutions to take up crowdsourcing. Though Ridge advocated for the usefulness of crowdsourcing in helping take time- and resource-intensive tasks and distributing that work amongst a crowd to improve content about collections, she was also one of the first people to articulate the importance of recognizing crowdsourcing as its own valuable form of public engagement with cultural heritage. As she encouraged institutions to engage in crowdsourcing, she continually highlighted the act of crowdsourcing as a form of engagement and the value that process had for the public in and of itself. These interactive forms of creation and engagement have created a new way of thinking of crowdsourcing, but also a new form of attraction and interest for a wider array of public visitors, helping to expand the value and relevance of the projects themselves (Ridge, 2013).

By refocusing on crowdsourcing not just as a process by which to increase access points, or even to reach a more diverse range of voices to increase representational context of collections, but indeed as an engaging form of participation that in itself benefits participants, it is possible to see even more support for incorporating these types of projects into the museum cataloging process. This shift in prioritizing the process as well as the outputs allows a refocusing on the value of the process of crowdsourcing and a better understanding of its need for resources and support institutionally while also framing the importance the process itself should take in project

designs in order to motivate public participation. With the importance of the process and the act of participation made clear, it is now possible to focus on the modern considerations for motivations and learning objectives these projects can expand to.

## Redefining Museums

The International Council of Museums (ICOM) had proposed a new definition of a museum in 2019. The proposed definition was a departure from "dominant paradigms for what is, and should be, at the center of the work that museums do in society" (Moore, Paquet, Wittman, 2022) – with a focus on diversity, equity, and inclusion, it was considered too political by many voting members of ICOM and was actually struck down. However, in the wake of the 2020 dual upheaval of the COVID-19 pandemic and social justice movements, a new definition was again proposed at ICOM in 2022, and this time it was ratified. The new definition of a museum now reads:

> 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. (Liu, 2022).

This new definition stresses a new aim for museums to facilitate diversity and sustainability, with the museum's mission and reason for being shifting from the previous definition's use of the word "study" to the new definition stating museums exist to be places for "reflection and knowledge sharing." This subtle shift signals that the cultural heritage sector is moving away from a neutral position of privileged authority and towards a more level network of collaboration, and considering the ICOM definition of museums is often a determinant in definition that national governments use to define museums and their activities, this shift is critical in how organizations may be funded or taxed.

As Moore, Paquet, and Wittman argue, this is a global shifting of cultural heritage institutions that acknowledges the non-neutral nature of the activities professionals in museums, archives, and libraries conduct, demanding these professionals do more critical reflection on these activities' context and processes.

In August 2022, the American Alliance of Museums published their newest "Excellence in DEAI Report" (AAM, 2022), specifically responding to the "social, political, and cultural polarization, and clear structural racism and other forms of oppression in the United States and around the world," by centering diversity, equity,

accessibility, and inclusion in the understanding and practice of museums. One of the key implications of this report was the express call for institutions to shift away from white-dominated characteristics of work, specifically those of perfection, risk aversion, and conflict avoidance. Many of the resounding criticisms to crowdsourcing projects, revolved around risk aversion, conflict avoidance, and a call for perfectionism. As the AAM report itself calls for, it is more important to foster an environment of iterating and trying new things, with a focus on transparency. This is perfectly encapsulated in the following quote from the report:

> "Making mistakes, being accountable about those mistakes, iterating, and trying again will support museums and museum leaders in building the capacity and skills to sustain DEAI in the long term. DEAI in museums is not about getting everything perfect; it is about lifelong learning and continuous improvement" (AAM, 2022).

There is a flexibility afforded to institutions who focus on these newer definitions of diversity, equity, accessibility, and inclusion, and ability to work with the public, to not fear mistakes but instead embrace opportunities to try to be better. With this ability to constantly adapt by including and incorporating feedback and experiences of their own community, peers, and the field at large, institutions can be more agile and responsive, which remains key in the current environment plagued by pandemic, climate crisis, and social justice movements. By being transparent and vulnerable with the public, with a focus on co-creation, institutions can more effectively create opportunities for diverse groups of people to have a voice, enabling the institutions to be more proactive and effective in responding to the changing times we occupy.

**Crowdsourcing as Exposure, Exposure for Literacy**

As has already been laid out, museums are spaces for discovery, innovation, interrogation, encouraging agency and exploration of not just objects but also the very missions of the organization. In today's modern world museums' missions have shifted, with ICOM redefining the definition of a museum in 2022. But this shift includes looking at digital literacy as a core competency for museums and libraries to focus on with their public, as handed down by the United States Congress.

The Consolidated Appropriations Act of 2022 directed the Institute of Museum and Library Services to explore ways to improve information literacy within communities, including through the creation of the Informationliteracy.gov website, as well as establishing and leading an Information Literacy Taskforce to develop guidance, instructional materials, and national strategies for libraries and museums to improve information literacy skills within communities.

On June 27, 2024, the Institute of Museum and Library Services (IMLS) debuted InformationLiteracy.gov, as a website with specialized tools and resources specifically for museum and library professionals to engage with their diverse communities in developing "critical information literacy skills." As acting director of IMLS at the time, Cyndee Laundrum stated, "we want to empower these trusted library and museum professionals who play a critical role in helping improve digital, financial, and health literacy to serve the needs of diverse communities" (IMLS, 2024).

It's important to note that digital literacy is a relatively new concept, emerging out of the 1990s during the era of internet revolution that also brought about crowdsourcing and museum digital experiences like online catalogues. In 1997, Paul Gilster, a historian and educator first coined the term "digital literacy," arguing that digital literacy went beyond just the skills need to use technology, focusing on it being about "mastering ideas, not [computer] keystrokes" (Glister, 1997). In popular use, the word literacy goes beyond its educational understanding as the ability to read, write, and use arithmetic, it is increasingly seen as a synonym for skill, competence and proficiency. Though digital literacy was primarily and initially viewed as the functional skills and competencies that people needed in order to use computers and the Internet, in the 2010s and beyond it has taken on a more expansive definition to be the skills needed to participate in digital environments.

As early as 2015, JISC (a non-profit in the UK focused on tertiary education, research and innovation as a digital, data and technology agency) defined digital literacy as "the capabilities which fit someone for living, learning and working in a digital society" (JISC, 2015). As indicated above, this is the definition of digital literacy that will be used going forward as it is this definition that prioritizes the three capabilities that most often now define the goals of digital literacy. These capabilities are, 1. The ability to engage in participatory culture, 2. To be a lifelong learner, and 3. To manage a professional digital identity. All three of these capabilities are reflected already in many of the missions of museums with their publics. Importantly, this is not just focused on digital natives, but the public at large.

A "digital native" or the "net generation" has been tossed around as terms for decades to describe Millennial, Generation Z, Generation Alpha, and even now Generation Beta, as a person who has been born or brought up during the age of digital technology, having a familiarity with computers and the Internet from an early age. However, it is important to note that this is already a biased understanding of generations that does not account for the digital divide, the income disparity or technical debt that have prevented many regardless of age from experiencing these technologies; but also it does not account for older generations who may have better relationships and literacy with technology due to their lived experiences. Importantly, regardless of age, digital literacy primarily should focus on the need to be able to develop socially responsible digital practices, and contribute to these practices in one's own personal, work, and learning lives (Brown, 2024).

This emphasis on lifelong learning, and participatory culture, demonstrate the strong background that museums and libraries already have to do this digital literacy work effectively. It is not just objects that museums house that matter, as stated previously by Falk, the primary value created by museums for the public exceeds their function as a "warehouse" and instead rely on supporting public learning and education, and providing access to cultural assets that inspire creativity, foster identity-building and civic pride (Falk et al., 2025). And this is why crowdsourcing, and the participatory museum, also needs to move away from being centered on objects and towards digital literacy as a primary mission.

This follows trends in digital preservation that call for a critical reflection and approach to preservation, one that acknowledges risks to be informed, but not averse. The key call from this movement is the need to remain agile, continue debates and further accumulate knowledge on a field that is responding to frequent and quick changes. In many ways this is the same challenge that has been articulated above and emphasizes the need for institutions to adopt digital literacy into their programming.

This follows trends in digital preservation that call for a critical reflection and approach to preservation, one that acknowledges risks to be informed, but not averse. This critical reflection on digital preservation will be revisited in this volume, particularly in calls for optimizing for climate impact, but for now the key call from this movement is the need to remain agile, continue debates and further accumulate knowledge on a field that is responding to frequent and quick changes. In many ways this is the same challenge that has been articulated above, and emphasizes the need for institutions to adopt digital literacy into their programming.

For example, a February 2025 report of the Microsoft Copilot AI programming lays the groundwork for the importance of digital literacy exposure (Bajkowski, 2025). The Australian Centre for Evaluation looked at the implementation of the Copilot generative AI product as tested within the Treasury and found that when they gave trial participants access to Copilot the participants reported concerns about reliability and accuracy of the responses produced by Copilot. Not only did they report these concerns however, some participants actually stopped using Copilot after this guided dive into the platform.

"After a few early tests, there seemed to be obvious errors which reduced my confidence in using co-pilot [sic] for this purpose" a trial participant observed. Not only did the experience leave participants with reported difficulties and concerns around prompt engineering, with difficulties reported in finding the correct prompt language to use, unhelpful outputs from prompts, and low-quality outputs produced; but this study found an almost tenfold increase in disinterest in Copilot from users. Guided exposure to the platforms' limitations and capabilities seemed to provide inoculation to the hype of the AI platforms, with 59% of trial users reporting

they reckoned the technology was of little to no use; prior to the experiment only 6% of these participants had indicated their views of the technology was little to no use.

***Tag Along with Adler Pilot Project***

The Tag Along with Adler project ran on the Zooniverse platform from 23 March 2021 until 12 March 2022. As each of the 11 subject sets was retired, the textual data and verification task data was processed, allowing evaluations of the 1,090 images. Over the year the Tag Along with Adler project (BrodeFrank, 2024) ran, the project had 3,557 registered volunteers, with 6,976 individual participants. A part of this project included introducing participants to AI generated descriptors, tags, of collections, through a verification task called "Verify AI Tags." AI already underlies many routine aspects of our lives, and part of the inclusion of AI tags in this project was specifically to raise with project participants the ways in which these tags are instrumental to their daily search and discovery taste, often in ways they do not realize.

## Results

Reviewing the literature, it is evident that machine vision and AI tagging have become advanced enough to detect subject matter and objects depicted across various content types including painting, photographs, and cultures. They have been used by various institutions already to expand and enrich existing metadata tags.

One standing question has been "just how well does machine vision do? Can it offer accurate tags? Is the metadata generated useful, and correct?" According to research by Electronic Frontier foundation, a group measuring the progress of artificial intelligence, the error rate had fallen from around 30% in 2010 to approximately 4% in 2016, making it on par with human classification accuracy (Ciecko, 2020). Still, there are recognized issues with AI and machine vision that keep institutions from readily adopting it. Not only are these AI models limited in their ability to process complexity, but they are still trained by humans. The importance here is to recognize that, by switching to a machine, bias is not removed. In fact, it is trained into it.

For the purposes of this project, I opted to use the iMet Collection Attribute Classifier and the Google Cloud Vision API taggers precisely for this reason. I chose these two tagging models specifically because they have been trained using more images than the Adler Planetarium had access to, and both are publicly available for use by any institution. I also selected them to reflect a tagging model specifically trained for museum collections (the iMet Collection 2019), and one that was trained with millions of images and would be most similar to the algorithms encountered by users in their daily lives doing image searches online (Google Cloud

Vision API). In summation, the inclusion of AI tags was done to expose project participants to this emerging technology and both its positives and negatives, but also to gauge various questions including:

> 1. How does exposure to AI tags affect the tags a user creates?, 2. How accurate do users find AI-generated tags?, 3. Do users favor terms created by a museum-specific tagger or a generalized image tagger?

It should be noted that the inclusion of AI tags did entice user engagement. The "Verify AI Tags" workflow consistently saw 2-3x the engagement of the "Tag Images" workflow, demonstrating the draw AI, automation, and algorithms can have on users. Additionally, results from this workflow demonstrated the difference in models and the importance of selection of AI models in project workflows. About 58% of the AI-generated tags, or 4,420 tags, were generated by the Google Cloud Vision API tagger, with the iMet tagger having generated 3,183. Despite accounting for approximately 58% of the total tags generated, the Google Cloud Vision API tags accounted for 86% of the tags verified by the volunteers, demonstrating a strong preference of the volunteers for the visually descriptive language of the Google Cloud Vision API to the more museum-cataloger language prevalent in the iMet tagger. In fact, volunteers verified just shy of 50% of the terms created by the iMet tagger vs. verifying 80% of the tags generated by the Google Cloud Vision API.

In a 2021 published report from the Library of Congress that explored the range of projects the Digital Strategy Directorate and its Digital Innovation Lab (LC Labs) have undertaken, including those in crowdsourcing, a similar approach to combining machine learning technology and crowdsourcing was conducted (Averkamp, 2021). A main research question for the Library of Congress was how machine learning and crowdsourcing could be used in tandem to create engaging, ethical, and useful data enrichment activities for cultural heritage institutions. Through testing using the U.S. Telephone Directory Collection, the Library of Congress team found that 75% of participants offered overall positive responses, indicating that they found it worthwhile for the Library to combine machine learning with volunteer contributions, and that they would in fact be willing to volunteer for further initiatives.

Similar to the appeal that the "Verify AI Tags" workflow appeared to have for Zooniverse users of the Tag Along with Adler project, the Library of Congress team noted that 50% of their users stated that knowing the Library was incorporating a combined approach to integrate machine learning and human knowledge had a positive impact on their motivations to volunteer. Furthermore, even the volunteers who explicitly noted a distrust for machine learning and AI indicated that knowing such technology was being incorporated into human-centered crowdsourcing would not deter them from volunteering in projects as long as the tasks and content remained engaging.

The ability to use crowdsourcing projects as a way to not only enrich collections information and increase entry points to collections, but also as a way to engage and build relationships with the public and the audiences of the institutions (i.e. digital literacy) is the most promising avenue of this technology. With this in mind, it is important to analyze the qualitative data provided in the Tag Along with Adler TalkBoard comments and survey responses. Breaking these down, it is possible to see major themes within the communications expressed as well as to see specific examples of engagement taking place throughout the course of the projects. In particular I want to highlight communications that are centered around AI.

18% of user comments on the Zooniverse TalkBoards were asking for help or clarity around the AI programs used in the "Verify AI Tags" workflow. Comments often questioned the effectiveness of the models to tag collections and served as effective conversation starters for Adler staff to engage with volunteers. Additionally, the qualitative survey appended to the project also saw comments on the AI models shown here:

> "A real eye-opener to see how far apart AI and human perceptions are!"
> "Intriguing process to consider descriptions. AI-generated were often not useful."

These comments demonstrated the interest that volunteers had in AI technology but also the importance of addressing AI technology's limitations with guests. As it was a noted reason for including AI tags within the Tag Along with Adler project, these comments helped to demonstrate the need for institutions to really communicate about these emerging technologies with their audiences as there is clearly a disconnect between the promises made for these technologies and the actual execution and limitations they currently have. As shown previously by the report of the Library of Congress, incorporating AI technologies into crowdsourcing projects, as done here, has the promise to introduce this technology's potential benefits and limitations, providing both an enticement to the project and a learning opportunity. When considered with the Australian Centre for Evaluation report on Microsoft Copilot, and the IMLS initiative encouraging museums and libraries to take on digital literacy tasks, this is an important task for the participatory museum of the 2020s.

## Conclusion

As Cameron and Kenderdine critiqued, museums often promote their missions and purpose as being places for life-long learning, but when it is felt by populations that the museum is controlling knowledge and gatekeeping expertise, a patronizing attitude is felt and 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 museum's self-

directed learning to support this in ways that framing crowdsourcing as an engaging, self-driven experience 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.

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