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DIGITAL

From Tagging to Theorizing: Deepening Engagement with Cultural Heritage through Crowdsourcing

MIA RIDGE

Abstract Crowdsourcing, or “obtaining information or services by soliciting input from a large number of people,” is becoming known for the impressive productivity of projects that ask the public to help transcribe, describe, locate, or categorize cultural heritage resources. This essay argues that crowdsourcing projects can also be a powerful platform for audience engagement with museums, offering truly deep and valuable connection with cultural heritage through online collaboration around shared goals or resources. It includes examples of well-designed crowdsourcing projects that provide platforms for deepening involvement with citizen history and citizen science; useful definitions of “engagement”; and evidence for why some activities help audiences interact with heritage and scientific material. It discusses projects with committed participants and considers the role of communities of participants in engaging participants more deeply.

INTRODUCTION

For museums, libraries, and archives with significant backlogs of un-digitized, under-catalogued, and un-researched material, crowdsourcing is a useful framework for inviting audiences to help with the resource-intensive tasks of creating or improving content about collections. There is plentiful evidence of the productivity of crowdsourcing in digitizing content, improving metadata, or identifying specimens from cultural heritage: see the lines of corrected text in *Trove*; pages transcribed in *Old Weather*; or animals identified in *Serengeti* (Proctor 2013; Romeo and Blaser 2011; Causer and Wallace 2012; Holley 2010; Kosmala 2013). Echoing themes from Nancy Proctor’s article “Crowdsourcing—An Introduction: From Public Goods to Public Good” in this journal (January 2013), I argue here that participation in crowdsourcing should also be recognized as a valuable form of public engagement

with cultural heritage. Well-designed crowdsourcing projects can help meet the core missions of museums (Poole 2013) by connecting people, culture, history, and collections while providing the public with platforms for enjoyable, meaningful activity.

This article reviews the evidence for a relationship between active participation through crowdsourcing and engagement with cultural heritage objects and knowledge. Its inception lies a few years in the past, when I was inspired by the early *steve.museum* crowdsourcing project to make crowdsourcing games based on “difficult” objects from science and social history museum collections. While evaluating the games, I noticed that participants were talking about the objects after they finished playing the games (Ridge 2011b). I discovered that two art historian friends, who had never shown any interest in astronomy collections before joining this crowdsourcing activity, were discussing the difference between heliocentric and geocentric

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1 astrolabes on Facebook. My curiosity was
 2 piqued. What was it about playing a crowd-
 3 sourcing game that engaged them when other
 4 encounters with the collections had not? Then,
 5 in mid-June 2013, the *Oxford English Dictionary*
 6 —itself an example of proto-crowdsourcing—
 7 included the term “crowdsourcing” for the first
 8 time. The *OED* definition: “The practice of
 9 obtaining information or services by soliciting
 10 input from a large number of people, typically
 11 via the Internet and often without offering com-
 12 pensation.” This definition is adequate for com-
 13 mercial crowdsourcing, but, in implying
 14 tangible “compensation,” it understates the
 15 value for participants of engaging in cultural
 16 heritage crowdsourcing projects.

17 In this article, I provide a brief overview of
 18 content, tasks, motivations, and participants
 19 typical of crowdsourcing projects in galleries,
 20 libraries, archives, and museums (or “GLAMs”).
 21 I consider how crowdsourcing in museums dif-
 22 fers from more traditional forms of user-gener-
 23 ated content. I present some design techniques
 24 for encouraging initial, on-going, and more
 25 engaged participation; these are drawn from suc-
 26 cessful GLAM crowdsourcing projects, casual
 27 game design, and scaffolding theory. I review
 28 the evidence for crowdsourcing as a form of pro-
 29 ductive engagement with cultural heritage and
 30 consider the role of project structures and com-
 31 munities of practitioners in supporting the
 32 development of skills and deeper engagement
 33 with cultural heritage.

34 **DEFINING CROWDSOURCING IN** 35 **CULTURAL HERITAGE**

36 “Crowdsourcing” was coined in 2006 when
 37 Jeff Howe and Mark Robinson riffed on the
 38 term “outsourcing” to describe “the act of a com-
 39 pany or institution taking a function once per-
 40 formed by employees and outsourcing it to an

undefined (and generally large) network of peo-
 ple in the form of an open call” (Howe 2006b),
 or more simply, using “the spare processing
 power of millions of human brains” (Howe
 2006a). However, the discomfort of cultural
 heritage and academic institutions with both
 the terms “crowd” and “outsourcing” is appar-
 ent in many online and in-person discussions of
 crowdsourcing. Commenters often question the
 size and composition of the “crowd” and express
 discomfort with the perceived threat of replac-
 ing digitization and research staff with volun-
 teers. However, the term has enough traction to
 provide a convenient short-hand name for a par-
 ticular type of participatory activity. As Estelles-
 Arolas and Gonzalez-Ladron-de-Guevara
 point out, crowdsourcing is evolving to the
 extent that the label may be applied to almost
 any Internet-based collaborative activity (2012).
 Lines are also blurred between related terms: for
 example, “cognitive surplus” (Shirky 2011);
 “human computation,” in which human effort is
 used for “tasks that computers cannot yet per-
 form” such as complex visual or semantic pro-
 cessing (Law and von Ahn 2009); and “social
 computing” and “collective intelligence” (Quinn
 and Bederson 2011).

Museums sometimes conflate crowdsourc-
 ing with “user-generated content” projects on
 online platforms or in-gallery interactives. This
 habit can cause confusion when trying to under-
 stand motivations for participation and the
 value subsequently placed on the content that
 has been created. While crowdsourcing is clo-
 sely related to Web 2.0-style user-generated
 content (UGC) projects, and raises similar
 issues about the validation and incorporation of
 audience-created content into collections docu-
 mentation and other museum informatics sys-
 tems, crowdsourcing projects only offer tasks
 that will contribute to the specific, shared, and
 substantial goals of the project. The Citizen Sci-

1 ence Alliance requires that all their crowdsourc-
 2 ing projects answer “a real scientific research
 3 question” and “must never waste the ‘clicks,’ or
 4 time, of volunteers” (Romeo and Blaser 2011).
 5 Dunn and Hedges state that “humanities
 6 crowdsourcing” requires “a clearly-defined
 7 humanities direction and/or research question”
 8 (2012). Peter Samis’s memorable phrase sum-
 9 marizes the fate of many UGC projects: “We
 10 opened the door to let visitors in... then we left
 11 the room.”¹ The value for the writer of a com-
 12 ment and the value of that content for a later
 13 reader in simple “have your say” activities is
 14 often not commensurate (Shirky 2012; Clari
 15 and Graham 2012). Holley differentiates
 16 between social engagement—“giving the public
 17 the ability to communicate with us and each
 18 other”—as a method, and crowdsourcing as the
 19 process through which a group working collabo-
 20 ratively achieves a “shared, usually significant,
 21 and large goal” (2010). To summarize these def-
 22 initions and the related literature, crowdsourc-
 23 ing is emerging as a form of engagement with
 24 cultural heritage that contributes toward a
 25 shared, significant goal or research area, by ask-
 26 ing the public to undertake tasks that cannot be
 27 done automatically, in an environment where
 28 the tasks, goals (or both) provide inherent
 29 rewards for participation.

30 A number of related terms describe crowd-
 31 sourcing projects based in humanistic or scien-
 32 tific disciplines. Citizen science, where
 33 “volunteers from the general public assist scien-
 34 tists in conducting research” (Raddick et al.
 35 2010), is well established. Citizen history (Fran-
 36 kle 2011) and the U.S. National Archives term
 37 “citizen archivist” are gaining ground. The long
 38 tradition of volunteering in cultural heritage
 39 encompasses both citizen science and citizen
 40 history (Proctor 2013). The role of traditional
 41 volunteer bureaus in matching people to oppor-
 42 tunities has been supplemented by online citizen

science portals. As an evolution of citizen partic-
 ipation in collection, research, and observation,
 crowdsourcing as we know it has been trans-
 formed by technology, but not created by it.
 Digital technology is able to provide almost
 instantaneous data-gathering and feedback,
 automatic validation, and the ability to reach
 both broad and niche groups through loose net-
 works. For museums, technology has also
 helped manage the limitations of physical space,
 conservation, location, and opening hours, all of
 which previously affected access to collections.

SOURCE MATERIALS, TASKS, OUTCOMES AND PLATFORMS

Tasks and source materials in cultural heri-
 tage crowdsourcing projects tend to fall into
 common groups: the collection, description,
 transcription, or specialist digitization of mate-
 rial culture, natural history, and historic docu-
 ments. These contribute to the transformation
 and gathering of knowledge about cultural heri-
 tage. Crowdsourcing projects often divide up
 large tasks (like digitizing an archive) into smal-
 ler, more manageable tasks (like transcribing a
 name, a line, or a page); this method has helped
 digitize numerous primary sources. In cultural
 heritage crowdsourcing, easy-to-complete “mi-
 crotasks,” or “one-off tasks requiring minimal
 effort” (McGonigal 2008) enable a broad base of
 potential participants who would find more
 complex or time-consuming tasks less satisfying.
 Tasks can be described as the “atoms” of crowd-
 sourcing, and can be linked together to form lar-
 ger actions that contribute to project goals.

Oomen and Aroyo categorized crowdsourc-
 ing within cultural heritage in terms of “tangible
 outcomes,” including “correction and transcrip-
 tion,” “contextualization,” the collection of
 objects, “classification,” and “co-curation”
 (2011). Task types and outcomes are often

1 closely linked—for example, the act of connect-
 2 ing museum objects to each other, or to authority
 3 records, creates relationship data—but the link
 4 is not always straightforward. Tags generated by
 5 tagging tasks can be divided into three general
 6 classes (Sen et al. 2006) and applied to the tag-
 7 ging of art works. Arends et al. distinguished
 8 between subjective tags (opinions and interpre-
 9 tations, useful for self-expression), personal tags
 10 (useful for content organization), and factual
 11 tags (2012). Other content created through cul-
 12 tural heritage crowdsourcing includes quality
 13 ratings, subjective rankings, spatial coordinates,
 14 extended creative or factual descriptions, per-
 15 sonal experiences or memories, family records,
 16 and even game levels (Preloaded undated);
 17 through tasks as varied as tagging, transcription,
 18 geo-location, and creating or sharing media such
 19 as text, images, audio, and video.

20 Cultural heritage crowdsourcing platforms
 21 range from games for creating metadata about
 22 objects (Ridge 2011a; Flanagan and Carini
 23 2012) to projects based on existing social plat-
 24 forms like Flickr Commons, online newspaper
 25 archives (Holley 2010), or specialist sites for
 26 transcribing hand-written correspondence
 27 (Moyle, Tonra, and Wallace 2011), each of
 28 which is designed to suit particular motivations
 29 for and types of participation. It is outside the
 30 scope of this essay, but crowdfunding is a related
 31 dynamic field which will yield useful case studies
 32 for future research.

33 PARTICIPANTS

34 Unlike commercial crowdsourcing, partici-
 35 pation in cultural heritage crowdsourcing is driv-
 36 en by pleasure, not profit. Rather than
 37 monetary recompense, GLAM projects provide
 38 an opportunity for altruistic acts, activated by
 39 intrinsic motivations, applied to inherently
 40 engaging tasks, encouraged by a personal inter-

est in the subject or task. In order to understand
 how projects can create deeper involvement
 with cultural heritage, it is necessary to consider
 why participants start and continue contribut-
 ing to crowdsourcing projects.

We might categorize participants in cultural
 heritage crowdsourcing projects groups in two
 ways: those who are intentionally participating
 in crowdsourced tasks for the intrinsic rewards;
 and those whose contributions are a side effect of
 their participation in other core activities. Inten-
 tional participants could be considered “digital
 volunteers” and include people who are passion-
 ate about the relevant subject, people who like
 doing the task offered in the project or the source
 material used, and people who are unable to vol-
 unteer in venue opening hours or locations.

Museums can find the open nature of
 crowdsourcing calls for participants to be chal-
 lenging, because tasks are undertaken online by
 possibly anonymous participants. To counter
 this, museums use terms such as “community-
 sourcing,” or working with people who already
 have a relationship with an institution (Phillips
 2010), and “nichesourcing,” where tasks are
 “distributed amongst a small crowd of amateur
 experts” (de Boer et al. 2012). Some projects
 cannot be as “open to all” as museums might
 like, because participants are limited to those
 who have or are willing to learn skills such as
 paleography or georectification.

While some participants in crowdsourcing
 projects are new to GLAM activities and
 resources, others are experts in the relevant field.
 Citizen historians are perfect examples of “pro-
 ams” (professional amateurs): “self motivated,
 enthusiastic, and dedicated” amateurs who work
 to professional standards (Leadbeater and
 Miller 2004; Terras 2010). As an example of the
 blurred lines between professional and amateur
 historians, people interviewed for my current
 research have included trained historians who

1 work in other fields while enjoying hobbies that
 2 let them keep up their historical research skills;
 3 academics who learned their historical research
 4 skills on the job; and self-taught researchers with
 5 decades of experience as practicing historians.

6 **DESIGNING FOR PARTICIPATION**

7
 8
 9 The following section outlines some design
 10 considerations for encouraging and deepening
 11 participation through museum crowdsourcing
 12 projects, including design techniques such as
 13 microtasks, scaffolding, and related concepts
 14 such as casual game design and “flow.”

15 As crowdsourcing becomes more popular, a
 16 growing body of literature discusses the chal-
 17 lenges of engaging mass audiences while com-
 18 petition for participants increases. Museums
 19 find it useful to provide easy ways to begin, so
 20 that potential participants who come across a
 21 project are immediately engaged. Designing a
 22 seductive initial task “that can be accomplished
 23 quickly and easily” is key: “It is less important
 24 at the onset to make something interesting or
 25 challenging than it is to make something easy”
 26 (McGonigal 2008). Snoek et al. described how
 27 the audio-visual archive-based crowdsourcing
 28 game *Waisda?* designed microtasks that led
 29 users to increase their level of activity by provid-
 30 ing feedback “just by clicking buttons,” or vali-
 31 dating another user’s tag with a “thumbs up.”
 32 Interactions were designed to entice the user
 33 into increasing the level of participation; users
 34 who press the “thumbs-down button” are asked
 35 to correct the label (2010).

36 **SCAFFOLDED DESIGNS IN CULTURAL** 37 **HERITAGE CROWDSOURCING**

38
 39
 40 It may sound paradoxical, but constraints in
 41 participatory interfaces can encourage engage-
 42 ment. Scaffolding supports novices “by limiting

the complexities of the learning context” and
 gradually “fading” or removing those limits
 (Dabbagh 2003). Nina Simon observes that the
 best participatory experiences in museums are
 “scaffolded to help people feel comfortable
 engaging in the activity” by building their confi-
 dence. In museum projects, scaffolding supports
 increased participation by providing “clear roles
 and information about how to participate”
 (Simon 2010). Scaffolding is designed for face-
 to-face educational environments where teach-
 ers can monitor student performance and adjust
 lessons accordingly. However, some principles
 can be extrapolated to guide the design of audi-
 ence experiences online.

The New York Public Library’s hugely suc-
 cessful crowdsourcing project *What’s on the*
Menu? focuses on digitizing its collection of
 historic menus. The value in reducing task com-
 plexity is evident on its closely scaffolded inter-
 face designed around the key tasks of
 transcribing menu items and prices. By remov-
 ing any uncertainty about how to fill in the two
 text boxes, the interface design reduces cogni-
 tive overhead, making the task simpler and
 more enjoyable. The whole site is designed to
 minimize barriers and encourage participation
 in clearly defined tasks.

Some of the less successful projects I have
 analyzed have failed in part because their initial
 task was too complex or required too much
 domain-specific knowledge, necessitating awk-
 ward and ineffective pre-task tutorials or
 instruction sheets, or the project was too loosely
 defined, with no clear feedback when a task was
 completed successfully.

43 **THE INTERSECTION BETWEEN SCAFF-** 44 **OLDING AND DESIGN FOR CASUAL GAMES**

45 Games can also be effective drivers of parti-
 46 cipation in museums (Birchall et al. 2012).

1 Games provide useful demonstrations of the
 2 power of scaffolded interactions.² Crowdsourc-
 3 ing games, or Games with a Purpose (GWAP),
 4 in which “players perform a useful computation
 5 as a side effect of enjoyable game play,” proved
 6 that games could bring mass audiences to com-
 7 putational problems such as describing the con-
 8 tent of images with tags (von Ahn and Dabbish
 9 2004; 2008). Flanagan and Carini found that
 10 GLAM crowdsourcing games could generate
 11 more content per participant than non-game
 12 interfaces (2012). Other crowdsourcing games
 13 in this area include games about art (Brooklyn
 14 Museum’s *Tag! You’re It!* and *Freeze Tag!* [Bern-
 15 stein 2008; 2009]); contemporary audio-visual
 16 material (*Waisda?* [Oomen and Aroyo 2011;
 17 Snoek et al. 2010]); and historic newspapers
 18 (*DigitalKoo!*). Currently, most successful
 19 crowdsourcing games are focused on microtasks
 20 like tagging, validating data, or transcribing
 21 small sections of content within larger collec-
 22 tions.

23 The precepts for casual game design, which
 24 are drawn from years of practical experience in
 25 the gaming sector, encapsulate some of the
 26 principles of design for increased participation
 27 that have evolved from scaffolding theory.
 28 Casual games are “games with a low barrier to
 29 entry that can be enjoyed in short increments”
 30 (Casual Games SIG 2009); these include puz-
 31 zles, word games, board games, card games, and
 32 trivia games. Features of casual games like *Soli-
 33 taire* and *Angry Birds* include easy-to-
 34 learn game-play, simple controls, addictive and
 35 “forgiving” game-play with a low risk of failure,
 36 and inclusive, accessible themes (Casual Games
 37 SIG 2009); these characteristics make games
 38 ideal for crowdsourcing (Ridge 2011a; 2011b).
 39 A key design principal—carefully managed
 40 complexity levels with a shallow learning curve
 41 and guidance through early levels—is clearly
 42 related to scaffolding. For museums with lim-

ited design budgets and large collections to
 cover, the International Game Developers
 Association recommends favoring “a variety of
 content over a variety of mechanics in a single
 game”; it reports that adding similar content to
 the same game structure leads the player to
 “greater feelings of mastery” (Casual Games
 SIG 2009). An additional benefit is that grow-
 ing feelings of mastery can help participants stay
 engaged.

Crowdsourcing games can build tutorials
 for new skills into the gameplay itself at the
 point where they are needed (Ridge 2011a). It
 seems that casual game design operationalizes
 scaffolding theory in ways that usefully inform
 design for cultural heritage crowdsourcing.

MOTIVATIONAL FRAMEWORKS FOR PARTICIPATION IN CROWDSOURCING

Understanding why people participate in
 crowdsourcing is important in designing for
 participant recruitment and retention. Project
 marketing and instructional messages that
 match participant motivations have enhanced
 “persuasive impact” and help volunteers find
 more enjoyable and satisfying roles that match
 their motivations (Clary et al. 1998; Romeo
 and Blaser 2011). In order to find research on
 motivations for participation in crowdsourcing
 projects that did not offer monetary recom-
 pense, I turned to research into citizen science
 and other “community-based peer-production
 projects” where people participate in collabora-
 tive efforts to create “publicly available knowl-
 edge-based products” such as open source
 software or the collaboratively written website
 Wikipedia (Nov 2007; Nov, Arazy, and Ander-
 son 2011). So why do people participate when
 they are not being paid? Brabham reported that
 several studies have located the primary motiva-
 tor of participation in open source projects in

1 “the pleasure found in doing hobbies” (2008).
 2 Research for citizen science projects discovered
 3 that the most important motivations for volun-
 4 tary participation were the collective (“the
 5 importance attributed to the project’s goals”)
 6 and intrinsic fun, or “the enjoyment associated
 7 with participation in the project” (Nov, Arazy,
 8 and Anderson 2011). Raddick et al. identified
 9 the main benefits for participants in the citizen
 10 science project *Galaxy Zoo*: enjoyment, commu-
 11 nity, the ability to participate in real science, and
 12 recognition for their participation (2009). Oo-
 13 men and Aroyo discussed two groups of
 14 “motivational factors” in cultural heritage
 15 crowdsourcing: “connectedness and member-
 16 ship,” and “sharing and generosity” (2011).
 17 Many researchers have found that community
 18 and social interactions are important motivators
 19 for participation (Nov, Arazy, and Anderson
 20 2011; Clary et al. 1998). Looking to pre-online
 21 volunteering, Holmes found that “social oppor-
 22 tunities” and “colleagues” were important moti-
 23 vations for continued volunteering in the
 24 heritage sector (2003). These various motiva-
 25 tions can be grouped into altruistic, intrinsic,
 26 and extrinsic motivations.

27 Unlike most commercial projects, cultural
 28 heritage crowdsourcing projects are well posi-
 29 tioned for appeals to altruism. Oomen et al.
 30 suggest that the use of specialist interfaces that
 31 reinforce the altruistic nature of the activity
 32 increases participation (2010). This has impli-
 33 cations for the design of crowdsourcing plat-
 34 form functionality and interface design. Trant
 35 recommends demonstrating the use of data so
 36 that players can see the impact of their contribu-
 37 tion (2009). In an earlier project, I learned that
 38 “validating procrastination” by offering mes-
 39 sages supporting altruistic motivations helped
 40 participants justify their time on the activity and
 41 could increase levels of participation (Ridge
 42 2011a). My review of crowdsourcing projects

found that intrinsic motivations—an activity
 worth doing for its own sake (Csikszentmihalyi
 and Hermanson 1995)—for participating in
 museum crowdsourcing include fun, the plea-
 sure in doing hobbies, enjoyment in learning,
 mastering new skills and practicing existing
 skills, recognition, community, and passion for
 the subject. GLAM crowdsourcing projects can
 appeal to extrinsic and intrinsic motivations:
 The same task (such as transcribing sections of a
 historic document) could be undertaken for dif-
 fering reasons: altruistic, such as “helping to
 provide an accurate record” of national history
 as represented in an online database of digitized
 newspapers (Alam and Campbell 2012); intrin-
 sic, such as solving the enjoyable puzzle of read-
 ing eighteenth-century handwriting in a
 correspondence; or extrinsic, as when an aca-
 demic transcribes a quote from a primary
 source.

Trove, the National Library of Australia’s
 database of online resources (including digitized
 newspapers), offers crowdsourcing functionality
 that is closely aligned to the needs of users who
 can correct text from the digitized originals for
 their own uses. However, other users choose to
 correct incorrectly transcribed text for the
 intrinsic enjoyment of performing that task in
 that context. This echoes findings by Dunn and
 Hedges that the primary motivation in humani-
 ties crowdsourcing can be altruistic, extrinsic, or
 intrinsic, but it is nearly always strongly related
 to the “project or activity’s subject area” (2012).

FROM TAGGING TO THEORIZING

There is a growing body of evidence that
 crowdsourcing (or citizen science, or citizen his-
 tory) can lead to deeper engagement with disci-
 plines such as science or history, as well as an
 increase in related skills and knowledge (see for
 instance Dunn and Hedges 2012). Just as there

1 is value in a one-off contribution to a crowd-
 2 sourcing project, there is also value in exercising
 3 the skills required at the initial levels of partici-
 4 pation. The possibility of building research and
 5 synthesis skills, experience, and content knowl-
 6 edge through participating in crowdsourcing is
 7 an exciting opportunity for GLAMs. In this
 8 section I look for useful definitions of “engage-
 9 ment” and evidence for why some activities
 10 engage audiences. I present some projects with
 11 highly engaged participants who have in turn
 12 found ways to connect more deeply with the
 13 material, and I consider the role of emergent
 14 communities in these projects.

15 Some cultural heritage crowdsourcing pro-
 16 jects allow participants to graduate from tightly
 17 scaffolded microtasks to higher cognitive pro-
 18 cesses like explaining, relating, and theorizing
 19 (Biggs 1999). Research into the citizen science
 20 project *Galaxy Zoo* has led to the development
 21 of a model: “Levels of Engagement.” At the first
 22 level, volunteers participate in simple classifica-
 23 tion tasks; at the second they participate in com-
 24 munity discussion (for example, on a project
 25 forum or blog), and at the third and final level
 26 they move to “working independently on self-
 27 identified research projects” (Raddick et al.
 28 2009). Raddick et al. report that citizen science
 29 research projects “have resulted in volunteers
 30 teaching themselves about scientific content,
 31 using tools of modern astronomy data, and
 32 working as scientists.”

33 **DEFINING “ENGAGEMENT” IN CULTURAL** 34 **HERITAGE**

35 Many definitions of “engagement” in the
 36 arts and cultural heritage simply seem to equate
 37 to physical attendance at events or venues. A
 38 more nuanced model comes from the United
 39 Kingdom’s governmental agency, Department
 40 for Culture, Media, and Sport, and its program
 41
 42

titled “Culture and Sport Evidence” (CASE
 2011). This research defines four types of
 engagement, each building on the previous
 level: 1) “*Attending*”—paying conscious, inten-
 tional attention to content. 2) “*Participating*”—
 an interaction that contributes to the creation of
 content. 3) “*Deciding*”—making decisions about
 the delivery of resources for content creation. 4)
 “*Producing*”—creating content “which has a
 public economic impact” (CASE 2011).

Other definitions draw directly from
 museology. Bitgood found that engagement
 involves “deep sensory-perceptual, mental and/
 or affective involvement with exhibit content,”
 possibly leading to “personal interpretation of
 exhibit content,”—“meaning making,”—or a
 “deep, emotional response” (2010). While
 written in the context of physical encounters,
 both the CASE model and Bitgood’s defini-
 tion apply equally well to physical and online
 visits or participation, and provide an explana-
 tion for art historians’ sudden interest in astro-
 labes.

CROWDSOURCING AS PRODUCTIVE **ENGAGEMENT WITH CULTURAL** **HERITAGE**

We call what we do harvesting or catalogu-
 ing, digitizing or preserving, data visualizing or
 crowd-sourcing, community management or
 customer service, or whatever the latest round of
 restructuring has deemed our job to involve. But
 what we’re really doing is working with people
 to create and share back our collective and col-
 laborative history. — Courtney Johnston (2011)

In an earlier issue of this journal, Owens
 concluded that crowdsourcing is a powerful
 tool for “deep engagement with the public”
 (2013). Aside from the intrinsic enjoyment
 discussed earlier, what is it about the scaffold-

1 ing, types of tasks, rewards, and community
 2 around crowdsourcing in cultural heritage that
 3 makes it so engaging? Some answers may lie in
 4 the close, active viewing of objects, scientific
 5 imagery, or historic documents, and the work
 6 required to describe, categorize, or transcribe
 7 them. Bitgood proposed a relationship
 8 between engagement and “exertion or concen-
 9 tration,” aided by a viewing time of “more than
 10 a few seconds” (2010). Earlier research on
 11 museum metadata games found that curiosity
 12 about presented objects “was a compelling part
 13 of the experience” (Ridge 2011a). Flanagan
 14 and Carini stated that players of the *Tiltfactor*
 15 metadata games “became so curious about the
 16 images they were tagging” that they added tags
 17 like “want to know more about this culture”
 18 (2012).

19 Deep engagement can be its own reward.
 20 “Flow” is experienced as a state of deep, enjoy-
 21 able focus or engagement (Csikszentmihalyi
 22 1990; Csikszentmihalyi and Hermanson 1995).
 23 It requires a clear goal, immediate feedback on
 24 the success of your attempts to reach that goal,
 25 and a good match between the skills of the indi-
 26 vidual and the challenges faced. Supporting
 27 flow through content and interaction design
 28 helps keep players engaged with an activity, and
 29 therefore helps crowdsourcing projects be more
 30 productive. It also points to one challenge of
 31 maintaining participation levels in crowdsourc-
 32 ing: When your skills are greater than the chal-
 33 lenge, you become bored; but if you do not have
 34 the skills to meet the challenge successfully,
 35 then you experience anxiety. It can be difficult
 36 to increase the challenge and provide sufficient
 37 scaffolding so that skills and mastery grow with-
 38 out compromising the quality of data. Some
 39 projects have found ways to manage this
 40 increase of skills and challenges. Providing
 41 opportunities for increasing mastery is discussed
 42 below.

PROJECTS ENABLING DEEPER ENGAGEMENT

Dunn and Hedges observed that some pro-
 jects support participants moving up a level to
 “carry out more complex tasks” (2012). Long-
 established or hugely popular crowdsourcing
 projects like *Herbaria@Home* (2006), *Family-
 Search* (2007), *Galaxy Zoo* (2007), *Founders and
 Survivors* (2009) and *Old Weather* (2010)³ have
 had enough time and enrollment to demon-
 strate ways in which project participants can
 develop new skills and knowledge as a result of
 their growing interest in the project source
 material, or can graduate to more complex tasks
 or bigger responsibilities.

For public participation in science, Bonney
 et al. devised a useful model for categorizing
 heritage crowdsourcing projects according to
 the amount of control participants have over
 project design processes (such as defining ques-
 tions for study, collecting and analyzing data,
 and drawing conclusions). Their model con-
 tains three categories: “contributory,” in which
 the public contributes data to a project designed
 by the organization; “collaborative,” in which
 the public can help refine project design and
 analyze data in a project led by the organization;
 and “co-creative,” in which the public can take
 part in all or nearly all processes, and all parties
 design the project together (Bonney et al.
 2009). Most crowdsourcing projects are con-
 tributory, but ones such as *Old Weather* and *Her-
 baria@Home* have evolved into collaborative and
 at least partially co-creative projects. It may be
 that more collaborative project structures are a
 factor in successfully encouraging deeper
 engagement with related disciplines. Further
 research is needed, but one measure of long-
 term success in GLAM crowdsourcing may be a
 willingness and ability to listen to a project’s user
 communities and collaboratively devise new and

1 improved tasks and research questions. Samis
 2 and Michaelson found that “a visitor centered
 3 focus leads to organizational transformation”
 4 (2013). The impact of collaborative and co-cre-
 5 ative crowdsourcing projects on the sponsoring
 6 organization is not yet clear, but it is probably
 7 significant that each of the projects discussed
 8 below has changed in response to participant
 9 actions and comments.

11 **FamilySearch**

13 *FamilySearch* is a genealogy site that
 14 encourages members of the public to “index”
 15 (transcribe) historic records. The site aims to
 16 get people to try a simple task—indexing
 17 records—knowing that, as transcribers are
 18 exposed to other people’s histories, they will
 19 probably be gradually interested in finding out
 20 more about their own families. This model of
 21 encouraging engagement introduces people
 22 who are not interested in family history (or who
 23 are overwhelmed by it) to the skills required in
 24 an initially closely scaffolded environment.
 25 Davis points out that transcribing historical
 26 documents “provides some much-needed,
 27 introductory, family history education” and
 28 increases the participants’ knowledge about the
 29 range of record types and genealogical informa-
 30 tion, while providing “handwriting practice”
 31 (2012).

32 *FamilySearch* provides a further level of
 33 involvement by inviting some established tran-
 34 scribers to become “arbitrators” who can review
 35 and approve the work of other transcribers.
 36 Invitations to become an arbitrator are issued
 37 after participants transcribe a certain number
 38 of records with a sufficiently high accuracy
 39 rate, or at the recommendation of a more
 40 senior participant (Anderson 2012a; Anderson
 41 2012b).

Old Weather

The *Old Weather* project aimed to digitize
 ship logs in order to analyze historic climatic
 data. However, ship logs contain enough inter-
 esting oddities that transcribers started to
 become interested in the voyages, events, and
 lives of those on the ships and in maritime his-
 tory generally. Dunn and Hedges found that
 transcribers were following these interests and
 becoming expert in “specialized areas of naval
 history” (2012). Posts on the *Old Weather* for-
 ums are a good example of the mixture: help
 with paleographic queries; explanation of sub-
 ject-specific jargon; and curiosity about passing
 references in the logs. These questions develop
 into a deeper interest in the topic, an evolution
 that characterizes citizen science and citizen
 history projects. Participants have theorized
 about questions including the relationship
 between deaths onboard ship and successive
 waves of the 1918-1919 influenza epidemic and
 have written detailed guidelines for others who
 wish to edit ship histories.⁴

Herbaria@Home

Herbaria@Home aims to document histori-
 cal herbarium collections in museums, based on
 photographs of specimen sheets supplied by
 museums. To date, participants have docu-
 mented almost 125,000 herbarium specimens.
 Some transcribers also became interested in the
 people whose specimens they were document-
 ing, and started collating their samples and
 researching their lives. To support this new
 research, the project expanded to include a wiki
 of biographies of the original collectors, along
 with samples of their handwriting from speci-
 men sheets, forum posts, specimens collected,
 and related people, places, and dates.

Galaxy Zoo

The *Galaxy Zoo* project initially asked participants to classify images of galaxies into three simple groups, with more complex classifications added in successive stages (Raddick et al. 2009; Cardamone et al. 2009; Raddick et al. 2010; Romeo and Blaser 2011). After a burst of publicity led to an increase in enquiries, the *Galaxy Zoo* team launched a forum “to encourage volunteers to communicate with one another and answer each other’s questions” (Raddick et al. 2010). This turned out to have unexpected consequences. Through discussion and conjecture on the forum, project participants have devised “novel collaborative research projects,” developed their own analysis tools, and discovered “at least one truly unique object” (Raddick et al. 2010; Simpson 2013). Examples include a collaboration among members of the forum who became curious about objects they nicknamed “green peas,” collecting examples of them and campaigning to “give Peas a chance,”⁵ eventually leading to the discovery of a new class of galaxy (Sheppard 2009; Cardamone et al. 2009). The forum also contains tales of the ways in which engagement with science has increased interest and changed lives: Participants have joined local astronomical societies, re-entered formal education to study astronomy, even changed careers. The *Galaxy Zoo* project has recently launched software tools to help “Zooites” interact and theorize “more deeply” with the data they have helped create (Simpson 2013).

COMMUNITY AS SCAFFOLDING

The projects discussed above show the value in leaving room for curiosity to develop into deeper interest in the subject of a project (see also Csikszentmihalyi and Hermanson

1995). Providing different roles within a project—such as transcriber, data validator, or community support member—is an excellent method for dealing with challenges specific to crowdsourcing. (These challenges might include validating contributions with limited resources for community outreach, and content moderation.) It is also an excellent way to keep participants motivated and excited about new challenges and responsibilities. Projects that provide a variety of tasks and roles can support a range of different levels and types of participant skills, availability, knowledge, and experience. But designing crowdsourcing interfaces that are able to determine participant skills and motivations, and with enough flexibility to respond appropriately, is difficult with limited resources. Sharma and Hannafin write: “Software constraints often limit dynamic scaffolding to interactions that can be anticipated in advance” (2007).

However, as Dunn and Hedges observed, the “vibrant and interacting communities of contributors” that emerge around many crowdsourcing projects are a factor in their success: “Communities develop and perpetuate internal dynamics, self-correct [and] provide mutual support” (2012). An examination of participant forums shows that the community itself can produce some of the personalized scaffolding for learning or mastering skills and knowledge in subject domains that digital interfaces currently cannot support. Crowdsourcing projects that encourage community participation find that dialogue between experts and novices can provide additional scaffolding through “continuous and constructive interactions between experts and learners” (Sharma and Hannafin 2007). Looking to the future, machine learning and improved computational techniques for pattern recognition and visual processing may reduce the need for volunteers for currently popular crowdsourced tasks,

1 raising new ethical issues for cultural heritage
 2 institutions, including their responsibility for
 3 the communities that have developed around
 4 and care deeply about their projects.

7 CONCLUSION

9 It is clear that crowdsourcing can be a pro-
 10 ductive tool for completing digitization and
 11 research tasks required by museums and cul-
 12 tural heritage institutions. Projects that can
 13 respond to the changing needs of their partici-
 14 pants, by introducing new content or tasks, or
 15 by offering new roles and responsibilities, help
 16 people remain motivated to keep participating
 17 and can even generate new research questions.
 18 Crowdsourcing projects are also a powerful
 19 platform for audience interaction with muse-
 20 ums, offering truly deep and valuable engage-
 21 ment with cultural heritage. As an opportunity
 22 to “exercise knowledge, skills, and abilities that
 23 might otherwise go unpracticed” (Clary et al.
 24 1998), volunteering through GLAM crowd-
 25 sourcing projects provides a platform for life-
 26 long learning and an opportunity to engage
 27 with cultural heritage content and tasks. In the
 28 words of the project instigators of the New
 29 York Public Library’s *What’s on the Menu?*:
 30 “We are coming to see crowdsourcing not only
 31 as a way to accomplish work that might not
 32 otherwise be possible, but as an extension of
 33 our core mission” (Lascarides and Vershbow,
 34 forthcoming). Following in the steps of tradi-
 35 tional volunteering, but with far wider and
 36 deeper capabilities to reach and engage the
 37 public, crowdsourcing helps museums serve
 38 their core missions by providing platforms for
 39 audiences to follow their own interests and
 40 hobbies and connect with communities of
 41 practice. **END**

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NOTES

1. Reported in <http://openobjects.blogspot.com/2008/04/museum-and-claytons-audience.html> in a presentation based on Samis’s written paper, “Who Has the Responsibility for Saying What We See? Mashing up Museum, Artist, and Visitor Voices, On-site and On-line,” *Archives and Museum Informatics: Museums and the Web 2008*.
2. I am avoiding the term “gamification,” which is another problematic buzzword with contested definitions. At best, it describes “the use of game design elements in non-game contexts” (Deterding, Dixon, Khaled, and Nacke 2011); at worst it talks about gimmicky or exploitative design that produces what game developer Kathy Sierra calls “a short-term sugar rush of engagement followed by a crash” (2011).
3. Found, respectively, at <http://herbariaunited.org/atHome/>; <http://familysearch.org/>; <http://www.galaxyzoo.org/>; <http://foundersandsurvivors.org/>; <http://www.oldweather.org/>.
4. See <http://www.naval-history.net/OW-Ships-LogBooksWW1EDITGUIDE.htm>.
5. The original forum discussion is at <http://www.galaxyzooforum.org/index.php?topic=3638.0>. An outline of the community collaboration is at <http://www.galaxyzooforum.org/index.php?topic=270633.msg218401#msg218401>. Another example is the “Heartbeat Binary stars” discussion on the Planet Hunters citizen science project at

1 <http://talk.planethunters.org/discussions/DPH100suo7>.

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Start new paragraph	¶	¶
Transpose	┌┐	┌┐
Close up	linking ○ characters	○
Insert or substitute space between characters or words	#	#
Reduce space between characters or words	⌒	⌒