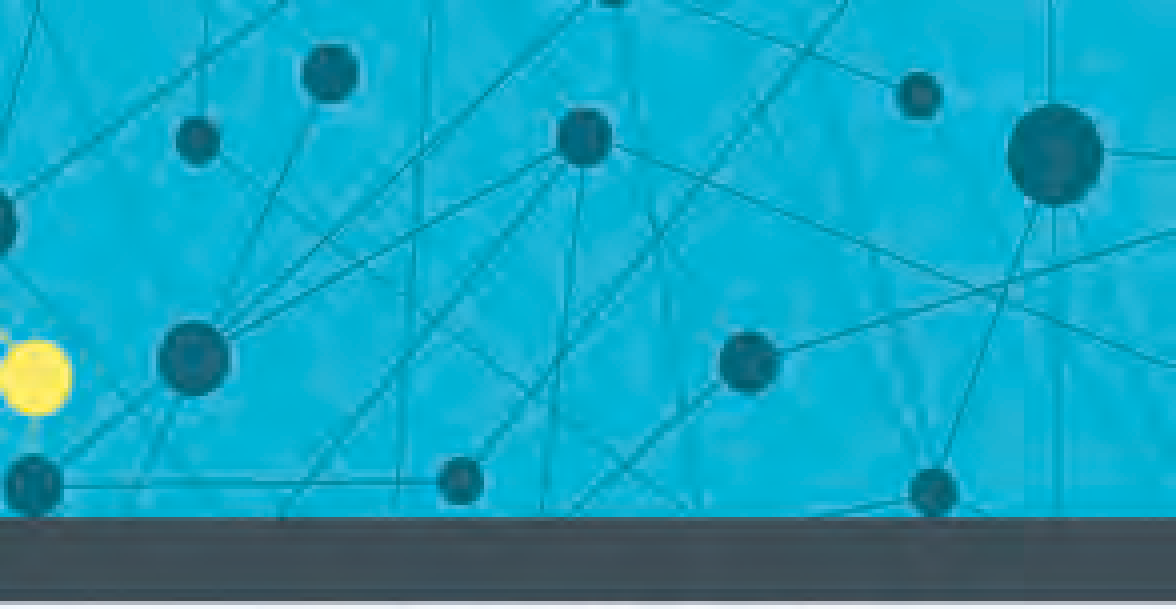

A HISTORY OF PARTICIPATION IN MUSEUMS AND ARCHIVES

TRAVERSING CITIZEN SCIENCE AND CITIZEN HUMANITIES

Edited by
Per Hetland, Palmyre Pierroux and Line Esborg

A History of Participation in Museums and Archives

Traversing disciplines, *A History of Participation in Museums and Archives* provides a framework for understanding how participatory modes in natural, cultural, and scientific heritage institutions intersect with practices in citizen science and citizen humanities.

Drawing on perspectives in cultural history, science and technology studies, and media and communication theory, the book explores how museums and archives make science and cultural heritage relevant to people's everyday lives, while soliciting their assistance and participation in research and citizen projects. More specifically, the book critically examines how different forms of engagement are constructed, how concepts of democratization are framed and enacted, and how epistemic practices in science and the humanities are transformed through socio-technological infrastructures. Tracking these central themes across disciplines and research from Europe, Canada, Australia, and the United States, the book simultaneously considers their relevance for museum and heritage studies.

A History of Participation in Museums and Archives should be essential reading for a broad academic audience, including scholars and students in museum and heritage studies, digital humanities, and the public communication of science and technology. It should also be of great interest to museum professionals working to foster public engagement through collaboration with networks and local community groups.

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Chapter 1

Traversing citizen science and citizen humanities

Tacking stitches

Palmyre Pierroux, Per Hetland, and Line Esborg

The emergence of terminology

Although the terms *citizen science* (CS) and *citizen humanities* (CH) may be new, the practice of involving volunteers in research is not a new phenomenon. In museums and archives there is a deep history of citizen participation with a broad range of aims and innovative strategies employed to engage and 'cultivate' the public. These aims may be traced through the historical development of the societal and democratizing role of museums as educational institutions (Bennett, 1995; Hooper-Greenhill, 1999; Vetter, 2011). Over time, understandings of public participation shifted from "cultivating impressed spectators" (Benedict, 1983, p. 54) to the democratic models of public engagement currently framing national and local cultural policy in countries worldwide (Irwin, 1995). In museum studies, aspects of this shift have been discussed as different *turns*, including *social* (Grewcock, 2013), *participatory* (Carletti, 2016; Simon, 2010; Tomka, 2013), and *educational* (O'Neill & Wilson, 2010; Rogoff, 2008), with technological developments in digital communication platforms often viewed as a crucial driver of change. These turns are further understood as intertwined with cultural policy debates since the 1990s, linking cultural institutions to developments in new public management, technology and innovation, globalization, and the creative industries (Binder & Brandt, 2008).

From a historical perspective, the current foregrounding of participation as a hallmark of quality in museum practice nonetheless represents a significant break with traditions in which quality was unequivocally associated with artifacts in museum collections and exhibitions (Brenna, 2016). Moreover, relations between citizen projects and concepts of "the participatory museum" (Simon, 2010) are increasingly scrutinized, with questions being raised about ethical issues of public contributions to professional work, changing relationships between citizens' and research institutions, and transformations from expert-driven projects to alternative models of knowledge

production and epistemologies (Roued-Cuncliffe & Copeland, 2017). In this sense participatory communication models in memory institutions and in galleries, libraries, archives, and museums (GLAMs) overlap in interesting ways with science communication models more generally, where the "participation explosion" in science (Einsiedel, 2008, p. 173) has been described using such terms as *stakeholder engagement*, *laypeople conferences*, *constructive technology assessment* and, perhaps most familiar, *citizen science* (Silvertown, 2009). Science communication refers to all science and technology (including social sciences and humanities) "mediation, interpretation, dissemination, and explanation activities – the range of efforts, among others, to inform, sensitize, and mobilize the public" (Schiele & Landry, 2012, p. 34).

Akin to developments in science communication, then, the construction of new participatory spaces in museums and archives has highlighted a need to re-conceptualize communication between academic research, knowledge experts in organizations, and volunteer practices such as *crowdsourcing* in the humanities. Crowdsourcing has been a popular term since it was famously coined by Jeff Howe in an article in *Wired* magazine in 2006 to describe a practice of outsourcing work traditionally performed by an employee in a firm (Carletti, 2016; Hedges & Dunn, 2018). However, important differences have been noted between business and heritage crowdsourcing practices, and the term is often at odds with important aspects of its use in museums and heritage organizations. These differences include the motivations of volunteers (monetary versus personal), ethical issues (paid work and anonymous online interactions versus community engagement in natural and cultural heritage), and the degree of volunteer interest in the content or material at the heart of the activity (Carletti, 2016; Hedges & Dunn, 2018). Moreover, Carletti (2016) notes a difference in terms of how museums and archives will often strategically employ crowdsourcing for mainly outreach purposes to enhance public engagement without a concrete product or outcome.

In view of these differences, it is perhaps unsurprising that *citizen humanities* is a term increasingly used to describe crowdsourcing activities in art and heritage organizations more broadly (Dobreva, 2016; Eveleigh, 2015). Initially, the term had been loosely used in digital humanities to reference the design of information infrastructures resembling those in CS (Neimanis, Åsberg, & Hedrén, 2015). More recently, the term was specifically proposed for crowdsourcing activities in the humanities by Mark Hedges and Stuart Dunn at a symposium at King's College in London in 2015 (Hedges & Dunn, 2018). On the basis of studies started in 2012, they found that crowdsourcing activities in the humanities share many common characteristics with CS – for example, community, shared responsibility, and distinctions between participatory and delegatory activities. However, given the differences between

disciplines and content, the purposes of the work, and the outcomes, a separate citizen "humanities" framework was deemed necessary (Hedges & Dunn, 2018).

This reasoning is also embraced in this book. We propose that despite well-known dilemmas with making distinctions between "the two cultures" (Snow, 1959 [2013]), the terms CS and CH offer researchers opportunities to effectually scrutinize disciplinary particularities and potencies. We further understand the shared aims of citizen projects in all disciplines as that of scaffolding scholarship, enhancing public engagement, and supporting communities of practice among volunteers, who at the same time assist art, science, and heritage institutions with various missions and research tasks. In CH, these tasks may include curating, transcribing, and locating resources for integration in existing collections and archives; creating new materials by documenting history and personal life; or augmenting historical locations with new information (Carletti, 2016). In CS, such integration, creating, and augmenting practices are oriented to different content, including biology, climate change, conservation research, and health. At the crux of *all* citizen projects are the volunteers – crowds, participants, amateurs, citizens, visitors, users, publics, and audiences – who dedicate their senses, passions, and knowledge to ongoing research in natural, cultural, and science heritage. Importantly, not only are there long traditions in science and the humanities of making research in museums and archives popular and engaging for the public through volunteer activities, but amateur scientists have also been an integral part of disciplinary histories, with many illustrations of their importance in art, anthropology, biology, field ecology, and habitat studies dating back to the seventeenth century (Adams, 1996; Hedges & Dunn, 2018; Vetter, 2011).

Today, these traditions have been carried over into virtual, physical, and hybrid spaces, where new digital forms of dialogue and interaction between citizens, scientists, and scholars are reshaping the content, collection, presentation, and representation of cultural and natural heritage in museums and archives. In physical spaces, museums and archives increasingly incorporate experimental zones and design labs, where volunteers contribute new content and participate in prototyping exhibition designs, collection practices, and texts (Mason, 2015; Parry, Ortiz-Williams, & Sawyer, 2007; Pierroux & Ludvigsen, 2013). Hybrid approaches combine face-to-face and virtual online interactions (Esborg & Oswald, 2017; Pierroux, 2018) which, to a certain extent, have "redesigned the relationships we have with one another and with organizations" (Brabham, 2013, p. xv). As digital tools and participatory strategies continue to rapidly develop, a diverse body of research is emerging to describe key characteristics of citizen projects in the sciences and the

humanities, examining types of dialogue and communication, tasks, organizational features, volunteer and institutional motivations, and the design of socio-technical infrastructures.

Big themes across disciplines

Traversing disciplines, our aim is to provide a critical framework for understanding how cultural and natural heritage museums, archives, and memory institutions fit in and contribute to this participatory landscape: how they construct opportunities for different types of citizen engagement, foster motivation and learning, and transform epistemic practices in science and the humanities. This book applies an interdisciplinary and critical approach, drawing on perspectives in cultural history, science and technology studies, and the learning sciences, to examine how participatory practices in museums and archives relate and contribute to concepts and practices in CS and CH.

The remainder of this chapter is organized as a qualitative systematic review of CS and CH research, identifying themes or constructs across mainly meta-reviews and larger studies conducted in the past decade. During the review process, four big themes were identified that we consider particularly relevant for museum and heritage studies: *Democratization*, *Divides*, *Drives*, and *Developments*. We have used these themes to organize this volume and have situated the chapters accordingly. *Democratization* is at the heart of citizen projects, and the chapters in this section consider how changes in perspectives on democracy and participation are intertwined with cultural policy as well as practices in museums and archives. *Divides* presents categorical strategies that are used in the literature to understand how citizen projects are organized, providing insight into how different knowledge infrastructures and power relations become embedded in tasks, practices, and technologies – for example, through strict protocols. *Drives* presents key aspects of research on participants and motivations, an important topic within CS and CH to understand public engagement. In museum and heritage studies, this is an established field of investigation that intersects with studies of visitors and publics in interesting ways. In *Developments*, chapters look beyond the mainstream of current approaches to consider how CS and CH projects are extending modes of action in collaborations with stakeholders and social networks at local, city, and community levels.

Democratizations

Research well illustrates that co-production is an important democratic element in many Western societies (see Jasanoff, 2005; 2011), and two

components have been identified as crucial: empowerment and scope of choice (Perrault, 2013; Pielke, 2007). Jasanoff (2005) identified six constitutive, interrelated dimensions of civic epistemology, defined as the "institutionalized practices by which members of a given society test and deploy knowledge claims used as a basis for making collective choices" (p. 255). These are (1) participatory styles of public knowledge-making; (2) methods of ensuring accountability; (3) the acquisition of public credibility by facts and things; (4) the preferred method for displaying objectivity in public decisions; (5) experts' satisfaction of the desire for order in the management of uncertainty; and (6) citizens' perceptions or knowledge of the reasons for public decisions. This overall emphasis on empowerment and scope of choice in science communication serves as background for understanding how cultural policy has framed and contributed to developments in CS and CH.

Policymakers position themselves within a specific civic epistemology when developing policy, or "culturally specific, historically and politically grounded, public knowledge-ways" (Jasanoff, 2005, p. 249). In cultural policy in Europe, it is possible to identify shifts in perspectives on democratization processes in past decades. In the context of Nordic cultural policy, for example, moves toward a participatory democracy may be seen as overlapping with two particular developments, namely the *democratization of culture* (1960-1975) and *cultural democracy* (1975-1985). While the former is associated with the development of the Nordic welfare state and policy directed toward cultural education for the public as a matter of national interest, the objective of cultural democracy was to provide for a more populist approach in the definition and provision of cultural opportunities (Mulcahy, 2006); for example, amateur activities and a "process in which we are all participatory" (Dueland, 2003, p. 22). A third shift in the 1990s was that of state, regional, and local authorities joining with the private sector to reinforce the economic basis of culture and the arts, with new public management approaches and the drive for innovation often prioritizing economic objectives over educational and aesthetic objectives in cultural policy. The European Commission (2016) similarly views participatory democracy models in CS and CH as encouraging social and cultural enterprise, particularly among young people or migrant groups who may be marginalized by society or education systems or both.

At the same time, however, science communication linked to participatory democracy models is not foregrounded in the same manner all over the world. The term *science communication* "is far from being universally recognized nor is it used uniformly, where it does occur" (Trench et al., 2014, p. 226). In their study from Argentina, Estonia, Malaysia, Nigeria, and Turkey, the authors conclude that the supposed turn from deficit approaches to dialogic communication models does not apply in regions where the "science communication

culture is 'developing' or 'fragile'" (p. 226). Instead, in what is sometimes called the *Global South*,[1] it is not unusual for didactically oriented programs of science awareness to coexist with more dialogue-based forms of communication. Chunming Li (2018), for example, found in his study of CS on the Chinese mainland a spectrum of CS activities – "from bird watching to air quality monitoring and from biological observations to volunteer computing" (p. 185). Democratization aspects of citizen participation in such activities in these regions are thus an area for future investigation in CS.

In contrast, and based on a review of publications in English, ideals of participatory democracy seem more overt in the ways that crowdsourcing cultural-heritage projects in the Global South are framed, suggesting a clear and principled democratic groundwork for CH. The Rekrie project,[2] for example, collects crowd-sourced images to virtually reconstruct destroyed artifacts and sites as 3D objects and virtual worlds (see Constantinidis, 2016). From a museums and cultural heritage archives perspective, Basu and Modest (2015b) present empirical cases from communities in Global South countries in an edited book, the product of a symposium held in 2011 that gathered both practitioners and academics. As Basu and Modest point out in their chapter (2015a), heritage and community engagement are often framed in terms of international development aims and objectives, situated within wider debates on relations between culture, development, and future making. However, while an increasing number of global heritage projects may be included in the realm of CH, the bulk of these initiatives seem to come from outside the Global South, often led and financed by museums and university partners in the Global North.

The chapters in this part of this volume critically examine how perspectives on democratization in CS and CH projects are related to historically developed participatory practices in museums and archives. In Chapter 2, Palmyre Pierroux, Mattias Bäckström, Brita Brenna, Geoffrey Gowlland, and Gro Ween explore Nordic values of democracy, egalitarianism, and collectivism in participatory practices in museums – historically, in the present, and as future-oriented experiments. The authors consider how Norwegian and Swedish publics, in particular, have been positioned as participants and knowledgeable citizens in different types of museum practices, including co-curating and inclusionary work with source communities. In Chapter 3, Bernard Schiele investigates perspectives on democratization in science communication and how these have developed in public discourse and in policy. Schiele proposes a framework for discussing participation and engagement in CS in three general categories: (1) modes promoting dialogue, (2) modes promoting engagement, and (3) modes promoting knowledge co-production. In Chapter 4, Jenny Kidd contributes a critical discussion of asymmetrical

power relations that museums and cultural heritage organizations may bring into crowdsourcing initiatives, reflecting on how these may be undermining democratic ideals. Digital ethics issues related to CS and CH, including questions of labor, exclusion, and compensation, are raised for debate.

Divides

A range of strategies have been used in previous research to differentiate between work conducted in CS and CH projects. Identifying the role of research institutions, practices, and outcomes is one means of modeling how participation is organized in CS (Bonney et al., 2009; Corburn, 2005; Dickinson & Bonney, 2012; Haklay, 2013; Socientize, 2015), and this approach has also served as a framework to analyze crowdsourcing activities in museums and heritage organizations (Carletti, 2016; Hedges & Dunn, 2018; Ridge, 2014). Three models have been proposed by Bonney et al. (2009) to understand the ways in which institutional research infrastructures organize CS communication, tasks, and projects. In a *contributory model*, projects are designed by scientists, and the public is mainly involved in collecting, validating, and analyzing data that has been predetermined by research needs. In some CH projects, the data that volunteers are asked to contribute is drawn from their own personal histories (Carletti, 2016; Jennett et al., 2014). A consistent finding in such contributory models is that an active minority of participants typically contribute most of the data (Bonney, Philips, Ballard, & Enck, 2016; Dunn & Hedges, 2012; Hetland, 2011). A *collaborative model* is still based on project designs by scientists, but the participants have greater influence on the research process. This might entail helping with interpreting the data, drawing conclusions, and adjusting protocols for data collection or suggesting new directions for study. A *co-created model* describes CS projects initiated by local communities, and which may include experts and scientists, but often originate outside academic institutions and most of their funding structures. These initiatives focus on local problems, often related to such environmental issues as pollution, health hazards, species conservation, water and air quality, and natural resource depletion (Epstein, 1996; Kullenberg, 2015). The co-created model has much in common with action research, or "participatory action research" (Pain, 2004), although community-driven projects have been studied least (but see Desplanques, 2015; Sharples, Herodotou, & Scanlon, 2017).

These three models may be understood along a continuum, in that contributory models work well for projects that capture the imagination of a broad audience, require large volumes of data, and involve recording regularly and large-scale analyses, while co-created and collaborative models work

well for projects that benefit from establishing a community-led or volunteer-led monitoring scheme, involve small numbers of participants, require repeat measurements over time, and are targeted at a specific, locally relevant problem or question (Tweddle, Robinson, Pocock, & Roy, 2012). Dickinson and Bonney (2012) claimed that the contributory model has been most productive in generating peer-reviewed publications, whereas collaborative and co-created approaches often have more practical goals. However, as Carletti (2016) points out, research infrastructures do not only frame participation in citizen projects, but they bring challenges to academia by disrupting the "dichotomy between expert and non-expert" (p. 201). Accordingly, there is a need for studies that not only define public engagement in science in normative terms and ideals, that is, to improve and institutionalize new democratic, participatory methods (Chilvers & Kearnes, 2016), but also shed light on how different interpretations are actually mediated and negotiated in collaborations over time, applying perspectives on participation as "co-produced, relational, and emergent" (p. 13).

Other studies of how research infrastructures organize citizen projects in the sciences and humanities have focused on problems of validating knowledge when non-experts are involved. In their study of scientists' perceptions of CS, Riesch and Potter (2014) found that data quality was a concern of the wider scientific community, although negative reactions and problems with data quality were more commonly expected or anticipated than factual. Ethical issues were also raised about ownership, attributing authorship, and payment, especially as CS can involve outsourcing validation work otherwise conducted by professional scientists. Scientists use a range of methods and approaches to ensure quality in CS, including,

> 1) providing training and close supervision,
> 2) cross-checking for consistency with the literature,
> 3) cross-checking for consistency with their own observations,
> 4) administering a quiz-style questionnaire at the end of research projects to gauge the reliability of public data, and,
> 5) simplifying the tasks asked of the public and adapting the research questions.
>
> (Riesch & Potter, 2014, p. 112)

The value of some training in quality control was confirmed by Theobald and others (2015), who found that CS "projects that trained volunteers in species identification methods, using in-person or online training, were more likely to be published than projects that provided no identification training or trained with a combination of methods" (pp. 240–241). The

authors nonetheless concluded that the probability of publication was largely unaffected by the data quality assurance measures, suggesting "that perhaps most projects have adequate data quality measures in place, or that non-professional data can be comparable to data collected by professional scientists" (p. 242).

In CH, the problem of validation has not been taken up in the literature from the same perspective as in CS. As an emerging field, the focus has rather been on data quality more broadly: "How knowledge is produced" rather than "Where it is produced" (Oomen & Aroyo, 2011, p. 202). In other words, as the purpose of academic crowdsourcing in the humanities has been mainly to develop, transform, synthesize, and describe content rather than to produce scientific publications or critical knowledge that requires validation, studies have focused more on understanding how quality is achieved in crowdsourcing activities in terms of process, asset, task, and output (Hedges & Dunn, 2018; Ridge, 2014). An early example of how the issue of data quality was approached in crowdsourcing projects is the *Steve* project from 2005, one of the first large-scale projects to methodologically explore non-expert semantic *tagging* of artworks in museum online collections (Trant, 2006). This study found that vocabulary and descriptive tags contributed by non-experts were unique when compared to existing context databases produced by experts, and that these contributions were deemed valuable to the development of more user-friendly search engines and semantic Web designs by both museum curators and users (Trant, 2009), thus validating the value of volunteers' contributions and the activity as a whole. More recently, in their review of crowdsourcing projects, Oomen and Aroyo (2011) identified a number of challenges in CH data quality assurance, e.g., resolving conflicting information, maintaining extensive provenance information, and creating review procedures that are clear and transparent, among others.

Although differences at the disciplinary level are at the core of validation issues and thus configured differently as *epistemic infrastructures* in CS and CH practices, researchers in the humanities are likewise concerned that crowdsourcing and the trend of peer production is undermining the authority of GLAMs as a source of context and trusted factual information (see Oomen & Aroyo, 2011). Therefore, similar to the concept "apomediation" in CS (Eysenbach, 2008), diligence, rules, and ethical standards within the actual volunteer communities are key to making and filtering good quality data contributions, as is the use of interactive user feedback and other scaffolding tools that can support citizen scholarship and foster learning (Oomen & Aroyo, 2011).

In sum, we identify strategies for researching CS and CH as focusing on three different kinds of infrastructures: *institutional infrastructures,* which

play a role in the organizational modeling of how publics may participate in and contribute to scientific research; *epistemic infrastructures,* which are linked to disciplinary procedures and practices dedicated to validating knowledge and making knowledge accessible in ways that are relevant for researchers and the public; and, ultimately (as illustrated throughout this book), research that is focused on how institutional and epistemic infrastructures are embedded in the design and development of *technological infrastructures*. The latter are defined as computational tools and socio-technological processes specific to the knowledge domain and the institutions that organize citizen projects. There is increasing awareness of how technological infrastructures may both enable and hinder democratization values, acknowledging a need for greater reciprocity in the design and development of digital platforms (see Hetland, this volume). A collective approach to the ownership of content was empirically explored through the design of technological infrastructures by Popple and Muibwa (2016), for example, in a two-year project at the University of Leeds. The *Pararchive* site involved different communities and two large institutions in co-designing and co-producing a new open access digital resource, "the aim of which was to facilitate engagement with, and use of, public archival resources for storytelling, historical research and creative practice" (p. 205). This study illustrated how a democratic process of designing and implementing digital infrastructures may be rife with tensions.

In the *Divides* section, the authors of three chapters study CS and CH infrastructures, with a focus on how these may be shifting in view of increased citizen participation. In Chapter 5, Christine Hine considers how epistemic infrastructures comprise a complex social process that involves power relations and navigating compromises on what counts as knowledge across sites, scales and publics. Applying a broad analytical brush that contrasts two design mindsets, she explores how authenticity and accountability – key dimensions in validation frameworks – become embedded in CS knowledge infrastructures, including open online discussion forums for health and parenting. In Chapter 6, Esborg similarly picks up on the question of authenticity, which has traditionally given heritage institutions their legitimacy in CH, to question whether this value is being replaced by a new institutional ethos that instead primarily values empowerment and accessibility. Increased public participation in knowledge practices influences roles and authority within the GLAM sector, according to Sanderhoff (2014), who points to the growing grassroots movement for *openness* (*openGLAM*) – "a catalyst for user creativity" – as the new standard for the sector. Document analysis is combined with an ethnographic approach in Esborg's study of early digital initiatives

that employed disenfranchised publics in heritage documentation projects. Economic deprivation, exclusionary practices, and unemployment are thus a backdrop to this study of modes of interaction between cultural heritage institutions and different types of non-users in two case studies in Ireland and in Norway, respectively. Seeing the archive as a collective tool through the lens of the concept "boundary object" (Star & Griesemer, 1989), Esborg considers how temporal and fluid modes of interaction might inform future research on community-building through non-user participation in CH.

This part of the volume concludes with a chapter on an under-represented demographic in research on public understanding in science, namely older adults. In Chapter 7, Karen Knutson and Kevin Crowley make the case for neighborhood interventions as a viable approach for museums to collaborate with local organizations and networks to overcome generational divides in citizen projects and to foster a more active role for older adults in the community. Applying interview methods and network analysis, they present findings from a study conducted in collaboration with local networks in two different cities and a science museum to engage older adults in socio-scientific issues related to climate change.

Drives

In her book *The Art of Relevance* (2016), American researcher and museum director Nina Simon refers to relevance theory to discuss how museums might better address the challenge of engaging audiences in museum activities and events. As Simon explains, relevance is achieved when the communicative intention, (1) stimulates positive cognitive effect through information that yields "new conclusions that matter to you," and (2) is obtained and absorbed "through the least amount of effort" (Simon, 2016, p. 32). An individual process with affective and cognitive dimensions, relevance is thus created through opportunities to build on previous knowledge. However, as Pierroux (2018) points out, this analytical framework is difficult to apply in studies of how social structures and institutional settings create relevance, motivation, and community engagement. To overcome an individual focus of motivation, Per Hetland in Chapter 13 moved the dyadic expert/volunteer relationship into focus. How do we understand the relationship between engaged citizen scientist and institutional science in terms of motivations? One approach is to study this relationship as an attempt to achieve reciprocity (Mauss, 1950 [2002]; Sahlins, 1972). In his study of practices in the portal *Norwegian Species Observation*, Hetland explored how Sahlins's three kinds of reciprocity (1972) – generalized, balanced or symmetrical, and negative – give an

alternative understanding of how engagement is constructed. Moreover, the study showed how mapping biodiversity on a voluntary basis represented a gift to institutional science, and it was important how this gift was received and, consequentially, how it was reciprocated to stabilize the relationship.

Other approaches to studying drives develop categories of motives, and Batson, Ahmad and Tsang (2002) identified four: egoism, altruism, collectivism, and principalism. These categories have been applied in studies of motivation in citizen projects:

> Egoism relates to motives that pertain to one's own welfare. Altruistic motives are related to increasing the welfare of others. Collectivism refers to increasing the welfare of a group. Principalism includes motives related to upholding a moral principle (e.g., justice, equality, caring for the environment).
>
> (Land-Zandstra, Devilee, Snik, Buurmeijer, & van den Broek, 2016, p. 47)

Studies often find that participants "wanted to contribute to scientific research, the environment or health because they were interested in science and the topics of the project" (Zandstra et al., 2016, p. 56). Reviewing previous research investigating citizens' motivations in CS, Jennett et al. (2014) found that motivations included interest in the research topic, learning new information, contributing to original research, enjoying the research task, sharing the same goals and values as the project, helping others and feeling part of a team, and finally, receiving recognition and feedback. Another finding was that motivations changed over time, moving from egoism to altruism, collectivism, and principalism. For memory institutions and GLAMs, a general will to contribute describes both motivational factor and the inherent power within citizen projects for civic mobilization and citizens' belief in the legitimacy of science in society.

Studies have also explored what it means to *not* participate in citizen knowledge production. In a study of citizen projects by Wyatt (2003), four groups of nonusers were identified: resisters, rejecters, the excluded, and the expelled. In heritage and museum studies, early studies of non-visitors found that differences in opportunities for participation were more important than differences in motivation (Hendon, 1990). A different study in Germany and the United States identified nuances in a "continuum ranging from non-visitors to popular museums to visitors of high culture museums with respect to their socioeconomic, demographic and geographic characteristics" (Kirchberg, 1996, p. 239). It may be concluded that studies in CS and CH of how users/

visitors and nonusers/non-visitors may be related – and of participants' motivations more generally – are still needed (Hossain & Kauranen, 2015).

Learning is often mentioned as a motive for participating in citizen projects, but there are tensions in terms of the extent to which volunteer learning is supported through the design of citizen projects and platforms. Although scaffolding learning and scientific scholarship is generally described as an overarching aim in both CS and CH, many projects are instead designed for the main purpose of engaging new audiences, increasing attendance, and enhancing public awareness and involvement more broadly. Moreover, scaffolding learning and scholarship in the humanities through crowdsourcing projects often constitute a secondary and indefinable goal, in part because content is "more likely to speak directly to emotion and emotive responses" (Dunn & Hedges, 2012, p. x,). Indeed, there are few studies of whether and how such projects advance public knowledge. One interesting question explored in the research, then, is whether citizen projects *can* improve public understanding of science, even if few such projects are designed to achieve such an outcome (Bonney et al., 2016).

To address this question, Bonney and others (2016) organized their review of CS according to four types of volunteer activities: (1) data-collection projects; (2) data-processing projects; (3) curriculum-based projects, both informal and formal; and (4) community-science projects. The first group of projects was found to produce somewhat mixed learning outcomes, while the second group did not have large impacts on public understanding. The third group did achieve certain learning outcomes, particularly projects that emphasized inquiry-based learning designs. Finally, the last group was found as having the greatest potential to achieve a wide range of impacts on public understanding, primarily as community-science projects that typically involved participants not only in collecting data but also in developing research questions, designing research protocols, interpreting data, and disseminating results. This last group falls most clearly within the collaborative and co-created models.

Applying a different approach in their study of how learning figured into humanities crowdsourcing projects, Dunn and Hedges (2018) conducted surveys and interviews with contributors and practitioners in libraries, galleries, and museums, among other methods. Based on these reports, the researchers concluded that while the development of different practical skills, historical research capabilities, and some serendipitous learning behaviors were apparent, the "formation of communities around a project is often the key driver of the learning process" (p. 95). Further, contributors reported acquiring new domain knowledge, and this was attributed primarily to transcribing tasks (Dunn & Hedges, 2018). In sum, research in both CS and CH suggests that learning – a key motivational factor for participation – is best

supported through inquiry-based and gap-closing designs in projects that emphasize collaboration, co-creation, and community building.

Three chapters explore this quite large topic of the respective and shared motivations of institutions and volunteers in CS and CH. In Chapter 8, Emily Oswald studies an exceptionally popular activity on a city museum's Facebook page as a communicative project, providing insight into participants' motivations and contributions as they "remember in public." Drawing on perspectives in dialogism (Linell, 1998), Oswald analyzes how participants construct meaning within the institutional and sociotechnical confines of the platform design. In Chapter 9, Per Hetland and Kim Christian Schrøder argue the need for clarity in distinctions made between concepts of 'citizens' in citizen projects. Applying an interdisciplinary framework, they examine how these concepts relate to users, publics, and audiences in the museum and cultural heritage sector. The study crisscrosses research fields to trace developments in understandings of amateurs, lay scientists, participants, volunteers, lay people, citizens, users, publics, and audiences. Landing on the three most general concepts – users, publics, and audiences, Hetland and Schrøder analyze their applicability in CS and CH at three levels of engagement: access, interaction, and participation (Carpentier, 2015). The study shows how a participatory turn emerged in the literature over time, as concepts of users, publics, and audiences increasingly emphasized active participants engaged in co-constructing and critically partaking in multiple participatory practices. Through this focus, the authors provide a framework for further research, discussions, and critical reflections on central agents in the emerging landscape of CS and CH. In Chapter 10, Sanita Reinsone delves into personalized practices in volunteering activity to understand how content and tasks become associated with distinctive meanings, habits, and experiences for cultural volunteers. Reinsone uses narrative analysis and discourse analysis in a case study of Latvian Folklore archives studies to deepen understandings of volunteer motivations in cultural crowdsourcing projects.

Developments

Emergent trends and issues in CS and CH highlight the many openings in heritage and museum studies to develop interdisciplinary perspectives on participatory work, spaces, and processes. Approaches to studying how museums and archives engage with the public at the community level is one example. In the context of civic responsibility and the quest for relevance (Simon, 2016), citizen projects that aim to engage at the community level are means of building both a culture of participation and new

museum audiences. At the same time, although citizen projects organized with community organizations, networks, or groups may have the greatest potential to achieve a wide range of impacts on public understanding, particularly those involving participants in developing research processes that extend beyond only collecting data, such projects have been studied least. This is perhaps unsurprising given the methodological challenges of researching activities across sites and institutions with different partners and stakeholder interests, and usually over an extended period of time. Ethnographic approaches to understanding complex processes in practice have had some impact in the field of museum studies (Macdonald, 2002; Roberts, 1997), although few longitudinal studies have been made of processes and outcomes from citizen projects involving complex community collaborations and museums. This may be changing, according to Sharples, Herodotou, and Scanlon (2017), who point to an increasing number of studies of what they call "citizen inquiry" projects, which are modelled on inquiry-led scientific investigations and range in scale from mass public participation to small groups in after-school organizations (Giarratani, Parikh, DiSalvo, Knutson, & Crowley, 2011). Innovative collaborative research designs are also increasingly used to study museum partnerships with community organizations and networks – for example, research-practice partnerships, public sector–university research fellowships, and design-based research and co-design partnerships.

Two chapters in this volume focus on issues of civic responsibility and community engagement in citizen projects in museums and archives. In Chapter 11, a contribution from Mary Ann Steiner, Mandela Lyon, and Kevin Crowley presents and contrasts cases of network learning that were supported by museums in three large American cities. The study follows how logistic and communicative divides were overcome in different networks of community organizations as they worked to foster public engagement in adaptive problems in science. Framed by different needs and organizational infrastructures, museum staff in the respective cities varied their approaches to building and growing their networks and to using and developing 'kits' for public use. In the analysis, the authors study these approaches as boundary objects and boundary crossing processes, which Star and Griesemer (1989) defined as temporary and negotiated agreements by different actors and groups on how to relate to a given situation, and as elements that link various groups and interests together. This chapter thus relates to studies of CS and CH as "boundary work" (Hine, 2008) and illustrates how interdisciplinary approaches in museums and heritage studies may traverse institutional, epistemic, and disciplinary divides.

In Chapter 12, Dick Kasperowski, Christopher Kullenberg, and Frauke Rohden address the impact of socio-technological changes and how these contribute to transformations in disciplinary practice. Applying and extending the concept "epistemic culture" (Knorr Cetina, 1999) to humanities research, the authors introduce "participatory epistemic cultures" as a new premise for interpretation and scholarly work in humanist disciplines when volunteers' tasks become collective and distributed by means of technology. The argument is illustrated by analyses of different discussion forums and tasks in cultural heritage projects. In Chapter 13, as mentioned above, Per Hetland introduces the concept of "reciprocity" to reframe relationships between the engaged citizen scientist and institutional science as a gift exchange with real consequence. Based on a survey-based study of users of a popular species observation portal, Hetland identifies individual and collective motivations of amateurs and volunteers, and reflects on how reciprocity may be operationalized in future sociotechnical designs for CS platforms. Finally, in Chapter 14, Palmyre Pierroux collects insights from the contributions in the volume, considering arguments and findings from the chapters across research traditions. She comments on the shared interest in and application of perspectives from Science and Technology Studies (STS), which seems notable given that "citizen science practitioners and scholars from the social sciences and humanities sometimes still appear to be disconnected" (Mahr, Göbel, Irwin, & Vohland, 2018, p. 101). A rationale for focusing on museums and archives as a context for drawing these strands together is also discussed.

Reflections

Developments in CS and CH are inextricably linked with advanced developments in socio-technological platforms that allow for different modes of sharing and producing knowledge on a global level. These developments have spurred a participation explosion in science communication, in activities organized by museums and archives, and in digital humanities research. As this volume illustrates, *citizen science* and *citizen humanities* are terms for participatory and contributory practices that have historical roots in museums and archives of natural, scientific, and cultural heritage. However, there is a challenge in that rapid expansions in the technological landscape demand innovation and agility not easily accomplished by museums and archives of natural, cultural and scientific heritage, even as these institutions continually aim for societal relevance. In exploring this and other challenges, this chapter has examined current themes in research on citizen participation in science, in the humanities, and in museums and archives, tacking an interdisciplinary

field of inquiry that to the best of our knowledge has not been previously attempted.

Notes

1 The term "Global South" is increasingly used as metaphor for underdevelopment rather than a geographical divide in the strict sense, and refers broadly to the regions of Latin America, Asia, Africa, and Oceania. See Dados & Connell, 2012, "The Global South," *Contexts*, vol. 11, no. 1, pp. 12–13.
2 https://rekrei.org/.

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Chapter 2

Museums as sites of participatory democracy and design

Palmyre Pierroux, Mattias Bäckström, Brita Brenna, Geoffrey Gowlland, and Gro Ween

A trajectory of participation

Citizen engagement and social inclusion are hallmarks of the *participatory museum*, a term coined by Nina Simon (2010) that resonates as democratizing ideal in both historical and contemporary museum aims and practices. Against a background in which participation is equated with a moral and political good, this chapter investigates how different participatory conceptions and practices have worked in different political contexts, drawing on examples from Norway and Sweden to study its history and how it works in the present. Although Nordic museums have different origin stories, they have more often than not been founded and developed along participatory lines. Moreover, during the last one hundred and fifty years, some participatory ideas, practices and designs first invented in museums in the Nordic countries have been spread worldwide (Bennett, 1995; cf. Hudson, 1987; Rentzhog, 2007). These ideas may be traced in "living pictures" created in the 1870s using home interior dioramas and at the time described as "permanent lecturers"; the national production of touring exhibitions in remote regions from the 1880s; the recruitment of different social classes from the cities to historical re-enactments in "living museums" from the 1890s; missions to engage communities in cultural-democracy projects from the 1970s; pre-Internet crowdsourcing approaches in national and local folk museums, ecomuseums and work-life museums; and participatory design methods that involve collaboration with source communities in curatorial processes (Bäckström, 2012, 2016; Eriksen, 2009; Kärnfelt, 2014; Näsman, 2014; Sandberg, 2003). As these examples illustrate, ideas of participation in Nordic museums have been principled, innovative, but also varied over time, the concept acquiring different meanings by being placed within different ideological frames and agendas and translated into different practices.

The aim of this chapter is to further historical, theoretical, and practical knowledge of museums and their participatory practices, exemplified

by historical cases in Norway and Sweden from the 1760s to present times. This entails critically examining concepts and practices of the participatory museum and identifying historical preconditions, challenges, paradoxes, and contributions, particularly those in a Nordic context. A focus on larger participative forces in Nordic museums also seems pressing in view of a trend identified by Duelund (2008) as a "nationalist reawakening" in European and Nordic cultural policy, visible not least in the publishing of *The Danish Cultural Canon* by the Danish Ministry of Culture in 2006: "A collection and presentation of the greatest, most important works of Denmark's cultural heritage" (p. 19). Ministers of Culture in Norway and The Netherlands have similarly called for nationally motivated cultural canons, a position ostensibly at odds with a longstanding multiculturalist ideology (Duelund, 2008). In contrast, cultural-heritage policy in Sweden has been promoted as inclusive and performative: "The basic idea behind the Government's policy is that cultural heritage is constantly being developed and shaped jointly by people. Everyone is to have the right to help shape our cultural heritage" (Ministry of Culture, Sweden, 2016). The fact that tensions between conflicting concepts of participation in shaping cultural heritage in Nordic cultural policy are entwined with present-day politicizations of museum collections is not trivial, given that museums are the most influential institutions of public heritage production.

There is thus a need to investigate the conceptual history of participation to nuance the rhetoric of democratization and citizen engagement that has been broadly adopted in recent museum policy, research, and practice. As Drotner (2017) points out, the historical master narrative in museum studies research describes a trajectory of democratization in communication practices, from "citizen enlightenment, public education and betterment of the unruly masses in the early days of museum development on to a situation today when individual experience and consumer enrichment is at the core of museum communication" (p. 150). While not disputing these developments as background for this chapter, our aim is to look across historical, but also contemporary, relationships between research, policy, and practice to investigate the following questions: In which ways are museums reformulating and contributing to contemporary notions of democracy, heritage, and participation? When participation shifts from idea or value to actual practice, how does the participation of different publics become a force of transformation in museum practices, values, and modus operandi? We examine these developments in a Nordic context, first by considering citizen engagement in *associational* and *crowdsourcing* practices in Norway and Sweden from the 1760s onwards. In the second part we consider democratizing developments in policy and practice from the 1960s onwards, particularly those related to curatorial practices and sociotechnological innovations, infrastructures and media designs.

Histories of participation in Norwegian and Swedish museums

Our enquiry is framed by the premise that participatory practices in museums combine or straddle different conceptions and forms of democracy, and that these practices must also be understood in the context of the forms of politics that are operative in museums. Accordingly, we examined historical cases in which questions were raised about what form of participation and what form of democracy were needed in museums. In a Nordic context, we identified two different ways that these questions were addressed: *crowdsourcing participation* and *associational participation*. Crowdsourcing is a somewhat ill-defined term (Wiggins & Crowston, 2011) that is often related to the use of digital platforms, and in this sense the practice is considered new. However, as pointed out by historian of ideas Kärnfelt (2014), among others, "the apparently recent Internet phenomenon of 'crowdsourcing,' especially as it related to scientific research, actually has a pre-Internet history that is worth studying" (p. 449). Associational participation is another kind of development, referring to the blossoming of voluntary associations in the period 1800–1870 and linked with the overall transformation of society, from a feudal state based on birthright and corporations to a modern state based on individual and economic liberties (Jansson, 1985). Jansson describes the nineteenth-century association as a way to structure a new kind of society, an organizing principle that broke the ties of the corporations. In 1844, Swedish philosopher, historian, and poet Erik Gustaf Geijer acclaimed: "The *principle of association* is the means of rescue of the time" (1844/1874, p. 343).

Although by the late nineteenth century the societal importance of voluntary associations had shifted to large-scale, country-wide movements, such as labor and temperance movements (Jansson, 1985), associations had an important impact on the development of museums and volunteer heritage work in the Nordic countries. This is the broader historical context for museum developments in Norway and Sweden presented below. To understand how museums and heritage initiatives have followed different lines of thought regarding how to organize activities, and to what extent participants influenced the institutions and their way establishing knowledge, we will present cases that show principled differences.

Associational participation: museums and heritage conservation

In Sweden, The Gothic Society (*Götiska förbundet*) was founded in Stockholm in 1811 with the purpose of advocating heritage management and archaeological research. Civically organized, it remained a closed society with limited

membership, hence resembling other eighteenth-century scholarly societies (Hillström, 2006; Molin, 2003). In contrast, the idea of open, associational participation was put into practice in Norway quite early. The Norwegian Society for Development (*Selskabet for Norges Vel*) was founded in 1809 as a countrywide civic association. In theory, all men and women could become members, but in practice only the upper classes could afford the membership fee. The Norwegian Society was in part a continuation of the eighteenth-century scholarly societies (classes 1–3 were focused on scientific and scholarly activities) and patriotic societies (classes 4–7 were focused on practical and economical activities). In another sense, it was an innovation of the nineteenth century, in which a new kind of national public sphere was organized by means of a countrywide association with a general assembly and regional and local departments. In 1810, through its historical-philosophic class, the Society founded the Norwegian Antiquarian Museum in Christiania as a national alternative to the state institutions in Copenhagen, the capital of the kingdom of Denmark–Norway (Bäckström, 2012; Bjerke, 2009a,b). Today, these are the prehistorical collections at the Museum of Cultural History, University of Oslo, but at its founding this was one of the first civically organized museums with a national purpose. As such, it is an early example of the associational participatory museum, owned and managed by the Society's members.

A similar example is seen is 1844, when an invitation was extended to all Norwegian countrymen to create an association with the purpose of exploring art and historical monuments, to acquire and widely disseminate reliable descriptions and correct drawings of them, and to give advice on how to preserve and restore them in the best way. The Society for the Preservation of Ancient Norwegian Monuments (*Foreningen til norske Fortidsmindesmærkers Bevaring*) was founded in December 1844. An open association, its membership fee was intended to not prevent clergymen and farmers in the regions from joining. It was organized with a general assembly and leadership in Christiania, with local departments around the country. Objects collected by the association were integrated in established official collections and museums from the very beginning.

The first heritage-conservation association in Sweden, founded in 1856 in the province of Nericia, was directly inspired by the 1840s association in Norway (Sellberg, 1993). A decade later, in 1869, The Swedish Antiquarian Society (*Svenska Fornminnesföreningen*) was established with the purpose of exploring, investigating and disseminating knowledge about Swedish monuments and oral traditions. As an open association in civil society, and the national center of the independent heritage-conservation associations in the provinces, it was intertwined in complex and tense ways with the official

heritage management of the Royal Swedish Academy of Letters, History and Antiquities. Within a few years, it had around seven hundred and fifty members spread throughout the country (Baudou, 2001; Hillström, 2006).

In comparison to the Swedish initiative from the 1860s, with its function as a national meeting place and coordinator of independent regional associations, the Norwegian initiatives from the 1810s and 1840s organized associations that were more centralized, with planning and decision-making concentrated within a general assembly or regional departments. However, both the Norwegian and the Swedish endeavors included participation as a central element in heritage preservation and knowledge dissemination activities. These heritage conservation associations in Norway and Sweden were also part of a contemporary democratizing European movement; in Norway, the national association was directly inspired by an association in Saxony, initiated in 1834; in Sweden, the inspiration came from an association in France, also started in 1834 (Hillström, 2006; Myklebust, 1994). The centralization impulse of the nineteenth century seems to have been channeled through voluntary associations in the Norwegian heritage and museum sector and, conversely, through state institutions in Sweden, like the *Statens historiska museum* (Swedish History Museum).

Crowdsourcing participation: museums and scholarly societies

In 1758, the new Bishop of the Diocese of Nidaros Johan Ernst Gunnerus arrived in Trondheim, Norway. His aims were to oversee priests, schools, and the religious practices of the general public. However, this bishop came also with a wish and a plan to improve the state of knowledge in the northernmost part of Norway (see Andersen et al., 2009). He would follow two strategies that were interlinked, but which for our purposes represent two different principles of organizing participation. One approach involved establishing, together with the historians Peter Friederich Suhm and Gerhard Schønning, the Society of Science, the first of its kind in Norway. This was a society that was open to those who had contributed to the advancement of science, preferably by writing scientific works. The group was based on voluntary association, but it was closed in the sense that only those proving their qualifications in the sciences would be allowed to participate in meetings and take part in elections and other decisions concerning the Society (which by 1767 became the Royal Norwegian Society of Science). A second approach by Bishop Gunnerus was to call out to a large constituency of people, asking them to contribute to science by delivering natural specimens, antiquities, and other curiosities that could become part of the "natural-cabinet" of the Society.

Through this *crowdsourcing* project, a large number of objects and information arrived in Trondheim and became working material for the members, in some cases described in the journal of the Society, *Skrifter* (Transactions). A large network was formed, but in a largely star-shaped form by which the participants contributed directly to the center (the bishop), with little or no interaction between them (Brenna, 2011). The collection of the Society and the bishop was to form the core of the Museum of Science (Videnskapsmuseet) in Trondheim.

More than a century later, in 1873, Artur Hazelius founded the Scandinavian-Ethnographic Collection in Stockholm, which in 1880 he reorganized as the Nordic Museum. Annually, from 1882 onwards, Hazelius sent out an open call for museum objects to the readers of the yearbook of *Samfundet för Nordiska museets främjande* (The Society for the Furtherance of the Nordic Museum). In it, he urged readers not to hesitate in sending objects, since each specific historical form of human labor was of the utmost interest to the Nordic Museum. Alongside the open call, Hazelius established a vast network of collectors in the northern parts of Europe, and he instructed them on "how to collect" through extensive correspondences and publications. At the center of the network, Hazelius acted as the leader (*styresman*) of the Nordic Museum, and men and women of the upper and lower classes in various regions of the Baltic and Nordic countries operated as voluntary suppliers (*skaffare*) of museum objects (Bäckström, 2012; Hammarlund-Larsson, 2004). Hence, on the one hand, the museal object of knowledge was partly constituted by an engaged public of volunteer suppliers in a crowdsourcing network, which responded to the leader of the Nordic Museum's open calls and correspondences by sending more or less self-defined museum objects. On the other hand, the institutional framework of the museum was closed to outer influences, because it was formally organized as a foundation in the civil society with a board of trustees.

Historically, then, crowdsourcing may be considered democratizing in the sense that citizens were openly invited to contribute original specimens and material objects to the earliest collections organized by museums and scholarly societies. Although public submissions of original specimens and materials to natural and cultural history museums continues as a practice today, it is not the kind of crowdsourcing activity most often solicited by institutions and heritage projects. Instead, heritage crowdsourcing is generally a highly process-focused activity in specific projects with tasks related to digitized collection materials, such as the photo-masking, transcription, and tagging/classification of collection assets (Bonacchi, Bevan, Keinan-Schoonbaert, Pett, & Wexler, 2019). Such activities are increasingly popular in recent years, with crowdsourcing generally

> understood and applied to facilitate online co-curation and wider participation in harnessing a range of expertise, knowledge, ways of working, seeing and thinking with a view to rendering digital content more accessible, relevant and valuable for both current generations and for posterity. (Mutibwa, Hess, & Jackson, 2018, p. 4)

However, with participation frequently motivated by people's interests in performing specific types of activities in short-term, top-down organized projects, today "crowdsourcing cannot necessarily or always be defined as a democratizing form of cultural engagement" (Bonacchi et al., 2019, p. 177).

The examples above present Norwegian and Swedish museum sectors and heritage sectors as having both centralization and local impulses guiding participative practices. In Norway, tensions between these impulses are exemplified by countrywide associations in the first half of the nineteenth century and local heritage institutions in the twentieth century (Bjerke, 2009a, b; Myklebust, 1994; Talleraas, 2009). In Sweden, such tensions are exemplified by a regionally centralistic endeavor in the 1910s to use museums as teaching resources in elementary school teacher education in large parts of northern Sweden, and in the variety of local heritage associations (*hembygdsföreningar*) around the country in the twentieth century (Bäckström, 2010; Björkroth, 2000). Although organized in different kinds of associational and crowdsourcing practices, citizen participation shaped the historical developments in natural and cultural heritage institutions and organizations in Norway and Sweden. Tensions and negotiations as to who should have what kind of say, or the most say, and what is the most democratic form of heritage production, continue today.

Recent developments in participatory practices

In 1970, four county museum directors in Sweden published the debate book, *70-talets museum* (*The 1970s Museum*). The book critiqued the Swedish government official inquiry, *MUS 65* (The 1965 Museum and Exhibition Experts), for representing cultural values of past times and for obsolete, patronizing attitudes toward county museums. Moreover, the directors were skeptical of the newly founded national Swedish Travelling Exhibitions, described by them as a result of new centralization impulses in the culture and museum sector. As county-museum directors, they could not accept a national institution as the producer of exhibitions with county museums as passive recipients, particularly since the county museums already produced many of the activities (Hofrén, Hvarfner, Rentzhog, & Zachrisson, 1970). In the 1970s, a line of conflict in the museum and exhibition sectors in Sweden was thus drawn between a *cultural democracy model*, whereby activities for local communities

were initiated and implemented by state institution, and a *participatory model* in local communities that was supported by county museums. In this conflict, different views on the 1970s concept of "everyman's right to culture" were brought into play; that is, the idea of citizens' rights to participate in shaping cultural and museal activities and to take active part in societal issues. These tensions do not alter the fact that the 1970s activities of social inclusion by the state and regional institutions proved to be very influential for the late twentieth-century Swedish museum sector.

Norwegian museum governance was more decentralized than in Sweden, and there was no institution in Norway that had the same function as the Swedish Travelling Exhibitions, producing national tours of cultural-history exhibitions. When, in the beginning of the 1970s, strong voices in Norway lamented the "museum crisis," the preconditions were thus quite different from other Western countries. In Norway, when there were discussions regarding local museums versus national institutions, the local would more often than not win out. However, similar important principles remained to be negotiated: local participation, environment, and cultural democracy. The beginning of the 1970s also saw the ecomuseum movement introduced more broadly to the international museum community, and it soon acquired momentum in Norway. Throughout the twentieth century, folk museums and open- air museums became the reigning paradigm for museum establishments; around 1970, Norway had 203 folk museums, and only 57 museums of art, arts and craft, natural history, and special museums of different kinds. These museums came in various forms, as national, regional, or local institutions, but the rationale behind all of the smaller museums was a vision of democratic ownership of heritage and the development of democracy through participation in heritage activities (Talleraas, 2009).

The ecomuseum movement addressed the museum crisis by trying to redefine the character of the museum institution precisely through new participatory practices, spurring discussions led by Hugues de Varine, the director of ICOM (International Committee for Museums), among others, on new ways of organizing museums. Examples of newly established practices from this time include "integrated museums" in South America, "neighborhood museums" in the United States, and ecomuseums in France. Among the most important aspects of these ideas was the notion that the government should run a museum together with local inhabitants of a place. For many proponents of the ecomuseum, the local museums, folk museums, and outdoor museums of the Nordic countries served as inspiration for thinking about how such museums could develop (Gjestrum, 2001).

Early on, then, Nordic museums have tried to solve the dilemma of how to combine expert knowledge and the participation of the public when

establishing who should have the final say and the right of determination about heritage collection, management, and communication at local and national levels. However, just as modes of participation can be powerful in terms of bringing new knowledge and artifacts into the museum, they also invite critique regarding how collections and exhibitions are institutionally organized; for decades, museums have been contested and scrutinized, not least by those who have been and still are excluded, whether women, workers, cultural minorities, indigenous people, or LGBTQ.[1] Such challenges risk destabilizing the authority and power in heritage and other types of museums in representing, communicating, and managing collections and content, an activity referred to as *curation*. Consequently, there is perhaps no more controversial sphere for combining expert knowledge and the participation of the public than the co-curation of collections and exhibitions.

The 1960s and 1970s *nouvelle muséologie*, with its ecomuseum, situated the sharing of curatorial authority – historically a clear domain of the museum – at the center of practice (Davis, 1999; Mensch, 1992), and co-curating heritage became "an important political goal for museums" during this period (Austin, 2018, p. 48). As described above, ambitions were high during these years for museums to serve as agents of change by addressing societal problems and environmental conservation, among other issues. From the 1990s onward, curatorial aims for broadening access to shared material and cultural heritage included digital platforms, which were top-down designed in keeping with established institutional practices and protocols (Mutibwa et al., 2018). The inclusion of new voices and community-led engagement was further augmented by increasingly ubiquitous Internet access and public participation in social media via smartphones, tablets, and personal devices in museum settings (Mutibwa et al., 2018; Pierroux, 2019; Samis, 2019), developments that served as context for the *participatory museum* concept launched by Simon in 2010. In the following sections we consider these two intertwined developments and their impact on museums as sites of participatory democracy and design: citizen engagement in *curatorial* and *mediatization* processes (Drotner, Dziekan, Parry, & Schrøder, 2019).

Co-curating heritage as postcolonial democratizing practice

The authority of museum curatorial expertise can be put into question when representatives from source communities (people from whom artifacts originate), or communities of interest such as activist groups, LGTBQ associations, or religious groups, are invited to co-curate representations of their own heritage or communities, whether in a museum's catalogues, exhibitions, or website. A fairly recent development in collaborative museology projects (Peers & Brown, 2003), co-curating addresses source communities'

dissatisfaction with the colonial nature of past practices of collecting, conserving, interpreting, and exhibiting their heritage.

Decolonization of museum practices is a pressing issue in Europe today, and evolving rapidly. Nordic countries have notably initiated several major repatriation initiatives: from the National Museum of Denmark to the National Museum and Archive in Nuuk, Greenland; the Sámi (the only recognized Indigenous People of Europe) collections from the Nordic Museum in Stockholm to Ajjte in Jokkmokk; items of the Roald Amundsen collection of the Cultural History Museum in Oslo to Gjøahavn, Canada; and the entire Sámi collection of the Finnish National museum to Siida museum in Inari starting in 2018 (Gabriel & Dahl, 2007; Silvén, 2011; Wang, 2018). In 2012, two museums based in Norway's capital city, Oslo, the Norwegian Museum of Cultural History (NMCH) and the Cultural History Museum (CHM), along with the Sámi Parliament (Sámediggi), decided to return half the collection of Sámi artifacts owned by the Oslo museums to six regional Sámi museums. These museums engaged in a process of repatriation called *Bååstede* (or "Return" in Southern Sámi). In June 2019, in Kautokeino, Sámidiggi and the two capital museums signed over ownership of artifacts to be transferred to Sámi museums, marking a significant milestone in the *Bååstede* process. The return, however, is by no means over and, despite great progress, essential elements of the restitution remain unresolved.

A Norwegian model of repatriation based on the equal sharing of collections between capital and Sámi museums has provided unique insights into how collaborations and co-curation of heritage take place. From 2013 to 2019, the parties involved – Sámediggi, NMCH, CHM (including one of the co-authors of this chapter, Gro Ween), the Sámi Museum Association and individual regional museums – have approached each object in the collection according to a number of criteria (representativity, uniqueness, aesthetics, local origin, origin as ethnographic object, significance within the collection, local significance, and relation to other items) to ensure as much as possible that each museum received a representative set of artifacts of relevance for them. In the case of *Bååstede*, the process of sharing artifacts generated not only new knowledge about individual items, but also a particular way of working around artifacts. Particular group dynamics were created among experts with various forms of knowledge relating to the collections (knowledge from archives, from local history, craft practices, practical uses, or conservation). The systematic methodology that developed in scrutinizing the artifacts and archival material led to increased awareness of colonial legacies in the museum, and promoted collaboration to revert these legacies.

The collections are now more accessible than ever before thanks to efforts as part of *Bååstede* to enhance digital documentation and access – including translations in Sámi, additional documentation, and crowdsourced knowledge. Information from museum databases has been made available on a digital platform called *DigitaltMuseum*. This platform was designed to make *all* Norwegian museum artifacts publicly available, and participants from mainstream and Sámi museums first explored issues of suitability and sustainability for its specific use for Sámi heritage collections. This is not a trivial task, as acquisition and preservation protocols in national museums have been critiqued by local communities as structural and ideological bearers of implicit agendas in representing expert historical narratives (Mutibwa et al., 2018). In the absence of a clear and coherent digital strategy, digitization principles and ethics were some of the initial topics under negotiation.

In this project, *DigitaltMuseum* may be understood as a *boundary object* (Star & Griesemer, 1989) for the participants. Star defines boundary objects as "a sort of arrangement that allow different groups to work together without consensus" (2010, p. 602). Star and Griesemer (1989) originally wrote about boundary objects in an article on the founding of the Berkeley Museum of Vertebrate Zoology, which still exists today. The authors showed how the museum's founding director was able to enlist university administrators, amateur naturalists, farmers, and trappers in the development of a scientific institution focused on the ecology of California. In boundary work, people with different priorities, interests, and ways of working may not agree on what they are going to do, or how they are going to do it, but they manage to get things done together anyway. A boundary object might be material and physical, like a Sámi ceremonial artifact, or immaterial and abstract, like a database of information about a museum object. Whether physical or immaterial, a boundary object is recognizable to people in different social worlds while its meaning and use may differ. This recognition makes it possible to agree on some vague, shared interpretation of work across the boundaries of social worlds and to simultaneously apply a more specific, local, or tailored use and interpretation when working within their respective social worlds.

At the organizational level, in the immediate and short-term boundary work between museums and Sámi communities, *DigitaltMuseum* operates as a documentation tool for the repatriation of images and aspects of intangible cultural heritage (such as local knowledge, oral history, Sámi terminology, etc.), with knowledge gained through the *Bååstede* process also included in the records. The collection is currently translated into Sámi languages, and knowledge from the community relating to the artifacts may be shared and incorporated in the database using a comment field on the website. The aim of medium to long-term boundary work, which was established during the

collaboration process, is to link *DigitaltMuseum* to other digital platforms to ensure that the artifacts but also a range of other resources are shared – for example: photographs, films, and documents; oral testimony and other audio files; and materials showing craft techniques. A mutual interpretation of the boundary work is thus to create richer contexts for artifacts, to trigger broader processes of memory retrieval, and to contribute to processes of cultural regeneration.

Yet the extent to which Sámi museum workers and other audiences will use *DigitaltMuseum* is unknown, as is the answer to the question of whether, and in which ways, co-curation will further the democratization of knowledge. On the one hand, the *Bååstede* repatriation project is the logical continuation of historical modes of democratic participation in Nordic museums described above, that is, crowdsourcing and associational. However, a principled democratization issue emerges when a museum's mandate of making collections accessible to the general public must also respond to an indigenous people's needs to manage and, in some cases, restrict public access to knowledge. On the other hand, *DigitaltMuseum* presents a number of postcolonial issues: it was not designed specifically for the Sámi collections, but rather is a centralized access point for diverse collections belonging to Norwegian and Swedish museums (Wold & Ween, 2018). The catalogue is standardized; it classifies and describes artifacts using a universalizing reference system based on a Euro-American understandings – for instance, favoring clear distinctions between persons and things, the natural and supernatural, or tangible and intangible. Sámi views and values may as a result be silenced or translated in ways that bear little resemblance to original meanings. Even if classifications of objects and significant categories are renamed in Sámi languages, the colonial categories in the digital structures remain unaltered. Accordingly, this case illustrates the nature of boundary work in citizen humanities when transforming institutional, epistemic, and technological infrastructures – or *divides* – embedded in cultural heritage practices.

As part of the late twentieth-century "new museology" (Vergo, 1989), critical approaches to exhibition strategies and pedagogical content were implemented to produce alternative histories that encouraged audiences to reflect on, rather than accept, the voice of an authoritative knowledge. Awareness of past acts of colonialism prompted curatorial efforts to rewrite history – through exhibitions presenting other kinds of histories and through repatriation exercises and collaborative research designs. Questions emerged about how to make the museum a place where all ethnic, cultural, and religious components of society may feel a sense of belonging (Goodnow & Ackman, 2008). These are issues of institutional practices but also of how to work with the communicative potential of digital and social media and

technologies in museum programs and exhibitions to tell new and sometimes fragmented narratives, celebrating not only science and nation, but also telling tales of treachery, pain, assimilation, oppression, and exclusion. Ultimately, these may be viewed as issues of *participatory design*: a term initially applied to a Nordic approach of navigating conflicting interests among different participants in the design of socio-technological systems.

Participatory design as democratic practice

Participatory design has Norwegian roots as a concept and practice from Kristen Nygaard and Olav-Terje Bergo's research project with the Norwegian Iron and Metal Workers Union in the 1970s. The approach is anchored in principles of democracy and democratization, including the beliefs that people in an organization need to be involved in decision-making that will likely affect their work, that values are intrinsic to design, and that contradictions and tensions can serve as resources in design processes. Moreover, based on the understanding "that scientists are responsible for the social consequences of the technologies that emerge from their research" (Bratteteig, Hannemyr, & Kaasboll, 2003, p. 124), participatory design is informed by the need to work together to achieve change in social practices. The democratic and socially responsible principles of participatory design, then, are similar to many of the fundamental ethical and political values and aims that drive endeavors in citizen humanities and citizen science.

Referred to as a Scandinavian approach, participatory design remains influential among different "research through design" paradigms focused on social innovation and formative change – for example, Living Labs, Mass Collaboration, Cloud Computing, and User Co-Creation (Pallot, Trousse, Senach, & Scapin, 2010). In museums, early examples of participatory design include exhibitions produced together with worker-class populations in industrial towns, while more recent collaborations such as those described above explore the design and use of digital platforms in repatriation work with source communities. At the same time, although participatory design methods aim to incorporate the "authentic concerns" of citizens, Stuedahl (2019) reminds us that participation does not necessarily mean an equalizing of power relations between citizens and decision-making in organizational structures like museums. A recent study of digitized cultural heritage in Denmark is not unusual in finding that despite "participation" as a democratization goal in museums, "the actual dominant discourses are informed by a rather passive view of the users" (Myrczik, 2018, p. 3). A similar recent study by Wold and Ween (2018) of digital initiatives in Nordic museums found that platform designs mostly flouted citizen agency and that "museum audiences

have been largely ignored" (p. 90), despite being framed by EU visions and goals for cultural heritage's democratic and transformative potential.

These findings thus differ from the utopian potential for social inclusion, democratization, and participation envisioned with the introduction of personalized, mobile, and Web 2.0 technologies in the 1990s. This decade kicked off an explosion in the development and testing of promising digital prototypes to foster new communication modes, create new outreach strategies, and allow for new forms of citizen engagement, with museum collections and exhibitions serving as ideal testbeds for experimentation (Pierroux, 2019; Samis, 2019). In policy debates during this time, such experimentation in museums and other cultural institutions were alternatively praised and critiqued for close ties to trends in New Public Management, technology and innovation, globalization, and the creative industries. In the Nordic countries, where a majority of cultural institutions are publicly funded, studies of cultural policy found museums generally resilient to such neoliberal trends, in spite of the economic crisis of the 1990s (Kangas & Vestheim, 2010). Today, as Samis (2019) notes in his historical account of technology developments in art museums from 1991–2017, much of this large-scale media experimentation in museums has subsided. Samis views the "normalization" of media communications as more practical than ideological, however, as the challenges and costs of implementing innovative and media-rich ubiquitous systems in museums using emergent technologies are not trivial, and several large museums have failed in the attempt.

In recent decades, then, perhaps the largest democratizing impact of social media and new technologies on practices in the museum and cultural heritage sectors is the shift in politics and values, with "participation" seemingly superseding "quality" in museum mission statements (Brenna, 2016). This fundamental change in values is linked in no small way with the participatory features of social media and socio-technological platforms and the general acceptance and implementation of participatory design approaches. According to Drotner et al. (2019), the particular emphasis on participation as an organizational value in museums is the result of mediatization: "a long-term, longitudinal process that implies transformations of practice and institutions taking place as an interplay between changes in communication and media and the personal, societal, political and cultural contexts in which they operate" (p. 8). Consequently, as participation translates from idea or value into actual practice, it is possible to critically trace how the participation of different publics becomes a force of transformation. Indeed, in the museum and heritage sectors, participatory designs are the new *modus operandi*, involving visitors in creating new gallery technologies and narratives, recruiting communities in co-curating exhibition programs and collection

databases, and engaging citizens in the development of socially responsible science and museums (MacLeod, Austin, Hale, & Ho Hing-Kay, 2018). Nordic museums have increasingly embraced these ideas as well, spurred by market-based aims of increasing national economic competitiveness and reaching new audiences but, we propose, also influenced by the democratization politics of these larger participatory forces, aims and technologies.

Conclusion

This chapter has examined ideas of museums as sites of participatory democracy and design, with a focus on historical and contemporary developments in museum practices in Norway and Sweden and the ways in which participatory practices may or may not work in democratic ways. In tracing a historical trajectory, we identified crowdsourcing and associational participation as two ways that relations between citizens and institutions doing cultural heritage work have been organized from the 1760s onwards. We have shown that it is relevant to speak about associational and crowdsourcing participation in the eighteenth and nineteenth century. However, it is also important to recognize that the democratic features of citizen participation being reformulated during this time were much narrower relative to the inclusionary aims of citizen humanities today. In shifting from political idea or societal value to actual practice in cultural heritage institutions, citizens with real power to make contributions were men of position in society – that is, up until the 1870s, when the Hazelian activities came to include voluntary suppliers from farming and fishing communities as well as upper-class women. We then considered how newer initiatives are similarly based on sharing the responsibilities, ownership, and management of heritage, specifically focusing on the inclusion of source communities in co-creating and co-curating knowledge in museums. These initiatives entail not only sharing curatorial authority and authorship with source communities, but in some cases, integrating the input of source communities requires relinquishing or recasting curatorial control – for example, amending practices of classifying and interpreting heritage using universal categories or restricting general access to collections to accommodate indigenous people's right to exclusive access to some knowledge. These issues were illustrated in a repatriation case, which shows how co-curating may be seen as a logical extension of historical practices, in general alignment with societal principles of social inclusion and equality. The case also illustrates the potential of citizen participation to transform museums in unprecedented ways, furthering but also challenging democratization principles, such as assuring all citizens equal rights to access and interpret cultural heritage. In following these developments in a Nordic

context, we highlighted the democratic roots of participatory design and boundary work: approaches developed, tested and implemented in museums to foster new knowledge and citizen engagement in crossing institutional, epistemic and technological divides. In considering how different participatory conceptions and practices have worked in museums in different political and historical contexts, we can conclude that museums continue to play an important role in reformulating and contributing to contemporary notions of democracy, heritage, and participation.

Note

1 Lesbian, Gay, Bisexual, Transgender, Queer/Questioning.

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Chapter 3

Participation and engagement in a world of increasing complexity

Bernard Schiele

This chapter explores contemporary forms of citizen participation and engagement that give voices to those who, historically, have been excluded from debates on issues of concern to them. For the three decades after World War II, scientists were undisputed figures of authority and the public the passive receptacle of knowledge. Because their lived experience and knowledge were undervalued, and because they did not meet recognized competency criteria, they were deprived of the right to speak. Instead, that right fell to those who could demand it, especially in fields of expertise in science and technology.

A paradigm shift took place at the turn of the 1980s: the public started questioning science and scientists and was gradually integrated into the evaluation, development and application processes of science. From a limited number of actors engaged in simple one-way communication, a plurality of actors has now emerged, engaging in complex multi-way interactions. The latest iteration of these complex multi-way interactions is often termed "participation" or "engagement." This chapter discusses the underlying factors of this paradigm shift and the new modes of participation and engagement that have emerged, and are still emerging, as well as the venues in which they are deployed.

The monopoly on the right to speak, reserved for those few, is now called into question in part because the problems facing contemporary societies need solutions that go beyond a narrow techno-scientific perspective. Moreover, the mode of interaction now called public participation or engagement involves a two-way communication between experts, scientists, decision makers and laypeople – the uninitiated, the non-specialists, citizens. This is a change, then, unlike one-way science communication, which until now has characterized and dominated the relationships between the scientific community (or its representatives and spokespeople) and the general public. In tangible terms, public participation and engagement involve decision-making processes on questions that affect a community (for example, environmental

and health risks). Actors of diverse competencies and interests unite around these questions so they can interact to reach a consensus. The engagement can be direct (public meetings; panels of experts and citizens; public hearings; deliberative groups; and so on) or indirect (public consultations, discussion groups and the like).

A short historical background

1945–1980: undisputable science

Simply put, one-way communication of information and scientific knowledge from experts to laypeople characterized the 19th century and the greater part of the 20th century. Essentially, however, the impact on society of sciences and technics – we were not talking about "technologies" back then – was minimal. Only gradually did they gain a hold on society, with the concomitant power that that entails. The development of the atomic bomb during World War II was the watershed moment that revealed to all the transformative power of scientists' knowledge, especially that of the physicists (Bush, 1945; Rhodes, 1980). From then on, all other forms of knowledge being depreciated, scientific or technical solutions were favored above all (Snow, 1959). The scientists' authority was absolute.

The creation of the Office of Technology Assessment (OTA) by the United States Congress marked a shift. Its mission was to analyze public policy issues with significant and technological components. At the beginning of the 1970s, it became evident that technologies had significant positive and negative impacts upon the environment and society, while the means to understand and evaluate them were inadequate.[1] The OTA's mandate went beyond the mere evaluation of scientific and technological policies. To fulfil its mission, it relied not only on scientific and technological experts but also on panels of members of communities that might be affected by those developments and policies. In the same spirit, evaluation reports were written in such a way that technical complexities could be understood by laypeople. Thus, the OTA contributed to a triple democratization of the science and society debate

- by including laypeople in its proceedings, it signaled that its definition of the impact of science and technology went beyond purely scientific and technological criteria
- by making its reports easily understandable by laypeople, it contributed to the scientific education of the public
- by making its reports easily accessible, it contributed to awareness raising and the mobilization of the public.

For those reasons, the OTA can be considered the first of the many public engagement initiatives that characterized the 1980s.[2]

The first consensus conferences, beginning in the late 1970s, were conceived and configured to improve the quality of patient care. Inspired by the United States Office of Medical Application of Research (OMAR), these conferences had the same objective: to ensure that biomedical research contributes to the improvement of care practices. Consensus conferences sprang from the American "science court" – a procedure advancing the concept that controversial science questions may be resolved by an adversarial debate among proponents of competing approaches (Jorgensen, 1995, *passim*). But those discussions took place behind closed doors. The need to base medical practices on a consensus acceptable to both professionals and the public led to OMAR's development and today's model of consensus conferences (Jorgensen, 1995, *passim*). First adopted in Sweden, then in the Netherlands, these conferences spread quickly in Europe. For the period from 1982 to 1995, Jorgensen counted nearly a hundred focused on medical issues. France, with nine conferences, ranked fifth after the Netherlands (23), Sweden (19), Denmark (13) and the United Kingdom (10) (Jorgensen, 1995, p. 19). Controversies over the growing impact of technologies on society spurred efforts to give the public a greater participatory role in analyzing that impact, for instance in assessing science and technology policies. Apart from Europe, other countries, including Japan, South Korea, Australia and New Zealand, also had to play the public participation card.

1980 to today: environment and mobilization

In parallel, the growing importance of environmental issues helped to consolidate the public engagement movement. From the 1980s on, in response to growing global environmental degradation, they became a global concern. The Club of Rome's *The Limits to Growth* report maintained that unlimited economic growth, accompanied by increased pollution, was outpacing our planet's renewal of resources; hence, shortages would inevitably follow (Meadows, Meadows, Randers, & Behrens, 1972). In 1987, the United Nations published the Brundtland Report, *Our Common Future*, which laid the groundwork for the Rio Declaration of 1992 calling on everyone to work together to deal with the crises affecting the planet.

Our Common Future showed that those crises – the environmental crisis, the development crisis, the energy crisis – are all one.[3] The authors propose the goal sustainable development, which was prescient in the light of human and ecological catastrophes to come.

In Bhopal, India, an explosion in December 1984 at the *Union Carbide India Limited* pesticides plant, released a toxic cloud of methyl isocyanate

gas, killing nearly four thousand people. That industrial disaster led to a mobilization of the population and a solidarity campaign that remains active 34 years later.[4] The 1986 Chernobyl nuclear accident, which spewed toxic radioisotopes into the atmosphere, also stands out as one of the most serious disasters of the 20th century. Despite successive containment measures for the damaged reactor (the latest in 2016), decontamination remains incomplete. The more recent Fukushima disaster in 2011 demonstrated the interdependence of the components of a catastrophe. Its dramatic consequences have extended over a very long period. In reaction to the mobilization following Fukushima, Germany will opt out of nuclear energy by 2022.

Extensive media coverage of these events sparked public concern and awareness of the dynamics between economic development and environmental impacts, leading to a continuing global mobilization. On the one hand, technology assessment agencies have proliferated: there were only three in the early 1980s, while there are eighteen today (Sclove, 2010). On the other hand, they encourage public participation, yet without systematizing it. Some of the public engagement methods developed in the 1980s and 1990s are now used in the context of nanotech, biotech, genetically modified organisms, and so on (Wilsdon & Willis, 2004). Today, upstream engagement serves to anticipate innovations rather than merely reacting to them, and participatory processes imply wider governance issues.

The movement is now larger and multiform: its activities range from speaking at public meetings to co-producing new knowledge in participatory research.[5] It includes distinct modes of participation in the pursuit of specific goals. Although we can refer to it as a two-way communication between experts and laypeople, no definition can adequately encompass all its possible participatory practices. Thus, we must see this movement as involving a broad scope of distinct and distinctive practices. We must recognize that, when a situation so requires, social actors, as members of distinct communities pursuing their own collective interests, mobilize or are mobilized around issues in order to debate or reach a consensus among all interested parties. This raises two questions: What is "public engagement" or "public participation"? Who are "the public" in this context?

Paradigm change

The deficit model: a one-way communication mode

At the height of the dominance of scientific discourse, the *deficit model* was the hegemonic paradigm of the relationship between the lay public and the sciences, and on the role that scientists had to play. Now, in view of its impact

on science communication practices that developed after World War II, we can understand the deficit model as "an ideology in practice" (Schiele, 2008).

To put it simply, the deficit model relied on a series of assumptions, including that

- the general public was scientifically illiterate
- thus, they could not understand the work done by scientists, and even less understand or share the world view of scientists
- they could not appreciate the value of science and therefore could not discuss the issues that it poses
- before they form any opinion on science topics, they should know more science.

As a result, promoting science and public understanding of science became the leitmotif. Moreover, it was also believed that increasing the scientific knowledge base of the population would naturally lead them to take a positive attitude towards science. In short, greater promotion and valorization of science became both the objective and the strategy in order to raise the level of science knowledge and its positive perception among the general public. This kind of scientism, which conceals a "myth" at work, has since been discredited (Jurdant, 2009, p. 133 and ensuing).

In practice, the deficit model reproduced the dominant "school" model at the time, in which scientists and science communicators were teachers and the purportedly unlearned public were pupils.[6] However, this model cannot easily fill the knowledge gap between the public and the scientists, and the relentless pace of new knowledge production makes it even more unlikely to do so, regardless of the effort (Schiele, 2013). More problematically, the media usually present scientific news out of context. Thus, devoid of any meaningful signification, it lacks interest and relevance for the intended public (Gross, 1994). Finally, the deficit model strengthens a technocratic approach that limits the tackling of science and technology issues to experts.

Beyond the deficit model

From the 1990s on, attempts have been made to go beyond the deficit model, putting a new emphasis on two-way communication between scientists and the public, beyond the mere transmission of scientific knowledge. Recognizing the right of citizens to express themselves, be listened to, and be heard on issues that affect or may affect them is nothing short of a paradigm change. From now on, "citizens are entitled to a say on issues that affect their lives" (Einsiedel, 2010, p. 182), and not just experts. Thus, the issue moved from the

mastery of scientific knowledge to the exercise of democratic rights. In parallel, as a result of a profound change of mindset, it is now recognized that "lay people are able to grasp and deal with complicated technical matters and can bring valuable insights that may not otherwise be considered by experts" (Einsiedel, 2010, p. 182). In other words, their abilities are acknowledged, and their experience is taken into account.

This movement promoting public participation and engagement is built around the concept of deliberative democracy. Far from equating lay knowledge with experts' or scientists' knowledge, it considers that it is from the pooling of those knowledges that genuine solutions to the problems that affect all implicated actors will arise.

Understanding this paradigm change: some food for thought

Among the various trends pushing this change, we will focus on three,

- the impact of technoscience upon society
- the legitimacy crisis
- the explosion in communication technologies.

First, the global impact of science and technology upon society, the environment, labor structures, and daily life today is such that no one can remain indifferent. We see the global standardization of lifestyles and mindsets under a single rationality, the automatization of the workplace and the pervasiveness of social media as part of everyday life. In our modernity, the development of science and technology is the main dynamic behind these social transformations, and nothing remains immune to it. Knowledge production is now systematically organized around communities, groups and areas of influence in order to stimulate an innovation regime that constantly accelerates the pace of these transformations. In reaction, we observe the strong mobilization of actors of whom is expected a constant adaptation to an unceasingly reorganizing framework of existence.

Consider, for example, the debate sparked in the United States and Canada by the Keystone XL pipeline project, which was vetoed by President Obama but recently reauthorized by President Trump. Once connected to the existing system, it will link the output of tar sands oil exploitation in Canada all the way to Texas.[7] The controversy places into opposition those who view the project as conducive to economic and therefore social development and those who see it as detrimental to the environment and thus to their well-being. Thus, science (nowadays technoscience), which was once synonymous with progress and hegemonic in a world permanently changing, is now viewed

as ambiguous because its many promises entail an element of risk. This is why Britain's House of Lords' Select Committee on Science and Technology declared that "society's relationship with science is in a critical phase" (Select Committee, 2000).

Second, in parallel – and probably as a result – we observe a legitimacy crisis of authority figures, including science. Therefore, science mediation is now synonymous with the involvement of a public that no longer wants to be kept apart from decision-making that may affect it, especially on questions involving social choices. The public is not stupid: what are advertised as purely scientific or technical questions usually also involve social, economic, and ethical questions. To exclude them from the debate fosters doubt and resentment. When facing their consequences, no one has a greater say than the rest.

The renewal of the nuclear debate, like that on new energy sources, illustrates this new mindset perfectly. Called "citizen participation" in English-speaking countries, the movement no longer seeks an impossible rise in individual and collective knowledge, but instead emphasizes the impacts of technoscience's encroachment on society. Hence, the debate now focuses more on participation and dialogue than on dissemination. Moreover, the idea of dialogue implies reciprocity; in other words, it involves equal partners. Thus, it is not enough to be a scientist or an expert to be listened to, let alone to have the final say.

In recent years, controversies over such things as the 2010 Gulf of Mexico oil spill and the concealed effects of the weight-loss drug, Mediator, in France have, among many others, played an important part in shifting public opinion. Such participation must be seen as a reaction to the impact of science on society and to the interests at stake. With a public at once welcoming and wary of science, it is difficult to foresee anything but direct interaction. This is the wager of science mediation.[8] The will of the public to participate has become a social reality.

Acknowledging this new reality, the Romanow Commission on the Future of Health Care in Canada, breaking with the usual mechanisms of consultation, listened to the public by organizing, in addition to traditional consultations, televised forums in universities and online conversations. In addition to one-way communication with the public, which in the science popularization model flows from the scientific elites to the public, forms of participatory public engagement are now commonly used. These two-way approaches take place in forums that foster dialogue and mutual learning by researchers, experts, citizens, and policymakers. These are thus interactions both between scientists and the public and, more importantly, between social partners. Among many examples, we can count national and local

consultations, deliberative polling, consultative committees, citizen forums, consensus forums, stakeholder dialogues, and Internet forums.[9] This multiform movement bears witness to the evolution of expectations, mindsets, and public attitudes to science and technology, and more generally to scientific and economic development policies.

Third, although the phenomenon is well established, we cannot avoid examining the explosion of communication technologies and of information and knowledge production centers. The pervasiveness of those technologies yields a constant flow of information that not only subverts traditional forms of communication and dramatically increases the number of (often contradictory) information sources but also results in the creation and development of new forms of participatory collaboration. Thus, it becomes increasingly difficult to "differentiate information from knowledge, opinion from judgment" (Jantzen, 1996, p. 10). This proliferation of immediately accessible discourses by Web users, regardless of their physical locations, far from allowing the expansion of knowledge, tends on the contrary to limit those discourses to their function as signs. This explosion of snippets of information can readily be qualified as *pseudo-events*, as defined by Debord (1967, p. 90):

> The pseudo-events that vie for attention in spectacular dramatizations have not been lived by those who are informed about them; and in any case they are soon forgotten due to their increasingly frenetic replacement at every pulsation of the spectacular machinery. On the other hand, what is really lived has no relation to the society's official version of irreversible time, and conflicts with the pseudo-cyclical rhythm of that time's consumable by-products.

However, when someone surfs the Internet in a systematic and investigative process, these technologies can provide a vast flow of information that destabilizes traditional forms of communication, reduces information sources and generates the possibility of new forms of participatory collaboration (Proulx, Poissant, & Sénécal, 2006). These new uses reshape current concepts of knowledge production and acquisition; they redefine science culture, rethinking it in a perspective of the co-construction of knowledge obtained and developed in self-operating contexts (Heaton, Millerand, Crespel, & Proulx, 2011; Heaton, Millerand, & Proulx, 2010). For example, *Tela Botanica* is both a worldwide communication network and a community dedicated to producing and sharing botanical knowledge.[10] It enables botany enthusiasts, amateurs, and professionals to submit their observations about plants, to share and sort the information and to conduct research, but its most interesting aspect in the project to develop a true science culture is the

collaboration between scientists and amateurs, with their varying degrees of knowledge. *Tela Botanica* not only facilitates the dissemination of botanical knowledge – a traditional function greatly expanded by new forms of communication – but actively contributes to the building of knowledge through apparatus (Heaton et al., 2010, p. 63). As such, it fosters the concept of *lay expertise*. It is an example of the potential unleashed by communication technologies: remote interaction and communicational reciprocity contribute to the emergence of new organizational forms for knowledge production, dissemination, and appropriation.

One might object that neither insects nor plants are prime research fields today but hark back to the early sciences of the 19th or early 20th centuries, when they were pursued by amateur researchers, science fans, pensioners, and others. One might also claim that researchers call upon the general public because there are no longer enough scientists to efficiently count birds, snails, or bladder campion *(Silene inflata)*, a botanical species that grows in roadside ditches. Of course! But the *citizen science* movement merits attention in promoting collaboration between scientists and the population, as pointed out by Hecker (2016); it contributes to the production of pertinent data, which can also be useful in developing policies to confront the challenges of contemporary society.

In short, the move to a two-way mode of interactions to achieve a common goal signals a profound change in society. It relates to

- a transformation of the role of institutions in our modern complex societies
- an evolution of the relationship to knowledge (expertise is being redefined while previously marginalized forms of knowledge – often local – are now recognized and integrated into decision-making).[11]

Thus, the development of public engagement has something to do with the redefinition of the boundaries of knowledge fields in a world in which new synergies between expert and lay knowledge are growing, and new ways and means of interaction between people are developing.

The origins of participation and engagement

This evolution leads to a recasting of the science communication apparatus, the content of the exchanges and the interactions of its actors. The new keywords of participation and engagement, in reaction to the old model of unequal and unilateral communication of knowledge between the literate speaker and the illiterate listener, encourage symmetrical relationships

between actors. However, symmetry does not imply that actors can claim to have abilities and knowledge that they have not acquired: physicists, chemists, biologists, and other scientists will remain scientists, accountants will remain accountants, and so on, because roles and abilities are not permutable. That is not the issue.

We must now reflect upon the distribution of knowledge within society by considering two factors: the role of researchers today, and the evolution of disciplines. Science allows us to form a world view and to understand the place we have within it, so the progress of knowledge is indispensable. However, that is not what is expected of scientists today. Scholars of the 19th and 20th centuries assumed that role, but the evolution of scientific practice transformed scholars into researchers: research has now become a profession (Gibbons et al., 1995). Now every researcher has their own area of expertise, and the research they do is far removed from daily life.[12] In short, the gap between new discoveries and common knowledge can only grow.

As a result of this process, the knowledge gap among scientists themselves can likewise only grow: an astronomer is not an astrophysicist; they live in different worlds, foreign to each other. Areas of research are constantly fragmenting into new ones, like islands in an extremely large and expanding archipelago (Lévy-Leblond, 1984). "Our society isn't characterized by an enormous hiatus between those who possess knowledge and those who don't, but rather by a multitude of fissures separating the specialists, the specialists within their specialty, and laypeople – each one alone on their own island" (Schiele, 2006, p. 14). In other words, the knowledge of not only laypeople but experts as well is merely local and situated (Irwin, 1995), distinguishable only by the area where they are mobilized and the context within which their knowledge is applied.

But the professionalization of researchers and the fragmentation of disciplines does not explain everything. There is also the increasing interdependency of our modern world and, perhaps as a result of that (and paradoxically), our acknowledgement of the heterogeneity of society. First, the society we live in is often called complex. In fact, what we refer to is a society characterized by the growing reciprocal interdependency of individuals in which no one and no group can claim to be its center. Of course, some networks of individuals have a greater influence at times, yet they are "linked in multiple ways such that they form interdependent associations" (Elias, 1991, p. 10). This interdependency is manifested anew every time a break in the balance of the groups happens, because it reverberates through the whole social body. Concisely, our modernity has come to realize the nature of this interdependency and of the risks that breaks in the balance pose to it. This is why collaboration, participation, dialogue and so on are the words that come up most often in the drafting of

strategies when major changes are expected. This applies whenever what is at stake is the impact of science and technology, because they always have social outcomes involving diverse social actors. This explains in part the consolidation of the public engagement component in science communication.

Second, the deficit model paradigm referred to an undifferentiated public. It seemingly viewed science, scientists, and the public as representing homogeneous entities. Questionnaires designed to assess the public's science culture[13] all used this premise, even when socio–demographic and socio–professional variables were refined: an average individual stood in for an undifferentiated public. However, no public is monolithic. "Members of the public differ in personal experiences and knowledge, educational achievements, cultural backgrounds, personal beliefs, income, and so on" (Allgaier, 2010, p. 132): the public is heterogeneous. Pierre Bourdieu, during a famous talk, showed that public opinion is a social construct, an "effect," produced by the very investigative process that aims to uncover it. Furthermore, as he said, "It does not exist in the form which some people, whose existence depends on this illusion, would have us believe" (Bourdieu, 1980, p. 224). The very design of the investigation process "tends to minimize conflicts and oppositions" (Bourdieu, 1980, p. 234), all of which creates differentiation in the social sphere. Furthermore, the deliberate reductionist approach of the deficit model erased all the potential vested in the *situated knowledge* of the citizens. However, it is on this diversity that the promoters of participation and engagement in science communication now focus their efforts, with the aim of mobilizing it. Thus, the citizen science movement brings together volunteers and scientists to work on research projects. For example, the Birdhouse Network, a project based at Cornell University in the United States, calls upon volunteers to gather observational data to add to an ornithology databank (Phillips, Lewenstein, & Bonney, 2006), just as *Tela Botanica* brings together a community of enthusiasts and scientists to produce and share botanical knowledge. There were some fifteen thousand people involved in 2011. Networking and discussion forums enable the production of new types of knowledge, while being representative of the emergence of new modes of knowledge production, and as such are truly "epistemic communities" (Heaton et al., 2010, 2011; Millerand et al., 2011). Communication technologies, the structuring effects of which have already been mentioned, are powerful stimulants for this type of online community.[14]

Finally, these transformations are based on the equality of interlocutors and the reciprocity of their exchanges as well as a greater transparency, since it is the conjunction of those three factors that make successful participation and engagement possible. The favored *modus operandi* is a deliberative process towards a decision, also known as *deliberative democracy*. For these very

Table 3.1 From deficit paradigm to engagement paradigm

Relationship	*Deficit paradigm*	*Engagement paradigm*
	One-way communication	*Two-way communication*
Interrelation	Asymmetric	Symmetric
Interpersonal	Compel	Collaborate
Interaction	Authority	Equal rights
Condition	Dependence	Autonomy
Behavior	Submission	Reciprocity
Personality	Undifferentiated	Differentiated
Knowledge	Transfer	Mutualization

reasons, the greatest possible participation is preferred. Table 3.1 summarizes the transformations that we are witnessing.

Modes of participation and engagement

As a provisional conclusion, since this is an ongoing evolution, we assert that *participation* and *engagement* can be grouped into three modalities:

- modes promoting dialogue
- modes promoting engagement
- modes promoting knowledge co-production.

Modes promoting dialogue

Modes promoting dialogue range from "information transmission to information exchange or critical dialogue" (Einsiedel, 2014), which includes town hall meetings and science cafés, but also festivals, certain exhibitions, and online discussions. Table 3.2 shows two dialogue-optimizing participatory modes.[15]

Public meetings, town hall meetings, public hearings and the like are all informal public gatherings that deal with questions of public interest. They stem from the very old model of town hall meetings in the United States, which bring together public interest groups and government and non-government organizations for informal debates on issues facing a community, be it a social group, the residents of a village or neighborhood, or an entire municipality or region. Participants may be citizens, businesspeople or members of public interest groups, but also, at another level, laypeople, experts or scientists. Since the short-term objective is to make or recommend a decision, it is up to the meeting organizers to prepare the desired information for participants, to present it and to solicit contributions in the form of comments or additional

Table 3.2 Participation models

		Town hall meetings (Public meetings, public hearings)	*Science café*
1	**Short-term goal**	(1) Discussion about issues (providing information, reviewing projects) (2) Present information (3) Solicit input (comments, information on issues) (4) Decision-making	Facilitate dialogue (sometimes decision-making)
2	**Long-term goal**	Acceptability of decision	(1) Build up capacities and motivation among laypeople to deliberate and engage with scientists (2) Develop empathy for competing perspectives (3) Build up capacities to critically analyze complex socio-scientific issues
3	**Participants**	Citizens, laypeople, businesses, special interest groups, public officials, journalists, scientists, technical experts)	Scientists & laypeople
4	**Interaction**	(1) Face-to-face (discussion, deliberation, debate) (2) Audience facing a speaker, a panel	Face-to-face discussion
5	**Mode**	Democracy in action	Dialogic (two-way communication; no top-down agenda)
6	**Mood**	(1) Formal (rules of order) (2) Informal	Informal
7	**Topic**	Specific (air quality, waste management, health issues)	Science & technology (rather general)
8	**Process/output**	(1) Presentation (2) Questions from the audience	(1) Short talk (interactive style) (2) Discussion
9	**Organizer**	(1) Anyone (religious organizations, NGOs, public interest groups) (2) Organization (health, environment) (3) Government (county, state, federal)	(1) Anyone (2) In practice: academics, specialists (research institutions, research networks, government, science museums)
10	**Context**	(1) Community (2) Stakeholders	(1) Community driven (2) General public
11	**Venue**	Formal / Informal (school auditoriums, churches, municipal board rooms)	(1) Informal (coffee shop, pubs, restaurants) (2) Outside of academy (3) Food & drinks

Table 3.2 Cont.

	Town hall meetings (Public meetings, public hearings)	*Science café*
12 Critics	(1) Not an effective methods of science communication and public engagement (2) Geared toward minimal impact from citizens on the end result (3) Does not allow equal opportunity to citizens (especially for meetings about scientific or technical issues) (4) Could decrease trust	(1) Often reification of old school model (*deficit model*) (2) Promote science (3) Self-selected groups

Adapted from McComas, 2010; Powell, 2010

data. The long-term objective is to have all members of the community accept the decision – an approach that is emblematic of democracy in action. Also, the participants interact face to face during discussions, deliberations, and debates, either in interchanges between the audience and speakers or between members of a panel. The simplest form, adhering to formal or informal rules, involves the presentation of a problem, one which usually involves a practical concern such as air quality or waste management, followed by a discussion period. These meetings take place at locations as varied as school auditoriums, municipal halls, and churches, which are familiar spots for those taking part.

Some criticisms arise about the form and running of public meetings, concerning

- the minimal impact that citizens might have on the final decision, even after mobilizing around the issue and expressing their choices numerous times
- the unequal allotment of speaking time between experts and laypeople when the question has a scientific or technical component, which tends to orient the debate and decision-making accordingly
- the possibility that factors might dampen interest for future meetings
- the variable contributions of such meetings to the dissemination and socialization of scientific knowledge.

Science cafés are information meetings between scientists and the general public in a friendly and relaxed format. There is no decision to be made on any specific question. The stated objective is to foster and facilitate a direct

dialogue, face to face, between scientists and the public. The long-term and more ambitious objective is to develop the ability of laypeople to discuss things with scientists, to learn to juggle concurrent ideas, and to acquire the means to critically analyze complex socio-scientific situations. While anyone can organize a science café, in practice the promotors are mostly academics and scientists.

Science cafés usually take place in two stages: a brief presentation is followed by a discussion. Science museums are popular places for such informal exchanges because they facilitate them and can offer annual programming for visitors. But, as the name implies, these meetings may also happen in the relaxed ambience of cafés, bistros, restaurants, pubs, bars or coffee shops. Universities, labs, and schools are excluded, since they represent places of formal education, while science cafés seek to embody an alternative environment to encourage a different relationship to knowledge.

Despite their popularity, science cafés have their downsides, because

- while they aim to break from the academic model and are well intentioned, they tend to reproduce the dichotomy between those who know and those who do not know
- the promotion of science discourse tends to dominate any other consideration
- many participants come from groups auto-selected by their training and interest, which goes against the primary intention to attract laypeople and to demystify science.

Modes promoting engagement

Modes promoting engagement focus on deliberative processes between citizens in order to reach a decision. Some see this as a renewal of democracy in the form of deliberative democracy in the face of shortcomings of representative democracy as practiced by most institutions (Chambers, 2003). Thus, this is an adaptation of a political theory to the field of science and technology communication. Table 3.3 shows five engagement modes: consensus conferences, deliberative polling, scenario workshops, citizen juries or committees, and upstream engagement.

Consensus conferences, as the name implies, aim to bring citizens into the policy-development process in order to build consensus on questions of science, technology, health, and other matters facing society. In the long term, these conferences aim to promote and increase citizens' capacity to influence public-interest decisions and public policies. Consensus conferences require considerable resources, so they are most often organized by government

Table 3.3 Engagement models

		Consensus conference	*Deliberative polling*	*Scenario workshop*	*Citizens jury*	*Upstream engagement*
1	**Short term goal**	(1) Discussion & communication about issues (science, technology, health) that confront society (2) Reach a consensus	Guidance to decision matter (finding out what citizens would think about an issue)	(1) Different visions or scenarios of possible future (2) Solution options to particular problems	Judgment	Assessing impacts: (1) Policy impacts (2) Influence technology development trajectory
2	**Long term goal**	Facilitate citizen's abilities to shape public decision or policies	(1) Increase knowledge and issue understanding; 2) Might lead to opinion change	New ideas for future actions or policies		(1) Assessing possible interactions between a certain technology and society (2) Codevelopment of technologies
3	**Participants**	Four sets of actors: (1) Advisory committee (2) Lay panel (citizens from different backgrounds; 15–20 citizens selected from a previous sample selected randomly) (3) Expert panel (experts from areas relevant for a given technology) (4) Project management team	(1) Citizens (2) Experts	Citizens, stakeholders, representatives, policy decision makers	Randomly 20–25 selected citizens (as a legal jury is chosen)	(1) Public (2) Related interest groups (3) Relevant science communities (4) Policy makers
4	**Interaction**	Open deliberation	(1) Opinion survey (2) Discussion	Deliberation	Hearing evidence	(1) Dialogue (2) Deliberation
5	**Mode**	Public deliberation	Dialog: citizen-citizen, citizen-expert	(1) Open discussion (2) Deliberation	Deliberation	Discussion public experts
6	**Mood**	Formal	Formal	Informal / formal	Formal	Formal

(*continued*)

Table 3.3 Cont.

	Consensus conference	*Deliberative polling*	*Scenario workshop*	*Citizens jury*	*Upstream engagement*
7 Topic	Topical technology issues, e.g., GMFood; conferences held in Australia, Canada, Denmark, South, Korea UK, USA	(1) Policy issues (e.g.,: health care) (2) Energy topics	Any science or technology subject matter	Public policy	(1) Potentially disruptive / controversial technologies at an early stage (research / development) (2) Subject matters that usually remain outside science and society traditional discussions ---- Test case: nanoscience and nanotechnologies (RS, RAEng)
8 Process/ output	(1) Lay citizens learn about the topic (they are also involved in the selection of the experts) (2) Hearing and questioning the experts (3) Key issues to be addressed (4) Recommendations ----- Typically lasts 3 weekends:	(1) Opinion survey (randomly selected group +/- 1000); preparticipation questionnaire; (2) Presentation from experts on multiple sides; (3) Discussion with experts (4) Postparticipation questionnaire ---- Typically lasts a weekend	Flexible	(1) 4–5 days event (2) Witnesses present information	(1) Duration: up to a year (2) Mutual sharing and learning between publics and scientists

		Wd (1) Key questions to be addressed; selection of experts Wd (2) Hearing Wd (3) Hearing and meeting open to the public, the media and policy makers; draft of the report (by a writer who is not part of the panel); deliberation; final document is presented to the experts				
9	**Organizer**	Government, professional body, agency, recognized International organizations, institutions, research institutions	Anyone	Anyone	Anyone	(1) Government bodies (2) Private companies
10	**Context**	Issues that affect life (community, country, institution)	Community	Community, country	Community driven	Science-society relationships (potential collective risks, health or environmental hazards)
11	**Venue**	Formal	Formal	Formal / informal	Formal	Formal
12	**Critics**	(1) Pressure of time (2) Composition of the lay panel (i.e.,; difficult to find the right person; representativeness of the lay panel) (3) Composition of the expert panel (wishes and requirements of the lay panel are not necessarily met)	Cost (gathering a large sample of a population in a single place)	No evaluation yet	No evaluation yet	(1) Early debate on technology is problematic: lack of product, lack of public awareness (2) Lead to discussion beyond technologies (e.g., type of society people wish to live in)

Adapted from Besley, 2010; Crosby, 2010; Einsiedel, 2010; Joss and Durant, 1995; Rogers-Hayden, 2010

agencies, professional bodies, international organizations, or research institutes. This is partly why, in contrast with open and informal participatory modes, they seek a concrete solution to a given problem, and thus proceed according to a formal protocol that governs the selection of participants and the procedures for reaching a desired consensus. Participants generally fall into four categories:

- consultative committees
- panels of ordinary citizens, about 15 to 20 on average, selected from a random sampling
- panels of experts in particular fields
- project management teams.

In panels of citizens, the selected citizens, all laypeople, are given a basic introduction to acquire some minimum knowledge in the reference area. They then take part in selecting experts, who, after presenting on the case under study, answer the citizens' questions. Following their deliberations, the citizens are expected to formulate recommendations. Such a process usually take place in three encounters: the first is devoted to defining the questions and selecting experts; the second involves an exchange between the panel and the experts; and at the third, which is open to the public and media, the panel submits its preliminary conclusions to the public. After this discussion, a final report, prepared by a third party, is submitted to the experts.

While consensus conferences have sparked interest, observers complain that

- time constraints prevent them getting to the core of the issue
- the representativeness of the lay citizen panels is never guaranteed
- the recruitment of experts does not always meet the wishes or requirements of the lay panels.

Deliberative polling refers to opinion polls that include the principles of deliberative democracy. A deliberative poll samples public opinion to inform decision-making. It is a form of popular consultation to determine how citizens feel about a question, a problem, or a situation. In the long term, it aims to increase public knowledge, raise the level of understanding, and refine a preliminary opinion that the public may have. The consultation structure is formal but differs from consensus conferences, which bring together a limited number of laypeople, in that the survey results are presented by experts in different fields to a subset of around a thousand people who have already been polled, brought together for the occasion. The meeting usually takes place

over a weekend and wraps up with a post-participation questionnaire. Unlike consensus conferences, deliberative polling can be organized by anyone. The main criticism of this type of consultation is its high cost.

Scenario workshops, unlike consensus conferences and deliberative polls, focus on anticipating future problems. They look at future scenarios, or different solutions to a specific problem, projecting ahead to possible actions or policies. They bring together stakeholders, representatives of concerned milieus or policy decision makers, who debate any questions of science and technology that arise, either formally or informally, over several meetings of varying length. To our knowledge, no one has yet evaluated the pros and cons of scenario workshops. *Citizen juries*, like juries in court cases, have a simple objective: to make a judgment after hearing evidence. As in a legal case, over the course of a few days, witnesses give information and data to some twenty citizens selected at random. Then the jury retires to deliberate. As far as we are aware, no one has yet evaluated the up sides and down sides of citizen juries. *Upstream engagement* is a participatory effort aimed at anticipating the impact of particular, perhaps controversial, technologies that are being developed. In the short term, upstream engagement examines the potential impact of future technologies to envisage different policies that could govern them. These questions of potential interactions between technology and society are usually debated by four groups: the public, interest groups, the scientific communities concerned, and decision makers. The discussions focus on projects still in their preliminary stages, but that could be contested. The upstream actions take place over about a year and involve mutual learning based on reciprocal sharing of information among lay and scientist participants.

Critics of this approach maintain that

- a pre-debate on an as yet nonexistent technology is problematic because it takes place in the absence of the technology and of public awareness
- it leads too often to discussions on future utopias.

Modes promoting knowledge co-production

Essentially, modes promoting knowledge co-production bring together amateur volunteers, "citizen scientists," who collaborate with researchers to produce new knowledge. This process aligns with the wider transformation of knowledge production, which is increasingly object-oriented and for that reason is transdisciplinary. The research is often conducted by teams of digitally interconnected members operating from different localities. This mode is also made possible by the recent possibility of mobilizing a cost-free workforce

with a wide range of abilities. The recent acknowledgement of the contribution of traditional or indigenous knowledge, or the knowledge produced by patient organizations, takes place within the same process. Table 3.4 presents two models: science shops and citizen production.

Science shops attempt to articulate the science needs of civil society. A research project that is outside the current focus of the scientific community is undertaken by researchers to answer questions raised by a citizens' group, to clarify, from a scientific perspective, a situation being experienced by a community. The results and new knowledge from this research are communicated to everyone. In the long term, science shops seek to bridge the gap between science and society. These workshops are a way for researchers and students involved in a field to acquire communication skills while also developing their social and political awareness. Focused on problem solving, science shops put scientists (or scientific institutions) into partnerships with formal or informal groups that have no commercial interest in the question – an essential condition. The researchers also play a supporting role, apart from the objectives pursued by these groups. Mostly, it is universities that respond to such requests from different milieus and in differing social contexts. These projects are difficult to carry out due to the limited means of the citizens' groups and the lack of availability of researchers and students. Patience and effort are needed to find adequate resources and willing researchers.

Citizen science is the most ambitious type of participatory project, since it links up volunteers to produce knowledge as part of research led by scientists, driven in some cases by administrators and policy actors. Citizens engaged in such projects have to collect data to develop knowledge. The participants are recruited among science enthusiasts, amateurs, the curious, and so on. Irwin (2015) sets out four levels of participation:

- crowdsourcing: citizens act as collectors
- distributed intelligence: citizens contribute to the interpretation
- participatory science: citizens help define the problem and collect data
- collaborative science: citizens are associated with the collaborative research network, help define the problem, collect data and analyze it.

At this point, it is difficult to assess the scope of citizen science and foresee how it will evolve; there has not yet been an overall evaluation, other than a few case studies (Millerand et al., 2011). The potential for citizen participation is also uncertain, since the most likely participants are already involved in some way, thereby reinforcing auto-selection.

Table 3.4 Citizen-science models

		Science shop (from the Dutch word wetenschapswinkel, knowledge point, community knowledge exchange, community-based knowledge center, community-university partnership)	*Citizen science*
		Science meets civil society needs	**Co-construction of knowledge**
1	**Short term goal**	(1) Address an actual concern (outside of science) (2) Results become public (3) Sharing knowledge (4) Creating knowledge	(1) Data collection (2) Publication of the results
2	**Long term goal**	(1) Bridging science-society divide (2) For the researchers and students involved: communication skills, social and political awareness	Contribute to the development of knowledge
3	**Participants**	Scientists (researchers, students, staff) and organizations, such as: (1) Groups in civil society (2) Formal and informal groups (neighborhood, environmental, nature protection, minority, patient, labor (not for commercial interests)	Scientists & laypeople
4	**Interaction**	Partnership: (1) Interactive communication (2) Project oriented (3) Problem-based learning	Work directed by scientists
5	**Mode**	(1) Provide research support only (2) Research is independent (objective) and participatory (applicable in context)	Irwin (2015) distinguishes 4 levels: (1) Crowdsourcing (citizens as sensors) (2) Distributed intelligence (citizens as basic interpreters) (3) Participatory science (citizens participate in problem definition and data collection (4) Extreme (collaborative science – problem definition, data collection and analysis)
6	**Mood**	Formal (research is conducted)	Formal

(*continued*)

Table 3.4 Cont.

		Science shop (from the Dutch word wetenschapswinkel, knowledge point, community knowledge exchange, community-based knowledge center, community-university partnership)	*Citizen science*
7	**Topic**	Specific (e.g.: protecting fish in rivers, at hydropower plants, using crops for industrial production, noise of wind turbines at night)	Mostly natural and health sciences (space, climate, humanities, biology, physics)
8	**Process/ output**	PROCESS: provide independent participatory research support to issues and concerns raised by members of society 10 steps: 1- Relevant question (request) 2- Assess the situation (problem) 3- Preliminary research 4- Find a supervisor 5- Find a researcher (student) 6- Conduct the research 7- Presentation of the results (scientifically approved): presentation, papers, reports 8- Help implement the results or recommendations; follow up 9- Inventory of follow up research 10-Evalution	Protocol of data collection
9	**Organizer**	Mostly universities, NGOs	Universities
10	**Context**	Community driven	Volunteers
11	**Venue**	Mostly universities	Field work, field observations
12	**Critics**	Take time to find a student	(1) No (little) research on the impact of participating (2) Self selection process

Adapted from Allgaier, 2010; Lipinski, 2015; Irwin, 1995, 2015; Millerand et al. 2011; Mulder & De Bok, 2006; Mulder & Stappers, 2010; Vargiu et al. 2019

The likely future

This quick tour of current practices has been necessarily schematic: we claim only to have summarized some participation and engagement practices being tried today. Those practices can be seen as tentative answers to social and cultural transformations happening in today's societies – transformations that indisputably include citizens' desire to express themselves as stakeholders

in decisions that concern and will affect them. Time alone will tell whether these practices were the beginning of deep social changes. However, it already seems as if the demand expressed by the public for a right to speak signals an awareness of a strong link between science and the democratic process. That link implies a need to take into account citizens' concerns addressed to researchers, businesspeople, and politicians. The issue now is less about individually appropriating knowledge, as used to be the case, than about learning how to cooperatively solve problems by mobilizing individual abilities and collectively adopting strategies and means to that end. Therefore, it is obvious that the issue of public participation and engagement cannot simply be limited to empirical or technical solutions. It is a democratic requirement.

Notes

1 See Carson (1962) on the issue of negative impact. For a history of the OTA, see Bimber (1996).
2 Called "public engagement" in English-speaking countries.
3 "Until recently, the planet was a large world in which human activities and their effects were neatly compartmentalized within nations, within sectors (energy, agriculture, trade), and within broad areas of concern (environment, economics, social). These compartments have begun to dissolve. This applies in particular to the various global 'crises' that have seized public concern, particularly over the past decade. These are not separate crises: an environmental crisis, a development crisis, an energy crisis. They are all one." United Nations (1987).
4 See International Campaign for Justice in Bhopal, www.bhopal.net/tag/summon/.
5 In the United States, a town hall meeting is an informal meeting to which citizens from a neighborhood, village, town, or city come for information and to give their views on questions, projects, or issues of concern. Such meetings have had a role in direct democracy in the United States since the beginning in the 17th century. The scope of the term has since been extended to meetings where questions are raised for debate but where participants are not necessarily called upon to vote. For an overview of participatory research, see Lipinski (2015).
6 In this regard, see Moles and Oulif (1967), which condenses the vision of an era. For an analysis of the implications of this vision, see Schiele and Jacobi (1988).
7 See "About the project: Keystone XL 101," TransCanada and Keystone XL, 2018, http://keystone-xl.com/about/the-keystone-xl-oil-pipeline-project.
8 For the implications of this paradigm reversal, see Luhman (2010).
9 Internet forums are a form of deliberative polling on a question. Stakeholder dialogues are consultations that bring together only those directly affected by a situation.

10 In the French language.
11 On another level, this move is very likely related to a transformation of the nation-state characterized by a breakdown of the consensus on the role of the state, and especially of its institutions, in a globalized world.
12 One might also add that fundamental research credits are today finalized as short-term contracts signed by labs or universities with policymakers in government, the military, industries, and sometimes health or citizens' associations, which leaves the question about fundamental research unanswered.
13 In English-speaking countries, the preferred expression is "science literacy," which is more restrictive than "science culture."
14 Nonetheless, such projects are hard to carry out in areas where the entry cost is higher than interest in or passion for the subject, unless, as may happen, those interested consent to the investment necessary to acquire the desired skill.
15 Tables 2, 3 and 4, like the following summaries, are partly based on the work of Irwin (1995), Joss and Durant (1995), McComas (2010), Powell (2010), Besley (2010), Crosby (2010), Einsiedel (2010), Rogers-Hayden (2010), Allgaier (2010), Millerand et al. (2011), Lipinski (2015) and Irwin (2015).

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Chapter 4

Infrastructures that democratize?

Citizen participation and digital ethics

Jenny Kidd

In 2015 a group of technologists, educators, designers, artists, and heritage professionals met at the University of Maryland for Crowd Consortium, a three-day exploration of citizen humanities, citizen science, and crowdsourcing projects. The extensive documentation from that event reveals a recurrent challenge emerging in the discussions and workshops around formal presentations, and an uneasiness about compensation and the kinds of labor being carried out within these initiatives. The following quotes illustrate how such issues were being articulated in those discussions.

> There are real questions of labor that should be asked and talked about.
> (Mary Flanagan, Tiltfactor, games makers for social change, in Crowdconsortium, 2015)

> I don't think we should be lulled into this false sense of security thinking … people are here for these reasons and are interested in science and so on, because you can still be exploitative even in that sort of environment.
> (Jeff Bigham, Human-Computer Interaction Institute, Carnegie Mellon University, in Crowdconsortium, 2015)

These concerns were linked by participants to ongoing debates about the ethics of microworking, microtasking, and the increased precarity of labor, especially within the gig economy (examples discussed at the event included Amazon's Mechanical Turk platform and Uber).[1] Had the consortium been held five years previously, it would have been almost unimaginable to have heard critical use of the term *labor* to describe involvement in citizen and crowd participation projects yet, in the 2015 documentation, the term was used no fewer than 15 times.

Concerns about the ethics of citizen participation in such initiatives have not abated since that time. In their introduction to a special edition of the journal *Citizen Science: Theory and Practice*, entirely devoted to exploring

ethics (March 2019), Rasmussen and Cooper propose that it is not enough to downplay such issues because "citizen scientists, practitioners, and participants seem well-intentioned and motivated to do good work in service of good aims" (2019, p. 5), and Robinson and others have proposed that developments in the field of ethics will "strongly influence views of 'best' practice in coming years" (2018, p. 40). It would seem that these discussions are likely to intensify, making it of paramount importance that institutions adopting these approaches are able to position – and perhaps defend – their activity in light of these concerns. We have yet to see a robust response from museums and heritage institutions to the ethical questions the above discussions bring into focus, despite projects that seek input from citizens remaining popular within those contexts, and where rather loose notions of intrinsic reward and exchange have dominated. This chapter explores why such a response is necessary.

Following the framework introduced by Susan Standing and Craig Standing for exploring the ethics of crowdsourcing activity within broader contexts – not just in the GLAM sectors (galleries, libraries, archives, museums) – I assess the ethical implications of cultural institutions' work with citizens in digital environments along three different trajectories: the economic, the relational, and the epistemological (Standing & Standing, 2017). Standing and Standing provide a comprehensive unpacking of these three categories of critique, which I summarize in the next section before offering an account of how each intersects with debates about ethics within museum and heritage work in particular. In sum, this chapter argues that the ethics of GLAM work – framed within notions of citizenship, democracy, and participation – demands closer scrutiny, and that such scrutiny should be connected to a more robust discussion about digital ethics within broader museum and heritage practice.

Digital ethics

Debates about museum ethics are as old as the institutions themselves, but become more urgent at particular times, and in particular places (Marstine, 2011; Kidd, 2017; Sandis, 2014). Our contemporary mediascape no doubt presents one such urgent context, where questions are increasingly being asked about rights, justice, and security within the digital environment. Herman Tavani's work on technology and ethics is helpful in beginning to think through the parameters of debates about digital ethics, encouraging attention to a range of high-level themes such as intellectual property, privacy and surveillance, security (including data security), accessibility, voice (and silence), identity and the realities of operating within converging systems

(Tavani, 2013). Other areas to explore include whether ethical positions could and/or should differ in the context of different hardware. For example, whether there should be different ethical responses in consideration of smart devices in comparison to 3D printers, or head-mounted displays (building on Roux & Falgoust, 2013).

Those who work with digital media in museums thus have a burgeoning literature on digital ethics to which they can connect their thinking and their practice but, increasingly, they also have access to scholarship about digital *museum* ethics as a particular focus of enquiry (Fouseki & Vacharopoulou, 2013; Kidd, 2014, 2019; Kidd & Cardiff, 2017; Manžuch, 2017; Pantalony, 2016; Parry, 2011). This literature has explored – among other themes – the ethics of museums' work in the spaces of social media, mobile experiences, games, and virtual reality. In addition, many (but by no means all) institutions now acknowledge that their work with the digital should be a consideration in their own codes of ethics if they have them.

As with digital media more broadly, the rhetoric surrounding the advent of citizen science and humanities approaches has been peppered with talk about democratization and empowerment (Mueller, Tippins & Bryan, 2012; Newman et al., 2012; Nov, Arazy & Anderson, 2014; Strasser, Baudry, Mahr, Sanchez, & Tancoigne, 2019) and connected to broader claims that appeals to the crowd might diversify and increase the knowledge base and expertise of an institution or project, and thus its value – whether epistemological, societal, cultural, or economic (Brabham, 2008, 2013; Hienerth, Von Hippel and Berg Jensen, 2014). Much has been made of the positive potential of these forms of engagement. Indeed, Birgitta Bergvall-Kåreborn and Debra Howcroft suggest it is the case that, in relation to crowdsourcing in particular, "few studies report on the more negative aspects" (2014, p. 214). Recent scholarship has, however, tended to be more tentative in its claims, acknowledging that these potentials may have been overstated, or that they amount to only a very partial perspective. Strasser and others, for example, note that:

> Among the various kinds of participatory research projects, those promoted under the banner of "citizen science" have produced a particularly dense promissory discourse. Three kinds of promises are made: a greater democratization of science; better scientific literacy; and new scientific breakthroughs. All three claims deserve critical scrutiny.
>
> (Strasser et al., 2019, p. 18)

They further assert that the democratization thesis especially – although the brightest of those promises – has been "the most opaque" (2019, p. 18).

With reference to the ethics of crowdsourcing projects in particular, Standing and Standing introduce three core critiques. These are summarized here, and then used as a framework for discussion in the remainder of this chapter. Firstly, they introduce *knowledge* implications related to the ethics of crowdsourcing; secondly, *economic* implications; and, thirdly, *relational* implications. In their assessment of crowdsourcing as a *knowledge* creation process, they note how critically important it is to understand and reflect upon who constitutes "the crowd" in each instance (for our purposes we might ask: Who are "the citizens"?), what their understanding of the task is, and what their motivations are for becoming involved. Standing and Standing note that processes of knowledge creation and negotiation can easily be manipulated or exploited and, as a result, can ultimately serve to "devalue knowledge" instead of bettering or extending it (2017, p. 4). For example, they discuss the virtues and challenges of crowd votes, noting how carefully such activities have to be managed so as to truly represent crowd opinion (2017, p. 3). In their consideration of the *economic* implications of crowdsourcing they turn their attention to the issue of remuneration, and the complexities of IP and copyright arrangements within such practices. These criticisms have been most comprehensively stated in the literature around digital labor, which I introduce later in this chapter. Finally, in exploring the *relational* implications of this work, Standing and Standing question the dynamics of power that are revealed (or often obscured) in how crowdsourcing practices intersect with their contexts.

This framework for critique – featuring *knowledge*, *economic*, and *relational* considerations – is helpful for beginning to think through the ethical dimensions of museum and heritage practice within the citizen sciences and humanities, as I go on to detail in the following sections.

Theme 1: Knowledge implications

That the involvement of citizens might be a more democratic way of creating and curating knowledge is of course a seductive logic for museums and heritage sites interested in developing their audiences or offering them more consequential ways of participating in the work of the institution. The realization that "knowledge is deeply social" (Wouters, Beaulieu, Scharnhorst, & Wyatt, 2013, p. 2) now underpins new patterns of interaction, reflection, and dissemination across the sciences and humanities, as is recorded in this book. Alongside these developments, we have seen an uneasy tension arising around the use of such terms as *expert*, *non-expert* (and *amateur*), with not insignificant political ramifications.[2] Digital media have of course been at the crux of these debates, offering the potential for a radical upheaval in the production and circulation of information that has been characterized (not unproblematically) as democratic.[3]

But it is patently not as easy as saying that more citizens being involved through digital means is, in and of itself, akin to a restructuring of knowledge systems. Fundamental changes throughout societies and their value systems would need to occur before such claims could bear scrutiny. Wouters and others (2013) point out that there are a multitude of unknowns within these debates:

> Does knowledge itself change when the tools with which knowledge is acquired, represented, and distributed become digital? Do new actors become involved, and/or do traditional actors become less prominent in knowledge production? Are there shifts in power relations around knowledge? Are traditional definitions of knowledge affected? What new opportunities might emerge, and how should they be taken up? … Change is not always for the better, thus, it is also necessary to raise questions, from the perspective of researchers and from the perspective of society more generally, about what kinds of changes and innovations are desirable and worthy of being promoted.
>
> (Wouters et al., 2013, p. 3)

They helpfully remind us that the value of such interventions in knowledge production and circulation might be considered at best ambiguous in certain instances. The types of knowledge created within citizen processes are varied and not easy to define, and debates continue about how we should understand rigor within these approaches (for example see Elliott & Rosenberg, 2019). Kosmala and others (2016) conclude in their review of citizen science literature that such projects can produce datasets on a par with those produced professionally, but that this is never inevitable, noting that projects need to be assessed on their individual merits. A number of authors in this volume develop debates about the verification and veracity of participant contributions still further.

One of the promises of crowd and citizen projects is the involvement of a great number of individuals, each making small contributions that can help cultural institutions manage the scale of some of their data challenges. Yet, as Allana Mayer (2016, unpaged) points out, what you tend to find is "a handful of users … contributing massive amounts of labor, while the majority of those signed up might do a few tasks and then disappear" (see also Owens, 2013). Strasser and others concur and call for a closer examination of claims about participation in such programs:

> Hyperbolic comments about massive crowds of "millions of participants" abound (Bonney et al. 2016), but such bold claims, and what is meant by "participant," have as yet received little scrutiny.
>
> (Strasser et al., 2019, p. 19)

Ultimately, the potential of "the crowd" is only ever partially realized; such projects include but they also exclude. These projects are in and of the world, and in particular, the online environment, and so they are subject to the same biases and inconsistencies found in those contexts. This raises questions about the forms of knowledge that are created as a result, a reminder that patterns and processes of discrimination and exclusion in operation offline tend to be replicated online (Eubanks, 2018; Hindman, 2008; Noble, 2018). Participation will be multiply skewed along lines of gender, age, ethnicity, education, geography, class, and ability in ways that may be difficult if not impossible to anticipate or to understand. Beyond the GLAM sectors, Bietz, Patrick, and Bloss (2019) explore the issue of limited representativeness and its ramifications for knowledge production through citizen science.[4] Their reporting of citizen science health research notes that some groups may be more or less likely to donate their data, which in turn introduces potential sources of bias in the datasets produced. This is as compared to traditional health studies that often have stringent recruitment protocols and aims of ensuring a representative sample. Bietz and others (2019) remind us that "the technologies and practices of data generation are unevenly spread through society" (p. 7), and they make the observation that certain concerns, such as privacy, "may have demographic or cultural features" (p. 8) that are difficult to predict. Given the significance of health studies for the eventual treatment of broad swathes of the population, it is easy to see how such biases in data collection, and the knowledge produced as a result, can be consequential.

Other contributions in this book problematize the concept of citizenship in the online space, and the term community is also complicated in virtual environments. As we can have multiple citizenships, so too can we belong to multiple communities. We tend not to have straightforward relationships with(in) those social units, and the ties on which they are built vary in strength and in value to us as individuals. Calling a group of participants a project's "community" is thus worthy of some thought and perhaps justification. What kind of community is it, and what might be an institution's role in relation to it, or responsibility to it?

Insight into problems associated with the ethical realities of digital participation is thus an important literacy, alongside thinking about how invitations to participate can be honestly and authentically framed so as to manage expectations for all involved; for example, is the ambition for a project that participants will learn something, or acquire new scientific, artistic or technical skills? Transparency about the nature of the transaction seems paramount here. This brings us to the second of Standing and Standing's critiques, at the intersection of ethics, expectations and economics.

Theme 2: Economic implications

This section takes a closer look at the kinds of "digital" (Scholz, 2013) and "immaterial" (Lazzarato, 1996) labor being encouraged by cultural institutions under the auspices of citizen participation. It will demonstrate that at the very least "free" (Terranova, 2000) "prosumer labor" (Fuchs, 2014) and "playbour" (Fuchs & Sevignani, 2013) raise questions about rights and justice that render the impacts of such initiatives more ambiguous than might be apparent from contemporary discourses, as referenced above. Comparisons to the kinds of transactions enabled through Amazon's Mechanical Turk[5] (for example) may seem overblown but, where made, demand robust defense: If the activities are important, then why are they not costed into core business and offered as paid roles to those interested in working in the sector? If the work is not "core" enough to cost in, then why engage members of the public in it? This is of course an oversimplification of the debates. Those working in the GLAM sectors will be aware that there is a knotty middle ground; the scale of the metadata challenges faced by archives (for example) is pressing, yet income streams are increasingly uncertain. It is in this middle ground that we find much citizen science and citizen humanities activity, and wherein ethics become a site of contestation. Rasmussen and Cooper (2019) neatly sum up the ethical issues related to citizen's contributions to museums and heritage work when they note that "there are significant ethical questions about labor, equity, and compensation for citizen scientists. Should citizen science practitioners pay their collaborators for their contributions? Can the field be sustained with volunteer labor, and should it be?" (p. 5).

Those who write about digital labor and its consequences are principally concerned with inequality and the potential for exploitation that lurks beneath the "creative and pleasurable" veneer of participation (Jin, 2015, p. 136). According to Dal Yong Jin (2015), although "not experienced as coercive or unpleasant," such projects do in fact represent "a form of hegemony," which should not be ignored (p. 136). Trebor Scholz (2013) has gone as far as to assert that crowdsourcing initiatives, for example, perform an "imminent violence" even as they are presented as harmless; "merely … the expenditure of cognitive surplus" (p. 2). To Scholz (2013) this kind of labor is all the more pernicious precisely because "It doesn't feel, look, or smell like labor at all" (p. 2). Talking about the value being exchanged in these projects is not easy, but the traditional ways of doing so – the common good, intrinsic rewards, "gifts" – may well prove too limited in the near future. In the broader field of citizen science, these debates are underway, and researchers are beginning to propose more nuanced ways of considering rewards and recognition that can inform our thinking on these issues. Smith, Bélisle-Pipon, and Resnik (2019),

for example, explore a typology of recognition that spans scientific recognition, financial recognition or reward, personal and altruistic recognition, and the beneficial outcomes of research applications. They also recognize that these debates do not relate solely to citizen science projects, extending to discussions about the exploitation (and even "scholarly domination") of groups and individuals who participate in scientific research more broadly (p. 5). Such debates, in other words, need not take place in a vacuum.

In beginning to call-out the lack of financial remuneration for volunteer work within the cultural heritage sphere, and with an eye on intersectional discrimination, Allana Mayer (2016) suggests that "we need pledges from cultural-heritage institutions that they will pay for labor where possible, and offer concrete incentives to volunteers or interns otherwise" (unpaged). Without those commitments, Mayer asserts, such projects could and should be open to accusations of exploitation. Individuals, Mayer notes, are left with no demonstrable deliverable they can call their own at the end of a project, or credit line that they can use as exchange value to acquire other kinds of capital (in securing work for example); the capital accrued goes solely to the institutions. Mayer goes on to propose that this "distributed digital model of volunteerism" might be seen as an extension of the (over)reliance on volunteering in these sectors more generally, and a devaluation and "dehumanization" of labor that is also understood as gendered (Mayer notes that these are a "distinctly feminized set of professions").[6] We are likely to see a more robust discussion about distinctions between digital volunteering and long-established traditions of volunteering elsewhere in the GLAM sectors – traditions that are coming under intense scrutiny as questions are posed about workforce diversity, conditions, and barriers to entry within those professions. As noted above, debates about remuneration in projects underpinned by citizen participation should not take place in a vacuum and, connecting these to larger discussions about volunteering and internships, unpaid and underpaid labor within the sector would be fruitful.[7]

The kinds of language often used to talk about citizen humanities and citizen science initiatives begin to sound problematic given these arguments. For instance, Carletti and others (2013) note in their discussion about crowdsourcing in museums that "volunteering has a long and consolidated tradition, and unpaid work is done for a common good" (unpaged), without questioning the ethical dimensions of that stance. Noordegraaf and others (2014) go further, proposing that crowdsourcing projects can be a way of compensating for diminishing funding in the sector; "the idea that the public might help create or improve information on collections has clear organizational appeal in an age of austerity" (unpaged). Jongma and Dijkshoorn (2016) propose that "the extension of citizen science into the humanities can

be an effective means of enriching an institution's data with expertise that is not available internally" (unpaged). Holding up such language to scrutiny might seem an act of pedantry – and there are certainly more considered appraisals out there, in Ridge (2014) for example – but it does highlight the question of how and whether museums and cultural institutions can justify continued compensation solely through "inherent rewards" (Ridge, 2013, p. 3). We have become comfortable in our assumption that museums tend to operate outside the capitalist and commercial imperative, but does it naturally follow that their appeals to citizens' labor are justified? At their core, these economic considerations highlight questions about exploitation and segue neatly into a related discussion about power dynamics and how they are revealed – and sometimes obscured – in projects oriented around the participation of citizens.

Theme 3: Relational implications

Thinking about relational implications means turning one's attention to the connections and interrelationships between institutions, participants, and other players (such as third-party sites) involved in participatory projects. These other players – often commercial ones – change those relationships in subtle and not so subtle ways. In her consideration of the relational nature of processes of cultural value location Eleonora Belfiore (2018) notes that "cultural value does not operate and is not generated in a social, cultural and political vacuum but is in fact shaped by the power relations prominent at any one time, and is a site for struggles" (p. 2). The same is true for the practices considered in this book. Thinking about *the relational* foregrounds the potential of these practices to become sites of struggle and contestation, reminding us to consider how they interact with their contexts, whether institutional, social, cultural, political, or temporal.

One of the most revealing studies of power dynamics in citizen science projects is that of Woodcock and others (2017), who conducted an exploration of the Zooniverse platform via a series of interviews with employees and contributors. The study identifies a number of tensions that arise at the intersection of paid and unpaid labor on the site: "There is a question of who 'owns' the data and outputs, 'how' can the data be classified, 'what' is the classification experience like[,] and 'where' can further questions and alternative voices (including dissent) be heard" (p. 5). The researchers note a further tension arising due to differences in agenda for each of those constituencies. Scientists (perhaps understandably) wish to orient the citizen science process toward scientific outputs, and as a result "meaningful collaboration with the crowd can … become secondary" (p. 5). Rather than deep engagement,

communication, and involvement, projects can often "remain strictly transactional" and in the interests of the scientists (p. 5).

Power dynamics between various stakeholders in a project can thus be opened up for scrutiny, as can those at play in the programs, platforms, and infrastructures that underpin citizen participation. Some projects use sites designed specifically for the purpose of citizen participation, such as the Zooniverse, a not-for-profit organization that originated within an academic research environment (Hill et al., 2012). To this day it is the largest citizen science platform on the Web, so large in fact that it is now run on Amazon Web Services (Woodcock et al., 2017). Whether bespoke or proprietary, platforms are not neutral, however (Spencer, 2017), and the choice of one over another is consequential. Platforms come with embedded logics and norms with regard to modes of communication, patterns of play, and (often implicit) permissions, all of which can alter over time.

Studies of the Internet have shown that it tends toward "asymmetrical power relations between companies and users" (Jin, 2015, p. 129), where the audience is best understood as itself a "commodity" (Jhally, 1987; Smythe, 1977). Yet this is out of step with how museums and cultural institutions wish to model their relationships with users, relationships that are increasingly articulated with reference to democracy, empowerment, collaboration and, as we have seen, now citizenship. Conceptualizing users as commodities might not seem comfortable to cultural professionals, yet it is a logic that often underpins their practice within these domains. Many museums and cultural institutions are not in the business of profit generation, and neither are they in the business of selling user data to advertising clients. Yet they do gather data about users to inform their operations. These data have value that is defined in different ways; museums subscribe to analytics software to track users around their websites, highlighting where friction might be occurring (in their event-booking facilities, for example); social media data help marketing teams make sense of the noisy space of online communications; information from tracking via iBeacons tells research teams where dwell time is at its highest, or helps curators identify the "star" exhibition objects or experiences (O Malley, 2017). We might not consider these practices to be in any way sinister, yet they are not neutral either. Such processes help institutions make assessments about how well the "audience commodity" (Kosterich & Napoli, 2016) is being delivered; museum professionals become adept at turning that knowledge into an information or data commodity that benefits their work.

There are examples in this book of museums using social media networks as stages for citizen participation. Within such sites, museums encourage their visitors to share images, posts, comments, and likes and, in doing so, they help to model and promote the institution as a *brand*. Here, they benefit from a

user's social labor in the form of consumer-to-consumer influence (Anderson, Hamilton & Tonner, 2016). A crowdsourcing project that sits within a branded social media space might be defended on the basis that it is meeting the online audience *where that audience already is*. Putting aside for now the fact that this audience will be multiply skewed (as outlined in theme one), a museum should also consider the broader ramifications of supporting the social media behemoths. That so many social media platforms have their origins in startups with Silicon Valley mentalities should give us pause for thought – individualism and the free market underpin much digital development in that context rather than ambitions toward social justice or democracy. Value accrues in projects that use such sites not only to museums or heritage institutions, but to the social media companies as well, in the ways users are observed, quantified, and exchanged for market value within those spaces. This is not to say that the use of such platforms – Facebook, Instagram, Twitter and the rest – is inherently unethical. Ethics does not tend to deal in such certainties. Rather, these critiques alert us to the fact that their use is not neutral, demanding careful consideration and (where appropriate) defense. Recent geopolitical developments and questions about the role of social media companies and other digital platforms within our public (and private) spheres have cataplted debate about the relationships between datafication, surveillance, regulation, governance, and social justice into the mainstream,[8] and museums and heritage sites cannot consider that their uses of social media platforms sit outside of these critiques. Operating within the digital environment is difficult, if not impossible, to de-politicize.

Some takeaways for museums and heritage contexts

Calling something a citizen science or citizen humanities project increasingly means something to people; it has a "performative power" that we should be aware of (Strasser et al., 2019, p. 24). As Eleta, Galdon Clavell, Righi, and Balestrini (2019) assert, "In any citizen science project, professional researchers are 'making a promise' to the public about the level of participation and power in decision making that they are willing to provide" (p. 1). But this promise can mean many things in practice, and transparency and care are needed in the framing of such projects. Strasser and others suggest that in order to achieve that kind of transparency we need to carry out a broader appraisal of what we wish to achieve through such practices:

> Is it about the production of a citizenry that embraces science and technology, a condition for liberal democracies to pursue the post-war alliance between science, technology, and the state? Is it about empowering a public

> to critically use the tools of science for solving some of its problems, while also resisting the hegemony of the scientific framing of others? Or is it about fostering scientific modes of reasoning among citizens, a condition for a robust deliberative democracy? Answering these questions will require sustained attention to the diversity of participatory practices, past and present, as well as how they transform knowledge, communities, and social order.
>
> (Strasser et al., 2019, p. 27)

Do citizen science approaches amount to a commodification, as free labor, of the GLAM sectors' digital users? Do they expose asymmetrical relationships of power where users create value for ill-defined rewards? There are of course no easy answers to these questions. It is too simplistic to assert that all citizen-science projects are exploitative, or that anything other than financial remuneration is inadequate. This does not, however, absolve those working at the sharp end of delivery on such projects of the responsibility to think through these questions. In their appraisal of ethics in citizen science projects, Rasmussen and Cooper (2019) sound a cautionary note: "Because scientists and citizen science practitioners are humans, and because humans err (or worse), we should expect that problems in the field will arise" (p. 5). Rather than sidestepping ethical questions such as those raised in this chapter, or waiting "for a problem to bring ethics to the door of citizen science," they propose that we should instead "find and prospectively address potential problems" (p. 5). But how can such thinking be facilitated? Considering citizen projects in light of institutional ethics policy or digital ethics policy is encouraged. If no such policy exists, or is found inadequate for thinking through these issues, then starting discussions about what a workable policy might look like in practice would likely be fruitful. Such a process would no doubt facilitate consideration of some of the tricky questions that circulate around this practice, some of which have been considered in this chapter. Yet having a Code of Ethics is no reassurance that an institution is consistently nurturing an ethical culture (Standing & Standing, 2017). Projects, processes, and platforms need to be monitored, and a practice of reflexivity should be prioritized in and around such work.

How museums and cultural institutions conceptualize their interactions with users and communities *could* and *should* differ from how Facebook and Google understand theirs. But we need to be better at articulating this distinction. As it stands, the seductive logics of the platforms and spaces being created are in danger of leaving us without the vocabulary, or the incentive, to

make that case. If that happens, then our moment to engage with searching political questions about exclusion, compensation, and the dynamics of power revealed through citizen participation might be lost. We have seen increased interest in deep questioning around digital ethics, digital labor, and "data justice" (Dencik et al., 2016). This chapter makes the case that it is time for cultural institutions to participate more robustly in those debates. In doing so, we can position museums and cultural institutions at the heart of more dynamic and reflexive participatory practices that really are focused on the *human* rather than the utilitarian. Bottom-up, open, socially responsible, and just.

Notes

1 For more on these themes see Bergvall-Kåreborn and Howcroft, 2014, McRobbie, 2016, and Scholz, 2016.
2 For example, in the many contexts in 2018 where politicians questioned the authority of academics.
3 Of course, debates about democratizing structures of knowledge within cultural institutions have not been prompted solely by developments in digital technologies. For example, ongoing discussions – and tensions – about repatriation, decolonization, representation, disposal, and acquisition in museums are at their core deliberations about the kinds of knowledge produced, circulated, and privileged within such contexts. Debates about how and on what grounds groups and individuals have been 'challenging history' are well documented (Kidd et al., 2014).
4 Bietz et al. (2019) also consider the question of remuneration for involvement in citizen-science initiatives as an ethical question that will need to be more openly addressed in future, as I discuss as Theme 2 in this chapter.
5 Mechanical Turk (MTurk) is a crowdsourcing marketplace for individuals or businesses to outsource activities to a workforce distributed over the Internet. MTurk makes it possible for companies to "manage labor and overhead costs associated with hiring and managing a temporary workforce" (MTurk, undated). On completing microtasks such as completing a survey, doing research or data processing, a "worker" (a contractor, not an employee) will receive financial compensation, often only a few cents. Typically, workers earn an average of $2 an hour. The platform raises questions about just compensation for labor and worker rights.
6 To a number of these critics the invisibility of free digital labor puts it on a par with work traditionally taken on by women, in particular child care and housework.
7 See for example, the discussions that took place as part of the 2017 Working Group on "The Economics and Ethics of Internships" by the

National Council on Public History (https://ncph.org/phc/the-economics-and-ethics-of-internships-2017-working-group/?fbclid=IwAR0a2YdTqw1xfYhUPJewgQ9r_RP8M4PliUHhoLLczCT90PIDSKj61dfrfP4, Accessed March 9, 2019)

8 See Dencik et al., 2016 on "data justice" and Redden and Brand, 2017 on "data harms."

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Chapter 5

Knowledge infrastructures for citizen science

The taming of knowledge

Christine Hine

Introduction

Citizen science initiatives promise to bring new constituencies into the knowledge production process, broadening participation and widening the scope of the knowledge being produced. It is important to recognize, however, that citizen science initiatives do not necessarily offer lay participants the opportunity to contribute to knowledge production on their own terms. In tailoring their activities toward producing outputs that fit the needs of science, citizen science initiatives may have to impose a structure on knowledge contributions that is unfamiliar to lay participants. While promising in its inclusivity, in practice the citizen science strategy also requires a series of judgments of the quality and authenticity of knowledge contributions that will filter out some potential forms of knowledge and will define, in a potentially exclusionary way, what is to count as knowledge.

This chapter focuses on two contrasting approaches to knowledge production involving lay participants – one a *top-down* citizen science approach closely tied to a conventional model of scientific knowledge production, and one a *bottom-up* initiative much more open in its approach to knowledge production. The top-down approach to designing participatory infrastructures faces considerable challenges in identifying desirable shared standards of authenticity and struggles to give due recognition to the various forms of labor that contribute to the process. The bottom-up approach develops emergent standards for authenticity and accountability that differ radically from the conventional scientific model. In both cases, core struggles over what counts as knowledge are happening – both at the design stage and in the day-to-day operations of the infrastructure. By contrasting top-down and bottom-up approaches to knowledge production involving lay participants, the chapter aims to highlight what may be lost in the shift toward more formally defined infrastructures and to provide encouragement to designers of citizen science initiatives to find ways to be more inclusive, both in the design process and within the infrastructure itself.

In the next section the status of citizen science initiatives as *knowledge infrastructures* will be explored, outlining perspectives from Science and Technology Studies (STS) that illuminate key features of the work of creating an infrastructure to store and provide access to knowledge through distributed collaboration. This section establishes the work of creating a knowledge infrastructure as a complex social process that involves navigating compromises on what is to count as knowledge and finding ways of operating successfully with different groups of people across sites and scales. The discussion then focuses attention on questions of what is to count as knowledge within a knowledge infrastructure, and who is to gain the credit for contributions. These issues of authenticity and accountability are often dealt with as features to be built into the design of an infrastructure, as part of a program of maintaining the quality and integrity of the knowledge produced. Such an approach is particularly apparent in the knowledge infrastructures for citizen science developed by scientists to promote particular, sanctioned kinds of knowledge contributions.

An alternative form of participatory knowledge production is explored in the following section, turning the discussion to issues that might be construed as scientific by lay participants within online forums. Online citizen forums would not be included within most definitions of citizen science, but they nonetheless offer a participatory form of knowledge production: people discuss issues that affect them and arrive at what to them are plausible and robust bodies of knowledge. Thus, the comparison with more conventionally defined citizen science initiatives may be instructive. In online forums we find quite different standards of authenticity and accountability emerging. These are developing forms of knowledge that may not be publishable in scientific journals but may have considerable resonance for participants as tapping into what, to them, are more immediately recognizable forms of expertise. The conclusion considers the implications of this contrasting set of approaches to defining knowledge and determining authenticity and accountability, asking whether the development of citizen science infrastructures must inevitably be a process of filtering and taming the kinds of bottom-up forms of participatory knowledge production found in online forums.

Citizen science as knowledge infrastructure

Citizen science is a complex and contested term, covering a wide range of activities in which people who are not trained scientists participate in a scientific knowledge production process in some way (Bonney et al., 2009, 2014; see also the introductory chapter to this volume). In citizen science, participants may contribute their labor to the completion of a routine but

non-automatable task or may act as a distributed system of sensors, sending in observations on their surroundings. They may also be more active participants in defining problems and analyzing data (Haklay, 2013). According to Fecher and Friesike (2014) "most citizen-science projects follow a top-down logic in which professional scientists give impetuses, take on leading roles in the process and analysis, and use amateurs not as partners, but rather as a free workforce" (p. 23). In this chapter, I begin by examining initiatives that most closely fit this form of top-down initiative, before moving to consider a wider array of sites of knowledge production involving lay participants where there is no top-down design logic.

Kullenberg and Kasperowski (2016) employ a scientometric mapping of the usage of the term "citizen science" to identify three core clusters of published work in the field: projects in biology, conservation and ecology, where lay participants collect and classify data; geographic information research, where lay participants contribute geographic data; and projects that involve public participation in environmental monitoring and health research. Notably, while these projects inhabit diverse substantive fields and some initiatives pre-date widespread use of online technologies, Kullenberg and Kasperowski (2016) identify across the full range of citizen science publishing a relatively recent boost in the number of publications deriving from citizen science, owing to the development of digital platforms with distinctive "logistical affordances" for this kind of project. It is not surprising that the advent of the Internet should have been a facilitating factor for the expansion of citizen science. A digital platform for citizen science offers a means to organize participation and to automate processes of communication and contribution, allowing large numbers of participants to take part at a relatively small cost for a core group of scientists coordinating a project. Both within the scientific community and in citizen science, digital platforms offer a potent resource for the organization of distributed collaborations in which large numbers of people, spread across different sites and institutions, work together on a single knowledge generation project. The digital platform becomes what is often lately termed a knowledge infrastructure, providing a means both to organize the work of knowledge production and to store and manage access to the accumulated knowledge that results.

The topic of infrastructures, and in particular knowledge infrastructures, has lately become a significant focus of attention within STS. An important feature of an infrastructure is that it should become taken-for-granted, sinking into the fabric of everyday life unnoticed as long as it functions properly (Bowker, 1994; Bowker & Star, 2000; Star & Bowker, 2006). As these scholars point out, however, when the infrastructure sinks into the fabric of everyday life an array of assumptions and a set of power relations that

are embedded within the infrastructure may also become taken-for-granted. Bowker (1994) argues for researchers in the field of infrastructure studies to practice an "infrastructural inversion," whereby the infrastructure is brought into the foreground for examination and we explore the assumptions that it embeds, and the otherwise often invisible work that goes into creating and sustaining the infrastructure. Within this perspective, the infrastructure is viewed not just as a technology, but as a set of relations between technologies and people and practices. Applying this approach to the specific case of infrastructures designed to capture and distribute information, Bowker, Baker, Millerand and Ribes (2010) suggest that a significant aspect of work in such settings is not simply to solve problems, but to work out whether problems are "technical" or "social" in nature and to decide on how to "distribute work and responsibilities between databases, users, and institutions" (p. 102). As Mongili and Pellegrino (2014) point out, *infrastructuring* can also be seen as a work of resolving tensions between different dimensions of a problem domain.

A body of work deploying perspectives from STS to examine knowledge infrastructures has accumulated in recent years, as showcased in a recent series of issues of the journal *Science and Technology Studies* (Karasti et al., 2016). As evidenced in the papers collected in these issues and their predecessors, knowledge infrastructures repeatedly show a set of key features: they are spatially complex, operating across geographic sites and involving many different sets of people who may not be co-located; they operate on multiple scales simultaneously, from the grand rhetoric of policy statements and long-term planning to the everyday practices of getting the work done; they orient to different audiences, being accountable for their success in different ways to each; they are chronologically complex, needing to attend appropriately to legacies from the past, to work in a viable way in the present, and to project themselves into the future; and infrastructures themselves and the work that goes into sustaining them are often invisible and undervalued, presenting a series of challenges for participants (and those excluded from participation) and for researchers wishing to study their operation. STS studies of the development and operation of knowledge infrastructures often involve multi-sited forms of ethnography and span an array of face-to-face settings, policy documents, and close examinations of the technology itself, as researchers seek to understand the details of what is done and the motivations and visions that make this work meaningful.

In addition to these key features of the operation and development of knowledge infrastructures, which pose tricky methodological challenges for researchers wishing to probe more deeply, there are also significant potential consequences of knowledge infrastructure "work" to examine. Designing a

knowledge infrastructure involves settling on a data structure to represent that knowledge (Ribes & Bowker 2009), in the process favoring some perspectives over others and silencing forms of experience that do not fit into the data structure (Bowker & Star 2000). The development of knowledge infrastructures in science often introduces disruptions into taken-for-granted arrangements of reward for labor and the attribution of credit. In the development of genomics databases, for example, established ways of giving credit for scientific work are disrupted as the labor of designing systems and curating data fails to fit in with the recognition and reward systems of publication and citation (Hine, 2006). While citizen scientists may find their work meaningful in ways that do not fit with scientific reward systems, this does not mean that they see themselves as unskilled laborers (Lin et al., 2016). As Fukushima (2016) argues, the value of various kinds of labor involved in a knowledge infrastructure may not be fixed, but may oscillate. Even in citizen science initiatives that attempt to sidestep the question of scientific rewards by motivating contributions through gamification, participants may not completely abandon a sense of commitment to the project as a scientific endeavor and may need to find their labor meaningful as science rather than simply as pleasure (Ponti et al., 2018). The question of whose labor is required for a knowledge infrastructure to operate effectively, and how that labor should be motivated and rewarded, becomes particularly pertinent in citizen science initiatives in which standard forms of recognition for work in science do not apply.

In addition to acting as sites of labor, knowledge infrastructures can also be sites of political action, bringing forth issues of power, marginalization, and voice as decisions are made about how knowledge should be represented and, thus, whose knowledge should be represented (Karasti et al., 2016). This feature of knowledge infrastructures in citizen science is illustrated clearly by the work of Jalbert (2016) on grassroots environmental monitoring. Here the development of a knowledge infrastructure enabled advocacy groups concerned about the impact of hydraulic fracturing to challenge scientific judgments made by powerful institutions. The question of power and voice connects strongly to a concern with the value of data and the different ways in which data might be valued both within the architecture of a knowledge infrastructure and by the contributors of and users of that data. Leonelli (2016) argues that it is important to pay attention to the way that infrastructures attribute value to data, noting that values may shift as data travels and that value can encompass scientific, political, financial, and affective aspects. Notably, in a citizen science project the value of data to contributors in an affective sense may clash with notions of value for scientific purposes.

The study of knowledge infrastructures from a perspective informed by STS has focused attention on the complex sets of social and technical aspects that must be aligned if a project is to be successful, highlighting the many tensions that may be encountered along the way. This work also highlights how consequential the outcomes may be, as a knowledge infrastructure becomes embedded into the working environment of participants as simply the means to get work done and yet entails a set of assumptions about motivations, rewards, relationships, and values and, fundamentally, about what is to count as knowledge. In the next section, a key aspect of this dimension of knowledge infrastructures for citizen science is explored, focusing on the ways in which judgments are made about the authenticity of knowledge contributions and the ways in which contributors are held accountable for what they submit.

Authenticity and accountability in knowledge infrastructures: the top-down approach

A concern with accountability and a desire to check contributions for their authenticity pervades many knowledge infrastructures. For example, within the development of large-scale distributed databases for biodiversity, the question of the quality of contributions has been a key concern for the designers of systems (Hine, 2008). While, on the one hand, the scale of the problem of transferring millions of records stored in analogue form in natural history museums and herbaria means that contributions from beyond the institution are necessary to get the job done, fears about lack of accountability and the need to maintain the integrity of databases mean that it is hard for institutions to open up their systems to external contributions. Even the transfer of existing records from analogue to digital creates tensions, since the widespread availability that digitization confers on a record may, it is feared, confer an illusion of credibility that the record would not otherwise have. An expert working within the physical collection might interpret a scribbled note on an index card with a degree of skepticism, but the same information viewed as a record in a database might be taken more seriously. Within the domain of biodiversity databases, questions of who has the expertise to interpret records and the extent to which both contributions and interpretations should be opened up to a community outside a known cohort of experts have been taken very seriously, often resulting in systems that are quite conservative in inviting external contributions. Additional layers of verification for contributed data and notes on the provenance of data tend to be built into such initiatives. Questions continually arise about the

quality of data, and issues of authenticity and accountability both permeate the work of the infrastructure as a whole and arise in relation to individual fragments of data.

The issue of authenticity and accountability for data quality can, thus, be a fraught issue even for a knowledge infrastructure that involves largely professional scientists. Within citizen science initiatives that invite participation beyond a community of professional scientists and yet still aspire to develop knowledge with scientific credibility, such issues can become even more stark. As Ridge (2016) argues in relation to initiatives from cultural heritage institutions to widen participation, "accepting contributions from members of the public for inclusion in collections documentation and other informatics systems has always raised issues about how to validate those contributions" (p. 5). Designing a new infrastructure for citizen science projects may involve making explicit the rules for deciding which contributions are to be accepted and which will be subjected to further scrutiny, or even rejected. There is an inherent challenge for such a project to balance a sense of inclusion and the promotion of participation with gatekeeping and a concern to maintain standards of quality. Pocock and others (2015) discuss this issue within the context of amateur contributions to records of species distribution, describing a technological solution that flags records in need of additional verification on the basis of how unusual it is for this species to be recorded in this area, how easy the species is to identify, the reputation of the recorder, and whether or not corroborating evidence is available. A team of expert verifiers is then able to focus its attention on records that are, on the one hand, of greatest potential scientific significance because they are unusual and, on the other hand, most likely to be erroneous.

The design of a knowledge infrastructure therefore often builds in a set of quality criteria that aim to preserve the authenticity of the knowledge that it holds and to keep contributors (and gatekeepers) accountable for their contributions. The design of a knowledge infrastructure for citizen science involves a combination of social and technical arrangements to define the boundaries of acceptable knowledge contributions. This is far from being a superficial gatekeeping exercise on the margins of the knowledge infrastructure, however. The technical architecture of data storage and retrieval can itself be seen as making fundamental judgments about what is to count as knowledge and embedding a notion of authenticity. Such a case is made by Tempini (2017) in a close examination of developments in the data architecture of *PatientsLikeMe*, a social media network for patients that captures data on medical conditions for use in both patient support and biomedical research. In their efforts to maintain an infrastructure that would

appropriately reflect the patient experience and still maintain order in the structure of data, the *PatientsLikeMe*-organization is described as having to "walk a thin line between comprehensive capture and epistemological chaos" (Tempini (2017, p. 200). As they developed the infrastructure, the developers encountered conflicts between the data architecture that might reflect a *medical perspective* of a condition and the data architecture that might more adequately reflect the *patient experience* of a condition as a characteristic that defined their shared identity with other patients. Core judgments on the status of knowledge are thus embedded within the design of the knowledge infrastructure that may favor one set of values above another: as Tempini (2017) states, "innovations in the system had repeatedly changed the understanding of who the patients were and what their health experience was" (p. 202).

A knowledge infrastructure can thus be said to embed a set of values concerning what counts as knowledge and what criteria are to be used to judge the worth/acceptability of a contribution. Within knowledge infrastructures for citizen science there is often an aspiration to mirror scientific values, although in the case that Tempini (2017) describes the situation involves managing different sets of values and attempting to develop a data architecture that remains open to "revaluing." The kind of forensic investigation of the implications of a data architecture that Tempini (2017) conducts makes clear the significance of design work when a knowledge infrastructure is being developed and the importance of a data architecture in fixing sets of relations and sets of values that then become hard to adjust.

Within this section and the previous one, a set of initiatives have been described that largely take a top-down approach. A core set of participants, often professional scientists, information scientists, and database engineers, set out to design a system that a wider array of participants will then be invited to join. Here the development of a knowledge infrastructure for citizen science becomes a site where relations between professional scientists and nonprofessionals get set in place and where ultimately authority to determine the criteria for what is to count as knowledge resides with developers working within the domain of professional science. As outlined above, these decisions are potentially highly consequential in mapping out the dynamics of power and shaping whose voice is included. In the next section, I move away from the domain of knowledge infrastructures as top-down initiatives to explore forms of participatory knowledge production involving lay people that exist in other spaces, in the interest of highlighting alternative approaches to accountability and authenticity.

Knowledge production in open online spaces

While the Internet has enabled an array of infrastructures for citizen science, it has also fostered an alternative set of participatory knowledge spaces. In online discussion forums and across social media people hold discussions about issues that concern them and, in the process, they conduct negotiations about what is to count as knowledge in that setting, developing what Duxbury (2018) calls a "marginal form of citizen science." In contrast to a knowledge infrastructure that filters, stores, and distributes contributions in a structured way, online forums are unstructured, messy, and dynamic. This form of participatory knowledge production "in the wild" develops its own set of ideas about the quality and authenticity of knowledge contributions, often in a form very locally specific to the particular online platform in question. Ideas about what counts as knowledge are fluid and, unlike a formalized infrastructure for citizen science, do not involve an *a priori* definition of the data structure to be achieved. These ideas about what counts as knowledge (and the knowledge itself that emerges from these interactions) may be very different from the standards and knowledge that prevail within the sanctioned knowledge infrastructures of citizen science. By examining discussions within these settings, we can gain richer insight into the issues that are excluded by a more top-down approach to citizen science where judgments about quality and authenticity go on behind the scenes or are delegated to the infrastructure, as described above.

Discussions about issues of health and medical treatment online are a particularly vibrant site of knowledge production. Eysenbach (2007, 2008) argues that in these online discussions we are seeing a new form of knowledge filtering happening as people advise one another in the absence of healthcare professionals and scientists. Here, Eysenbach suggests, a peer-to-peer transmission of knowledge that he terms "apomediation" occurs. This apomediation develops a different set of attitudes toward the judgment of credibility as compared to traditional forms of expertise. In apomediation credibility is based on an authority that comes from direct experience rather than the formal credentials of a traditional expert. While, in a conventional scientific domain, facts would be valued over opinions, within apomediation opinions are often valued. A conventional approach to knowledge would pay attention to the source of a message and, for example, a peer-reviewed journal article would be rated more highly than a personal message, while in apomediation a judgment of believability may pay less attention to source and place more emphasis on the message itself and the credibility of an apomediary. While the intermediated message is deemed more trustworthy

if expressed in professional language and substantiated through citations, an apomediated message may be valued more for its understandability and its deployment of relevant experience in support of an opinion. Filtering of messages and decisions about what is believable happen dynamically, in situ and hence there is little sense of an accumulating body of decontextualizable knowledge in such settings. Similarly, Duxbury (2018) observes that potential users of legal "highs" make use of online forums to construct a form of knowledge about these drugs that draws heavily on the sharing of personal experience, in the absence of an accessible body of conventional scientific knowledge.

Eysenbach's (2007, 2008) observations on apomediation have a continued resonance across many online settings. In the online forum *Mumsnet*, for example, discussions between parents about common parenting dilemmas show many features of the apomediated approach to credibility (Hine, 2012). In the process of these discussions a form of knowledge quite different from that promoted by healthcare professionals and public health policy can emerge. Official advice on treatment of the headlice commonly suffered by younger school-age children is widely promoted by schools and health visitors and favors a set of approaches based on the life cycle of the louse and understanding of its biology. Such official advice, however, rarely features within the discussions between parents on *Mumsnet*, and these discussions tend instead toward valuing parental experience of what works rather than detailed knowledge of the mechanism of action of solutions. Values that emerge as important include an emotional register of disgust in relation to headlice, a mistrust of "chemicals," an acceptance of the importance of labor on behalf of one's child, and a rejection of the relevance of expert advice. Treating headlice was positioned as a feature of responsible parenthood largely necessary for social acceptability rather than a matter of public health. Participants offered one another emotional support and practical advice, and in contrast to official public health advice they acknowledge the complexity that blended families and complex living arrangements brought to the ability to sustain a treatment regime. Within the *Mumsnet* environment the authenticity of advice on headlice treatment was derived from the salient identity of parent.

From viewing the visible interactions in an online community we can witness forms of knowledge production that appear to develop standards for judging the value of a knowledge contribution that differ from the standards that prevail within a scientific community or which might be enacted within a knowledge infrastructure. Observing visible interactions is, however, only part of the story. From what is observable online we cannot necessarily tell whether a contribution was ultimately found convincing enough to act upon, either by active participants in the discussion or the many readers of such forums

who do not participate and thus leave no visible trace. Interviews with users of such forums are one means of exploring the extent to which contributions are considered convincing. Litchman and others (2017) conducted interviews with users of online communities related to diabetes and found that readers did not take what they read online at face value, subjecting it to a range of tests of credibility, including whether it made sense according to what they already knew, whether it was a single opinion or more widely shared, and whether it aligned with suggestions from other sources. The way that information was presented as a product of experience (rather than a decontextualized factual statement) also made a difference to the decision whether or not to believe and act accordingly. Knowledge filtering by users of online forums is therefore an active process that develops its own standards of authenticity and accountability that connect with, but do not entirely mirror, conventional scientific standards.

The infrastructure offered by an online discussion forum is very different from that of the conventional citizen science initiative. The latter tends to be underpinned by a database structure that embeds a definition of what is to count as knowledge and incorporates rules about the nature of submissions and the tests of validity and reliability to be placed upon them. Within the online forum, no such data structure exists. The format of contributions is fluid, and forum-specific sets of conventions emerge regarding the kind of contribution that is valued, the conversational etiquette around acknowledging contributions, and how reputations are acquired. The formal top-down citizen science infrastructure tends to be cumulative in its approach to recording and archiving contributions, while the online forum may have a searchable archive of past messages but does not, in any formal way, structure that archive.

Within online spaces we can see new forms of authenticity and accountability emerging that deviate from, and in some cases explicitly reject, traditional science-based notions of expertise. This connects with a form of citizen science that has a meaning quite different from the kind of initiatives discussed above. The term citizen science is used by Irwin (1995) to evoke an array of forms of "contextual knowledges" generated by people outside formal scientific institutions. Such contextual knowledges are built on experience and situated within localities and may construct quite different sets of values and come to different conclusions to a science-based form of advice. A classic example in the field is the sheep farmers in Cumbria responding to the aftermath of Chernobyl, as described by Wynne (1989). Here, farmers found themselves at odds with science-based official advice, as the scientists were perceived as neglecting the famers' local knowledges and underestimating the significance of farming practices and variations in terrain.

Irwin's (1995) use of the term citizen science sits in opposition to the notion that citizens should be enrolled into forms of science defined by the scientific community, and he proposes instead more radical forms of participation whereby citizens are recognized as stakeholders who may frame issues in ways quite different from the framings used by scientists, policymakers and other experts. The practices of apomediation that we find in online forums can produce contextual knowledges that are a result of active processes that are not to be reduced to a form of public ignorance of science (Irwin & Wynne, 2003). It is therefore important to recognize that, in developing the infrastructural form of a citizen science initiative, there may be a considerable epistemic loss in terms of the contextual knowledges of this alternative form of citizen science, which is not so easily accommodated within a scientific framing.

Conclusion

Even within science, the development of a new knowledge infrastructure may act to devalue or sideline an established approach; in validating one approach to knowledge production, another may be diminished (Edwards et al., 2013). The development of a knowledge infrastructure entails making decisions about what is to count as knowledge, and there will inevitably be some compromises and some exclusions resulting from these decisions. In citizen science, often viewed as a means to promote a wider inclusion in science, such decisions on what counts as knowledge may be particularly necessary if outsiders are to be involved in production of knowledge that is credible to the scientific community, and yet these decisions are also troubling in the limits they place on the inclusivity of a project that is designed to include. In both top-down design of knowledge infrastructures and in bottom-up settings where less structured forms of citizen knowledge arise, qualitative and ethnographic studies can reveal much that is of interest about the processes of knowledge production and the entwining of social, technical and epistemological work. Juxtaposing studies of knowledge infrastructure production with observation of online discussion forums is telling in demonstrating just how broad the gulf may be between the forms of expertise and the norms of authenticity and accountability that are built into citizen science knowledge infrastructures and the forms of expertise in a truly lay knowledge. Such untamed forms of lay knowledge may ask questions quite different from those captured in citizen science infrastructures, for the very shaping of the question is a valorization of a particular set of priorities and embeds a specific way of understanding what the underlying problem to address might be.

The extent to which this clash between definitions of knowledge and between standards of authenticity and accountability matters may be highly

dependent on the form of citizen science in question. Where the goal is simply to recruit additional labor for a relatively routine task of annotation or classification, it may not be a matter of concern that the design of the infrastructure remains, at heart, wedded to the frameworks and criteria of the scientific community. Where the project involves a more complex analytic task, or where it focuses on an area of citizen humanities or a cultural heritage project that aims to represent the heritage and experience of the very citizens who are to become involved in the project, then the clash of standards may become a more acute problem, threatening a project's legitimacy claims in terms of representing citizen knowledge. Building a knowledge infrastructure that makes space for the unexpected and incorporates open fields for unstructured contributions may be useful. Here, too, the development of a participatory approach to design may become particularly important, involving citizens not simply in filling an already-defined container of knowledge but in scoping out both what the container is to be and the processes by which it might be filled. Such challenges are indeed often faced by the initiators of citizen humanities projects in cultural heritage. Ridge (2016) outlines an array of projects that involve cultural heritage institutions working with their publics to create new knowledge and grappling with these problems of reconciling the missions of the institution with the understandings that lay contributors bring with them. As Phillips (2013) notes, this may entail an acceptance of a new form of "open authority" by the institution or, as Cairns (2013) terms it, a co-creation of knowledge between museum professional and non-experts that relieves the museum professional of a traditional gatekeeper role.

Outside the cultural heritage domain there are further models for a more radical rethinking of the relationship between institutionally sanctioned forms of knowledge production and wider publics. Fecher and Friesike (2014) suggest that more research is needed into whether the degree of top-down organization that we have hitherto seen in citizen science is really necessary. Wylie and others (2014) describe the emergence of a "civic technoscience," building on the civic science advocated by Fortun and Fortun (2005) that involves grassroots groups engaged in building their own open source tools to facilitate knowledge gathering as a part of activism, drawing on volunteer scientific and technical expertise that adapts to contextual needs. This civic technoscience, Wylie and others (2014) suggest, offers the prospect of "a practice, research, and design space that enables each of us to question the state of the things around us and to share that information for public good" (p. 124). Such a model, adapted to cultural heritage contexts, might provide tools and framings of knowledge quite different from the standard citizen science knowledge infrastructure.

It is clear that while citizen science may operate under a banner of inclusivity, the forms of inclusion that it promotes are many and varied, and not all are or can be fully inclusive in terms of their judgments of authenticity and accountability and their acceptance of citizen knowledges in all their diversity and deviation from scientific norms. Further research into the notions of inclusivity deployed in citizen science would be valuable. In at least some citizen science projects, arrangements of the form that Haklay (2013) describes as collaborative science, or "extreme citizen science," may be appropriate: professionals and nonprofessionals work together in an integrated way on defining problems, collecting data, and assessing outcomes, and also, I would add, collaborating in the design of knowledge infrastructures and reflecting on the consequences of their design decisions. The choice of a top-down or bottom-up approach may depend to some extent on who are envisaged as users of the products of the initiative: if the scientific community, then a more prestructured approach may be inevitable. However, if a wider public is intended as direct users then it may be more appropriate to take a fluid approach that is more reflective of the diversity of perspectives on what counts as knowledge.

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Chapter 6

Engaging disenfranchised publics through citizen humanities projects

Line Esborg

Participatory patterns

How should heritage institutions engage with the public in the future? Without efforts to connect people to the past and to each other, cultural heritage institutions, such as the archive, is nothing but "an empty box, an institution whose special role is the guardianship of the document" (Appadurai, 2003). According to the esteemed anthropologist Arjun Appadurai, the archive is a collective tool or a collective project (2003). He proposes that we begin to see all documentation as intervention and all archiving as part of a collective project. In this sense, archives are shaped by history and shape history. The idea of an archive as a collective tool is compelling, particularly in relation to discourse on citizen humanities projects today, which tends to emphasize the benefits of involving the public in social interaction and knowledge exchange. In a time of the interconnected social Internet, the "participatory turn" (Simon, 2010) has become imperative: "Particularly for cultural institutions with a mandate to use their collections for public good, digitization and accessibility [have] become a top priority" (Simon, 2010, pp. 3–4). However, digital tools and accessibility are not just technical issues – they affect research practices and collaboration models. The participatory turn has given birth to a large array of heterogeneous participatory practices developed by a wide variety of institutions. The concept of citizen humanities, understood as "public engagement" or even as "scientific citizenship," is increasingly presented as a solution to diverse challenges in the digital age of archiving. It is a discourse promising collaboration, community, relevance, participation, democracy, citizenship, and other constructive outcomes. The overall consensus frames voluntary participatory practices in a strongly positive manner (see Ciolfi, Damala, Hornecker, Lechner, & Maye, 2018; Guttormsen & Swensen, 2016). However, beside concrete tasks linked with "transforming content from one format to another" (Ridge, 2014, p. 23), such as transcribing handwritten documents, describing artifacts, adding tags

or metadata and so forth, what other implications might "the great diversity in the nature of community engagement in contemporary society entail?" (Watson & Waterton, 2010, p. 2).

Citizen humanities encompasses a broad range of approaches that commonly involve citizens in aspects of a research process. Many parallels can be drawn to the "history-from-below" movements, like oral history societies and community archives (e.g., Thompson, 1978), and the idea of sharing of authority by seeking to empower citizens in their daily lives and to some degree dissolve boundaries between professionals and others by sharing expertise and skills. Since the turn of the twentieth century, cultural history archives that endeavor to collect and keep records of everyday life have involved the public in different ways: as informants, collectors, or more recently, as amateur participants in contemporary online crowdsourcing initiatives. The historical participatory patterns of folklore collections involved the use of volunteers (Harvilahti et al., 2018; see also Reinsone, this volume), but there are also several examples of remuneration, mainly in the form of small payments to storytellers and through grants given to collectors by tradition archives. Hence, citizens have taken part in collective projects that document and shape collective memory. However, the ways in which citizens have been conceptualized – whether passive containers of tradition, volunteers, research assistants, or community researchers in citizen humanities projects – have also had an impact on this collective construction. As Watson & Waterton (2010) point out, imbalances between professionals and volunteering communities in relation to the control of resources in knowledge production should not be ignored and, consequently, there is a need to problematize the ideal of collaboration between the public and researchers. The key defining element of participation, after all, is power (Carpentier, 2011). Moreover, participation is always situated, involving specific actors and localities. In *Knowledge Machines. Digital Transformations of the Sciences and the Humanities* (2015), Meyer and Schroeder argue that digital technologies have fundamentally changed research practices in the sciences and humanities. Meyer and Schroeder show that digital tools and data – used collectively and in distributed modes – have transformed not just the consumption of knowledge but also the production of knowledge. Along the same lines, Stevens, Flinn and Shepherd (2010) claim that "shifts in the understanding of the role of archives in society, combined with pressure from historically marginalized groups for greater visibility for their histories, have led mainstream organizations to develop more flexible working practices" (p. 59). One such working practice with historical roots involves the question of remuneration, a topic that tends to be ignored in the expanding body of literature on participatory practices.

In this chapter, I propose to address some of the issues outlined above by looking at two archive projects concerned with folklore material, exploring how early digital efforts in citizen humanities took place in practice, engaging the disenfranchised. The disenfranchised publics in this context may be considered a variant of what Sally Wyatt coined as *nonusers* (Wyatt, 2003). Leaving aside her taxonomy of nonusers of the Internet, including both voluntary and involuntary aspects of nonuse, I propose the concept useful to highlight the power relations involved in participatory projects. Specifically, how might the paid engagement of former nonusers alter the endeavors that participation is designed to address and support?

The empirical point of departure is two innovative projects from the 1990s: the Folklore Project in Cork, Ireland, and *Dokumentasjonsprosjektet* (The Documentation Project), launched in Oslo, Norway. Both projects were established as a tripartite academic, local community, and government structure, sharing a need and desire to engage a disenfranchised public in times of national economic deprivation and increasing unemployment. My methods may be described as a close reading of the two projects' published texts (policy papers, reports, journals) during the 1990s. Examining these texts, I am specifically interested in the terminology used: who and what were defined as "the disenfranchised" and what were the consequences of applying labels to human relations and power relations. A second question, then, concerned the practices involved: who recruited or selected participants, what were their tasks, and how were they asked to contribute to the documentation process? Finally, I explore the question of how the disenfranchised publics affected the cultural heritage institutions and their documentation projects. Indeed, is the public affecting the cultural heritage institutions at all? These analytical lenses enable a discussion that foregrounds unequal power relations, different types of knowledge and expertise, different needs and expectations regarding the projects, ethics, different levels of authority, and accountability for the outcome. The aim of the chapter is to explore public participation in research-led projects that involve remuneratation, as part of government employment measures for disenfranchised publics.

Case I. Comprehensive and rational access: The University Documentation Project

In the early 1990s, an innovative project was established as a cooperative venture between the faculties of humanities at the Norwegian universities of Bergen, Oslo, Trondheim and Tromsø. During the main project period, 1992–1997, the Documentation Project served many different collections, the Norwegian Folklore Archives[1] located at the University of Oslo, being one of them.

The goal was to transfer material and collections on paper at the four Norwegian universities into digital files for purposes of easing and modernizing work methods, giving the humanist disciplines improved tools, and securing the material for posterity. The 123-page final report (*Sluttrapport*) written at the end of the Documentation Project (Ore & Kristiansen, 1998) summarizes the achievement of objectives in the project, its organizational structure, economy, and actors involved (Figure 6.1). As a policy document written by project coordinators Christian-Emil Ore and Nina Kristiansen, it is worth noting that digitization is described as a "national strategy." The project's intentions were to make archival collections available in a digital format for researchers as well as the general public. As we will see in the Cork case, the economic conditions for the digitalization were aligned with employment measures, whereby unemployed people's welfare payments were translated into paid employment. Critical voices might perceive a version of "Protestant ethics" operating here, given that the unemployed welfare payments were only available to those who engaged in the project.

The initial planning started in 1989 as a massive effort to enable the university archivists to use what was labeled "computer-supported methods" (Ore & Kristiansen, 1998, p. 5). A small but growing number of archivists used computers to some extent in their academic work during the 1980s, and there were isolated projects that digitized museum collections (Hetland & Spord Borgen, 2005). A societal trend toward increased access to information, formulated as democratization of access to information about cultural heritage, was a strong factor in the initial development of the Documentation Project. This tendency was enhanced, in the decades to come, by perceptions of new computer technology as a facilitator of information. Finally, the endeavor was additionally strengthened by international trends in heritage policy, such as UNESCO using the new technology to promote public access (Ore & Kristiansen, 1998, p. 5).

In the first semester of 1990, the dean (Bjarne Hodne) at the Faculty of Humanities, University of Oslo, in collaboration with Professor Herman Jervell, initiated a pilot project, mapping the archives at the faculty to initiate a more coherent, widespread introduction of data technology. The project was launched in 1991, funded by the Faculty of Humanities at the University of Oslo. The following three years saw additional funding from the Department of Education, but this was insufficient. Consequently, large numbers of unemployed people were recruited and financed to alleviate unemployment. Hence, the project was instrumental in "creating competence-enhancing employment measures" (Ore & Kristiansen, 1998, p. 15). The objective was twofold: to efficiently convert analog archives and, simultaneously, to ensure meaningful employment measures that would increase career opportunities

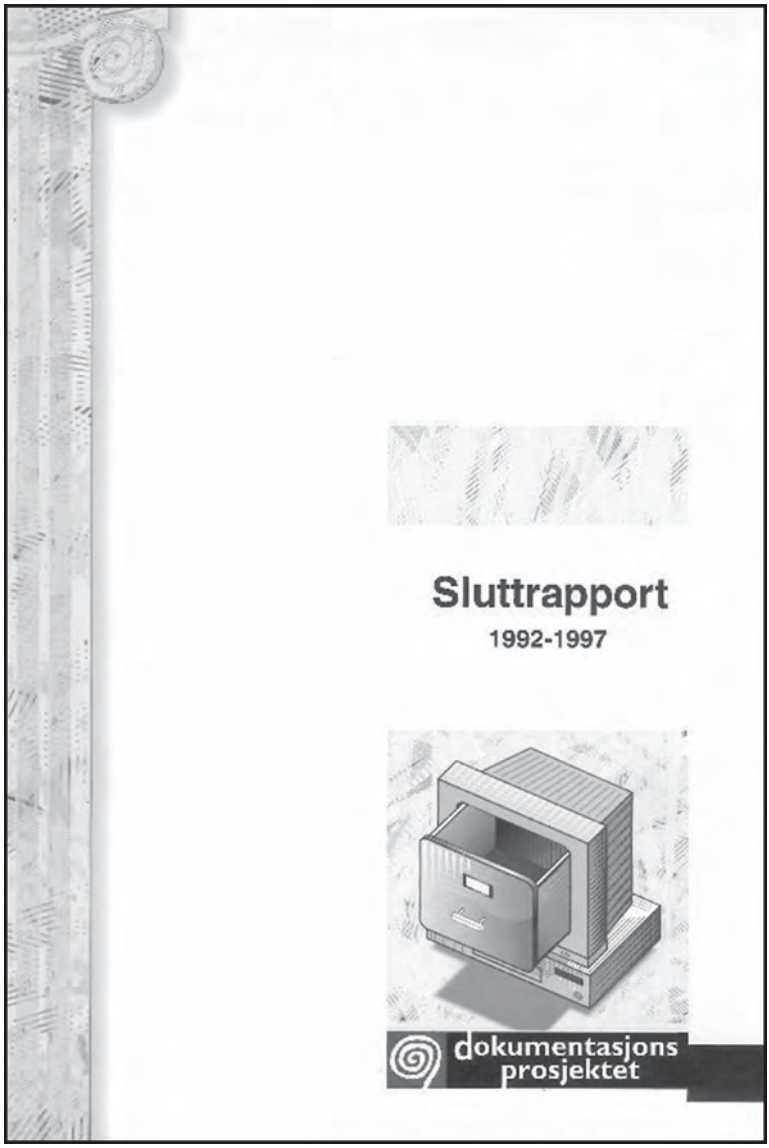

Figure 6.1 Final Report of The Documentation Project.

for the unemployed (1998). Interestingly, the word "efficiency" appears frequently in the final report. The Documentation Project aimed through the digitization of archival collections to make the collections and their collecting more efficient, and the report emphasizes the cost-effectiveness of the universities' future operation of the archives: "the purpose of the Documentation

Project has been to readjust the archival treatment of information into modern computer techniques and thus streamline the internal work on collections, external cooperation and obtaining new information" (Ore & Kristiansen, 1998, p. 17).

In addition, "The Documentation Project's task was to bring the collections a step towards the digital everyday life. Our task has thus been to publish the information electronically, so that the paper originals become redundant" (Ore & Kristiansen, 1998, p. 20). Contrasted with the Cork project, the Oslo project ethos is *modernity*; faith in digital technology is considerable, even making the paper originals redundant. It is presented as a modernization of the universities, bringing them into the digital age. A discourse involving efficiency and rationalization also had an impact on the selected archives for the project, focusing on text material (rather than sound recordings or pictures) that required little storage space. Furthermore, the report highlights that the introduction of electronic archives would contribute to "national rationalization with regard to maintenance" (Ore & Kristiansen, 1998, p, 7). Lastly, appointing unskilled non-academics is cost-effective: "Although converting texts is labor intensive, it can be performed by unskilled people" (Ore & Kristiansen, 1998, p. 6).

The Faculty Council endorsed a six-year project, beginning with a limit of 600 unskilled full-time employees (FTEs) and 120 full-time professionals. The idea came from the University of Oslo, but the digitizing work on behalf of the involved various disciplines took place in different communities around the country, not least in the strongly represented northern regions. Initially, 16 small groups composed of 5–19 transcribers were established in the south of Norway, where local employment offices funded some or all of the labor costs, while the Documentation Project carried the administrative costs (Ore & Kristiansen, 1998). Shortly afterwards, the state project *Realignment through Education*[2] led to the establishment of four large registration centers (organizing 35–75 persons) in northern municipalities that needed new measures to secure work experience for unemployed people. The centers were partnerships between local municipalities, businesses, county employment offices in Nordland and Finnmark, the Ministry of Industry, the Ministry of Labour, the State Industrial and District Development Fund (SND), Statens Datasentral AS and the universities.

The ministries, the SND, and county municipalities covered the cost of equipment and overhead, while the employment offices funded management and education. The university-managed courses required technical and administrative management, which in turn required a local partner (Ore & Kristiansen, 1998).[3] At these centers, 50% of the transcribers' time was reserved for digitizing and 50% for (further) education.

The main goal of the Documentation Project, as formulated in 1991, was "to provide comprehensive and rational access to information on language and culture" (Ore & Kristiansen, 1998, p. 6). This goal was emphasized and reinforced by four subsidiary objectives: First, to create a registration of archives and to coordinate representation of the diverse data on culture and language. The second goal was to safeguard "rational routines for collections," stating that the introduction of e-archives would contribute to a national rationalization of maintenance. The third objective concerned "optimal accessibility" for researchers, authorities, and the general public via the Internet – mostly aimed at the general public (Ore & Kristiansen, 1998, p. 8), and an evaluation of what material could be legally and ethically distributed. The final objective established a coordinated approach to representation through the chosen interface.

The Documentation Project was initially established as 15 subprojects, and selected material from the Norwegian Folklore archives located at the Department of Culture Studies (IKS) was included among them. One of the tasks undertaken on behalf of the Norwegian Folklore Archive was to digitize a large collection of handwritten life stories (over 25,000 pages) from across the country. Hence, the workers developed skills in transcribing handwritten texts and refining data by tagging it. Several of them also acquired basic computer and word-processing skills. Using computers to transcribe handwritten texts was a novel experience for many of the employees. Through the consultants' efforts, the staff gained knowledge and understanding of the academic source material in addition to learning something about folklore or cultural history and how to tag and transcribe. Considering the pedagogical challenges, quality of work was prioritized over speed and quantity.

Two objectives were simultaneously at stake: converting the archives efficiently, with high quality, and giving the participants meaningful work training to improve their future opportunities for paid employment. Evaluations of the Documentation Project demonstrate very good results. A survey in 1995 revealed that 64% of the project's workforce went on to permanent employment or further studies after the project ended. The project reports concluded that the results were "very good" (Ore & Kristiansen, 1998, p. 45).

Case II. A living archive: The Cork Folklore Project

An apparently similar project developed in Ireland in the same decade. University College Cork (UCC), Northside Community Enterprises, and the Department of Social Protection formed the basis of the structure and funding for the Northside Folklore Project, later named the Cork Folklore Project (CFP). Unlike the Documentation Project in Norway, which drew

Figure 6.2 Logo for oral history project showing microphone. Photo by Karen Knutson

its staff from very different parts of the country, this project was confined to a single city. It was launched in August 1996 and has since continued, employing community-based researchers for a period of up to three years. Although the project experiences "a constant struggle with insufficient funding" (*The Archive*, 20/2016, p. 27),[4] it has managed to employ and engage over a hundred community enterprise-based researchers; that is, an average of ten employees per year during the past twenty years. The project is now presented on the website as a nonprofit organization that partners with the folklore department at UCC and Northside Community Enterprises (Figure 6.2).

The applicants were, in the beginning, mostly unemployed young people from the Northside of Cork[5] without any previous academic training. Today, they come from different parts of the city, and there is a wider variety of ages. The Cork Folklore Project staff, a local project manager, and a research director from the Folklore Department at University College Cork organized the necessary training in technology and interview techniques and helped the recruits to identify and develop new interests and skills. The desire to create a living archive was strong from the beginning: "The heart of our work involves the documentation of everyday life in the past and present" (CFP website[6]). The formerly long-term unemployed are referred to as "community researchers." The employees are labelled research assistants and are trained as such, receiving advanced communication and ethnology training to enable them to compile lists of suitable topics before embarking

on the field work. During this stage, interviews are conducted with native Northside people, and aspects of their traditions and life histories are recorded. The results of these interviews are transcribed, indexed, and archived in what has become a pilot community archive. For some of the participants, joining the project was a path to a new career and, for quite a number, satisfying paid employment. They were given the task of presenting themselves and their missions in their local community – for many, this involved the new and overwhelming experience of conducting ethnographic interviews, among other skills.

The workers' main activities focus on recorded audio interviews. The Cork Folklore Project explains the "whys" and "hows" on their website:

> [W]e sit down with individuals and explore their memories and stories in a recorded conversation. … These interviews serve as windows into the ordinary and extraordinary lives of individuals and, taken together, they give a vivid picture of life in the city through the years.
>
> (CFP website)

After every interview they record, a copy is given to the interviewee. The collected stories also serve as research material for academic and non-academic staff, published in the annual journal, *The Archive*, on radio, and through their latest edition of the "Cork Memory Map," which includes voice recordings, pictures and transcriptions.

The Cork Folklore Project was initially met with suspicion and even resistance from the community due to the legacy of social research of the past antagonizing the community. One solution to the risk of skepticism, taken from the first journal they published, emphasizes vernacular identity: "It is perhaps worthy of note that six of the researchers currently working on the project are native Northsiders" (*The Archive*, 1/1997, p. 1). Drawing on their own "insider" Cork identities, they were able to overcome hostility and convey something of the collaborative and empowering nature of the project they wished to promote. As the co-founders concluded in the 2016 edition of their journal: "What could have been a brief experimental collaboration between the people of the Northside and UCC has become an established entity, recognized not just in Cork but nationally, and even internationally, as an innovative and cutting-edge community oral history project" (*The Archive*, 20/2016, p. 27). Looking back on her 15 years as project manager (2001–2015), Mary O'Driscoll states that among her personal sense of accomplishments is the fact that many CFP staff were helped to find and develop new interests and skills: for many, a path to a new career. Along the same lines, Marie-Annick Desplanques, the co-founder, research director 1996–2010, and lecturer at the

Department of Béaloideas/Folklore and Ethnology, University College Cork, explained the Cork Folklore Project:

> A true sign of the continuing healthy ethos which drove the founding team to establish, a couple years earlier, in 1995, a pilot project then known as the Northside project, a city-based folklore initiative with its own archive. We wanted a living archive, almost an oxymoron yet an attempt to conjugate the past and the present, by making the results of researchers immediately available and preserved for the future.
>
> (*The Archive* 20/201, p. 27)

"The community" seems to be the catchphrase for the Cork Folklore Project. The oral history connection is evident in this case. They present their practice online:

> We digitally record stories and memories from the people of Cork. To date we have collected over 900 hours of recordings on a range of subjects [of] everyday life in the past and present and are recognised nationally and internationally for our high standard of folklore collection & dissemination.[7]

Starting as a community employment pilot scheme in the 1990s, they have successfully sustained development. By 2016, over a hundred Northside community enterprise-based researchers had worked on the project, interviewing over 550 individuals and working with many community groups. The Cork Folklore Project now has an impressive list of books, films, and radio programs and 20 issues of *The Archive* to its name. The first issue of *The Archive* was released in 1997 and looked more like a fanzine than a professional journal. The first edition presented one of the main objectives of the project: "To document the native tradition within these key areas so that a record remains of life in a Northside community during the latter half of the 20th century" (*The Archive*, 1/1997, p. 1). The free copies of the journal, *The Archive*, undoubtedly serve as a participatory outcome, giving voice to vernacular narratives written by staff members with and without university degrees. Digital projects like The Cork Memory Map set precedents for the future.

Cultural encounters: a comparison

According to Roued-Cunliffe and Copeland (2017), we are today "in the midst of a transformation of the field from expert-driven to participatory heritage

that recognizes multiple forms of knowledge and epistemologies and that invites community-curated content and decision-making" (Roued-Cunliffe & Copeland, 2017). The Cork Folklore Project is a shining example of that ideal. At the same time, one might argue that the expanding body of literature on participatory practices tends to ignore the dynamics of the cultural encounters involved. Differences between the mainstream and the marginal are somewhat reinforced when engaging the disenfranchised. The applicants were not recruited because of their skills or interest, but because of their lack of employment and the project's need for cheap labor. In both cases, the experienced imbalances between academic and non-academic staff are significant.

As in historical ethnographic encounters, cultural encounters with "the other" in the Documentation Project (i.e., the encounters between academics and non-academics) are reported as filled with challenges:

> For newly graduated academics with a long stay in the university, meeting "the people" at the registration centers was often a challenge. The transcribers were excited about meeting an academic and the academic no less excited of his/her role. The project underlined the importance of giving the transcribers insights into the field of research the archive belonged to. Sometimes this was taken too far, by offering the staff long tedious lectures on arrowheads or convoluted grammar, but mostly they [were] inspirational and motivational. It was common for the transcribers to develop an interest in the discipline, as well as a loyalty towards the archive.
>
> (Ore & Kristiansen, 1998, p. 41)

The final report also stressed how the relationship between the two parties developed as a prerequisite for results: "A good result was dependent on the relationship between the principal, represented by the consultant, and the transcribers. The transcribers were located far from the archives and conflict might grow without a close relationship" (Ore & Kristiansen, 1998, p. 41). The recruitment process in this case was supervised by a third party, the national employment service. The cultural encounters between the involved various parties also placed demands on the consultants. Initially, the consultants were hired by the Documentation Project exclusively on the grounds of academic merit (grades). After a while, the project also emphasized IT knowledge and leadership skills because the consultant was the one directly in contact with the "people" (Ore & Kristiansen, 1998, p. 41). The formerly unemployed workers were, in contrast, designated as transcribers or, less frequently, as associates. The Documentation Project final report uses the phrase "the unemployed" regarding the staff and "the people" when referring to the recipient of the work. The labelling of staff had, as a consequence, the potential for

imbalanced relations; a distance reinforced by the size of the group. The consultant travelled to his or her group or center and "gave an introduction to the archive, explained the use of the material, the purpose of transcribing, and the advantages of a digital version" (Ore & Kristiansen, 1998, p. 45). The staff at the registration centers comprised diverse individuals: people on welfare, people with occupational disabilities, those undergoing rehabilitation, and the long-term unemployed.[8] The majority of transcribers were engaged to work for the Documentation Project for ten months. Most transcribers were former male industrial workers or adult females without any previous experience with computers – or with academic staff, for that matter. However, the relatively small working groups, each with its own local project leader and local administration, developed over time a sense of ownership and loyalty to the archive and an interest in the material they were working with (Kristiansen & Akselsen, 1998, p. 24). In that sense, the Documentation Project facilitated a sense of dignity and purpose in entering a collegial community. They acquired skills (using word-processing tools) and learned about the specific material they were assigned to transcribe. Overall, excellent results were achieved – ironically, as a digital dissemination project that has since become outdated.[9]

At the universities, the Documentation Project was known as a "computer data project" and was met with skepticism and doubt by the academic staff who, at the time, had limited exposure to modern IT-based methods. It was not unusual to encounter the belief that databases could never replace the old archive records (Ore & Kristiansen, 1998). Where the Documentation Project encountered skepticism regarding new technology and methods, the Cork Folklore Project faced other kinds of hostility, such as community suspicion toward academics. According to Gearóid Ó Crualaoich, co-founder of the Cork Folklore Project and professor emeritus at the Department of Béaloideas/Folklore and Ethnology UCC, the academics were surprised by the degree of initial resistance to the project:

> A surprise was the degree of suspicion and resistance towards the Béaloideas staff with representatives of as many local Northside community groups and organisations as we were able to muster. This was the legacy of previous not-well-thought-out social research exercises by investigators who had antagonised the community in a number of ways. Through drawing on our own "insider" vernacular Cork identities, as well as observing the fundamental requirements of ethical ethnological fieldwork, we were able to dissolve this hostility and convey something of the collaborative and empowering nature of the project we wished to promote.
>
> (*Journal of the Cork Folklore Project*, Issue 20, 2016, p. 26)

Drawing on these vernacular Cork identities and using staff representatives from within their own communities, they managed to convey "the collaborative and empowering nature of the project" through their community researchers.

In 1992, the development of skills in data conversion and computer use, as a benefit for the unemployed, resulted in registration centers being established in cooperation with local authorities and businesses in the northern counties of Norway by means of the *Realignment through Education* program (Ore & Kristiansen, 1998). Places like Mo i Rana, Narvik, Indre Salten and Kirkenes were on the brink of bankruptcy when vital industrial companies closed down. Unemployed miners and similar workers had to radically change their career paths, but the value of sitting in an office in front of a computer was disputed. Amazingly, to a large degree, it was a success. More than half of all workers at the registration centers went on to regular permanent employment after the project ended, and 15% of them became students. Another effect was local efforts to establish permanent jobs based on involvement in the centers' activities. The distinctive innovation of the Norwegian project was the link between training and qualifications for re-entry into permanent work, financed through cooperation between government departments, universities, regional municipalities, and local corporate businesses, through participation in what today may be referred to as citizen humanities projects.

The unemployed attended university or high school courses and achieved formal qualifications. For the Norwegian municipalities, the project became an important tool for building competence for local business employment. The universities gained regional status as facilitators of competence and experimented with decentralized courses using visiting lecturers, Internet-based teaching, and different adult didactic practices. For university collections like the Norwegian Folklore Archives that were involved in the Documentation Project, the registration centers enabled a large-scale analog to digital conversion of archive material. The archive material presented opportunities for transcribers to connect with historical material from their own part of the country.

The consultants were responsible for the training and monitoring of transcribers, overseeing transcribing and tagging, production of metadata, proofreading, file storage, and writing of final reports. From the beginning, emphasis was placed on the fact that the transcribers should receive feedback on their work to ensure quality. Initial telephone messages confirmed that they did well, followed by visits and, gradually, detailed statistical reports. A consequence of the level of detail was improved results. Regular feedback from the university consultant also had a positive effect on the employment

initiative. Many of the long-term unemployed suffered from a lack of faith in themselves as employees (Ore & Kristiansen, 1998), and the project gave them confidence.

A questionnaire distributed among the transcribers in 1995 revealed substantial interest in the work. Transcribers reported that it was exciting to learn about the past, and some started reading history on their own initiative. However, when asked to describe what they liked best about the project, they mentioned the social benefits of the group and the degree of independence in the work. Statements such as "I gained a new type of confidence" were widespread (Ore & Kristiansen, 1998, p. 45).

In the published book about the ideas underpinning the Documentation Project, *From drawer to screen: about the universties' databases for language and culture* (*Fra skuff til skjerm: om universitetenes databaser for språk og kultur*) (1998), edited by Knut Aukrust and Bjarne Hodne, the various accounts from each discipline emphasize the digitized content more than the organization and relationships within the project, whereas the Cork Folklore Project tends to focus on the cooperation between different levels as a tool of empowerment. This might be explained by the fact that the latter project continued, or even by the fact that the Cork Folklore Project is more community related.

In the Documentation Project, the work involved tagging and transcribing handwritten texts: transcribers used their ability to read handwritten texts and developed basic computer skills, in addition to learning about the discipline and the humanist source material they worked on. In Cork, the task was to record and perform fieldwork, conduct interviews, and learn about the associated methodologies and technologies of ethnography and archiving (Desplanques, 2015). In both cases, the workers were recruited locally, although the length of involvement varied from ten months in the Documentation Project to three years in the Cork Folklore Project. Supplementary tuition, relating to higher education rather than practical education, in both cases led to good outcomes: permanent jobs, further study, reintegration in a work environment, and increased self-esteem. Both projects were established in a time of economic deprivation, with high unemployment as the backdrop to the modes of interaction between heritage institutions and "nonusers." The labelling of workers (i.e., the unemployed being called "transcribers" or "assistant researchers") reveals asymmetrical power relations, but for the Cork project, it evolved into a bottom-up, organic effort in some respects, perhaps being more clearly based on an ideal of bringing the public and researchers into contact. Despite differences in approaches, they may both be seen as having served as tools of empowerment.

The archive as a collective tool?

So, what do heritage institutions want from citizen humanities: cheap labor, citizens' engagement in cultural history, greater visibility, or new stories? This chapter briefly highlights two early digital efforts, definitely innovative projects of their time, as a way of initiating a discussion on the broader issue of the role of the nonusers in collective documentation projects and the associated risks and opportunities. The manner in which cultural heritage institutions and the disenfranchised public interact and are characterized shows some interesting similarities and differences in the two initiatives explored above. The new contemporary institutional ethos of heritage institutions as responsive, democratic, and reflective institutions, wherein knowledge is produced with the public rather than for the public, broadens the scope of participatory practices by engaging nonusers. Citizen humanities may support research by contributing necessary human resources to enrich the historical collections. Coordinated by researchers and heritage professionals, and involving volunteers who can contribute to a range of tasks – nowadays through the use of easily accessible technological platforms – citizen humanities also facilitates methods that benefit community engagement and, at the same time, provide scaffolding for under-resourced institutions. As Taylor and Gibson (2017) noted, this means that we might need to renegotiate roles, allowing others to move into spaces that have traditionally been seen as the responsibility of professionals.

Over time, the participatory turn has given birth to a large array of heterogeneous participatory practices developed by a wide variety of organizations and groups (Bherer, Dufour, & Montambeault, 2016). Simon (2010) argues that the key to fostering museum participation is identifying what functions participation can support. In relation to the archive cases discussed above, this translates to getting the job done, but also recruiting new audiences through the employment of former nonusers. It may be possible to be inspired by these 1990s projects, seeing the archive as an inclusive or even empowering tool, enhancing the idea of citizenship by engaging "nonusers" through renumeration strategies.

Treating the archive as a collective tool – or through the lens of "boundary objects" as coined by Star and Grisemer (1989) – enables us to investigate the different actors and how they each contribute to creating a shared object. Boundary objects can contain different interests and allow for slightly different practices for different actors. Instead of focusing on imbalances between the actors involved or even the degree to which participants engage, the notion of boundary objects helps us understand *how* various actors may engage and cooperate in a project despite having different or even conflicting interests, as

the cases above illustrate. Seeing the archive as a collective tool through the lens of the concept boundary object, the temporal and fluid modes of interaction may inform future research. In particular, the community-building potential of engaging nonusers in citizen humanities projects is a small contribution to larger debates on the changing roles of public knowledge institutions in contemporary society. The two cases initiated in the early 1990s, both of which engaged nonusers and increased employment opportunities among a disenfranchised public, demonstrated this potential.

Notes

1 Founded in 1914, the Norwegian Folklore Archives has served as a national archive of cultural-historical texts and source materials. The archive is located at the Department of Culture Studies and Oriental Languages (IKOS) at the University of Oslo. During the 1990s the archive took part in the University Documentation Project.
2 Omstilling gjennom målrettet utdanning
3 Later on an organization was established 1998–2000 also involving university museums to ensure continuation of databases. Ore and Kristiansen 1998:11, see also Hetland and Borgen, 2005.
4 The journal *The Archive. Journal of the Cork Folklore Project* Issue 1–21 (1997–2017) is also available at https://corkfolklore.org/our-journal/.
5 The demographic structure of Cork is historically divided by a northside-southside gap, the latter understood as the more privileged one.
6 CFP webpage [my abbrevation]: The Cork Folklore Project homepage https://corkfolklore.org/.
7 http://corkfolklore.org/about/.
8 Arbeid for trygd, SKAP, KAJA.
9 Home page, The University Documentation Project (Dokumentasjonsprosjektet) www.dokpro.uio.no/

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Chapter 7

Engaging older adults in climate science education

Making the case for relevant, neighborhood-focused interventions

Karen Knutson and Kevin Crowley

In this chapter, we examine a case where a large science museum created a multi-week science engagement program in two senior centers in different urban neighborhoods. The project was part of a broader initiative called the Climate and Urban Systems Partnership (CUSP). CUSP is a museum-based project that explored how museums might more effectively engage with their surrounding community. Devoted to increasing the adoption of effective, high-quality educational programs and resources related to the science of climate change and its impacts, the project included museums in four American cities (New York, Philadelphia, Pittsburgh, and Washington, DC). As part of this project, learning researchers (the authors) worked with each city group to explore the design of potential activities and to study potential impacts of this work (Snyder et al., 2014). Working with senior centers in one city hub allowed us to explore the ways in which seniors might be envisioned as an audience for participatory climate change education, where seniors would be activated to share, learn, and take action on locally relevant climate change related activities in their own neighborhoods and with their own families and social networks. The learning research team conducted observations of programming and interviewed senior participants.

There is a critical need to engage older adults around climate science issues. The effects of climate change are no longer hypothetical and in the future. Extreme heat, flooding, and declining air quality are all current, ongoing threats to cities in the Eastern United States. And these threats are particularly dangerous for older adults, who often have existing health issues, are more socially isolated, and may have limited mobility and a lower socioeconomic status (Gamble et al., 2013; Keating & Dosman, 2009). Older adults are also among the most likely age groups to vote. According to US Census Bureau data, 71% of Americans over 65 voted in the 2016 US presidential election compared to just 46 of 18- to 29-year-olds (US Census, 2017). Philadelphia has the highest proportion of older persons (age 60+) of any of the ten largest cities in the United States (Clark, 2011). Adapting to climate change is

a wicked, complex, systems-level problem. Most people over 65 may have had their last formal science education 40 to 50 years ago and, unless they have been actively engaged in life-long informal science education, probably start out without little to no relevant knowledge of climate science or climate change that might inform more adaptive patterns of voting and civic participation.

Older adults are a central part of the fabric of their communities with long lasting civic, social, and family ties. This means older adults may bring unique knowledge resources for a climate education audience. In many cities in the Eastern United States, older adults have aged in place, living in the same cities where they raised their families and spent their working lives. They have long, locally grounded memories of how the city and the climate have changed over the years. They may have strong attachments to their cities, and care deeply about the future of their neighborhood and their extended family and community. If they are retired, they may have both the time and inclination to get involved in engagement activities, especially if those activities are geared toward the neighborhood issues and locations most relevant to urban senior citizens. Effective educational interventions should recognize and build on these resources.

This project provides an interesting case for citizen science and citizen humanities as it illuminates an emerging role for museums in supporting public participation in science with specific attention on community needs and interests. Historically, citizen science has been most often defined as having non-scientists participate in the scientific enterprise, most typically by contributing to large-scale data collection efforts. These efforts provide crucial support and increased capacity for scientists, as well as an outlet for science-interested amateurs to share their expertise with the broader field. But these efforts may also reify the boundary between science and the public. The community of science sets the agenda and defines what it means to participate meaningfully. The public is temporarily invited into the scientific community to work on what scientists want to work on, in the way that scientists define, regulate, and control.

This is public participation in scientific research – which can be seen as part of a continuum with other forms of citizen/science engagement such as public understanding of science and public engagement with science (McCallie et al., 2009). A "public understanding of science" approach focuses on knowledge acquisition as well as developing productive attitudes towards, and beliefs about, science and scientists. This is most clearly exemplified by science content in the media or traditional exhibitions in museums. Those who design museum exhibitions, for example, often worry about how to shape messages effectively and efficiently so that complex scientific content can be understood by non-specialist audiences, and their research questions often focus on how

an individual's beliefs, background knowledge, or position in the community influence how they seek out and understand knowledge (Haywood & Besley, 2014).

Public engagement with science approaches can similarly struggle to attract and support a variety of communities, and can tend to default to a dissemination model (Brossard & Lewenstein, 2010) based on a public deficit framing (Hess, 2011). However, as Hetland (2014) suggests, dialogic aspects can coexist and cut across these different approaches to science communication, and the CUSP model recognizes the fluidity, importance, and co-occurrence of transmissive and co-created shared knowledge in programming. The project at hand challenges our conception of citizen science models to understand where a community, that is perhaps not scientifically engaged or motivated, might find a point of entry to the practices of science.

For the museums in the CUSP project, activities centered on ways that they might create experiences outside their buildings and with new communities. This put a special focus on needing to understand the interests of an audience that was not self-selecting to visit the museum and engage in the activities offered inside. To interface with these communities, the museum partners developed networks of organizations that were connected in different ways across their cities. Science engagement experiences were designed to be relevant to issues of interest and concern to specific community organizations and neighborhood-level groups (Allen & Crowley, 2017). Design questions included: What do city residents care about? What are the issues, topics, and activities with which residents personally and socially identify? And, then, how will climate change impact these interests?

Our public engagement approach was a targeted, coordinated strategy that relied on connecting personal passions and interests to urban systems and thinking about how cities will be impacted by a changing climate (Snyder et al., 2014; Steiner, Lyon, & Crowley, Chapter 11, this volume). This was dialogic, emphasizing mutual engagement between science and citizen. Here, the citizen is positioned as an equal-status participant whose goals, values, and interests are as important in shaping a meaningful learning experience as those of scientists or science educators. As Wibeck (2014) notes, studies from a public engagement in science perspective suggest that increased scientific literacy is not a sufficient goal for climate change communication. Instead of being mere receivers of climate change messages, public engagement means that the public needs to actively take part in learning and in action on climate change. Engagement involves "minds, hearts and hands" (Wolf & Moser, 2011, p. 550).

This approach is essential for complex socio-scientific problems such as climate change, where there is a need to engage the public to understand and take

action on scientific issues with direct impacts on their lives. Broader groups of citizens will get involved with science if the experiences reflect what is relevant and accessible to them (Irwin, 1995), and social and contextual factors can be more important than scientific knowledge in determining whether an individual will change their behavior (Eriksson, 2010; Putnam, 2000).

Seniors and museums

Museums, and science museums in particular, are perhaps most comfortable focusing on children and families as an audience – with an emphasis on supporting the educational pipeline for STEM jobs. A search for learning research on adults or older adults in museums will find several studies, but most of them focus on the role of adults in supporting children's learning (e.g., Borun, Chambers, & Cleghorn, 1996; Sanford et al., 2007; Thomas & Anderson, 2013). Adult-oriented education programs in museums are often in the form of lecture-format presentations and docent-led tours (Sachatello-Sawyer et al., 2002), although we have lately seen new experimental programming for young and middle-aged adults ranging from science cafes (discussion and drinks mixers), to adult sleep-overs, and yoga.

The Smithsonian museums provided programs specifically for older adults back in the 1970s (Sharpe, 1984), but senior-specific programming is not very common. A review of literature on educational opportunities for senior citizens in the community reveals that programs focus on two main areas: health issues or dementia avoidance (Chené, 2006; Merriam & Kee, 2014). Similarly, most of the programming specifically for older adults in museums focuses on senior's cognitive health or enrichment. The support for the lifelong-learning goals of seniors within a particular discipline central to the museums' collection is not necessarily part of programming on offer to this audience. A review of museum programs offered specifically for older adults found that, while in some cases lectures and presentations were specifically targeted for older adult groups, commonly offered programs included reminiscence (with objects for artifact discussion or personal memory recall), storytelling (oral history), and art therapy (Smiraglia, 2016). In creating an educational program for older adults, the museum in our study had an opportunity to explore some new ways to reach this audience as a valuable and critical piece of the neighborhood community infrastructure.

As we will describe, the multi-week program for older adults helped the museum think about how to make the content engaging, relevant, and accessible to this audience, and how to value the perspectives and knowledge of audience members in a profound way. The program was held at two centers in two different neighborhoods in Philadelphia. One senior center

served a predominantly African-American neighborhood, and the other a predominantly white neighborhood. Both neighborhoods were somewhat economically depressed. One center was a city-supported and run senior center (Southwest), and one was part of a historic community group in a transitional and rapidly gentrifying neighborhood (Lutheran). At both sites, the center is a regular meeting place for participants, and seniors come from inside and outside of the neighborhood, often using public transit to get to the center.

Our participants reported that they come to the center for fitness and social activities. Many have long-term commitments to a center; with some attending for over ten years, and many come to the centers five days a week. The Southwest center provides exercise and fitness classes, art and cultural classes, billiards, social-service connections, meals, support groups, and field trips. Similarly, the Lutheran center provides senior services, including daily activities such as arts and crafts, tai chi, computer instruction, Bible study, line dancing, and bingo. Field trips and speakers are common. A food pantry is available, and a daily lunch is served. A sliding scale is used to collect fees for activities. The center is connected with sustainability groups in the city, and they have depaved a parking lot across the street to create an urban farm with raised garden beds.

"Science of Solutions": a climate change program for older adults

Designing a multi-week program about climate change for this audience of older adults was a new challenge for museum staff. A major goal was for the experience to be as engaging as it was educational and to start by connecting the content to what participants know and care about – Philadelphia, their homes, and community. The audience did not necessarily have a strong interest in visiting a museum, or in learning about science. Participants had limited prior science knowledge and the age of this group meant that they might not have been familiar or comfortable with inquiry models of teaching and learning that were a hallmark of the museum's pedagogical style. Most of the educational experiences these participants had encountered as adults would have been focused on knowledge transmission – that is, using a lecture format. They might also be unfamiliar and uncomfortable with some newer technologies. Older adults at these community centers were attending educational workshops entirely at their leisure, balanced against other activities competing for their interest and time. And for some, a diminished cognitive or physical ability meant that it might be difficult to keep long-term engagement and focus on the topic or experience at hand.

The center staff were very welcoming to museum staff, and the older adults appreciated having access to new learning programs and outside educators. But the program needed to fit within the rhythms of the existing structures. It would have to fit, for example, between breakfast and the immensely popular daily bingo game. Powerpoint lectures would need to be short and engaging. The program would have to take place in whatever temporary classroom space each center could spare, and all materials would have to be brought to the center each day and broken down and loaded up again when the program was over. While the audience was fairly open to, and even quite excited about working with the museum, and having a trip to the museum, they were also willing to "vote with their feet" and get up and leave a workshop if it was not interesting to them, or if was going to conflict with the other activities in their schedule.

Through the development of the program the museum learned to approach public engagement with science from the perspective of its audience. The museum had a hunch that older adults would embody and connect with a sense of place and that they would have strong affective connection to their neighborhood and city. As McShane and others (2011) suggest, connecting with people's everyday lives and sense of place has positive implications for community development initiatives, but also the possibility for improved environmental outcomes. Household and neighborhood connections were used as a means to link a potentially abstract topic with relatable real-world experiences. Two major foci were about the health impacts of a hotter Philadelphia, and the city's efforts to help residents deal with ongoing flooding issues. Hands-on activities at each session explored novel solutions or technology combined with familiar subjects like gardening.

This CUSP program was introduced with an introductory field trip to the science museum. Participants were really excited to join the project and to attend the museum, where they had a special lecture and a short tour. After this initial visit, each week for seven weeks, a one-hour session was conducted at each senior center by museum staff specifically trained to deliver this program. These sessions included a powerpoint lecture, and hands-on activities that took place in the center, or outside in areas near the center. The program was designed to explore climate change and "how science helps to prepare us to live well in a hotter, wetter Philadelphia," with discussions of adaptive topics including green spaces, cool roofs, rain gardens, downspout planters/rain barrels, and porous pavement. Lessons incorporated practical resources and activities with issues connected to climate change impacts (Figure 7.1).

The program took a one-hour slot that began after breakfast and before bingo and lunch. For each class, approximately 10–15 participants made their

Figure 7.1 Program participants making model rain gardens. Photo by Karen Knutson

way into a program room set up with long tables and a projector and screen at one end. The instructor first gave a slideshow and presentation of the day's topic. She asked questions about the topic at hand and solicited input from the room throughout her talk. Pictures from the neighborhood were used to illustrate points about content, such as storm-water management and flooding, or heat islands. After the presentation, the group did a hands-on activity related to the topic. While some older adults were hesitant to answer questions asked by the instructor, they all seemed quite interested in working on the hands-on activities. These activities provide an opportunity for participants to speak to one another, or to ask questions and converse with the instructor in smaller groups. For example, the asthma session discussed how climate change will lead to increased exposure to asthma triggers: hotter days; higher ground-level ozone; and increases in mold due to increased rainfall. Participants used heat guns to measure the impact of landscaping on heat islands, built model rain gardens, and studied green spaces in their neighborhoods (Figure 7.2). The workshop instructor, a senior herself, was a near peer, and able to connect to the beliefs and prior knowledge of this group of non-science but interested seniors, who had a broad range in their readiness to comprehend the science and environmental messages presented.

Figure 7.2 Program participants using heat guns to measure temperature differences in shade, sun, and on the pavement.

The study

Our study of this program included a review of lesson materials and observations of sessions at each senior center. We, the co-authors of this chapter, were involved in a research practice partnership with museum staff. We were not directly involved in the design of the program, although many elements built upon prior programming that we had studied and discussed with museum staff. The co-authors and one of the museum staff conducted 16 semi-structured, open-ended interviews with participants across the two sites. Interviews were audio recorded and lasted from 8 to 12 minutes. We asked participants about their association with the senior center, their use of services, and how often they visited the center. We asked about their living situations, interactions with family and friends, and their social activities, hobbies, and interests. Participants were asked their thoughts about and attachment to Philadelphia, and their perceptions about the issues that the city is currently facing. Finally, we asked participants to tell us about their experiences in the program.

The interviews were transcribed and iteratively analyzed for themes. We present findings in two parts. First, we explore the question of how we might make climate change education relevant for older adults in urban settings. Do we see participants becoming engaged in thinking about how climate change is impacting their local neighborhoods? Next, we explore the potential for older adults to be a conduit for sharing these educational experiences with others in their communities and families.

Relevance as a bridge between citizen and science

One of the reasons the museum was running an educational program in senior centers was to reach an audience that might otherwise be unlikely to come to the science museum to learn. And indeed, the older adults in our study were not generally interested in science. When asked the question directly, only three participants expressed a clear interest in science, while more than half said they had no interest. Participants generally enjoyed their visit to the museum at the beginning of the program, but said they would not have been likely to visit the museum on their own. As one older adult told us, "It's great that we can learn all about this stuff [in the senior center], because we probably won't go no place else to learn this stuff" (Martha).[1]

One of the approaches used to make climate change education relevant for older adults was to frame activities in terms of the neighborhood-level impacts of a warmer, wetter Philadelphia. Our participants were mostly long-time residents of Philadelphia, with 10 of the 16 having lived more than 30 years in their current neighborhood, and only two reporting less than 10 years. We were thus expecting that older adults would come to the program with a strong sense of place and that, even if they were not interested in climate change, they might be interested in improving and protecting their neighborhoods. Prior research suggests that strong ties to place can be associated with pro-environmental behaviors (Burley et al., 2007; Walker & Ryan, 2008).

Our interviews included items adapted from Ardoin (2014) and Ramkissoon, Weiler, and Smith (2012) that assessed the degree to which participants felt connected to Philadelphia and their neighborhood. We asked our 16 participants to rate statements on a scale of 1 to 5 (from strongly disagree to strongly agree), and, after they provided a rating, we asked them to describe why they chose that particular number.

As we expected, the older adults expressed a strong attachment to place (Table 7.1), giving close to maximum ratings to statements such as "I feel like this place is a part of me," and "I identify strongly with this place." Most liked living in the city, but did not necessarily identify only with city settings, as evidenced by giving their lowest ratings to the item "I am an urban person." Some participants noted that they had "just found" themselves living in the city at some point in their lives. In fact, many participants had grown up in rural agricultural settings, and many noted that they loved gardening. Many found the region's green landscapes more appealing than the city streets.

Only two of our participants, Penny and Ilse, reported they knew "a lot" about climate change before they participated in the program – and both attributed some of their knowledge to Al Gore's writings and films. Penny

Table 7.1 Mean scores for sense of place and connection to nature

Sense of place statements	*Mean rating 1 (strongly disagree) to 5 (strongly agree)*
I feel like this place is a part of me.	4.7
I identify strongly with this place.	4.6
I visit places of natural beauty (wildlife preserves, parks, gardens, lakes, seaside).	4.2
I like city living.	4.1
I am very attached to this place.	4.0
I think the landscape here is beautiful.	4.0
I like the area's range of plants, animals, and landscapes.	3.9
I like the range of outdoor activities available to me here.	3.8
I am an urban person.	3.4

talked about the unfortunate demise of street trees in her neighborhood and wondered about the link to climate.

Ilse had a lot to tell us about her feelings about the environment. At 81, Ilse has been attending the senior center at least three times a week for the past four years. She likes the exercise programs and does Zumba and chair yoga. She likes to read and garden and described herself as a lone wolf who does not do too much volunteering outside of the senior center. She lives in a neighborhood created from a brownfield that at one time housed a chemical plant. Ilse came to Philadelphia from Germany as a teenager and spent many years in the Kensington neighborhood working as a supervisor in a commercial printing mill before moving to her current neighborhood. She has lived in an apartment with her daughter and granddaughters for the past four years. Another daughter and a great-granddaughter live nearby. She likes to visit places of natural beauty and is interested in environmental issues. She says she has "Al Gore's book" and also told us about having a debate with her daughter's friend about how the barrier islands will disappear in the next fifty years or so. While she has lived her life in a city, she does not describe herself as an urban person. She says she wants to see green things and would rather live in the country, but, "You have to do the best you can with what you have." She explains that she already knew about some general topics that were covered in the program – citing the need to preserve land, trees, and water. But she did not know about some specific climate adaptations such as sidewalk planters that deal with rainwater. She thought the class was nicely presented, comfortable, and warm. She thinks that, while the program covered issues that were really important for the community to know, it might be too late to save the earth.

The rest of our participants came to the program with low knowledge and little prior experience engaging with climate science. The program focused primarily on actionable issues, providing helpful new information about specific strategies for adaptation solutions and water management. For example, Rose reported: "I didn't know about permeable paving. I didn't know about the kinds of things that are available through the city water department, and that they would help pay for some of these things if you live in Philadelphia."

In the course of learning about these practical strategies, participants also picked up some of science and knowledge of structural urban and ecological systems. For example, Louise, talked about how the program helped her to think about some basic processes that she had never considered. She described how the instructor explained combined sewage overflow (CSO):

> I mean, you know, she explained why the water gets polluted because of the rain and overflowing … I didn't realize that the pipes, when it rained, got overflowed so it went back into the river. I just assumed everything went through the drain and that was the end of it. So that was a new one … It affects the water I drink!

The program helped Penny learn that the city was taking steps to incorporate new technologies to help with flooding:

> The idea of planting gardens on the roofs was a new idea. Although I saw it in Canada. But I didn't realize we were doing it here. And then also the idea of the water flowing, that it had nowhere to go. It's a lot of flooding in Philadelphia. I mean I've seen it around Cobbs Creek Parkway, but I think I was reminded of a little more about what we can do as a city to eliminate it by having all the beautiful gardens.

Participants also made connections to the environmental choices of the past. Elizabeth noted that she enjoyed learning about "the [permeable] pavers, and what you can do for runoff and stuff like that." She then recalled, "You know what it reminds me? It reminds me of years ago when you had your pavement done, cemented, you had the stones and all." In the past, Philadelphians just tried to seal up all of the areas around their homes to direct water to the gutters in the street and did not allow for any permeable areas near their homes. Now, with increasingly intense rain events, these systems are easily overwhelmed, and more flooding and CSO is occurring.

Finally, participants also made connections from the program to the broader issues at hand, and how to get others to make changes to help adapt to climate-change impacts on the city. This was clearly illustrated in the case

of Paulette, a retired high-school science teacher who now comes to the senior center three times a week to do exercises (her doctor's orders, she says). She is also a member of a garden club. At 74 years old, Paulette talks about flooding in the neighborhood over time. She has lived in neighborhood for 30 years after arriving from Georgia. She has been in her current house for 15 years. She noted that many people in the neighborhood do not carry flood insurance, but the neighborhood does flood regularly. After the last flood, she needed to get asbestos removed from her basement. She received assistance from the government to deal with the problem and figured out how to get a state grant to help cover the cost of the abatement. While she reacted positively to the idea of learning more about how to adapt to climate change, she did have doubts about how her neighbors would react. For example, she told us that her neighbors do not want trees planted along the street, even though they will have a positive impact on reducing heat islands and flooding. She thinks it is because they will create too much maintenance work for them. She talked about wanting to recreate some of the activities from this science program with her grandchildren in the summer when they visit her. Paulette said, "In my neighborhood I would love to see more people involved in getting rain barrels and planting trees. You know we do have a lot of land around us that we could plant, but they're not interested."

Another participant, Rose, was more positive, saying,

> For future generations we cannot go in a way that we're going on … A lot needs to change, and this is one of the ways to change it; by disseminations of information to the people in power and to the people who don't understand. I think that, as Americans, we think many times, this [climate-change effects] can't happen. But you know, it can, easily.

Knowledge sharing: How does workshop content travel into the neighborhood, social, or cultural settings?

We were interested in the potential for older adults to be key information nodes in broader community and social networks, and we wondered if participants were bringing their new expertise about climate change into social interactions in their daily lives. A key role of senior centers is for older adults to develop and maintain social networks (Keating & Dosman, 2009; Kim & Merriman, 2004; Putnam, 2000) and, indeed, most participants talked to us about the importance of interacting with their peers at the center. Our thinking followed from Henning and Lieberg's (1996) work on neighborhood networks and the strength of social connections within them. They suggest that there are important differences between close and weak ties within

a neighborhood, and that both are necessary for a healthy social network. Close ties, familial, or strong relational connections provide important qualities to families and close-friend networks, but may result in resistance to new information. Weak ties, such as those maintained by acquaintances in senior centers, can leave people more open to learning new information or considering alternative viewpoints (Granovetter, 1983). Thus, one rationale for intervening in the weaker-tie context of places like a senior center is that seniors, in a group of co-learners, might be more likely to take up information that they might otherwise not encounter or be amenable to listen to in their daily family lives or in other social circles. Once assimilated, the information might then be introduced back into the harder-to-penetrate spaces of family and friend networks, effectively spreading messages to a broader section of the community.

In terms of our research questions, we were especially pleased to hear that those interactions now included conversations about climate change. The climate change program drew about half of those attending each senior center, and many of our participants mentioned talking to the other non-attending seniors about the program. Ilse described how she got into a "heated discussion" with another member of the senior center who did not attend the program, about the possibility of food shortages due to climate change.

> We had a couple of beers together on the senior trip and that came up and we talked about it … I mean, come on! The disasters we've been having, the change – everything has to be changed. I mean, what once grew corn, may not grow it. And it will take time until everything is being reestablished. There will be a shortage of food.

When we asked about other networks and pursuits, we heard about garden clubs, women's volunteer groups, or teaching in Sunday school or Cub Scouts. Church was important – cited by about half of our participants. But family was clearly the most important network in addition to the center itself. Most were long-time residents who had raised their own children in the city, and most still had children and extended family in the area. Almost 70% of people we interviewed told us that they had shared their experiences in the program with friends and family. For example, Paulette spoke about how she has been talking to her daughter and granddaughter about the class:

> I'm telling them that they need to get involved in planning – you know, in the trees and keeping the neighborhood up. Finding out what the city can do, how can the city help. My daughter, I told her that she can call the

> horticultural society and see what they can come out and do to help her, you know, make a [rain] garden.

In Maxwell, we saw an example of how the weak social ties present at the senior center might facilitate new learning for the social networks of seniors. Maxwell comes to the senior center five days a week, mainly to fight his boredom. He hoped that the program would come back to the center every year as he felt it dealt with important content that he did not know about before: "I was one of the ones who didn't believe in climate change until I came to this class. I said, 'Oh no, it's just natural.' But when I came [and learned about it] … I said, 'Yes! It is happening.'" While he feels pessimistic that climate change can be successfully countered, he appreciated the city's work to improve the environment by "the trees that they're planting and they're trying to build the water system better – to change the water system. The conservation and treatment and all that. They've tried – they're trying to get that settled." He said that the program prompted him to notice, for the first time, that his church had installed a rain barrel. Maxwell has five children and "many" grandchildren, and he mentioned that he had spoken to his grandchildren about the program and taught his seven-year-old grandson about the water cycle.

In addition to supporting conversations about climate change, the program also provided engaging science-related experiences that older adults wanted to replicate with others in their lives. We heard from our participants about doing the rain garden and seed-planting activities with their grandchildren or through their volunteer work with children in Sunday schools or scouting. For example, Gwendolyn spoke to her Boy Scout families about climate change:

> they were interested in it, too, and they're like, 'Miss Gwen, you do all that?' And I'm like, 'I sure do! I'm saying it was fun because I took some of my projects to my boys and they enjoyed them. So I did benefit – I benefited and they benefited … They know me. I could talk about anything. Whatever I do, I talk about it to them and they're like interested in the things that I do, especially with me going to the senior center so I was learning more about me discussing what I did and I'm learning what is – because it's like, oh, my boys can get a badge or something for them doing this project with me.

We had not anticipated that participants would be attempting to replicate activities from the program for others in their lives, so this was an unexpected success for the program, and evidence that older adults were

engaging in science, and becoming comfortable sharing the knowledge they had gained. We had hoped that the older adults might speak to their neighbors about climate change, but this was not generally the case. A few of our participants did report conversations about climate change related issues with their neighbors and friends, but for many of our participants, the social circle that may have heard about the program content was primarily restricted to other peers at the center or family members. The impact we saw at the neighborhood level was mostly around noticing and observing. Once they completed the program, older adults reported that they were starting to notice city-supported rainwater management systems that had been built in their neighborhoods.

For example, Francesca, 71 years old, has recently come to Philadelphia and has been attending the senior center for three years. She is originally from Guatemala and lived in New York for 40 years, but when her daughter moved to Philadelphia, she laughed, and said "Where you go I go!" She lives alone in senior living, but sees her daughter and her family every day, as she helps out with childcare for her grandchildren. While in New York, Francesca worked for 40 years in food service at a hospital. Now that her grandchildren are a bit older, she comes more often to the senior center – at least a couple of times each week. She likes the variety of programs that are provided and participates in many different things. She is currently working hard on her computer skills. She has developed a friend network outside of the senior center, often meeting with a group of friends at a donut shop. She also participates in the Senior All Women Network. As she is fairly new to Philadelphia, she was one of the few people we interviewed who did not know a lot about the city and its different neighborhoods. She grew up on a farm in Central America, but appreciated the environment in New York, and told us she especially loved its parks. She wonders why Philadelphia does not have the same kind of environmental regulations as New York, observing that Philadelphia does not seem to have fines for littering in the parks. She said that she has taken activities from the climate-change program back to her daughter and grandchildren. She suggested to her daughter that she utilize some techniques she learned to better manage poor drainage in the yard and worked on a project similar to the rain garden activity with her grandchildren. She told us that she began to look at things differently in her neighborhood – noticing and visiting rain gardens with her grandchildren, for example.

Francesca and others explored their own houses and nearby neighbors' houses for possible evidence of excessive storm water or areas for intervention. Participants became aware of different potential health impacts of climate change, and of city-wide initiatives that they might contact for further information or assistance. In these activities we found that the program was

relevant to older adults and provided a mechanism for them to take action, to engage in science discovery in their own lives.

Conclusion

In prior museum studies, as in other informal learning settings, the notion of stakeholder collaboration and engagement has all too often been reduced to convenient rhetoric at the expense of meaningful engagement with the issues (Ardoin, 2014). Here, by targeting this population within a neighborhood, the museum created a foundation for future engagement and action; a meeting place between citizen and science. We see this example as playing out in a broader historical moment where museums of science and natural history realize they face an existential challenge (Watson & Werb, 2013). Museums remain trusted sources of scientific information and are popular destinations for school trips, families, and adults who already have an affinity for science and nature. But museums that represent science are increasingly aware that they must move outside their walls to actively seek out and engage broader segments of society. Not just in terms of building new audiences, but also in terms of responding to global socio-scientific challenges such as climate change. It is clear that museums have to act differently. Building better climate exhibitions and hoping that the public will come to visit will only get us so far. As representatives of the scientific community, museums have an urgent duty to reach out and engage the public in ways that are relevant and accessible (Janes, 2009; Knutson, 2019).

This study suggests lessons for how citizen/science engagements might be more relevant, accessible, and solutions-based with respect to complex socio-scientific problems. The first of these lessons concerns the issue of who has access to engagement with science. The adults we studied were not a group that typically has access to scientific information, or would typically seek out engagement with the science community on their own. Instead, these adults had low levels of science interest, were predominantly mid-to-low socio-economic status, and many did not have college degrees. But all were living in areas of the city that were at high risk for increased environmental impacts as a result of climate change. The museum initially targeted this audience guided by an environmental justice rationale: those who were most at risk should be the audience of highest priority.

But the museum also recognized that the older adults' history and position in the community could be a vital asset in the pursuit of larger goals of climate literacy, science engagement and, importantly, action in terms of local climate adaptation. We documented many instances of how an older adult's local history and attachment to place was an effective and productive starting

point for engagement. These older adults might not have been interested or invested in science, but they were certainly interested and invested in their own communities and families. By the end of the program, older adults had learned about heat islands and green infrastructure; they were noticing rain gardens and talking about flooding in their neighborhoods; and they were starting to spread the message by talking to other people in their lives about climate change. Most of the older adults had become activated on the issue of climate impacts, were proud to know and share specific knowledge, and were interested in learning more.

Thus, in a modest, but potentially important way, the museum succeeded in establishing a new and local presence of science in two neighborhoods in Philadelphia. This was not an easy lift for the museum staff, and it required going far outside their usual comfort zones. By working in a community setting, and by shaping the program in response to community needs, the museum needed to allocate significant staff time up front for building relationships, managing the partnerships, and customizing the curriculum. Delivering the program in the confines of a senior center required ongoing logistical and pedagogical challenges. And the museum also had to constantly check its assumptions about what the citizen/science exchange should be about. When museums do climate science programming or build climate science exhibitions, they tend to focus on the "science" part of the citizen/science exchange. In contrast, the approach exemplified in this project revolves around the assumption that an understanding of the science of climate change is neither necessary nor sufficient to engage communities in responding to climate change. Engagement and action rely upon the complementary expertise of those representing science and those representing specific communities that will be impacted by climate change.

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Note

1 All names are pseudonyms.

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Chapter 8

Remembering in public

A case study of museum-user communication on Facebook

Emily Oswald

On a weekday in September 2016, the Museum of Oslo's institutional Facebook account posted a black-and-white image from the museum's photographic collections, showing a curving, snowy street flanked by a four-story brick building.[1] The photograph was captioned "Ser du hvor dette er? [Do you see where this is?] 1966." In the 36 hours following the publication of the post, 145 users commented on it or replied to the comment of another user; 823 users "liked" the photograph. In an interview, the museum's social-media manager described this kind of post as central to the museum's "concept" for Facebook. Since 2013, the museum has published one historical photograph from the collections every day, captioned each time with the same question. Hundreds of "likes" and dozens of comments on a post are a typical response from users, and the museum always comments on its own post to confirm the location shown in the photograph, generally twenty-four hours after the initial post was published.

When we spoke in July 2017, the social media manager indicated that the overall increase in the number of users who follow the museum on social media was due in part to the popularity of its Facebook concept. This popularity aligns with findings from studies of museums' presence on social media platforms, which show that individuals and cultural institutions do indeed interact in these contexts (Baker, 2017; Gronemann, Kristiansen, & Drotner, 2015; Laursen, Mortensen, Olesen & Schrøder, 2017). Perspectives vary, however, on what such interactions accomplish, and what is being communicated by individuals and institutions. As Danish museum media and communication researchers Kirsten Drotner and Kim Christian Schrøder (2013) have framed the question, toward what ends are museums and users communicating on social media?

This chapter is a qualitative study of how museum–user communication occurs on the Museum of Oslo's Facebook page and "toward what ends" the activity is directed. In analyzing the museum's "Do you see where this is?" concept, the chapter poses two research questions: first, when users comment

on the museum's Facebook post, how do they seem to understand their own activity? And second, how, and among whom, is this communicative activity organized? Using analytical techniques from conversation analysis (Reeves & Brown, 2016), and the responsive and initiative aspects of utterances from dialogic theory (Linell, 2009), the museum's posts are studied as a context not only for communication between the museum and users, but also *among* users. The aim of the chapter is to contribute to understandings of how social media may support the aspirations of museums to become more participatory institutions.

Previous studies of museum–user communication on social media

There is a growing body of research that explores how museums, as institutional users of social network sites, interact with other users on these platforms. Badell (2015), for example, focused on the use of social media by Catalonian museums in terms of which platforms the 107 museums in the region used, and how many users followed the institutions on Facebook and Twitter. An understanding of how or whether users responded to museums' activities was limited to reports of the institutions' number of followers. Kidd (2014) studied the use of Facebook and Twitter by twenty museums in the United Kingdom. Though the study included some descriptions of Facebook user comments and the observation that "individuals were keen on having their posts or comments acknowledged by institutions" (2014, p. 52), the analysis primarily focused on the tone and function of museums' posts, not on users' response to them. In contrast to these approaches, this study adopts a dialogic framework to understanding museum communication on social media.

Dialogic approaches to institutional uses of social media have been framed in previous research using concepts such as "communicative co-creation" (Gronemann et al., 2015), "modes of participation" afforded by a particular speech act (Laursen et al., 2017), and "two-way communication" (Baker, 2017). Applying these concepts to a museum's activity on social media implies that meaning must be understood in terms of both what a museum aims or intends to communicate *and* the response of users who comment on a museum's Facebook post, or favorite a museum's tweet. A 2017 study, for example, explored user responses to tweets from science museums through a quantitative analysis of the relationship between the kind of content museums published on Twitter and whether content was re-tweeted or "favorited" by users (Baker, 2017). The analysis demonstrated that educational tweets were more likely to be re-tweeted or favorited than marketing-oriented tweets.

Baker speculated that users may favorite or re-tweet educational content from museums as a way to save information for future reference or to communicate the content to their own followers and suggested that Twitter users may view science museums as an authoritative source of information. However, only a small portion of the museum tweets (194 of 1422) involved interaction or the potential for interaction between the museum and another Twitter user (Baker, 2017, p. 149), leading the author to conclude that "some museums appear to be struggling to adapt to the use of social media such as Twitter for two-way communication with their audience" (p. 156).

In a study published in 2015, Gronemann, Kristiansen, and Drotner analyzed approximately fifteen hundred user comments on more than two hundred Facebook posts, published by nine Danish museums during a three-month period in 2013. The study conceptualized the communication between users and museums that occurred through posting and commenting in terms of co-construction or the "shifting processes of mutual-meaning making" (Gronemann et al., 2015, p. 177). The study considered whether posts elicited a response from users, and whether museums subsequently made any follow-up comments. Finding that nearly half (42%) of the museums' posts elicited no comments from users, and that when users did comment, museums rarely made follow up comments (only 27% of all posts included comments from users and the museum), the authors concluded that "in nearly three-quarters of all posts … the museum and its audiences remain empty spaces for one another to be filled by pre-conceived assumptions" (Gronemann et al., 2015, p. 180). Gronemann and others (2015) additionally considered user response to museums' posts in terms of genre, and the degree to which different genres of posts invited comments from users. The genre "stories" that constituted the majority (41%) of posts "focus[ed] on the museum pushing nicely illustrated content, inviting little or no audience involvement" (Gronemann et al., 2015, p. 183), and elicited few responses. The genre of pseudo questions, in which a museum posed a question it already knew the answer to, likewise resulted in few comments from users. In contrast, more users commented in response to quizzes or requests for help from the museum, leading the authors to observe that users "adopt explicit museum invitations to participate when participation is deemed relevant" (Gronemann et al., 2015, p. 183).

Laursen and others (2017) published a second analysis of the Danish museum Facebook data that complements Gronemann and others' (2015) focus on genre. Both speech act theory and conversation analysis were used to explore how posts supported interaction between users and institutions. In their study, Laursen and others defined six categories of speech acts, including directive speech acts, or "utterances designed to get the recipient to take a particular action" (2017, p. 175). A directive post resulted in

interaction between the museum and users on Facebook when, for example, the National Museum of Denmark asked for help identifying a church in a photograph. Multiple users posted 40 additional comments, and the church was eventually identified (Laursen et al., 2017, p. 178). A directive post authored by the museum may also, however, elicit a minimal response, such as a like. This is typical when a museum invites users to visit a new exhibition, for example, and rather than commenting on the post, users visit the exhibit (Laursen et al., 2017, p. 177). Based on the analysis of Facebook posts authored by museums and users, they thus conclude that in some cases the absence of a response from users on Facebook is "communicatively appropriate" (Laursen et al., 2017, p. 185). These studies of pseudo questions and directive speech contextualize an analysis of the Museum of Oslo's approach to initiating interactions and dialogue with its users with the question, "Do you see where this is?"

The three preceding studies broadly conceptualize communication between institutions and individuals on social media as communicative interaction. A speaker or author, whether the museum's institutional social media account or an individual user, makes an utterance in the form of a Facebook post or a tweet. This utterance is read and interpreted by other users who, in turn, may respond with their own utterances such as a comment on a Facebook post or a tweeted reply. While not explicitly framed using a dialogic theory of language, all three studies approached activity on social media in terms of the response the activity elicits from users. An emphasis on utterance and response is consistent with how dialogic theory, grounded in the work of Russian scholar Mikhail Bakhtin, has been used to study digitally mediated communication (Gillen, 2014). However, because much of the analysis relies on categorizing museum utterances and describing whether users respond to utterances in a given category, these studies primarily provide insight into whether interaction or communication between museums and users takes place rather than understanding users' interpretations and responses to museum posts. Further, categorizing museums' posts or tweets and the subsequent user responses limits or excludes exploration of whether and how users communicate with each other when interacting with content published by museums. Studies of organization communication on social media have explored whether this kind of "many-to-many" communication takes place when content is published by institutional accounts on Twitter and Facebook (Hether, 2014; Waters & Jamal, 2011). In the museum literature, Russo (2012) wrote favorably about the potential for museums to use social media to "foster community" (i.e., support communication among users, in addition to between an institution and its publics) in discussions of museum blogs and online forums, but made no reference to Twitter or Facebook. The current social media environment as

depicted by Badell (2015) and Kidd (2014), where the use of Facebook by cultural institutions is the rule rather than the exception, underlines the need to specifically reassess whether museums are orchestrating many-to-many communication through the use of these platforms. This chapter draws on findings from the studies discussed above to investigate users' responses and discursive orientations, including many-to-many communication; how users interpret or understand museums' utterances as well as those of other users; and what users' responses suggest about their understanding of their own activity.

Methods and empirical context

Conversation analysis of social media activity

Conversation analysis is used to study "moment-by-moment, unfolding, real-time human action," and has been applied in social media research (Reeves and Brown, 2016, p. 1054). As such, this approach differs from social media research that analyzes users' retrospective accounts of their activities or aggregate data sets to seek "patterns that occur across multiple users and uses" (Reeves and Brown, 2016, p. 1053). Using conversation analysis in a study of comments on Facebook posts, Frobenius and Harper (2015) proposed that users treated comments as a "quasi-conversational space" (p. 121), and presented empirical examples to demonstrate how users organized their comments in relation to a post or the comments of other users. They underlined that it may be difficult for users to manage the large number of potential participants in the conversation-like spaces of comments on a Facebook post. By extension, in dialogues on social media platforms, "who is involved, who is being addressed, and more generally the question of the status of other participants" (Frobenius & Harper, 2015, p. 129) require a different kind of work on the part of the participants than in-person interactions. Gauging whether and how to appropriately engage with an institution on Facebook involves the added difficulties of knowing how to communicate with an institution or organization and the presence of users from outside one's own network.

Laursen and others (2017), discussed above, also used conversation analysis to consider a sequence of comments on a Facebook post by Denmark's national art museum. The authors characterized the interactions between the museum and Facebook users (ten total utterances by the National Gallery and six utterances by other Facebook users) as "fairly standard" (Laursen et al., 2017, p. 181). Based on the analysis, they hypothesized several conversational premises for the museum and users' actions. From the perspective of the National Gallery, which published the initial post, this interaction with users "attracts attention to the [museum's] Facebook page by creating

activities on speakers' walls and in speakers' friends' newsfeeds" (Laursen et al., 2017, p. 185). When users commented on the National Gallery's post, they were primarily articulating their identities as people who appreciate art (Laursen et al., 2017). The authors additionally noted that several users' comments do not acknowledge the previous comments of other users, further contributing to the impression that commenting on the museum's post is, for many users, an activity related to displaying an identity on social media, rather than interacting with others.

In this chapter, conversation analysis is used as an approach to analyze how users respond to the museum's posts and engage with the comments of others. I specifically refer to Swedish linguist Per Linell's (1998) analytical framework describing the *initiative* and *responsive* aspects of utterances. I identify how Facebook comments may have *initiative links* that anticipate future comments, and further, may be a *soliciting initiative* that "explicitly call[s] for, and hence, virtually oblige[s], a response on the part of the interlocutor" (1998, p. 170), or a *non-soliciting initiative* that "invite[s] but do[es] not oblige a continuation by the other" (1998, p. 170). I also consider how utterances may have *responsive links* to preceding comments in that the comment responds to something initiated by another user (1998, p. 165–166).

Institutional collaboration and informed consent

The Museum of Oslo is a municipal history museum located in Norway's capital city.[2] Its collections include fine art (paintings, drawings, watercolors, and prints); material culture (furniture, textiles, and other historical objects), and a photographic archive containing an estimated 1.5 million images. Although the Museum of Oslo has developed exhibition text and audio guides in English and other languages and promotes its exhibits to international tourists, the museum's programming and planning documents (Oslo Museum, n.d.) describe residents of Oslo as its primary audience. In 2009, the museum began a collaboration with the city's municipal archive to digitize the museum's photographic collection and, by 2013, more than a hundred thousand images had been digitized, extensively cataloged, and made available through the website www.oslobilder.no. It was at this time that the museum began publishing a photograph a day through its institutional Facebook account. The Museum of Oslo publishes a range of other content on its Facebook page as well, including information about museum programming and exhibitions. This study, however, analyzes only the museum's posts that show a historical photograph, captioned with the question, 'Do you see where this is?' Focusing on one kind of post allows for an in-depth analysis of the different ways that users may respond.

Before beginning data collection, I met with museum staff to explain the aims of the project and data collection methods. A short description of the research was then posted on the museum's Facebook page. This description included a link to a university website containing a more detailed project description and an online form where Facebook users could "opt out" of the project and indicate their data should be removed. No users completed the form to opt out of the project. The project description informed users that if their comments were quoted for publication, they would be contacted and given an additional opportunity to withdraw their comments. The data excerpts below include comments and replies from twenty-eight unique users. One additional user who was contacted indicated her comment should be removed from the chapter. Quotations from these comments and replies, which I have translated from Norwegian to English, only appear in the chapter if users have provided consent to publish their comments; otherwise, users' comments are paraphrased in the text and referred to by turn number and user pseudonym in the figures. This approach to informed consent aims to strike a balance between, on the one hand, giving Facebook users information about and control over whether content they create (i.e., comments and replies) is used in academic research and, on the other hand, the public nature of a museum's Facebook posts and users' comments.[3] The approach is consistent with guidelines for research in online settings at the time of writing (cf. Ingierd & Fossheim, 2015) and recent studies of user activity on Facebook (Rensfeldt, Hillman, & Selwyn, 2018).

Data corpus and selection

Data about posts published by the Museum of Oslo between October 1, 2013 and September 30, 2016, were downloaded using the social network analysis software, Nodel XL (Smith et al., 2010). This three-year period was selected for study because it included the earliest examples of the museum's "Do you see where this is?" posts. In keeping with Facebook policy and privacy restrictions at the time it was downloaded, the data included the content of users' comments on the museum's post and replies to others' comments, as well as information about which users liked the museum's post and other users' comments.[4] To develop a data corpus appropriate for qualitative analysis by a single researcher, thirty-six posts were selected (one post from each month for the three-year period). The selection included approximately equal numbers of posts with photographs from a range of time periods (1880 to 1980), resulting in a corpus of 2,085 user comments and 353 replies to comments. Comments and replies were arranged chronologically by post and given turn numbers for ease of reference in the analysis.

Analytical procedures

The data corpus was analyzed in three consecutive phases. In the first phase of analysis, I observed that although user comments were generally "about" the location in the picture, comments were surprisingly diverse in terms of what users talked about. For example, in addition to the many users who identified the place in the picture in relatively short comments, users' comments on a single post also referred to personal memories of the neighborhood pictured, described urban renewal and the built environment, expressed appreciation to the museum for publishing the photograph, and referenced a song by a popular Norwegian folksinger that included the name of the neighborhood. This suggested the need to describe or delineate the different activities users seemed to be pursuing when they commented on the museum's post.

In the second phase of analysis, I developed several broad categories to describe user comments. These categories built on descriptions I had generated in the first phase of analysis and included "remembering in public," which referred to comments whereby a user recounted a personal memory, and "knowledge seeking/building," which noted when a user posed a question or answered a question posed by another user, such as when the hotel in a photograph was built, or where a particular tram line ran. I additionally identified comments that did not fit in these categories, including apparent jokes, such as identifying a place in the photograph as "Grand Canyon" or literally answering the museum's question by posting the comment "no." During this phase of the analysis, I also observed that many users' comments seemed to indicate the user had not only read the museum's post and looked at the picture, but had also read the preceding comments of other users. This highlighted the need for an analytical tool that would help put an individual's comments in the context of the moment the comment was posted, a sequential context that was constantly changing with the addition of each new comment.

In the third phase, three types of user activity (identifying a place, sharing and soliciting knowledge, and remembering in public) were selected for further analysis. Each of the following data excerpts illustrates a different type of activity. These activities appeared across the corpus with differing frequencies. The activity of identifying a place appeared in user comments on all thirty-six posts in the corpus, and users engaged in the activity of reminiscing in comments on thirty-five of thirty-six posts. Soliciting and sharing historical information was less common and appeared in user comments on twenty of the thirty-six posts. Each excerpt deals with comments and replies from a different post. The excerpts have been selected to illustrate the diversity of ways users respond to the museum's post and communicate with the museum and other users, rather than to provide a comprehensive description of all

user activity in the corpus. The figure accompanying each excerpt aims to contextualize the comments and replies considered in the analysis by illustrating how many comments and replies in total were published in response to the post, and over what time period comments and replies were published (Figures 8.1, 8.2, 8.3).

Empirical findings

Excerpt 1: Identifying (and identifying correctly) a place

The museum posts a photograph of a street corner and a multiple-story brick building, with buses parked along the curb. As shown in Figure 8.1, several users make short one- or two-word comments identifying the neighborhood pictured as Majorstuen (turns 28, 49, 50, 51) or naming the streets at the intersection (turns 51, 52). Petter comments on the post, writing:

> Majorstuen as many others say. What's great is that there are no big changes to the buildings, yes, there are more in the background of the picture, but the existing ones are the same today. [comment includes photo of location from Google Street View] (turn 48).

Marianne repeats street names other users have already written and adds that the picture was taken looking toward Frogner Place (turn 62). Thomas replies to Marianne's comment, writing that it was "almost right" (turn 63).

Approximately twenty-four hours after publishing the post, the museum confirms that users have accurately identified the location as the intersection of Church Road and Sørkedals Road (turn 91). Fifteen minutes later, Anders, who has previously commented on the post, writes that the intersection is in fact Church Road and Bogstad Road, not Sørkedals Road, disputing the name of the street as identified by the museum (turn 97). Anders's comment is posted on the museum's main post, not as a reply to the museum's comment in turn 91.

The same day, later in the afternoon, Erik replies to the museum's confirming comment in turn 92, writing that on another website, the intersection in the picture is identified as Church Road and Bogstad Road (turn 92). Marius, who has previously commented on the post, also replies to the museum's comment in turn 92, four days after the museum initially published the post and two days after Erik commented. Marius reiterates that the museum has misidentified the intersection (turn 93). Fifteen minutes later, the museum acknowledges the mistake and praises the close attention of its followers, tagging Marius and Erik (turn 94). Marius replies immediately

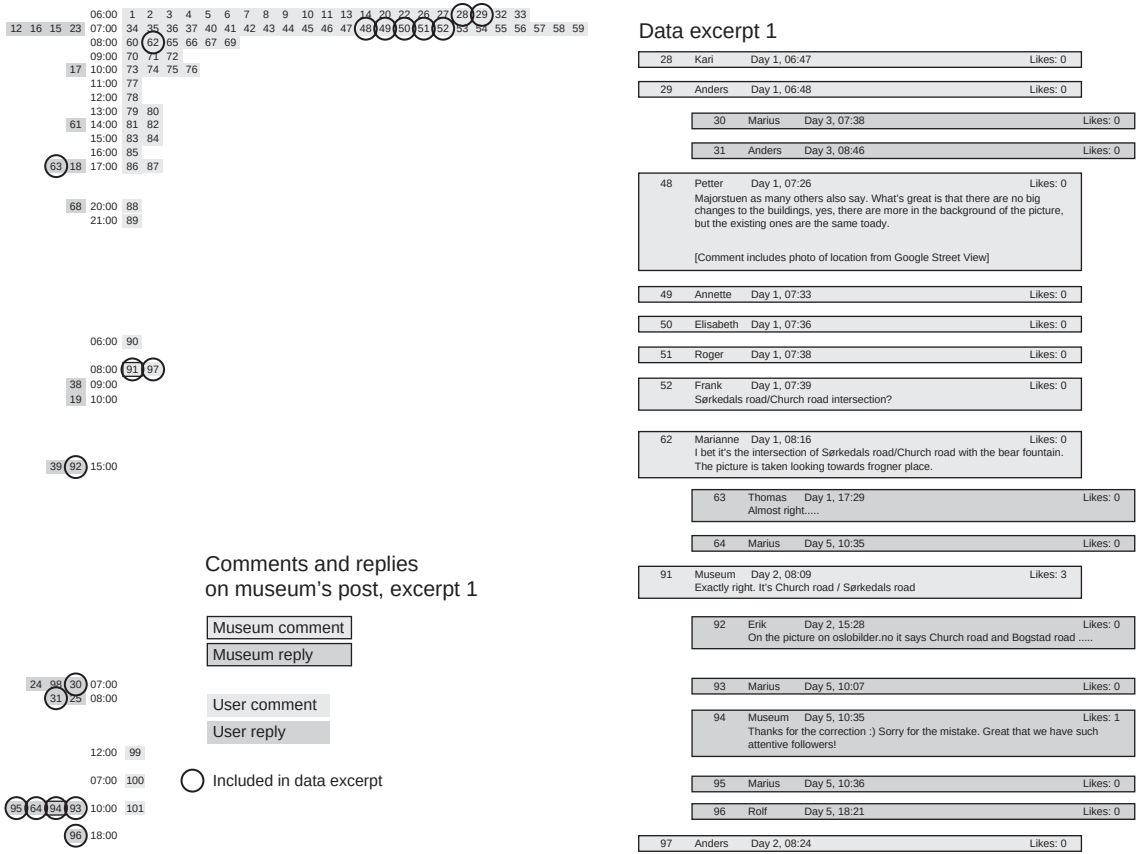

Figure 8.1 Representations of all user comments on the Facebook post described in Excerpt 1.

(one minute after the museum), thanking the museum for the many pictures and inquiring about other photographs (turn 95). Later that evening, Rolf asks where Sørkedals Road begins, perhaps in an attempt to clarify for himself the preceding disagreement between the museum and Marius and Erik (turn 96).

In Figure 8.1 above, *the chart on the left* shows all comments and replies to the museum's post. Each "turn" (comment or reply) is placed on the chart according to the hour in which it was published by the user. Replies to comments appear in dark gray on the left; posting times are shown in the center; and comments on the museum's post appear on the right; turns authored by the museum appear in a black square; turns that appear in the data excerpt are circled. *The chart on the right* shows the ten comments and nine replies that make up Excerpt 1; this chart includes turn numbers, user pseudonyms, the date and time the turn was published, and the number of likes the comment or reply received. Comments are shaded light gray; replies are shaded dark gray.

Throughout Excerpt 1, users respond to the question posed in the museum's post ("Do you see where this is?") by identifying the location shown in the picture. Most of these identifying comments are quite short (turns 49–52) and include only the name of the neighborhood (Majorstuen) or intersecting streets; such comments often repeat information introduced in earlier comments by other users, as when three separate users post the name of the neighborhood in turns 49–51. Some users, such as Petter in turn 48 or Marianne in 62, write longer comments that include the location of the photograph along with additional commentary. A small number of users correct others, including the museum, who have apparently misidentified the location (turns 30, 63–64, 98). Users are apparently concerned with guessing the location of the picture, an approach to commenting on the photograph that seems to relate closely to the question posed in the museum's post.

Identifying the location of a photograph is a user activity that is clearly responsive to the museum's 'Do you see where this is?' concept. The museum's post explicitly invites a response by posing a question about the location of the photograph, and users treat the museum's post as a soliciting initiative that merits a response by answering the question. Users whose comments only reference the location, such as the one- or two-word comments in turns 28, 49, 50, and 51, might be thought of as providing a minimal response to the museum's initiative, insofar as these comments answer the museum's question but do not initiate a new topic or introduce additional information. The museum's practice of commenting on its own posts implicitly reinforces

the appropriateness of this kind of minimal response by using affirmative language ("Exactly right") and additionally models a possible user response by providing a relatively short description of the location ("Oslo hospital and Old Town church", turn 91).

These minimal responses, however, contrast with other comments that, in addition to responding to the museum's question, acknowledge the preceding contributions of other users or introduce new topics. Petter's comment in turn 48 is one such example: his comment is responsively linked to the museum's question in that he identifies the location. It is also, however, a non-soliciting initiative in its own right ; Petter initiates a topic (how the location looks in the present, emphasized by his use of an image) not explicitly introduced in the museum's post, and he acknowledges that other users have made similar comments by writing "as many others say."

Finally, this excerpt also includes examples of users whose turns are responsively linked to the previous comment of another specific user without responding to the museum's post. In turn 63, for example, Thomas responds to Marianne, in turn 62, several hours after she has posted, implying that some aspect of her comment is incorrect. He underlines that his turn relates to hers by using the Facebook reply function and includes no explicit responsive link to the museum's initial question. Similarly, Erik, in turn 92, questions whether the museum has correctly identified the location in the photograph by referring to an alternate identification of the location on another website; he also positions his turn as responsively linked to the museum's comment by using the reply function.

Excerpt 2: Users soliciting and sharing historical information about a place

The museum posts a photograph showing a paved plaza with several horse carts in the foreground and an unpaved rise in the middle ground. As shown in Figure 8.2, Kristoffer comments several hours after the museum posts the photograph, writing "the opposite way, a few decades later" (turn 28) and includes a different historical photograph of the same plaza. The following day, after four other users have replied to Kristoffer, Nina also replies to Kristoffer's comment. She reports that she has read about the plaza in a local history book, which referred to a hill called "the spitting hill," and she asks for clarification about which hill the name referred to and where the name came from (turn 33). The same day, the museum confirms that the location shown is a square in central Oslo (turn 83). Another user, Andreas, then publishes

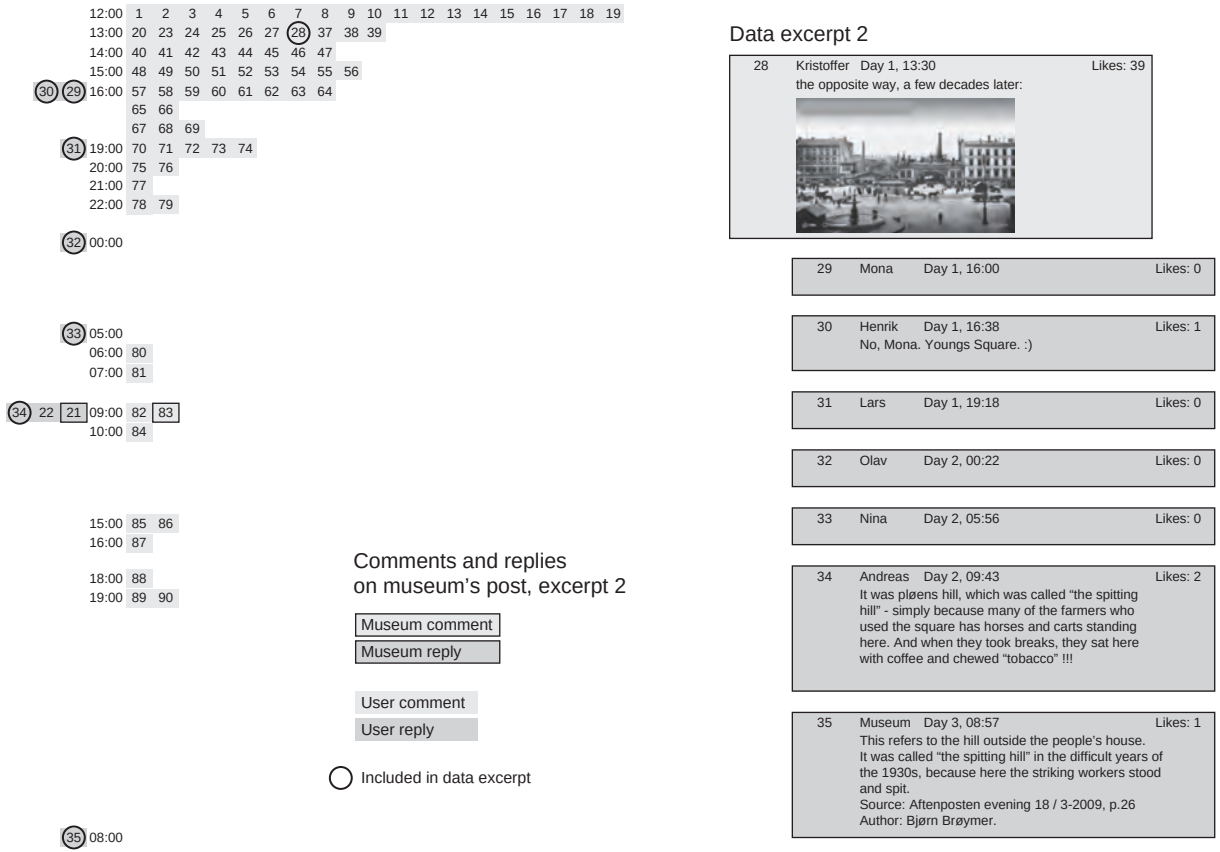

Figure 8.2 Representations of comments and replies on Facebook post described in Excerpt 2.

a sixth reply to Kristoffer's comment, in which he apparently responds to Nina's question:

> It was Pløens Hill that was called "the Spitting Hill"–simply because many of the farmers who used the square had horses and carts standing here. And when they took breaks, they sat here with coffee and chewed "tobacco"!!! (turn 34)

The following day, two days after publishing the original post, the museum publishes a reply (the seventh in the sequence) to Kristoffer's comment, also apparently responding to Nina's question (turn 33) and Andreas's answer (turn 34):

> This refers to the hill outside the People's House. It was called "the Spitting Hill" in the difficult years of the 1930s, because the striking workers stood and spit. Source: Aftenposten Evening 18/3-2009, p. 26, Author: Bjørn Brøymer (turn 35)

In Figure 8.2 above, *the chart on the left* shows comments and replies to the post published in the first 48 hours; each "turn" (comment or reply) is placed on the chart according to the hour it was published by the user. Replies to comments appear in dark gray on the left; posting times are shown in the center; and comments on the museum's post appear on the right; turns authored by the museum appear in a black square; turns that appear in the data excerpt are circled. After the post was initially published, twelve comments (turns 91–102) and one reply (turn 36) were made by users that are not included. *The chart on the right* shows the one comment and seven replies that make up Excerpt 2; this chart includes turn numbers, user pseudonyms, the date and time the turn was published, and the number of likes the comment or reply received. The comment (turn 28) is shaded light gray; the replies (turns 29–35) are shaded dark gray.

In this sequence of comments, users and the museum introduce historical information related to the location in the museum's original post. This information includes how the plaza looked at a later date in the form of an additional historical photograph (turn 28), a place name associated with the plaza (turn 33), and two explanations of the origins of the place name (turns 34, 35). The information in these comments does not originate from users' lived experience or personal memories, but instead from other sources about local history. In two instances, these sources are "cited" or explicitly referred to: Nina indicates she read about "the spitting hill" in a local history book,

and the museum similarly explains that the account of the place name in its comment comes from a 2009 newspaper article.

In contrast to the user activity of identifying a location, the activity of soliciting and sharing historical information is not obviously responsive to the museum's Facebook concept. The comments and replies summarized in Excerpt 2 are nevertheless responsively linked to the museum's post in that they deal with the location in the photograph posted by the museum: they solicit and share information about Youngs Square, not some other part of the city. Kristoffer's comment in turn 28 can usefully be thought of as a non-soliciting initiative, in that it introduces the "topic" of looking at other historical photographs of the same location, but does not expressly invite a response from other users; nevertheless, thirty-nine users acknowledge the comment by liking it. Andreas's turn in 34 is a variation on the use of replies: though within the architecture of Facebook's software, his turn is a reply to Kristoffer's comment in turn 28, and the text of his reply makes it clear that he is answering Nina's question in turn 33; his reply is specifically linked to Nina's immediately preceding comment. Finally, the museum's turn in 35 underlines how responses to a soliciting initiative, such as Nina's question in turn 33, can unfold over and take into consideration multiple turns. The museum's account of the history of "Spitting Hill" as a place name in turn 35 can be seen as a specification of Andreas's reply to Nina, in that it clarifies which hill in Youngs Square "Pløens Hill" refers to, and simultaneously offers a correction of the information Andreas offers (it was strikers who spit, not farmers), bolstered by a citation.

Data Excerpt 3: Users reminiscing about a place

The museum posts a photograph showing a road with buildings to the right and greenery to the left, horses at a watering trough, and several adults and children in the foreground. As shown in Figure 8.3, the second user comment (turn 2) identifies the location by giving the names of the intersecting streets and writes that a tower visible in the upper right corner is the tower of Old Town Church. Camilla, in turn 8, writes that her grandfather was baptized in the church, and that she herself attended school church services there and remembers a particular priest, whom she identifies by name. Ten users like Camilla's comment. Within the hour, two other users, Ola and Hans, repeat the name of the priest, and add their own memories of living close to the church and attending school church services (turns 10, 13). Roger writes that the intersection is also familiar for those traveling on a particular tram line (turn 11). Martin and Ida add their own comments, noting baptisms,

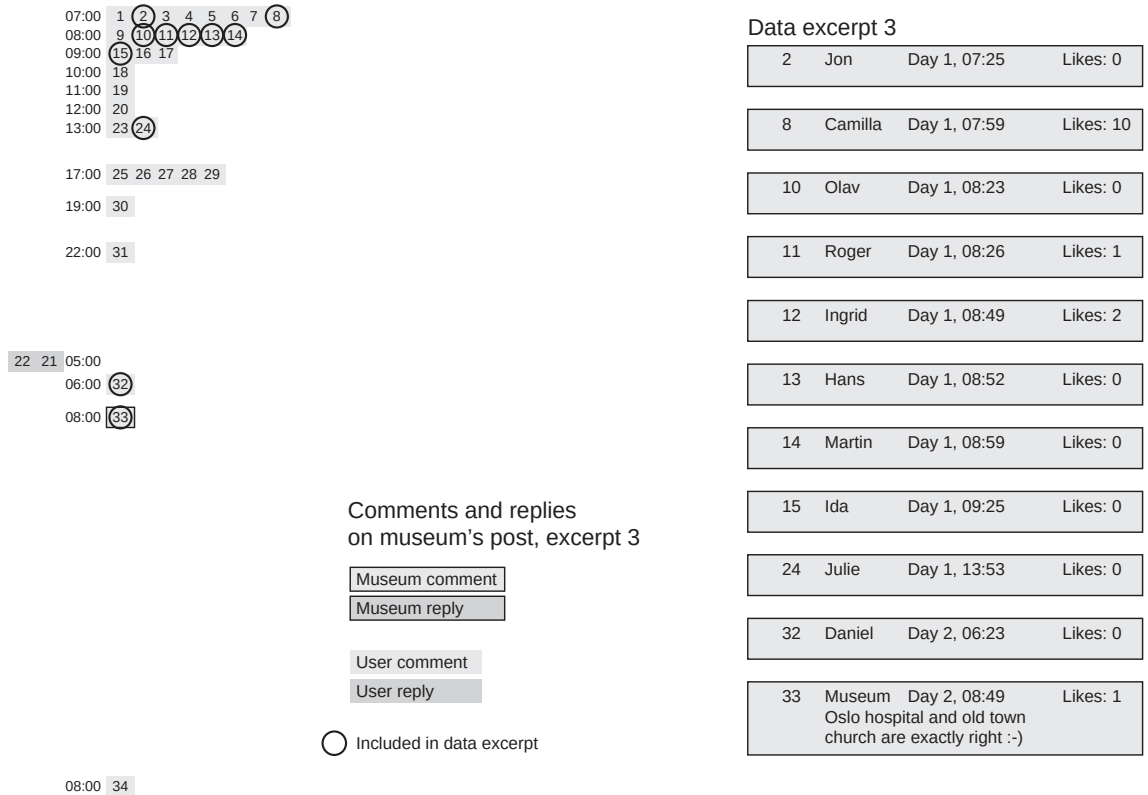

Figure 8.3 Representations of all user comments on the Facebook post.

confirmations, and marriages held at the church (turns 14, 15). Julie and Daniel comment on the pleasure of seeing pictures of places from childhood (turn 24) and working life (turn 32). Approximately 24 hours after publishing the post, the museum confirms that users have correctly identified the location as "Oslo hospital and Old Town Church" (turn 33).

In the figure above, *the chart on the left* shows all comments and replies to the museum's post. Each turn (comment or reply) is placed on the chart according to the hour in which it was published by the user. Replies to comments appear in dark gray on the left; posting times are shown in the center; and comments on the museum's post appear on the right; turns authored by the museum appear in a black square; turns that appear in the data excerpt are circled. *The chart on the right* shows the eleven comments that make up Excerpt 3; this chart includes turn numbers, user pseudonyms, the date and time the turn was published, and the number of likes the comment or reply received.

The comments in this excerpt can usefully be understood as users making a connection between the place pictured in the photograph and their own past life experiences and memories. Users establish their connection to, or experience of, the place in different ways. Some refer to milestone life events such as baptisms and weddings, while others recall everyday experiences of traveling past the church and hospital on public transportation or working in the area. Still others more generally allude to their memories and experiences by characterizing the place pictured as almost home or as place they remember from childhood.

Like the activity of soliciting and sharing historical information, the activity of reminiscing is not obviously responsive to the museum's Facebook concept. The sequence of comments in which users reminisce about a priest and the pictured church suggests the importance of other users' comments in eliciting these memories. Olav and Hans's comments in turns 10 and 13 respond and explicitly connect to Camilla's introduction of the priest's name; her comment, intentionally or not, allows for other users' memories associated with that priest to emerge. Daniel's reference in turn 32 to his own experiences of working as a hospital priest in the 1970s further illustrates how a users' comment may be elicited by a theme in previous comments by other users. Though Daniel does not make an explicit connection to Camilla's comment as Olav and Hans do, his self-identification as a hospital priest is arguably more responsive to Camilla, Olav, and Hans's memories of a particular priest than it is to the museum's photograph, where the hospital and church are visible but not particularly prominent. Daniel's comment is responsive to the earlier reminiscing about priests by other users who commented on the museum's post.

Summarizing empirical findings

Through its consistent use of the question, "Do you see where this is?" the Museum of Oslo's Facebook concept suggests a possible avenue for user activity: an individual user identifies the location of a historical photograph. This analysis demonstrates that users frequently engaged in this activity and that users responsively linked their comments to the museum's post by answering the museum's question. However, identifying the location of a picture from the museum's collections was not the only activity users were engaged in when they commented on these Facebook posts. They also solicited and shared historical information about the location pictured and remembered in public by establishing a personal connection to the place.

Analyzing the responsive and initiative aspects of users' comments and replies reveals that while some users provided a minimal response to the museum's post, others directed their comments toward the museum or another specific user or acknowledged previous users more generally while also initiating new topics. As they published their comments, users were attentive to the technical features of Facebook as a platform, suggesting multiple understandings of how a comment on a post or a reply to a comment might function, depending on its position within a sequence of comments and replies. These findings highlight the importance and complexity of *sequentiality* in users' understandings of how to organize their communicative activities. The analysis also demonstrates that interaction, as indicated by comments or replies that explicitly accounted for the contributions of others, took place not only between the museum and individual users, but also among users.

Toward what ends: Implications for further research and practice

Conversation analysis-inspired approaches to user activity on social media

This chapter contributes to a growing body of conceptual and empirical literature that uses conversation analysis to study users' activity on social media. As Reeves and Brown argue, such an analytical approach can bring to light social phenomena that aggregate-level analysis of social media activity fails to account for (2016, p. 1060). Findings from this study underline Reeves and Brown's conclusion about the usefulness of conversation analysis for studying social media and illustrate the kinds of social activity or phenomena that aggregate analysis might miss or mischaracterize. For example, an aggregate analysis where interaction among users was defined in terms of replying

to another user's comment would not account for interaction among users across comments, where users clearly signal that they have read and are referencing the comments of others without using Facebook's reply function. Conversely, defining interaction in terms of replies would also be problematic insofar as this analysis demonstrates that some comments elicit multiple replies, and that users refer and respond to the immediately preceding reply rather than the initial comment to which they are "replying."

Museum user communication on social media

In addition to exemplifying the usefulness of conversation analysis as an analytical tool for studying user activity on social media, this study complements and complicates findings from previous empirical work on interaction between museums and Facebook users. The centrality of questions and answers to the Museum of Oslo's Facebook concept problematizes Gronemann and others' (2015) finding that pseudo questions (i.e., questions that a museum knows the answer to) do little to elicit a response from users. The Museum of Oslo's Facebook concept is fundamentally based on a pseudo question insofar as the museum knows the answer to the question it poses, and demonstrates as much by confirming that users have correctly identified the location pictured. Many users nevertheless respond to the museum's question. Rather than dismiss pseudo questions as a genre of institutional social media activity that does little to elicit a response from users, the findings presented in this chapter suggest the importance of investigating how and why posing such questions may produce different responses from users and different types of user activity. The user response to the Museum of Oslo's Facebook concept, does, however, strongly support Gronemann and others' (2015) conclusion that Facebook users respond to museum posts that involve a specific invitation to participate or interact. Such conclusions have practical implications for museums' use of social media. They suggest that when it comes to "doing something" with material from a museum's collections, some users are happy to follow the institution's lead; museums can guide users toward communicative interaction and participation by regularly asking an answerable question.

In their study of an art museum's Facebook post and responses to the post from users, Laursen and others (2017) observed that comments from individual users involved little acknowledgement of, or interaction with, other users who also responded to the post. In contrast, many of the individuals who commented on the Museum of Oslo's posts were, by virtue of their acknowledgement of and expansion on the comments of other users, participating in many-to-many communication, facilitated by photographs from the museum's collection. By extension, this chapter provides empirical support

for the claim that museums' use of social media can create opportunities for such communication "to develop around collections and disciplinary knowledge" (Russo, 2012, p. 151). Communication with other individual users, not just the institution, is an end toward which users interact with the museum's Facebook posts.

Does the Museum of Oslo's Facebook concept and consistent posting strategy make it a more participatory institution? The types of user activity that emerge in response to the museum's Facebook posts make visible how social media users think about and experience images from the museum's collections. Users' comments suggest they understand the museum's image and question as an occasion to remember in public, whether the name of a priest or the route of an urban commute; as a forum to show what one knows of local history or to inquire about the details of what one does not; as a daily reminder of the pasts and places of the city, both as they are preserved in a historical photo and as they live in the minds and words of neighbors. Institutionally and individually creating time and space for such everyday engagement with museum collections is a kind of participation that seems worth pursuing.

Notes

1 The museum's post described here is available at: www.facebook.com/183343891697105_1256002107764606.
2 Known as "Bymuseet" (literally, The City Museum) in Norwegian, the institution's name is translated as the Museum of Oslo in English-language promotional materials.
3 As of June 2019, the museum's posts and users' comments on the posts can be viewed without logging in to Facebook.
4 In the time between when data for this study was downloaded and analyzed, and the submission of the manuscript, Facebook made substantial changes to what data is publicly available through its API. This in turn affected how data could be collected using open-source tools for academic research like NodeXL. As of July 2018, it would be possible to download the data presented in this chapter using NodeXL, however the procedures for doing so would be slightly different from those I originally followed, and involve additional collaboration with the Museum of Oslo staff.

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Chapter 9

The participatory turn

Users, publics, and audiences

Per Hetland and Kim Christian Schrøder

Introduction

The idea of citizen science (CS) has developed along two tracks generally understood as *democratized CS* and *contributory CS*. In his book *Citizen Science: A Study of People, Expertise and Sustainable Development*, Alan Irwin argued that sustainable development would not be possible without attention to questions of citizenship and citizen knowledge, defining democratized CS as developing concepts of "scientific citizenship" that emphasize the need to open up science and science policy processes to the public (Irwin, 1995). At the same time, Rick Bonney has. defined "contributory CS" as public participation and engagement that entails voluntarily contributing scientific data (Bonney et al., 2009; Dickinson & Bonney, 2012; Heiss & Matthes, 2017). Both versions of CS may also be seen as a reaction to the deficit model. After the publication of Irwin's book in 1995, emphasis has been placed on the science, rather than on the citizen. This chapter highlights the citizens' end of the fast-growing research field of CS and explores how the participatory turn is manifested in concepts we use to describe citizens in citizen science, as well as how these concepts have developed over time. Consequently, our main research aim in this chapter is to discuss the concepts of users, publics, and audiences, each of which can help us to understand how people take part in both contributory CS and democratized CS (Cooper & Lewenstein, 2016), as well as participatory science communication.[1]

The participation of users, publics, and audiences in scientific research has a long history within the natural sciences (Conniff, 2011; Kohler, 2002, 2006), social sciences, and the humanities (Mahr et al., 2018); however, the content of these three concepts is changing. To ground our discussion of users, publics and audiences in the current literature on CS, we refer to the electronic versions of the two recent books, *Citizen Science: Innovation in Open Science, Society and Policy* (Hecker et al., 2018a) and *The Rightful Place of Science: Citizen Science* (Cavalier & Kennedy, 2016), as well as the new

journal, *Citizen Science: Theory and Practice*. In the following sections, we point to key examples of each concept from the journal and the books, and we discuss each concept in relation to the fields of innovation studies, science and technology studies, and media and communication studies.

The three concepts will consequently be linked to media scholar Nico Carpentier's distinctions between access, interaction, and participation (2012, 2015). In the conclusion, we will use Carpentier's model to explore the participatory turn. Much indicates that common ground between the three concepts is emerging: They all increasingly come with an understanding that users, publics, and audiences are engaging in *interpretational and constructional* work.

User and users

Searches in the two books (Cavalier & Kennedy, 2016; Hecker et al., 2018a) and the journal *Citizen Science: Theory and Practice*, revealed that the term *user* appeared less frequently than the term *publics*, and was rarely deployed in the journal. Nevertheless, the user concept does appear, and the following book chapters are crucial readings for understanding how the concept is currently used in CS:

- user-inspired modifications describing CS methods (Ottinger, 2016)
- user needs, lead user involvement, user-centered and participatory design that signify users as active innovators in CS (Novak, Becker, Grey, & Mondardini, 2018)
- user-generated content, user preferences, engaged/advanced users focusing on CS technologies (Mazumdar et al., 2018)
- reuse of CS data makes concepts like user-accepted norms, user group/communities, and user-friendly relevant (Williams et al., 2018)

In the introduction to *How Users Matter*, Oudshoorn and Pinch state that "we are interested in how users consume, modify, domesticate, design, reconfigure, and resist technologies. In short, our interest is in whatever users do with technology" (2003, p. 1). In other words, users are perceived as both consumers and producers acting within both private and public spaces. Alvin Toffler even coined the term *prosumer* to describe this new actor, in whom, he predicted, the roles of producer and consumer would begin to blur and then merge (Toffler, 1980).

Innovations were once looked upon as established facts or machines, and the role of the user was limited to that of an adopter. Up until the 1970s, reinventions were considered rare. Reinventions were, as a rule, treated as

"interference" in diffusion research. Gradually, and to an increasing extent, people have come to view reinvention as an important process. While invention is the process by which a new idea is discovered or created, adoption is a decision to make full use of an innovation. Rogers therefore defined reinvention as "the degree to which an innovation is changed or modified by the user in the process of its adoption and implementation" (Rogers, 2003, p. 180). User-centered and participatory design as well as user-generated content accurately signify these modifications.

User studies have been important when introducing new media technology, two traditions of which are presented here. In the early 1990s, Ann Brown and Alan Collins introduced "design experiments" as a new approach for studying learning phenomena in *quasi-experimental settings* (Brown, 1992; Collins, 1992). This is important, because when end-users have an active role to play, their function according to Hartley is usually one or more of the following: (1) to act as "guinea pigs"; (2) to perform research and development (R&D) and undertake innovation; (3) to become informed about ICT; or (4) to be the primary subject(s) under study (Hartley, 1987). Similarly, Brown stated that in strictly controlled laboratory settings the learned theorist is prepared to work with "subjects" (like rats or children) (Brown, 1992, p. 141). This is a shortcoming that design experiments are meant to overcome; therefore, Brown contrasted laboratory contexts with classrooms. Rasmussen showed how pupils took part in the activities, and how "teachers authored the pupils' locus of agency to pursue their interest and to redefine the task" (Rasmussen, 2005, p. 182). She described and analyzed participation using three concepts: authoring, positionality, and improvisation. According to Rasmussen, authoring shows how social practice is constructed and maintained; positionality reveals the dynamic of social interactions and how this dynamic relates to participants' joint construction of knowledge and understanding; and, finally, improvisation increases analytical sensitivity toward change (2005, p. 224). The three concepts also link experimental activity to the dual relationship between humans and technologies, or the process of domestication, as Silverstone and colleagues have described it (Bjur et al., 2014; Hartmann, 2009; Hetland, 2012, 2015; Lie & Sørensen, 1996; Morley & Silverstone, 1990; Silverstone & Haddon, 1996). In this process of co-construction, the power relations between the actors are of central significance. In this context, there is a great difference between having influence on a text or a media technology as a recipient or user, and having influence over the agenda based on which the text or media technology was originally produced (Morley & Silverstone, 1990). This process of co-construction includes, first and foremost, those we perceive as innovators when it comes to adopting and adapting a new media technology within CS.

An additional important element in domestication theory is that technology contains *user representations* that both enable and hinder the actions of specific user groups. Unveiling these representations is consequently important when performing user studies. It is often claimed that when a particular technological solution fails, it is because it does not meet the real needs of its users. This type of statement illustrates a superficial understanding of the concept of need. When it comes to new technology, one must often see the solution before one can formulate the needs. The concept of need in our context is thus relative and not absolute. Furthermore, we can distinguish between two different contexts in which the concept of need is used: (1) as a logical necessity, in the sense that in order to talk to a person in another town in real time, one must have a telephone, and (2) as experienced needs or wants. Need is often treated as if it were stable over time, although few phenomena undergo so many changes over time and between different actors. Experienced needs may, incidentally, also be "substitutes" for other types of needs or requirements. In most social experiments, users are recruited according to the notion of a future user. However, the problems of user studies include situations such as the following (Woolgar, 1994, p. 202):

- the user does not know his/her requirements
- the user knows his/her requirements but cannot articulate them
- the user changes his/her mind
- individual users say different things to different people
- users disagree about what their joint requirements are
- individual users are not representative of (all) relevant users
- the user turns out to be a customer rather than just a user

Many needs studies are of little value precisely because they do not specify how different types of needs are understood, or the degree to which the actors represent different relevant social groups. One mistake that is often made is that heterogeneous social groups are categorized, and common needs and aims are then ascribed to them. This is certainly also a challenge within CS.

In the infancy of the computer age, only experts had access to digital media technologies. With an extended user group also came the desire for greater user-friendliness. It will always be problematic to define user-friendliness, not least because the users constitute a multifarious group. Seen from a historical perspective, we can, however, link user-friendliness to the development of different interfaces. To study user interfaces, we can begin with the hypothesis that machines display, at least in principle, interpretative flexibility. This paves the way for a study of construction (as a process of inscribing or writing) and use (as a reading process). The relationship between the reader and the

writer may be understood as one mediated by the machine as well as interpretations of what the machine is, why it exists, and what it can do (Woolgar, 1991). Notions of future use and users of technology are, in other words, an important element in technological development. Thus, suppositions about gender, competence, job performance, and working environment in the relevant target group become an important part of technological design and are firmly anchored together. Put differently, we meet technological objects not only as tools but also as bearers of meaning and interpretations, including the interpretation of social and societal relations. However, these properties do not prevent the users from reinterpreting or reinventing these objects. It is therefore important to make technological problems comprehensible based on the context in which the technology is placed. An obvious starting point for achieving this aim is to take a closer look at how technology is constantly changing.

Reviewing the ways in which innovation studies has conceptualized users suggests that the adoption of the user concept within CS allows for the description of participating actors and actions, the characterization of an informed user, and the possibility of citizens modifying and participating in the co-construction of new technologies for CS. The next important concept is *public and publics*, perhaps the most used concept within CS studies.

Public and publics

In contrast to the term users, public and publics were most frequently used to describe citizens in both the books (Cavalier & Kennedy, 2016; Hecker et al., 2018a) and the journal *Citizen Science: Theory and Practice*. The following book chapters and articles are important readings for understanding how the concept is currently used in CS:

- the public's desire to be actively involved in scientific processes (Hecker et al., 2018b)
- various publics (Mahr et al., 2018)
- public perceptions of CS (Lewandowsky et al., 2017)
- public understanding of science (Golumbic, Orr, Baram-Tsabari, & Fishbain, 2017)
- and that the term *public* or *the public* is often used to describe the general population (Eitzel et al., 2017)

While users as a concept is closely linked to design and use, public and publics are more closely associated with scientific processes, policies, and politics. Public participation and involvement with science and technology

implies "setting research agendas, making decisions, shaping policy, and co-producing scientific knowledge" (Hackett, 2008, p. 429). Irwin and Wynne underlined an awareness of the diversity of *public groups* (1996, p. 9), and they criticized the portrayal of the public as a homogeneous mass: The "public" exists as an audience for science; they are an object rather than a subject. Irwin and Wynne reminded us of Raymond Williams's observation: "There are in fact no masses, but only ways of seeing people as masses." Consequently, a constructivist conception of participation is "co-produced, relational and emergent" (Chilvers & Kearnes, 2016, p. 13). Following this, participation emphasizes the following aspects: (1) Publics as mediated and emergent. (2) Publics as collectives. (3) Participation as collective experimental practices "in the making." (4) Participatory collectives as co-produced, material, and diverse. (5) Relational ecologies of participation. (6) Reflexivity and humility as key qualities of successful participation. (7) Participation as nonlinear and multiply productive. (8) Participation as constitutive of science and democracy (Chilvers & Kearnes, 2016, pp. 15–16).

As Edna Einsiedel (2014) quite rightly stated, there are many ways of conceptualizing or considering publics. Einsiedel argued that the debate between the American philosophers Walter Lippmann and John Dewey epitomizes two conceptions of publics: the ongoing struggle between the omnicompetent and sovereign citizen (Lippmann, [1922] 2007), on the one hand, and the more hopeful possibilities of an enlarged public sphere imbued with the promise and hope of a democratic polity that values the *practical wisdom* of the citizen (Dewey, 1927), on the other. Publics are also deployed as analytical categories and performed as part of the reconfiguration of science and society (Irwin & Michael, 2003). Furthermore, publics have been assigned roles or have emerged as social categories: Michael (2009), for example, distinguished between "Publics-in-Particular" and "Publics-in-General". Two specific versions of "Publics-in-Particular" are deliberative mini-publics, which are invited to participate in specific democratic processes (Grönlund, Bächtiger, & Setälä, 2014), and issue-oriented publics, which enter the political arena to participate in shaping scientific and technological futures (Gastil, 2017; Jasanoff, 2003).

The roles taken by different publics assume a variety of enactments and meanings: the construction of (scientific and technological) knowledge, the construction and display of identities, and the conduct of a particular form of citizenship. While we use publics as a noun, we recognize that the adjectival use of the term (for example, the public sphere, public interest) is also a means of demarcation, pointing to the shifting boundaries between the private and the public, the collective and the individual, and the exclusive and the inclusive within professional or policy communities. Einsiedel (2014) claimed

that the discussion of publics provides an entry point to understanding the many different forms of participation entailed in public participation. She considered participation in terms of science and technology according to three purposes – for policymaking, for public dialogue, and for knowledge production.

In other words, we are living in sciencescapes and mediascapes in which a constant flow of new media hybrids is extending the repertoire of mediated forms of expression. For the sake of simplicity, we shall allow the nuancing that lies in emphasizing the public's active interpretational and constructional work, and not least the heterogeneity of the public's composition, to remain implicit in the concept of the public; in this way, the plural form of public is increasingly relevant.

In their 2014 discussion of international perspectives on public understanding of science, Bauer and Falade suggested that the idea of scientific literacy attributes a knowledge deficit to an insufficiently literate public. Jon D. Miller defined science literacy in terms of "four elements: a) knowledge of basic textbook *facts* of science, b) an understanding of scientific *methods* such as probability reasoning and experimental design, c) an appreciation of the *positive outcomes* of science and technology for science, and d) the *rejection of superstitious beliefs* such as astrology or numerology" (Bauer, Allum, & Miller, 2007, pp. 80–81).

We will present the three periods mentioned in Bauer and Falade, as the development illustrates changing understandings. *Scientific literacy* builds on two ideas, claimed Bauer et al. (2007). First, science literacy is essentially a part of the secular drive for basic literacy in reading, writing, and numeracy. The second idea is that science literacy is a necessary part of civic competence. Knowledge is the key problem of this paradigm, and interventions are focused mainly on education. Critics have also argued that indicators of textbook knowledge are irrelevant and empirical artefacts. Of real importance is knowledge-in-context that emerges from local controversies and people's concerns, as Brian Wynne described in his study of hill-sheep farmers of the Lake District who experienced radioactive fallout from the 1986 Chernobyl accident, which contaminated their sheep flocks and upland pastures (Wynne, 1992).

New concerns emerged under the *public understanding of science* period. In the UK, this change was marked by the influential Bodmer Report (Bodmer, 1985); while in Norway, the White Paper, "Research for the Common Good" (St.meld.no.36 1992–93) introduced a more systematic approach to the public understanding of science and outlined the need for a national strategy for science communication aimed at both the general public and users (Hetland, 2017). Public understanding of science inherits the notion of a *public deficit*;

however, in Norway, an *access deficit* and a *policy deficit* were foregrounded. In general, this period was marked by an attitudinal deficit, according to Bauer and Falade (2014), creating more positive attitudes toward science. Children and youths, who will comprise the basis for recruiting future researchers, were highlighted as an important target group.

In the third period, *science in society*, the focus shifted to the deficit of scientific experts: their prejudices against the public. According to Bauer and Falade (2014), the view of the public held by scientific experts came under scrutiny. For the science in society paradigm, the distinction between research and intervention blurs. Public participation is perceived as a way to rebuild trust; and, in Norwegian science policy, several participatory arrangements were developed – what Jasanoff referred to as technologies of humilities (Jasanoff, 2003). Deliberative activities are time-consuming and costly, and this high cost is one reason why the dissemination model still thrives (Hetland, 2017).

Reflecting on the ways in which the public and publics have been conceptualized in the field of science and technology studies suggest that the concept of "public" within CS allows for describing both public perceptions and understanding, public dialogues, and publics co-producing scientific knowledge. We now proceed to the concept of the *audience and audiences*.

Audience and audiences

If public and publics were the most frequently used term to describe citizens, audience and audiences appeared least frequently in the two books (Cavalier & Kennedy, 2016; Hecker et al., 2018a), and the concept has not yet been used in published articles from the journal *Citizen Science: Theory and Practice*. Nevertheless, the following book chapters suggest how the audience concept is currently being used in CS:

- a general, nonprofessional audience (Cavalier, 2016)
- unintended audiences (Dunn & Menninger, 2016) and new audiences (Hecker et al., 2018b)
- wider audience (Gold & Ochu, 2018) and nontraditional audiences (Sforzi et al., 2018)

Consequently, when it comes to the audience concept, we identified expressions mostly characterizing the audience. The issues and concerns that have challenged the study of users and publics are in many ways echoed in media audience studies (e.g., "use" as a process of "reading," or "reinventing," technology; the participatory dimension of publics). Until recently, it was common in audience studies to perceive audiences and publics in fairly dichotomous

terms: "In both popular and elite discourses, audiences are denigrated as trivial, passive, individualized, while publics are valued as active, critically engaged, and politically significant" (Livingstone, 2005, p. 18). However, these polarized characterizations became outdated as the emergence of digital and social media appeared to herald a new form of media user, one who would abandon the passive audience role for the benefit of the multiple participatory practices afforded by digital media technologies, and who would substitute the passive habits of the one-to-many regime of broadcasting for the lean-forward practices of many-to-many communication enabled by the digital platforms (Jensen, 2010). One much-quoted phrase even talked about "the people formerly known as the audience" (Rosen, 2006).

On firmer theoretical and empirical foundations, it has been argued that it has become increasingly difficult to sharply distinguish between, on the one hand, audiences as viewers, readers, listeners, and spectators, and on the other, between audiences and publics (Schrøder, 2017), with Michael Warner arguing that the boundary separating an "audience" from a "public" is blurred and porous (Warner, 2002). Taking this argument further, as we are moving into an era of "mediatization" (Hjarvard, 2013) or even "deep mediatization" (Couldry & Hepp, 2016), Livingstone has argued that "where once people moved in and out of their status as audiences, using media for specific purposes and then doing something else […] in our present age of continual immersion in media, we are now continually and unavoidable audiences at the same time as being consumers, relatives, workers, and […] citizens and publics" (2013, p. 22). Reflecting this broad and inclusive understanding of "audience" in the digital, mediatized society, the term *audience* can be defined as people who, in their capacity of social actors, attend to, negotiate the meaning of, and sometimes participate in the multimodal processes initiated or carried out by institutional media (Schrøder & Gulbrandsen, 2018, p. 1).

It would thus appear that audience studies have moved within a couple of decades from the position that "there is no doubt that the audience concept is in many ways outdated" (McQuail, 1997, p. 142) to a stance where the audience role has become vindicated as superordinate. This situation can be seen as the last stage in the historical trajectory of audience research (for an overview, see Schrøder, Drotner, Kline, & Murray, 2003, p. 26ff). From the 1920s, research was dominated by the "effects" paradigm, which holds that audiences (in their capacity as citizens as well as consumers) were the passive victims of direct and immediate media effects. From the 1950s, this perspective was challenged by uses-and-gratifications research, which argued that if we want to understand what the media do to people, we should first study how people are "active audiences" who "do things with the media" (Berlin, 1958; Blumler & Katz, 1974). However, uses-and-gratifications research retained a

transmission view of mediated communication, one which saw the meaning of mediated content as a straightforward matter, and which also insisted that only media phenomena which lent themselves to analysis with quantitative methods were researchable (Gitlin, 1978).

The next wave of audience research, from 1980 onward, can be labeled as the "sense-making turn" in audience studies. Here, reception researchers began focusing on the encounter between audiences and mediated content, exploring how people "read" news and current affairs programs on TV (Morley, 1980), how female readers made sense of romance novels in everyday life (Radway, 1984), and how housewives domesticated video recorders as an empowering cultural meaning process (Gray, 1992). Reception research was premised on Stuart Hall's encoding/decoding model (Hall, 1973), which argued that media content was encoded with a "preferred meaning" in compliance with the hegemonic role of cultural industries, and that although audiences were predisposed to largely decode the content with a "dominant reading," they also might have at their disposal (depending on the communicative repertoires they had acquired through the life course) a "negotiated" code or an "oppositional" code. The gist of the reception perspective was economically expressed by the American communication scholar Brenda Dervin:

> Communication cannot be conceptualized as *transmission*. Rather, it must be conceptualized in terms of both parties involved in creating meanings, by means of *dialogue*. The sense people make of the media messages is never limited to what sources intend and is always enriched by the realities people bring to bear.
>
> (Dervin, 1989, p. 72)

As we saw in our discussion of publics above, audiences are thus seen to engage in interpretational and constructional work. In the encounter with mediated meanings, audience members engage a meaning product which is inherently polysemous, such that the resulting meaning must be seen as a joint product of text and reader. Recently, Adrienne Shaw has suggested that this process can be conceptualized, in parallel with users' negotiation of the affordances of new technological devices, as a process whereby the discursive "affordances" of the media text are meaningfully actualized in the process of reception (Shaw, 2017, p. 9). We may thus combine the notion of technological affordances with Hall's notion of preferred readings: "In the age of interactive media there are parallels between the ways we use communication technologies and read media texts, and the concept of affordance can be metaphorically related to the encoding/decoding model in order to account for this parallel" (Schrøder, 2017, p. 111).

In recent years, there has been a movement within audience studies toward conceptualizing audiences in non-media-centric terms (Krajina, Moores, & Morley 2014; Morley, 1980). While there is clearly a limit to how audiences can be defined independently of media (cf. also the definition given above), it is fundamentally sound to insist on seeing audiences as first and foremost embedded in the situational contexts of everyday life, in which media may, or may not, be used to fulfill people's needs. One such theoretical framework is offered by the "communicative figurations" perspective, which starts its exploration of audiences by considering the social domains that people move in and between in daily life (Hepp, Breiter, & Hasebrink, 2017). The communicative figurations of these domains are characterized by three defining features: They are populated by a *constellation of actors* (networks of people who communicate and act); the figuration has a *frame of relevance* focused on a topic or project; and they come with a set of *communicative practices* by which actors "do" and "say" things with or without a given media ensemble as they reproduce or transform the domain.

These communicative figurations can be seen as communicative, cultural, and political "stages" (ranging from small social units like the family or peer group to the public sphere), on which power relations are played out in a complex dialectical relationship between audiences and media. On the one hand, the media have structural institutional power, exerting influence on audiences in well-known ways, including commercial exploitation, ideological hegemony, and cultural exclusion. On the other hand, audience members can, in their capacity *as* audiences, or by forming into publics or online crowds, affect and challenge the media and other societal institutions in various ways.

One of these ways, as suggested by Kleut et al. (2017, p. 28), takes the form of "small acts of engagement": that is, as commenting and debating, as the production of small stories, or even as just "one-click engagement." The idea is that emerging social changes of a potentially and ultimately profound nature may start with "small acts of engagement rather than by more laborious and dedicated practices" (Kleut et al., 2017, p. 28). In other words, at the aggregate level, audiences can exert power through inconspicuous everyday acts. Attending to the understanding of audiences from media and communication studies suggests that the audience concept within CS allows for the description of a plurality of audiences, how such audiences engage and, finally, how active audiences partake in multiple participatory practices.

Conclusion

Carpentier (2012, 2015) introduced the AIP model – Access, Interaction, and Participation – to structure his discussion on production and reception in the

areas of technology, organizations and publics, and media. To conclude our discussion, we combine the AIP model with the above review of the literature. This allows us to discuss how people who take part in CS are understood when the three concepts of users, publics, and audiences are used to discuss public participation within evolving sciencescapes and mediascapes.

Carpentier sees "access" as "articulated as presence, in a variety of ways that are related to four areas: technology, content, people and organizations", while "interaction" "refers to the establishment of socio-communicative relationships" (2012, p. 173f). "Participation" is distinguished from access and interaction as a consequence of "the key role that is attributed to power, and to equal(ized) power relations in decision-making processes" (2012, p. 174) in the given practice domain.

In Table 9.1, we map the changing understandings of the concepts of user, public, and audience described in the three sections above to components of the AIP model, condensing and summarizing our review (see also a discussion of the three science communication models in Hetland, 2017, pp. 29–33). Table 9.1 thus shows how people in their three guises as *users* of technology and design, *publics* of communal life and of science, and *audiences* of media are all undergoing a processual development from access (transmission) through interaction (negotiation) to participation (empowerment). The forms

Table 9.1 The participatory turn in citizen science – access, interaction, and participation

AIP	*Access*	*Interaction*	*Participation*
Science Communication Models	Dissemination (deficit) model	Dialogue model	Participation model
Communicative Relation Form of power	Transmission Unequal	Negotiation Unequal	Empowerment Egalitarian
Users of technology and design (Production and Reception)	The informed user, user representations, and user-friendliness; users as adopters	The user domesticates, modifies, and resists; users as adapters	The user co-constructs, designs, reconfigures, and performs research; users as "producers"
Publics of communal life and of science (Production and Reception)	Public understanding and literacy	Public dialogue	Publics critically engaged and politically significant
Audiences of media (Production and Reception)	Individualized/ passive viewers, readers, listeners, and spectators; victims of media effects	Encoding/ decoding, small acts of engagement, mediatization	Active audiences, multiple participatory practices

of power accorded to people under the regime of each science communication model is unequal in the case of access and interaction, but egalitarian in the case of participation.

The AIP model as well as the three science communication models provide an analytical framework for understanding how users, publics, and audiences participate in CS. First, we claim that the three processes take place:

* over time: the three concepts of users, publics, and audiences move along diversifying trajectories, with the multiplicity of users, publics, and audiences being increasingly more important, and
* by this movement, all three concepts emphasize more strongly the actors as interpreters and producers in the public; and, consequently,
* the three concepts, emerging from innovation studies, science and technology studies, and media studies, converge when the digital media converge.

In spite of the converging development, all three concepts are still useful in discussing public participation within evolving sciencescapes and mediascapes. At the same time, new mediascapes marked by digitization are transforming participation. One may claim that the changes within both sciencescapes and mediascapes have completely altered our understanding of both media and science in recent decades, and that CS is just one of several emerging knowledge practices that has evolved from these changes. For instance, similar transformations are occurring in events studies, where Eriksson, Reestorff, and Stage (2018) analyzed citizen participation in European cultural centers, both as a method with citizen scientists from across Europe and "as practices and understandings of participation at the centres" (p. 205; see also Simon, 2010 for parallel developments in museum studies). We have focused our discussion on the three concepts of users, publics, and audiences when discussing public participation within evolving sciencescapes and mediascapes. *Users* acting with authoring, positionality, and improvisation emphasizes the often-invisible work that users do, as illustrated by concepts like crowdsourcing and CS. Domestication theory claims that domestication implies a double articulation, as described by Silverstone and Haddon; that is, media texts cannot be meaningful before they are articulated through technological objects (Silverstone & Haddon, 1996). However, in extending domestication theory (see also the discussion in Bjur et al., 2014), Hartmann adopted a triple articulation: as text, as object, and as an immediate socio-spatial situational context (Hartmann, 2009). *Users as publics* illustrates our participation in public life as democratic

citizens shaping society. Finally, Berlin stated that the user as audience aims "to be a subject, not object: to be moved by reasons, by conscious purposes which are my own, not by causes which affect me" (Berlin, 1958, p. 8). *Users as audiences* emphasizes that users are co-producing frames and positions, and thereby partaking in domestication processes.

Note

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Chapter 10

Searching for deeper meanings in cultural heritage crowdsourcing

Sanita Reinsone

Riga, October 6, 2017

It is a chilly fall day. There is a slight drizzle. I am headed for a conversation with Muris. That is how she, this woman born in 1941, encourages me to call her when I ask what pseudonym she would like to have. "Well, like a cat,"[1] she explains. Whiteness – that is the first thing I notice as I enter Muris's apartment. White flooring, white walls, white curtains, a white sofa in the living room. She is wearing a white blouse. The only contrast to the white is the huge, dark green palm in the corner of the room. Muris is well prepared. She has looked online to see where I am working and where I have worked. She has read about my books and has identified our mutual acquaintances. All that serves well – as a way to get acquainted and as an introduction to our conversation. I look for the computer, but I do not see it in the living room. It is in the other room, and we will spend several hours there, talking. Muris is a dedicated voluntary folklore text transcriber. It is technical work – transcribing words you see on the screen. She has been doing it for more than three years. Day after day. Numerically, her work adds up to 2.5 million characters. I have come to discover its intangible subjective value. "There's something magical there, inside all that," said Muris.

During the last decade, crowdsourcing has proved to be a useful method for approaching cultural heritage and humanities sources. Although the term *crowdsourcing* is fairly new (known only since 2006 when *Wired* editor Jeff Howe first used it), the approach is widely acknowledged for the genuine advantages and opportunities it offers. Cultural heritage institutions stand to benefit not only from its collective intelligence and creativity but also obtain significant help in processing digitized collections. The general public benefits from being personally introduced to the vast richness of diverse cultural heritage materials and empowered to engage as volunteers (Hedges & Dunn, 2017).

Allegedly, the essence of crowdsourcing is doing things together at a distance in a technology-mediated environment that takes advantage of the collective efforts and wisdom of crowds documented in the growing literature on

crowdsourcing in cultural heritage and the humanities. On the other hand, substantive analysis of the integration of crowdsourcing into daily virtual practices and the creation of individual meanings through personal interaction with cultural heritage sources has largely been neglected.[2] Additionally, the research literature has paid little, if any, attention to the individual personalities behind the digital curtain. In some sense, as if "crowd" in the term "crowdsourcing" has misleadingly conveyed the impression of unidentifiable masses of partakers actively collaborating in a joint digital environment, the individuality of participants is fused and disguised within an "anonymous crowd."

Community engagement in cultural heritage crowdsourcing can take various forms. As noted by researcher and digital curator Mia Ridge, these forms generally include transforming content from one format into another, describing artifacts, synthesizing knowledge, or producing creative artifacts (Ridge, 2014b, p. 23; cf. Hedges & Dunn, 2017). The crowdsourcing initiatives brought to the fore in this chapter deal with archived folklore manuscript[3] transcription that aligns with the first form mentioned in Ridge's overview, namely, transforming content from one format to another. The chapter articulates individual meanings behind this technical work by volunteers and introduces a personal approach to the study of cultural heritage crowdsourcing.

The transcription of handwritten manuscripts is recognized as one of the most common and familiar processing forms currently in use in digital humanities and cultural heritage crowdsourcing, invaluable for a myriad of cultural heritage institutions to care for and disseminate vast amounts of materials. Primary among the well-known projects are the ones that provide interaction with material in English, such as *Transcribe Bentham*,[4] *Old Weather*,[5] *Smithsonian Digital Volunteers Transcription Center*,[6] *Transcribathon* by Europeana,[7] *What's on the Menu?*,[8] *Citizen Archivist* initiative,[9] and *MicroPasts*.[10] Among folklore archives, crowdsourced manuscript transcription currently is offered by the Archives of Latvian Folklore[11] and the Irish Folklore Collection.[12]

The proliferating literature on cultural heritage crowdsourcing published during the last decade has concentrated on various aspects and research fields of this ICT-mediated process – cultural heritage studies (digital) humanities, libraries, museums and archival research, media studies, and computer science, among others. Since it is a comparatively new method for disseminating cultural heritage and for interacting with the public, numerous publications have foregrounded projects where this method had been used, providing analysis of carried out tasks, exploring usability, or presenting results (Alam & Campbell, 2017; Causer & Terras, 2014; Causer & Wallace,

2012; Daniels, Holtze, Howard, & Kuehn, 2014; Dunn & Hedges, 2013, 2014; Ellis, 2014; Ridge, 2013, 2014a; Seitsonen, 2017). Publications also have compiled inventories of the known kinds of crowdsourcing tasks and have focused on broader methodological issues – for example, the opportunities and possibilities offered, the cultural value of digital engagement with heritage (King, Stark, & Cooke, 2016), its ability to attract audiences and gain good results. Significant interdisciplinary efforts have been carried out to properly define the term and to create typologies, taxonomies, and classifications of crowdsourcing tasks (Causer & Wallace, 2012; Wood, Sullivan, Iliff, Fink, & Kelling, 2011).

The user dimension of crowdsourcing has attracted particular attention because participant involvement is the essential ingredient of all efforts (Causer & Wallace, 2012; Wood et al., 2011). Users have been viewed and studied primarily as a crowd, with attention focused on their quantity, input level, engagement frequency, proficiency, and motivation. Quantitative methods, namely, participant surveys and log data analysis in combination with other indirect methods, such as exploration of user profile pages (Lane, 2017; Raddick et al., 2009; Wood et al., 2011), are used most frequently to explore user involvement. Focus groups are an additional and productive way to collect more individualized points of view (Ferriter et al., 2016).

The crowd of crowdsourcing, as suggested by several researchers, typically is not that large (at least in the cultural heritage and humanities field), and the number of those who should be regarded as active, permanent, or dedicated participants is considerably smaller still (Wood et al., 2011). Studies suggest that less is more, a conclusion also referred to as the Pareto Principle or the 80/20 law (Lane, 2017; Wood et al., 2011). Thus, "power participants" are key to making crowdsourcing processes possible, and studies about the experiences of those hard-working participants are indeed relevant.

Getting to know the most active participants, exploring their way of life, their viewpoints and habits (including virtual ones) enables researchers to acquire a deeper understanding about how cultural heritage is being lived and practiced and what incentives motivate participation. In other words, why is someone willing to devote time and skills to accomplish a common goal or to contribute to a joint process without being paid? Furthermore, deeper participant study may reveal how best to address new audiences, how to improve technical tools, how to develop content and features that could make the experience of collaborative digital work more enjoyable (as noted by Wood et al., 2011).

In this study, I acknowledge that whatever the nature of the performed tasks (which can vary from very technical to very creative), each multi-engagement consists of many personalized experiences. I address the personal

dimension of intangible heritage crowdsourcing by bringing into focus high-level participants who devote their time to cultural heritage crowdsourcing on a regular basis. The case study I present is based on a crowdsourcing initiative carried out since June 2016 by the Archives of Latvian Folklore (ALF). I focus on two research questions: How are cultural heritage and digital space being experienced? How is digital engagement narratively interpreted by the participants themselves?

With these questions in mind, I introduce a personal approach to the study of cultural heritage crowdsourcing participants. Methodologically, I rely on in-depth life-story interviews. The specifics of such interviewing are described below to make the case that this is a valuable method for obtaining deeper insights into participant life experience, daily life activities, worldview, and how collaborative digital engagement is being practiced and narratively substantiated. In order to choose interviewees and explore anonymous opinions, additional complementary methods are used. They range from distant/anonymous to close/personal interaction with the target group: first, the digital footsteps of participants are traced by collecting and analyzing log data[13] and the content with which each participant most often interacts; second, anonymous information on user experience and opinions is collected through Web surveying; third, in order to get acquainted with the target group and to explore differing experiences and views, a group discussion primarily involving the power participants is convened; fourth, participants are interviewed in person using a life story approach. The purpose is to gain close insights into the volunteer group through personal and group interaction and the collection of quantitative data, as described above.

In this chapter, I highlight the story of Muris. She vividly represents the group involved with the ALF digital transcription project. Although it is her first encounter with cultural heritage crowdsourcing, her active participation fits into her life, admirably, naturally. What is more, her life story reveals deeper meanings connected to this engagement, meanings that exclude the technical side in favor of a narratively articulated interpretation of digital transcription as an emotionally and culturally charged and socially influenced experience.

Historical context: participatory folklore heritage

This chapter is based on a case study about volunteer work connected to digitizing archived folklore materials. Although the participation takes place in a digital environment, I nevertheless see voluntary engagement connected to folkloric materials as a continuation, essentially, of the participatory tradition that began centuries ago.

The past offers exciting and valuable examples to help us understand that crowdsourcing is a phenomenon not only of the digital era. While it has allowed today's Internet users to identify an enthusiastic work force and source of collective knowledge, large-scale public participation in cultural heritage dissemination and research has been known for several hundred years. In this context, the collecting of folklore (and later, its archiving) is an important and valuable example. In addition to other initiatives[14] for intellectual and preservation purposes that have elicited the public's help, the creation of folklore collections stands out for the sustainability, intensity, and broad scope of public participation.

In Europe, focused folklore collection initiatives began in the second half of the 18th century and have continued ever since, inextricably linked to the expansion of romantic movements (especially in northern Europe) as well as the development of folklore as a field of research (Abrahams, 1993; Baycroft & Hopkin, 2012). With the help of newspapers, both ardent intellectuals and folklore societies reached out to the public to interest them and to convince them of the need for their engagement in the folklore-collecting project. Networks of narrators, collectors, and dispatchers were created, and for many decades they sent materials to the archives and continued to work productively. By the end of the 19th century, thanks to the help of dedicated and enthusiastic contemporaries, nationally significant folklore collections were created throughout Europe (see Reinsone 2018). These participatory folklore-collecting initiatives from the past offer proof of the potential efficacy of crowdsourcing as a methodology. The enthusiasm and belief that what is being accomplished is necessary and appreciated by society (as well as by a future community) proves sufficient enough for motivating thousands of people to volunteer their time, energy, and knowledge to accomplishing a worthy endeavor.

For example, in Finland a stable and active volunteer network of folklore collectors had evolved by the end of the 19th century (Harvilahti, 2012, pp. 391–7). By the middle of the 19th century, folklorist Svend Hersleb Grundtvig in Denmark had managed to gather a network of collectors and to assemble a large collection of ballads (Tangherlini, 2013, pp. 25–28). In 1848, a few thousand volunteers participated in the Ethnographic Division of the Russian Geographical Society's project to collect traditions (Knight, 1998, pp. 122–31); in 1852, a government-sponsored campaign to collect folk songs began in France (Simonsen, 2005). In Slovenia, in 1897, several hundred volunteers helped to launch a project to collect folksongs (Stanonik, 2012, pp. 359–418); in Estonia, folklorist Jakob Hurt and later Matthias Johann Eisen assembled a group of some one hundred and fifty folklore collectors (Järv & Sarv, 2014; Kuutma, 2005; Ross & Lehiste, 2001, p. 28). The initiative

of German scholar and folklore collector Richard Wossidlo is noteworthy for creating a well-trained network of about the same size in the middle of the 19th century (Schmitt, 2015) as were many other similar efforts in other countries in the 19th century. At the beginning of the 20th century, when many folklore archives were established, these participatory collecting projects not only continued but were also broadened, diversified, and strengthened (see Reinsone, 2018).

In Latvia,[15] individual efforts to launch participatory folklore-collecting projects were made in the mid-19th century by the Baltic German pastor and scientist August Johann Gottfried Bielenstein. His activity attracted considerable attention although, during the first Latvian national awakening movement, intellectuals were starting to issue similar calls in newspapers to attract the Latvian intelligentsia to folklore collection (Vīksna, 2015, p. 12). Participatory efforts gained momentum during the second part of the 19th century and culminated in the Latvian folksong project carried out by Krišjānis Barons (1835–1923), which involved a multi-level network of almost nine hundred volunteer folklore collectors,[16] and which was essential for the compilation of six extensive volumes of Latvian folksongs, that is, *Latvju dainas*, 1894–1915. Along with Barons's (Figure 10.1) Latvian folksong project, and within the same time frame, separate networks of collectors developed individually under the guidance of other early folklore researchers.

A second wave of participatory collecting began after the founding of the Latvian folklore archives in 1924[17] and continued until the World War II. Since 2011, the collected materials, which are stored in the specially designed *Dainu skapis* (The Daina Cabinet) in the Archive of Latvian Folklore, have been included in the UNESCO Memory of the World Register. In turn, Krišjānis Barons, who devoted his life to organizing the work of collecting folklore and then compiling the volumes of Latvian folksongs, has become a symbol for the enthusiastic collecting work in Latvia.

Centenary Word Wizards: Barons's legacy

Krišjānis Barons was chosen as the symbol for the crowdsourcing campaign that the Archives of Latvian Folklore began in June 2016 in cooperation with the Latvian National Radio and Television, the Ministry of Culture, and the Latvian Centenary Bureau. "Become the 21st Century's Krišjānis Barons!" the press release for the campaign declared (Figure 10.2), and at the opening orientation participants were encouraged to embody Barons symbolically by adopting his style of eyeglasses and beard.

The crowdsourcing promotion was named "Centenary Word Wizards" (CWW)[18] (*Simtgades burtnieki*) in honor of the hundredth anniversary of

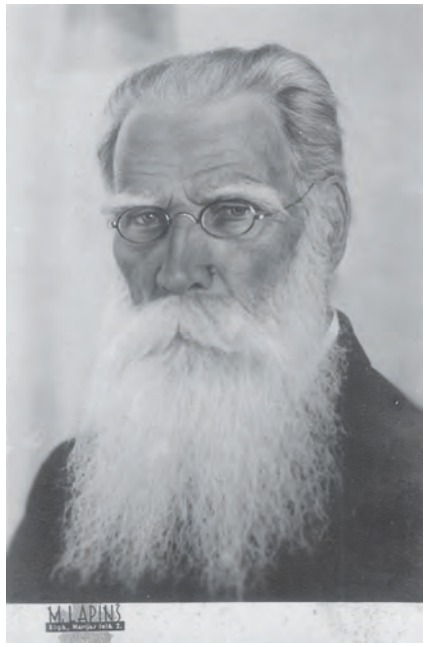

Figure 10.1 Krišjānis Barons (1835–1923), Latvian folklore collector.

Figure 10.2 CWW promotional mask.

Latvia's founding.[19] Media attention, resulting from broadcasts, reporting, and publicizing news about CWW, was a crucial factor in attracting the public. Although the website garamantas.lv actively publicized the project, especially on social media, their efforts alone would not have created as broad an audience. In the first months, the number of enrolled participants who completed at least one transcription exceeded two thousand individuals. Considering Latvia's relatively small population,[20] and the fact that not all residents are interested in cultural matters, the results are noteworthy.

Technically, CWW is rather simple. The website's display of ALF manuscripts available for transcription into 11 languages changes every few seconds.[21] User manuals for texts and videos have been simplified, and new transcriptions and their transcriber's names are listed. The crowdsourcing platform is synchronized with the ALF digital archive's website garamantas.lv. All transcriptions are instantly indexed and checked by editors. The CWW platform displays a ticking clock that tracks the time spent collectively and individually (seen on personal profiles) in transcribing. In June of 2018, two years after the founding of CWW, the time contributed by volunteers exceeded one year: in other words, volunteers had spent 440 days or 10,560 hours in the digital field to transcribe 75,473 manuscript pages.

Thanks to the intensive publicity, the number of participants initially attracted by the crowdsourcing campaign reached several hundred, momentarily even a thousand, but the majority proved to be mere onlookers enticed by TV or radio coverage to try out how it feels to transcribe old manuscripts, but whose desire waned after initial attempts.[22] As with similar projects (Lane, 2017; Wood et al., 2011), there are far fewer individuals who are regular collaborators. Some volunteers, however, are special – namely, those who work hard for CWW every day, often several hours a day. Data from log journals suggests that the participation of this group in cultural heritage crowdsourcing has been a daily and sustainable hobby.

For example, Anna[23] worked an average of 90 hours per month on the CWW site for the first half of 2018, but since June of 2016, she contributed 4,285 hours, or 168 full-time days. Magda, on the other hand, devoted a total of 282 hours from the beginning of 2018 until the end of July, but since the CWW was founded, she has worked a total of 690 hours (or 86 full-time days). Muris has transcribed texts from the first day the site opened, that is, June 2016, and from that time until August of 2018, she volunteered 1,032 hours (or 129 workdays); her monthly average that last year was 50 hours.

The number of those who might be called "power participants" has not only stabilized in the two years since the CWW site was available but shows

signs of increasing. On average the group includes twenty to thirty people. Their contribution to the digitization of, and accessibility to, ALF materials is significant. Their regular participation makes the site a vibrant and dynamic resource. Moreover, the majority of participants become adept transcribers who learn to handle the old and complicated handwritten materials in many different languages, with their competence increasing over time. In December 2017, during a meeting with members of the most active participant group,[24] it was clear that they were interested in specific questions related to the collections and were able to hold their own in discussions with experienced ALF specialists.

In November of 2017, shortly before the December meeting, I distributed a survey to the most productive members of this active group. The invitation to participate was sent to the 26 most active transcribers, and 20 members sent replies.[25] The survey contained numerous questions, but for this study, the important answers primarily concerned their motivation for participating[26] and, secondly, the nature of the experience of working on the CWW platform (for example, when was the work done and where was it done - at home, at work, elsewhere?). In addition, I asked each transcriber to describe one day of work.

An analysis of the question about motivation shows that the responses largely reflect the formulation of the questions. There is noticeable agreement and a certain formulaic uniformity in the responses. They foreground four motivations: (1) the work is interesting; (2) the content is engrossing; (3) the materials are unique and of cultural value: and (4) participating in a team effort is rewarding. These results largely concur with those observed by other researchers (Ferriter et al., 2016; Oomen & Aroyo, 2011; Raddick et al., 2009). But the homogeneity of the responses also corresponds to the ideas and incentives featured in publicity about CWW on the radio and TV, online, and in print, suggesting that the publicity materials were read and remembered by the participants. Moreover, the homogeneity of the answers is characterized by laconic expressions and the use of generalized and learned statements, which points to the language in both the narratives and the Web survey format.

Nevertheless, some of the answers express nuances that also are detectable in the qualitative interviews that were held with the participants later on, when they voiced both their gratitude for the opportunity to become better acquainted with their native land through the old stories and their desire to be drawn closer to the past. For the transcribers, the CWW platform becomes the metaphorical crossroads where they encounter previous generations, and the knowledge they share, through the folklore materials, as seen in the responses below.

As I transcribe, I sometimes feel as if I am talking to my grandparents, their neighbours, and with the help of my imagination, to still earlier generations (ID10.)

I enjoy the chance to touch the work done by those in the past. Transcribing what they have written, I feel as if I am holding hands with them (ID12).

I like to feel the values that were important in earlier times, I like to decipher the handwriting, I like to compare things that I recognize and to learn about things that are entirely new to me (ID 20).

(Survey responses to motivation question)

The answers to questions about where, when, and under what circumstances transcription takes place are also brief. Not surprisingly, CWW work takes place at home.

I transcribe at home. It could be at any time during the day, starting with a morning cup of coffee as well as at other times when I sit down at the computer. Sometimes I get so involved, it's hard to stop.

(ID10)

When I can free up the time, then I transcribe the materials. I do it at home. I come home from work, get ready for tomorrow, and then I get started with the manuscripts.

(ID13)

Notably, a portion of the survey responses suggest that transcribing manuscripts is a respite from work and an alternative to other forms of entertainment and information.

I work on transcription when I don't feel like doing anything else – sometimes in the morning, sometimes during lunch times as food is cooking on the stove, or in evenings, when I get tired of boring television programs.

(ID5)

I sometimes transcribe during coffee breaks at work, as relaxation.

(ID4)

Transcribing depends upon my mood, but usually after breakfast and in the afternoon. And also when there's nothing worth watching on television.

(ID19)

Although answers to the online survey might offer good insights into participant attitudes and activities, individual experience is all too briefly generalized.

To gain a deeper understanding of the meaning of crowdsourcing in the daily life of transcribers, I found it essential to go beyond comfortable anonymity and become acquainted with the participants, to talk to them without the mediation of the screen and predefined questions.

Searching for deeper meanings

The in-depth method used in this research relies on the life-history interview, which refers to interviews in which the interviewees are asked to talk about their personal lives. I regard the life story as a productive means for gaining as full a perspective as possible about the narrator's life experiences. I wanted to situate crowdsourcing in the context of the transcriber's life and to understand how virtual participation is narratively integrated into that life. For Robert Atkinson, the life story narrative typically

> includes the aspects of our life and experience that we want to pass on about ourselves to others, the parts that we have come to understand and see as the essence of our whole experience. It highlights the most important influences, experiences, circumstances, issues, themes, and lessons of a lifetime.
>
> (Atkinson, 1998, p. 7)

The role of the interviewer can vary using this method. Considering the specific goals of this research, I chose to not be an inconspicuous and passive interviewer, silently observing the evolution of the story. Instead, I took advantage of topical threads that interested me and encouraged their development. I tried to create a comfortable and trusting atmosphere, with the result that the interview at times resembles a conversation.[27]

The research participants were aware of my interests. Although I did not steer our conversation toward the CWW project, the stories they told me about their life, to a greater or lesser extent, led them to talk about participating in the crowdsourcing initiative during their free time over the past year. Consequently, one of the observed rhetorical goals emerging from the life storytelling during the interview was a justification for participation. Thus, directly or indirectly, the stories connected crowdsourcing retrospectively to diverse life events, interests, social needs, and emotions. As Livia Polanyi observed about the contextualization of stories in interviews, "The 'meaning' of any given telling of a story in a conversation is socially determined: a story is 'about' what it is taken to be about" (Polanyi, 1981, p. 51). Most frequently, the topic of crowdsourcing cropped up as an example of leisure-time activity and connected to the consumption of cultural information and news and

Figure 10.3 Muris showing her photo album. Riga, October 6, 2017.

the daily use of technology. Part of the conversation occurred sitting by the computer as the narrators demonstrated and explained certain things while I observed and listened to what was being said about the CWW platform experience.

Muris spoke of her participation in the CWW project only after we had talked for an hour.[28] She first described her life in broad strokes, referring to a photo album (Figure 10.3), and then, after a lengthy silence, she connected what she told me to her current involvement in transcribing the folklore manuscripts.

> *Since I had wanted to go into philology but ended up with physics and math, I had the skills and opportunity to get involved.*

Muris is one of the first programmers in Latvia. After finishing the university, she worked at the computational research center until her retirement. In high school, she had been enthusiastic about enrolling in the philology department at the university, but her parents urged her to study math instead, and she herself was drawn to the prospect of a stable job. Muris does not regret her decision. Indeed, she regards her interest in philology and her professional computer experience as the logical factors that motivated her participation in CWW.

Her participation in the CWW project surfaced intermittently as she talked about her daily routine. Still, it is a significant topic. In her stories as well as those of other interviewees there is a sense that they do not regard or interpret transcribing as technical work – it is not a straightforward matter of transferring information from one format to another. Instead, fascination with the ever-changing content of the folklore materials turns the physical process of transcription into a medium that offers a deeper awareness of cultural heritage. "Yes, it's like an addiction for me!" Muris said, and went on to elaborate:

> *I get up in the morning, do this and that. Then I think – what do I do now? I don't watch soap operas … Aha! I sit down and transcribe a page or two! And the thing is, I find something interesting every time! Really, I find such pearls. I write them down in a notebook and I think – some truly are pearls! These are wonderful discoveries, not just something trivial.*
>
> (Interview with Muris, at home)

"Pearls and Grains of Thought" – that's the title of the notebook that Muris uses to write down her findings from the old folklore manuscripts. Typically, they are aphoristic – apt proverbs and instructive expressions – but most of all they are little-known Latvian folk songs that poetically express notions about human life, world order, and natural rhythms (translation from Latvian by author).

> *The past is the teacher of the present and the future.*
> *That which does not open your eyes, opens your wallet.*
> *Whether eaten or not eaten, hold your head high.*
> *Save bread, don't save work.*
> *Dawn comes, the sun rises,*
> *That is the day's first light.*
> *Good morning, God helps,*
> *That is the day's first language.*[29]
> *Falling asleep at night,*
> *I wrapped myself in folktales.*
> *Awaking in the morning,*
> *I was again listening to new ones.*[30]
>
> (Interview with Muris, at home)

"Aren't these wonderful discoveries?" Muris asks rhetorically.

Television serials are an important theme in Muris's life story. In conversation, she repeatedly returned to the theme in different contexts. Together

with political newscasts, they represent the emptiness and negativity of such programming and are a mindless waste of time.

> *Transcribing also allows me to tune out the negativity that surrounds me. I completely switch off. In the manuscripts there is a bit of everything and, most of all, nothing is ever the same! Each is a little bit different," says Muris, and then goes on to compare. "But you turn on the television – and once again they're talking about Rīdzene!*[31] *Every day! Almost every day! Or, well, then there are the serials. I can't stand them. They are simply intolerable … I go to the computer when something totally boring is on television. I turn it on, increase the volume a bit, go to the computer, start transcribing, and keep an ear out for something more worthwhile to watch.*
>
> (Interview with Muris, at home)

As suggested by both the interviews and the survey responses, cultural heritage crowdsourcing is of vital importance as an alternative to content offered by the media and by social networks. Muris's characterization of media content is in sharp contrast to the ascribed quality and thematic diversity of the archival materials, and creates a unique perceptual opposition between the two. While adamantly stressing the heterogeneity of CWW content, Muris also emphasizes its emotional homogeneity: it is positive, inspiring and worth knowing, especially as an escape from today's media content. TV is almost always turned on while Muris is at home. In her stories, however, she rarely mentions the media content she likes. When I asked about her favorites on TV, she cited interviews with scientists and broadcasts about nature, wildlife, and technology. These are broadcasts with content that, in general, stands apart from everyday life and social problems. From this point of view, it is possible to see a certain similarity with what the folklore materials offer Muris, namely, new knowledge.

Muris's interest in cultural heritage themes did not come about suddenly. For several decades, she has been intrigued by her ancestors, by the places they lived, and by family history, but the time for searching and finding old documents came about only after she retired. Her interest in family history brought her to the digital archive. Her selection of materials to transcribe is not random, but rather is closely connected to places that are important to her.[32] As she describes how she selects materials to transcribe, a whole world opens up, one in which the boundaries between the past and the present – between the narrated (and even mythical) and real world, between documentary and personal knowledge, between digital and geographical space – are diffuse and unclear. Such blurred boundaries

are further intensified by her interchangeable references to past and present times.

In talking about how she selects what to transcribe, Muris often uses a travel metaphor. She starts out/travels from one place in the collection to another, then to still another, and onward to the next.

> *First, I think – I have to take a look at what is happening in Opekalns.*[33] *My father went to the church school in Opekalns. Then I moved to Veclaicene*[34] *because it had a lot of lakes. And I know that devils live in barns in Jaunlaicene*.[35] *But in Veclaicene, the devils live in lakes! It also has lots of hills. I just had to go see what it was all about … And then Rencēni*[36] *– because my son has a farm not far from there. I moved closer to him. Rencēni is very rich in folklore. And now I just go through the Rencēni collection in order.*
>
> (Interview with Muris, at home)

The centrality of the travel metaphor Muris uses to describe her activity in CWW reveals her emotional attachment to the places in the manuscripts she chooses to explore, especially when "traveling" childhood paths via the narrated experiences of forebears. Their stories add a new layer to her knowledge of family history. The result is something surprising for Muris, a discovery of what she neither knew nor suspected previously, despite a childhood spent in these locales, and, to the extent possible, she perceives them as places of birth.

Even the folklore collectors from earlier generations appear in Muris's stories as if they were well-known acquaintances with whom to visit for a while, to discuss recent observations and follow along on their collecting adventures. After the folklore materials from family birthplaces and hometowns have been transcribed, "then I move on to Kučers[37] in Lejasciems,"[38] says Muris, before adding "and later I will go to Ape[39] to visit the famous Dāvis Ozoliņš!"[40]

Similarly, the other transcribers with whom Muris shares the CWW virtual space also enter harmoniously into an interesting narrated space. As she transcribes collections, Muris invariably meets others virtually and she good-naturedly refers to them as rivals. This daily encounter – even if it means no more than taking note of new postings of transcripts and the name of the transcriber – creates a sense of family. When she opens the CWW platform, Muris always looks to see who has been online recently and what they have accomplished. It is like shaking hands with an invisible companion:

> *I always look at the most recent names. And they really are like relatives to me! Now I regret not ever making contact, so we could meet up sometime. Yes, when I get online, I always look to see who's been there recently.*
>
> (Interview with Muris, at home)

The CWW platform does not host a communication forum for its participants, and the Facebook page for the ALF digital archive (garamantas.lv) had not added such a forum by summer 2018. Though minimal, the practice of inscribing the username on each page of a transcribed manuscript as well as identifying recent users[41] on the introductory page provides for a modicum of socializing and conveys the feeling of belonging to an active virtual group with common interests. Participants look at each other's work and notice which themes or collections interest other transcribers. They also refrain from "competing" by not intruding on a collection someone else has started. True, the group also monitors quality. Mistakes are noted and reported to the CWW editors.

Gradually, the life-story interview with Muris, which lasts several hours not counting the many digressions about her life, reaches the present day. Muris is over seventy. "You can't just lose touch," she says, as she describes how hard it is to learn to use smart devices, but she goes on to say that she has mastered all the digital essentials by herself so far. In talking about the changes in her life after retirement, our conversation suddenly shifts to the theme of aging and social attitudes toward seniors. On this topic, Muris sounds different. Her voice is much louder and more unyielding, suggesting she is offended and ready to challenge stereotypical notions about aging as a stage of infirmity and uselessness.

When our conversation took place, the Baltic Center for Investigative Journalism had just published research results titled "Latvia's Aging Dilemma: A Country for Old Men."[42] Although the research calls for needed political reform, Muris reacted personally to the study's title, which was being loudly proclaimed on the radio and in other media, considering it prejudicial. "Latvia is turning into a country of old people," Muris says, and she quotes directly:

> "The Land of Old People!!" Well, what are the old folks to do?!? What am I supposed to do as an old woman? What am I to do?!? If you are still alive, then you are a nuisance because, you see, it's an "old people's land."

With this thematic turn, our entire conversation about Muris's active participation in CWW suddenly assumed a new hue. Participation also reveals itself a powerful testimony to Muris's abilities and usefulness – despite her years. "Of course, it's unfortunate that there are no young people," she says, "but what are the old folks supposed to do? On the other hand, they also must work at being useful. They can always do *something*!"

After a four-hour interview, I left Muris's house with a head full of ideas, a valuable record of our conversation, and many photographs. In the following months, I continued to observe her constant activity on the CWW platform, albeit from a distance, but with a much deeper understanding of how and why

Muris goes on working. Muris remained in the Rencēni collection of folklore until July 2018, and then responded to a call by ALF researchers to lend a hand transcribing the extensive and complicated collection of incantations and magic spells. She joined the other volunteers and moved to that collection.

Conclusion

Providing free access to cultural heritage in a digital environment and introducing opportunities for participation that allow everyone to contribute to its preservation, replenishment, and creation encourages the emergence of an interested and active group of volunteers. Previous studies have demonstrated the importance of such communities to the digitization process, but the meaning of individual participation has been neglected.

In this study, I explored the personal dimension of cultural heritage crowdsourcing by focusing on the collections of the Archives of Latvian Folklore at the Institute of Literature, Folklore and Art (University of Latvia), and the participants in its Centenary World Wizard initiative. Using the life story interview method, I presented a personal picture of the experience of crowdsourcing as being inseparable from the participant's personality and life as a whole.

An analysis of one life story told in the context of crowdsourcing reveals different meanings attached to this presumably technical process and suggests that social context is equally as important as the nuances of personality and cultural context. Additionally, during the interview, participation – interpreted as personal enthusiasm for the archival collection itself because of its highly regarded quality – emerged as a means of enriching personal knowledge and as an important affirmation of social worth in old age.

Although the analysis of one interview does not take into full account the experiences of all participants of this crowdsourcing initiative, it nevertheless highlights the value of a qualitative research method. This approach clearly demonstrates that digital participation not only promotes a deeper familiarity with cultural heritage but is also a source for creating personal and experience-based meanings. Cultural heritage is neither static nor abstract nor sealed in an archive. Cultural heritage brings past and present generations together in a dynamic way, revealing that their relationships are alive and ongoing, personal, and personally significant.

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Notes

1 In Latvian, "muris" is a synonym for a male cat.
2 A commendable exception is a special issue of Collections (a journal of museum and archive specialists) devoted to the efforts of the Smithsonian Institution Transcription Center to involve digital volunteers (Decker 2016, especially Ferriter et al. 2016).
3 Folklore manuscripts held by the Archives of Latvian Folklore (Institute of Literature, Folklore and Art, University of Latvia) contain different folklore genres (folk songs, legends, proverbs, charms, folk tales, to name a few), written traditions, life narratives and regional history.
4 http://blogs.ucl.ac.uk/transcribe-bentham/.
5 www.oldweather.org/.
6 https://transcription.si.edu/, see also (Decker, 2016).
7 https://transcribathon.com/.
8 http://menus.nypl.org/.
9 www.archives.gov/citizen-archivist.
10 https://crowdsourced.micropasts.org/.
11 The Archives of Latvian Folklore (ALF) established in 1924, currently is a part of the Institute of Literature, Folklore and Art (University of Latvia). ALF has integrated crowdsourcing tools in its digital archive http://garamantas.lv but a targeted public campaign for collaborative manuscript transcription also has been organized via a specialized crowdsourcing platform http://lv100.garamantas.lv, where manuscripts in different languages can be selected for transcription.
12 Irish Folklore Collection (University College Dublin) runs its Meitheal duchas.ie public transcription project.
13 The user sample group is purposefully selected for further research based on the quantity of their involvement in a given period of time.
14 For example, in the middle of the 19th century, the Oxford English Dictionary was created with the help of volunteers (Gilliver, 2016), astronomer Denison Olmstead's gathering of information about meteorological incidents in the US relied on creating a volunteer base in 1833 (Littmann & Suomela, 2014) as did the North American Bird Phenology program from 1880–1970 for collecting bird migration patterns (Mayer, 2010), among other examples.
15 At that time, Latvia was part of the Russian Empire.
16 Most of the volunteers were educated contemporaries of Krišjānis Barons, i.e., teachers, literary writers, pastors, doctors, students, but also peasants with an appropriate level of education (Vīksna, 2015, p. 7).

17 The Archives of Latvian Folklore was founded following the initiative of Anna Bērzkalne (1891–1956), a folklorist and schoolteacher. Initially, it was affiliated with the Ministry of Education of the recently established Republic of Latvia.
18 Website: http://lv100.garamantas.lv. This drive followed the 71-day crowdsourcing campaign "Language Task Force" (Valodas talka) the target audience of which was school children. It was jointly organized by the ALF and the Latvian National Commission for UNESCO (Reinsone, 2018).
19 In the beginning, the LV100 office funded the publicity campaign and brought in national and regional media coverage – television, radio, online news sites. After that, communication among participants was facilitated by the editorial team of the ALF digital archive www.garamantas.lv.
20 According to data provided by the Central Statistical Bureau of Latvia, the population of Latvia in 2016 was 1.97 million people. www.csb.gov.lv/en/statistics/statistics-by-theme/population/number-and-change/key-indicator/population-number-its-changes-and-density.
21 The languages represented in the ALF collections include Latvian, Latgalian, Livonian, Lithuanian, Estonian, Russian, Belorussian, Yiddish, Roma, Polish, and German.
22 A study of the campaign, "Language Task Force," shows that 55% of the crowdsourcing participants have contributed only once (Reinsone, 2018).
23 All names are pseudonyms.
24 The first meeting of ALF staff members and active CWW participants took place in December of 2017 at the National Library of Latvia. The primary goal was to meet face-to-face and to thank the digital partners; a second goal was to learn about their experiences, suggestions, and observations; a third goal was to let them know about the jointly realized achievements and publications; and, finally, the fourth goal was to show them the ALF and the original materials with which they were working.
25 Of the respondents, 16 were female, 4 were male. By age: 2 (ages 20–35), 8 (ages 36–55), 9 (over 56 years of age).
26 The survey also invited respondents to reflect upon the content of what they were transcribing. Did they remember something of what they had read as they transcribed the folklore manuscripts? Did they take notes on things that caught their eye? Do they share what they have learned with others?
27 Ivor Goodson and Pat Sikes suggest the term *grounded conversation* for life-story interviews with such a goal (Goodson & Sikes, 2001).
28 The interview was carried out on October 6, 2017 in Muris's apartment in Riga.
29 In Latvian:

> Aust gaismiņa, lec saulīte,
> Tas pirmais gaišumiņš.
> Labrītiņ, Dievs palīdz,
> Tā pirmā valodiņa.

30 In Latvian:

> Vakarā aizmiegot,
> Tinos tautas pasakā.
> No rītiņa celdamās,
> Atkal jaunas klausījos.

31 The so-called Rīdzenes (or Oligarch) discussions refers to one of the biggest political scandals of 2017 in Latvia, including bribery, money laundering, and other crimes that involved high-level politicians and other public figures.
32 The folklore materials offered for transcription typically derive from specific places or regions.
33 A small village in northeastern Latvia.
34 A neighboring village.
35 Another nearby village.
36 A village in northern Latvia. The Rencēni collection, one of the biggest and best collections in the ALF, was carried out by schoolchildren between 1926–1939.
37 Jānis Kučers (1901–1989) was a volunteer folklore collector who sent Latvian folklore materials to the archive from 1936 until 1988.
38 A village in northeastern Latvia.
39 A little town in northeastern Latvia.
40 Dāvis Ozoliņš (1856–1916) was a well-known Latvian folklore collector, scholar, and organizer of the network of volunteer folklore collectors.
41 Five pseudonyms of recent online participants appear on the CWW home page lv100.garamantas.lv and also on the ALF digital archive's garamantas.lv.
42 https://en.rebaltica.lv/2017/09/a-country-for-old-men/(lastaccessedAugust1, 2018).

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Chapter 11

Museums that connect science and communities

Using boundary objects and networks to encourage dialogue and collective response to wicked, socio-scientific problems

Mary Ann Steiner, Mandela Lyon, and Kevin Crowley

Introduction

As our planet continues to experience rapid change in climate, biodiversity, and ecosystem functioning, it is clear that our very future depends on bridging the gap between science and society. In this chapter, we explore how one type of civic institution – museums of science and natural history – can help to catalyze and shape broader public learning and engagement around the socio-scientific problem of climate change. Science and natural history museums are valued as shared cultural assets, providing homes for scientists and science educators, housing scientific collections and interactive learning exhibits, and running educational programs for a wide range of audiences, from school children, to families, to adults. They are trusted and supported by the public and, in turn, often depend on the public (through entrance fees or government funding) for their very existence. It may not be surprising, then, that rather than leading the charge on difficult issues, museums may be tempted to choose a less-risky path. In terms of an educational identity, museums have traditionally preferred the role of a neutral party, focusing on helping people learn about settled scientific knowledge rather than being seen as advocates for social change or undecided aspects of controversial, urgent topics (Chittenden, 2011). When museums do choose to address difficult and urgent topics such as climate change, they often do so in ways that will not overtly challenge visitors or, worse, depress them (Knutson, 2019). After all, if visitors do not enjoy their museum learning experiences, they might not return.

However, museums of science and nature are increasingly looking for ways to break out of this complacent stance. There is growing understanding that museums have a responsibility to engage the public, not just in learning about pressing socio-scientific issues, but also in doing something about them

(Watson & Werb, 2013; Steiner & Crowley, 2013; Davis 2016). Indeed, in recent decades, museums of all types have begun to move beyond acting as trusted purveyors of established knowledge, adding new kinds of civic engagement platforms to their programming. Supported by models of public engagement, public understanding, and public participation in research (Bonney et al., 2009), some museums have taken on a role to support public knowledge of science, as it emerges, when there are still debates about the direction, need, and intent of the science (Chittenden, 2011).

Climate change is a *wicked* problem in that it is unstructured, cross-cutting, and relentless (Weber & Khademian, 2008). Social science has shown that public response to climate change is heavily influenced by social norms rather than rational thinking about scientific evidence (Kahneman, 2011; Kahan et al., 2012). Rather than seeing the educational process as the explanation of a technical problem that is well-defined with known solutions, climate change education, with its social and scientific complexity, becomes an adaptive problem as well (Kania and Kramer, 2011). When an answer is not known, or when no single entity could bring about a necessary change, then broader civic/science engagement that crosses geographical, temporal, and social distance is needed (Brugger, Morton, & Dessai, 2015).

In this chapter, we examine how museums partnered with a broad range of organizations to help cities learn about climate change as a wicked, adaptive problem and to respond to local impacts. The focal project, Climate & Urban Systems Partnership (CUSP), involved four cities in the northeastern United States. In each city, a museum served as the hub of a network of organizations that, either directly or indirectly, were connected to climate impacts in the city. To achieve the broader civic/science engagement needed to address climate impacts, the museums planned to work with their networks to develop community-based education interventions that were relevant and accessible to a wide range of people living in each city (Snyder et al., 2014; Knutson, 2019; Knutson & Crowley, Chapter 7, this volume).

Bridging science and community: a design-based research approach

Three key "bets" underlie the design of CUSP, the first of which we ended up referring to in the project as the "CUSP DNA," a theory of action that emphasized the importance of local relevance, participation, and interconnectedness. By *relevance*, we mean that the topic must be presented in a way that meshes with a person's or community's interests and experience. *Participation* refers to the concept that connecting to a role, a concrete opportunity for

engagement, or a possible next step with others creates a social identity with the topic. *Interconnectedness* is the idea that understanding how components of the issue impact each other can support systemic rather than solely individual change.

We recognized from the start that the standard museum approach of teaching people the science of climate change would not accomplish our goals. As argued in Allen and Crowley (2017), prior approaches to climate change education, grounded in a knowledge-first approach to behavior change, were driven by the assumption that if people are taught how climate change occurs, then they will change their behavior to reduce the impact. In this context, the low-hanging fruit of ready-to-disseminate educational experiences would focus on bits of scientific knowledge such as how the greenhouse effect works, the factors that cause sea-level rise, or the ways that individuals can reduce their carbon footprint by driving less or changing from incandescent to LED bulbs. However, in their review of the literature, Allen and Crowley found there is little evidence that such learning is likely to lead to adaptive behavior change.

Knowledge alone is certainly not sufficient (and perhaps not even necessary) in generating behavior change in ways that will enable effective *systemic* responses to climate change. Research argues instead for human-scale stories (Kahneman, 2011) and education that addresses values, ideology and place attachment (Marshal, 2014), with attention to personal experience with impacts and solutions, or *interconnectedness* (Marx et al., 2007; Sterman, 2011; CRED and EcoAmerica, 2014; Corner, Lewandowsky, Phillips, & Roberts, 2015).

The second bet underlying our work was the idea that broad civic/science engagement was best supported by heterogeneous networks, including community-based organizations, watershed associations, neighborhood groups, education providers, social-services organizations, and policy/government groups. By expanding network membership beyond the usual climate change and science education groups, we were intentionally disrupting the typical relationship between science and society. The museums at the center of the networks were seen in each city as "experts" on the topics of science and climate change, but we did not want the networks to become dominated by the usual voices of science engagement and science education. We wanted our networks to be focused on the collaborative development of intervention tools and platforms.

By developing and using tools together, we wanted solutions to emerge from a group's combined expertise and resources (Kania & Kramer, 2011). Working with others on shared practice creates opportunities to provide objective, supportive feedback about specific topics rather than talking in

abstract or subjective terms (Burkhardt & Schoenfeld 2003; Bryke, 2009). The process develops relational trust and social capital among members (Gadja, 2004), and provides a process to problematize and improve practice (Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003). This kind of learning approach is time-intensive and relies on a network's enthusiastic participation. We hypothesized that eventual learning experiences would be more potent when grounded in each city's specific content, and that the networks themselves would be stronger as a result of having tailored learning experiences to their own context. This approach to collaborative and iterative design allowed us to match our set of principles to mechanisms that worked with public audiences and supported our newly deputized outreach educators from a wide variety of institutions.

The final bet was that collaborative use and design of tools would increase network-building capacity. Pittsburgh's initial approach, the development and deployment of climate-focused transportable activities ("kits"), provided a focus for the collaborative process, in that the kits acted as boundary objects that embodied the CUSP DNA while remaining flexible to the experience and interests of each network partner. Kits are not polished final products accompanied by a binder full of implementation instructions (a common dissemination form in the informal science education world). Instead, kits are rough physical prototypes developed through an interactive workshop process; as such, these "messy examples" invite creative modification (Richardson, 2014). In our work, the kits came to function as important *boundary objects* (Star & Griesmer, 1989; Warr & O'Neil, 2007). Boundary objects and boundary-crossing processes (Star & Griesemer, 1989; Akkermann & Bakker, 2011) reflect how ideas are situated in groups and how a concrete touchstone helps to draw out from members talent that might not otherwise be apparent (Barab & Plucker; 2002). Boundary objects can be seen as a dialogical tool to convene diverse participants, create shared processes, surface network knowledge and, through combinations of expertise and support, generate new learning experiences. Star and Griesmer (1989) emphasize that boundary objects are about the activity the object inspires, rather than the object as a product.

During our work with CUSP the first years, CUSP acted as a learning lab for how the kits would function, how we could convene the network, and how we could encourage participation in a shared effort that made our collective work relevant to the partner organizations, their audiences, and issues. Through this process, we discovered key features of the network and noticed the role kits played as boundary objects that engaged network members in sharing their expertise and adapting the kits to their own goals.

Discovering the power of boundary objects in Pittsburgh

Pittsburgh's CUSP effort is led by the Carnegie Museum of Natural History (CarnegieMNH). Founded in 1895 by Andrew Carnegie, CarnegieMNH is located in the Oakland neighborhood of Pittsburgh and is centered between a number of higher education institutions, including the University of Pittsburgh, home to the learning scientists who participated in the CUSP project. Museum staff participating in the project included a learning researcher with expertise in teen programming in museums, a museum educator with a background in paleoecology and paleoclimatology, and the museum's Director of Education. Other education staff, including some who identify primarily as naturalists, also made important contributions throughout the project.

Pittsburgh's network grew through active recruitment and word of mouth to include about thirty different organizational partners. Members included informal science institutions (e.g., museums, zoos, and botanic gardens), civic environmental organizations (e.g., nonprofit groups focused on urban tree planting, vacant lot renewal, and watershed restoration), university faculty, local government, policy and advocacy groups, and artists.

One of the network's earliest efforts involved the development of kits for partners to use at festivals and other tabling-based events. From the start the team sought to elicit ideas from the network by providing an example and then asking for ideas to improve or iterate on the prototype – or suggest new themes. In this way, the Pittsburgh team sought to activate the network's expertise (Reisman, 2008; Houser et al., 2009). Before long the museum was happy to respond to partner requests to participate in kit design by hosting design workshops that led to an iterative, collaborative process to develop these educational tools.

Invitations from the museum hub for CUSP kit design workshops were targeted so artists (experts in material use, construction, and design), scientists and other content experts, and educators (experts in facilitation) would all be present and work in teams together. The most productive workshops were held in a relaxed, informal setting with abundant food, beverages, and materials (Figure 11.1). These workshops were often hosted by the Pittsburgh Center for Creative Reuse, where shelves of repurposed materials for sale as arts and crafts supplies surrounded participants and suggested a loose, playful approach to kit building. The workshop agenda was designed to support a progressive, collaborative design process beginning with exposure to existing kits. After reviewing a range of already-developed activities, the group would

Figure 11.1 Kit-building workshop at Center for Creative Reuse. (Photo: Mary Ann Steiner).

brainstorm a list of key features they liked (or would change) about the materials and mechanisms of the kits. Then the participants would generate possible topics for new kits and refine ideas by identifying connections to the CUSP DNA – that is, how the topic is locally relevant, which community-level solutions to this topic are explored or implemented in Pittsburgh, and how Pittsburgh residents can get involved in those solutions. After a short break, groups with similar topical interests were tasked with the challenge to create a very simple prototype of a tabletop activity. After 30 minutes, groups shared their initial results and stumbling blocks and received feedback from other participants and then returned to refine the initial prototypes further, followed by a second share-out session. During these workshops, CarnegieMNH staff documented each design, and noted those prototypes that generated particular interest from other participants. At the end of each

session, productive ideas were either taken back to the museum to be further developed by museum staff (to be later shared with the network for feedback), or were handed off to network partners or workshop attendees who themselves wanted to keep working on the idea-in-progress.

For museum educators, this collaborative process of shifting content knowledge outside the institution and inviting others to contribute and define uses for the tools, was new territory. Allen (2016) defined the museum's enacted role as a "flexible hub" that was willing to be iterative in design, to learn from the partners and their experiences with the public, and to shift direction as needed. After several rounds of iteration under this model, the project team came to two important conclusions: the ability to anticipate topics and types of activities most compelling to partners was limited without their early input; and partners who were actively involved in the development of new activities (rather than simply providing feedback at irregular intervals) were much more likely to enthusiastically use these resources. This early success with collaborative design led to deeper commitment by the museum team to shift from the traditional information delivery role to keeping the options for new directions open and leaning on the network members for their interests, ideas, and participation as full collaborative partners.

CUSP kits were first tested with the public at festivals. Partners were offered an activity and some basic facilitation guidelines to use at their individual tables while members of the learning research team observed and surveyed both facilitators and participants at these events. Two important issues surfaced through observations and surveys: the facilitators felt isolated and lacked confidence in their climate messaging, and, because partners were spread out at their own individual tables, festival participants were not making connections between climate messages, the work of the facilitating organizations, and relevant city systems. The project was not generating a clear message of interconnectedness with partners dispersed across an event.

These issues were subsequently discussed at a network meeting, and a learning scientist on the project mentioned a recent conversation with a UK-based group called Eco Action Games that builds giant-sized versions of common party games, adds sustainable action messaging to them, and presents them in combination to create "playground" experiences in workplaces, schools, and other venues. The network was inspired by this vision of a festive, collaborative approach to a difficult topic. A palpable change of energy swept the room and led the network to eventually develop a new mode of tabling for the CUSP project: climate playgrounds, where several CUSP partner organizations run tabletop activities together under the

Figure 11.2 Hidden Cost Cafe: Foods weighted by carbon cost. (Photo: Lindsey Scherloum).

same large tent. As visitors to the tent try each tabletop activity, they have the opportunity to see how urban watersheds, heat islands, transportation issues, food systems, energy production, and urban biodiversity are all linked under the umbrella topic of climate change (Figures 11.2 and 11.3).

The easily accessed game-like quality of the kits, along with both familiar and surprising use of materials, made using the kits fun for public audiences. As boundary objects, kits required facilitators to do something very different at festivals as they shifted from talking about programs and handing out brochures, to eliciting descriptions and stories of what was happening in the kit experience and connecting those moments to their participants' personal experience and their own organizational work. As a result of these coordinated festival efforts, staff from CUSP partner organizations reported feeling more confident about their climate messaging. An unintended but perhaps even more important outcome of the new approach was that partners indicated that they learned from listening to other facilitators in the tent and incorporated new techniques into their own practice. Follow-up surveys of visitors to CUSP playgrounds indicated that participants felt more comfortable having climate conversations with their family and friends after the event, and suggested a better understanding of the types of climate-related solutions being explored or enacted in Pittsburgh (Figure 11.4). A partner

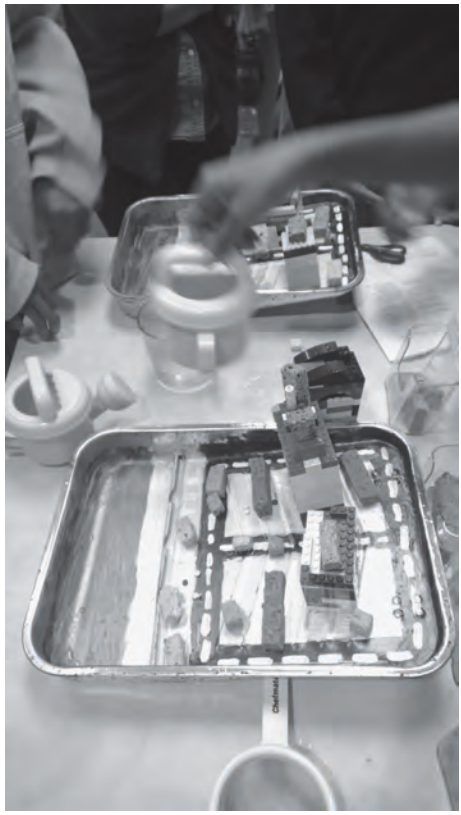

Figure 11.3 Extreme Weather Events: infrastructure to mitigate storm sewer overflow incidents. (Photo: Lindsey Scherloum).

Figure 11.4 Climate playground at local sewer authority community day. (Photo: Lauren Allen).

from a nearby conservatory and botanical garden shared the following in an interview:

> The climate change playground approach left network members positive and excited: It was way more positive than tabling events by ourselves or even when other [network] groups were at separate tables. You're there in a big space, that has a theme, and you're not competing with somebody who has a possum in a cage or a bunch of chickens. In that big space, even if you can't reach everybody, everybody who comes through is going to have some kind of good interaction in there. I really liked how integrated the activities were … We felt like we were really part of something important, and people were getting something out of it. And there was a bigger impact because we were a group there, together.
>
> (Michelle, educator, debrief meeting, 26 September 2014; reported in Allen, 2016)

This evolution from dispersed to collective kit facilitation at festivals activated elements of the CUSP DNA in the network experience at the festival. The power of interrelatedness between all the systemic solutions was represented by the network members' expertise and effort in the community. The sense of belonging, participation, and local relevance was cultivated by presenting local examples side by side in a tent and learning from the public and each other. Developing the confidence to start a conversation and the practice of listening to people's experiences was supported by the collaborative effort and the stark difference in engagement from traditional knowledge dissemination experiences to being in the Climate Playground.

Implementation case studies: moving the research and practice process to new sites

The CUSP project was designed with a dissemination approach where each city supported the other in implementing the resources they developed. As other CUSP cities reached out to Pittsburgh to begin the transfer of CUSP kits, we retained the process-focused approach to help learning transfer in contextually sensitive ways. Emphasizing the principles behind the intervention over the products is common in implementation studies in education and management (McLaughlin, 1990; Hargreaves, 2002; Sherin & Han, 2004; Datnow & Park, 209; Sabelli & Harris, 2015).

In the next section, we compare two CUSP kit dissemination cases: CUSP networks with science museum hubs in New York and Philadelphia. In both

instances the Pittsburgh team traveled to network meetings to support the uptake and adaptation of kits and the kit workshop process. We consider both of these cases successful in the sense that both city networks ended up more vibrant, connected, and focused on locally relevant climate change science. However, the ways the two networks achieved this, and the particular roles of boundary objects and boundary processes, were quite different.

Each of these cases was constructed based on data collected and primarily analyzed by the first author. She was positioned as a participant observer, involved as a practitioner with the CarnegieMNH hub team and as a researcher with the University of Pittsburgh learning sciences team. The researcher met with both groups separately and together and collaborated with the second author (hub staff at CarnegieMNH) to co-design implementation events in Pittsburgh and, eventually, with hub staff in Philadelphia and New York City. The research role varied from observer (Philadelphia) to co-facilitator (Pittsburgh and New York City) based on the hub's stated interest and needs. Data sources included planning meeting notes and correspondence, implementation observations at workshops and festivals in each city, artifacts from events such as pictures, kit prototypes, surveys, and activity passports, and notes from debrief discussions with hub staff immediately after events. Post-event data sources included semi-structured, hour-long interviews with a hub staff member (pre and post) and several partners (post) in each city.

For each data collection moment, field notes were reviewed and transcribed into an expanded form to clarify and better describe the context with reflective summaries about the process, noting emergent ideas (Table 11.1). Summaries were shared with hub collaborators, and their feedback and written reflections filled in gaps in event observations. Interviews were transcribed and verified by a second researcher.

Analysis followed several iterations in coding. The planning data was coded for local context and goals for the implementation process. Emergent themes were discussed with another researcher and added to a code book. Then data were reviewed for how experiences supported the convening of diverse groups, helped to coordinate thinking, and created a shared process. Examples and counterexamples of these themes were identified (Table 11.2).

Data was also reviewed for examples of embodiment of CUSP DNA; that is, relevance, participation and interconnectedness (Table 11.3).

The coding passes involved constant revisiting of data sets, documenting emergent themes in research memos. After coding within each case, cross-case coding was conducted to reveal contextual differences in implementation.

Table 11.1 Data corpus for CUSP case studies in New York City and Philadelphia

Table key *√s denote data gathered across an event. Numerals indicate data points unique to an individual.*			*Hub planning*		*Workshop*				*Festival*					*Interview*	
City/Role	*Partner*	*Org Type*	*transcribed notes*	*artifacts*	*observations*	*artifacts*	*hub reflection*	*verified summary*	*observations*	*artifacts*	*hub reflection*	*intercept surveys*	*verified summary*	*pre*	*post*
NYC Hub	Abriana	Museum Hub	1	38	√		√	√	√	√	√		√	1	1
	Amanda				√		√	√	√	√	√				
	Joshua				√		√		√	√	√				
NYC Network	Ella	Library			√	√			√		√				1
	Teens								√		√				
	Paul	Settlement house			√	√									1
	Andrew				√	√									
	Emma	Citizen science			√	√									1
	Sophia	Land trust			√	√									1
	Alexis	Children's museum							√		√	√			
	Caitlin	Zoo			√	√									
	Tyler	Zoo			√	√									
NYC Public									√	√		11			
PHILA Hub	Janet	Museum Hub													
	John		1	25	√		√	√	√	√	√	√		1	1
	Elana				√		√	√	√		√	√			
	Jennifer				√		√								
	Samantha				√		√								
PHILA Network	Michael	Energy Efficiency							√	√					1
	Jackson	Air quality			√	√			√	√					1
	Hannah	Enviro. ed.			√	v			√	√					1
	Barbara	Horticulture			√	√			√	√					
	Amanda	Reclaim store			√	√			√	√					
	Teens	Community gardens							√	v					
	Brandy	Water utility			√	√			√	√					
PHILA Public									√	√		8			

Table 11.2 Boundary object decision code rules

	Code	*Sub codes*	*Decision rule, evidence of dissemination*
Boundary Crossing Features	Convene	**in bold**	(+) attracting **diverse participants** and creating an **environment conducive** to engaging around the CCE. (-) attracting **homogeneous participants**, little variety in interest and point of view.
	Coordinate	**in bold**	(+) engaging partner/hub **collaboratively** in thinking about kits and about kit design process in ways that bring out **unique thinking** across network members, **surface terms or concepts**, help to identify **specific variables or solutions** to a CCE, discussion about **multiple outcomes** for CCE. (-) resulting in **solitary** work, **single message** designs by participants
	Shared Iterative Process	**in bold**	(+) supporting partners in picking up and **testing** or **adapting group ideas**, expressing interest in the process and principles in the CUSP approach. (-) sustaining notion that CUSP work is **separate from institutional work**, **misconceptions** or **lack of connection** to or CUSP principles, focus on **knowledge first** approach instead.

Case 1: using boundary objects to push collaboration and agency into the network

The New York Hall of Science (NYSCI) is located in in Corona, Queens, which is one of the most diverse urban centers in America with immigrant populations from all over the world. The museum has a reputation for being very connected and committed to the surrounding neighborhoods, especially through its youth programming. NYSCI is part of a founding wave of institutions that emerged in the 1970s and 1980s known as science centers – educationally oriented museums that hold collections of phenomenological or interactive exhibits. As CUSP was getting underway, the museum was launching a new institutional initiative called 'design/make/play' to reframe its outcomes and to prioritize the *processes* of learning over *products* for learning (Honey & Kanter, 2013).

The hub facilitator, Abriana, came to CUSP with eight years of experience at NYSCI, and prior interest and academic experience in climate change science, cognitive studies, and the process of iterative program development. She was supported by two other part-time educational program developers. New York

Table 11.3 CUSP theory of action decision code rules

	Code	*Sub*	*Decision Rule (+/-) Evidence of partner/ hub:*
Learning Principles	Relevance	**In bold**	(+) consideration of personal or public **experience** with, current **activity** around, hope or fear about, interest in, or other **affect** toward CCE (climate change example). (-) lost interest in CCE (personally, or their perception of low interest to public audience or organization).
	Participation	**In bold**	(+) thinking about how to move beyond individual action to **group/ system level solutions**. Evidence of thinking about particular **next steps** or ways to **draw public into** the CCE. (-) focus on **individual action**, **lack of next step** notion.
	Interconnectedness	**In bold**	(+) considering **system** or cross system impacts of CCE; more than one relevant **network connection** to CCE, **co-benefits** or impacts of the CCE. (-) intentional **exclusion** of **climate change impacts** in the experience due to organizational preference, **choosing a knowledge first** or **socially irrelevant approach** to climate change education over the CUSP approach.

City's CUSP network had a flexible membership of more than thirty organizational partners from Manhattan, Queens, and Brooklyn who represented environmental organizations, informal science and art institutions, policy and advocacy groups, community-based organizations, schools, government, and media groups. Despite this range, or perhaps because of it, network members were enthusiastically engaged:

> Here's something (CUSP) I can glom onto to help me do what I'm tasked with doing … I'm always thinking, there's lots of other brains out there who are working on this and I'm always really excited to connect with that.
>
> (Ella, interview, line 141)

Abriana positioned the kit work as professional development. She was sensitive to aligning the work of CUSP to ease network members' efforts rather than add to them and thought that co-developed CUSP activities "take a little bit of work off each partner's plate." She saw her role as an evolving one – first introductory, supporting participation, and then part of a more equal-status network where everyone develops and uses tools. With each network engagement, she hoped partners felt more confident grappling with core CUSP ideas and developing autonomy to take them forward without NYSCI being explicitly in the lead. Thus, with its focus on collaborative design, Abriana aimed to support partners in making connections across network expertise and to continue the CUSP approach in a less centralized manner across the city. In effect, she was *pushing* the design process out to the network members:

> The process is really important. Thinking not just "here I'm going to hand this to you," but, how is this kit different from the kit you might already be using? Or, where did this idea come from?
>
> (Abriana, front end interview, line 17)

By pushing the design process, Abriana embraced the kits as boundary objects framed by the CUSP DNA and structured to support diverse participants in coordinating thinking and generating a shared process (Akkerman and Bakkar, 2011; Warr and O'Neill, 2007; Richardson, 2014). Kits were introduced to the New York City network through a design workshop experience that (1) convened diverse participants from the network; (2) gave them opportunities to share ideas and experience related to a topic; (3) supported collaborative experiences to shape joint ideas; and then (4) encouraged the connection of ideas to new content in creative, locally relevant ways. During the workshop, we noticed participants networking throughout the sessions, moving to sit next to new people they did not know. Participants were deeply engaged with the kits, often running through prototype activities multiple times, shifting variables to see what would happen. As one partner put it:

> That was just – instant engagement. You walked in, and it's colorful and it's fun … it was just like being in a toyshop. You know? … It took me a while to get settled down and to finish discussing feedback, because I just wanted to play all of them.
>
> (Emma, interview, line 91)

At the end of the workshop, four prototype kits were developed and some participants were excited to immediately try the kit prototyping process back

in their home organization. Participants also wanted to keep joint kit development as a core activity of the network, with NYSCI as the hub. Abriana was pleased that the process, as opposed to the kits themselves, appeared to be the main takeaway of the workshop. This participatory workshop, with kits as a focal point, affirmed her conviction about the importance of design and play in learning:

> In our workshops (we ask), imagine your most impactful experience as a learner: What were the characteristics of that and how can we apply that to climate change work? But making that jump is really hard for people, whereas when it is something physical, with materials, it's easier for people to pull in those prior experiences.
>
> (Abriana, group debrief)

As a direct result of the workshop series, Ella, a network member, invited others to attend a street festival she was hosting outside her library for the local community. In preparation for the event, Abriana's team made changes to several kits based on discussions at the kit workshop. She also trained the library teens to facilitate the kits and received feedback from them to improve designs, which she incorporated in time for the festival. The local reputation of the library drew a diverse and engaged crowd of about seventeen hundred community members representing many different languages and nationalities, and dozens of presenters. In the CUSP "Climate City" area, business was brisk. Each of the four CUSP tables had a family doing an activity and another family or two waiting in line. Families were offered a CUSP passport to be stamped at each of three Climate City activity stations that could then be redeemed for a small prize. The festival was a step in an activity process that allowed Ella to test, and reflect on, the kits with her audience, to engage her teens directly with kits, and for NYSCI to see and reflect on the state of this newly adapted set of kits for their network. This activity cycle served to strengthen the network, for both those who attended and those who benefited from the thinking after the workshop, for instance the teens at the library facilitating kits at the festival.

In follow-up interviews it became clear that some of the partners came to the kit-building workshop with preconceived notions that a climate change education project would be mostly about teaching direct knowledge about climate science; thus, they were pleasantly surprised that the CUSP process revolved around tinkering with boundary objects, allowing network members to connect to climate change in ways that were directly relevant to their organizations and audiences. For example, Sophia, an outreach coordinator for a local land trust, had not always talked explicitly about climate change.

She noted the difference between her approach and CUSP and allowed there could be room to be more direct:

> I think we could get into the climate change concepts eventually, but what I love about (CUSP) is starting and ending it with a really positive message. Taking care of your schoolyard is also helping with this other problem. You're presenting a solution and at the same time, introducing the problem. You know? So the kids don't feel powerless and scared of how big it is. I like that lot about it.
>
> (Sophia, interview, line 47)

Partners also talked about CUSP influencing or pushing their approach to education. Ella brought up systemic connections as a piece of their work that she strives for and sometimes struggles with. This self-proclaimed "dour environmentalist" and well-versed science content deliverer described it this way:

> I have come to realize through many experiences that just thinking bugs are cool and knowing that they visit flowers and pollinate them is just not enough to affect the way people behave. We need to figure out how to really help people understand that we live in a very integrated system, and the choices we make on a daily basis really do have an impact on the larger world. I think so many people feel like "What difference can I make?" I think things are at a critical point in terms of climate change and a lot of us have been grasping at straws: What kind of education does it take to help people understand their role in the bigger picture? So, CUSP is one of the first things I've seen in a while that I feel like people really are thinking about that and trying to arrive at some helpful conclusions, or helpful, strategies.
>
> (Ella, interview, line 126)

Case 2: using boundary objects to pull partners into the network

Founded in 1825, The Franklin Institute (TFI) is one of America's oldest and most well-respected museums. TFI is centrally located in Philadelphia, well-branded, and large in terms of square feet, staff, budget, and reach. In addition to historic collections of objects and contemporary interactive STEM education exhibitions, the museum has a broad portfolio of community-education programs. TFI was the lead for the whole four-city CUSP project, led by climate scientist Elena, who was hired for the project, and Janet, a veteran museum leader. The Philadelphia hub was coordinated by John,

who came to the project with a background in community development. The museum has many education and exhibits staff who also worked with the CUSP team as needed.

The Philadelphia network was composed of 22 members. Most of the agencies had a broad regional reach, while some were more localized community programs with youth or adult audiences. Overall, as with Pittsburgh and New York City, there was representation from diverse sectors: commercial, city-service departments, federal agencies, informal education groups, outreach groups from service agencies, media, hospitals and health policy groups, and primary, secondary, and higher education institutions. At the time of the kit dissemination effort, TFI had been working on creating less formal processes for network participation, offering mini-grant funding for network collaboration projects, and coordinating informal gatherings at member organizations' events to provide cross-member support and get to know each other's work.

TFI took a different approach to kit development than NYSCI. Working largely without network input, TFI's exhibitions staff had produced 30 polished, durable kits, each capable of running either an urban heat or extreme rainfall activity. The kit design was based on prototypes inspired by Pittsburgh kits but adapted to the specific geography, architecture, and sustainability strategies of Philadelphia. The museum's idea was that partners could borrow as needed from this "kit library." One partner expressed her gratitude to the museum for taking up this task:

> The Franklin Institute is this big institution that has the facility, the resources to build … I know at our agency, if somebody told us we have to build a prototype row house, I would be pressed to do it as well as that kit.
>
> (Hannah, interview, line 55 & 56)

In one way, the strategy was successful. Partners were borrowing and using the kits in their various community events. But in another the way, the TFI staff were disappointed. Kits were getting out there, but network partners were not becoming more enthusiastic, engaged, or committed to the network. Elena noted tension between TFI's internal capacity to produce kits and their desire for collaboration from the network:

> How do we better involve the partners? We could tell [TFI exhibition developers] – do something on climate change and health, and they'll come up with some amazing thing that we can then just give to our partners, that's already built, already designed, already, you know, the

> facilitation outline is there … but where do we get the type of buy in and the collective collaborative ideas and impact that come from the network creating from scratch?
>
> (Elena, New York City and Philadelphia planning, call, line 6)

TFI had observed Pittsburgh's "Climate Playground" and felt a similar event in Philadelphia might pull partners into more active network engagement. TFI named their event "Climate City" and declared a central message that could tie together all the partners' work: "Preventing and preparing for a hotter, wetter Philadelphia." The first Climate City occupied a central space with multiple, connected stations at a major festival, organized by TFI, called "The Philadelphia Science Festival Carnival on the Parkway." Like the kits, this access to a central space, and a festival typically reaching an audience of thirty thousand, was perceived as incredibly valuable to network members.

The main planning event for Climate City was called the "Chat and Chew" because they would be serving food and the TFI team was aiming for something "more informal, not like a workshop, but loose, and see if discussion and climate connections come out organically" (John, planning notes, "Chat and Chew" agenda). Attendees at the Chat and Chew included organizations involved with air quality, reuse, environmental education media, sewer systems, and a horticultural society. They were a combination of outreach staff with a role in public communication about their organizations' work, and educators who worked with school groups and families to teach lessons about the local sewer system, environmental sustainability, and plants.

The preparation included an overview about how to facilitate in an interactive manner and an introduction to the space layout and central location, which drew comments of appreciation from partners who had attended the science festival in prior years but who had less advantageous table locations. Partners were asked to bring existing tabletop activities and to develop titles for them that highlighted climate-change connections, and half of the meeting was dedicated to showcasing these products. This attention to rehearsing and preparing participants for the festival supported the goal of making this a low-risk experience. The activities on display demonstrated a range of design features, some with potential to operate in a very CUSP-like manner in terms of interactivity, compelling materials, and eliciting public ideas and experience about a topic. However, while participants tried all the activities, in contrast to workshops in Pittsburgh and New York City, design features were not discussed overtly and did not become a central object of the network's attention.

The opportunity to see each other's work led to a different boundary crossing experience. An animated discussion emerged between two of the educators,

who moved about the room pointing and discussing proximity of activities and flow of themes. As he heard the shift in conversation, John brought the group back to the meeting table to create a hand-drawn map that reflected their ideas for the festival setup. This exchange emerged from and was led by the partners' interests. In this discussion, they identified connections between the green infrastructure issues in the TFI row-home kits and a tree initiative promoted by the horticultural society. They made energy connections between the air quality activity and a reuse activity. Here, the festival plan became the boundary object that generated a sense of collective effort and engagement with the topic of climate change. The festival was a new endeavor for them as a group, and it had clear parameters in terms of where, when, and what was expected, but there were still thematic questions to decide, providing a place to think together.

As partners left this meeting, they expressed excitement about the advantageous location of the Climate City at the festival, the support the CUSP network was providing them, and the sense that they were not alone. John's goal of energizing the members and helping them see the benefit of collective effort was on target. Each partner brought an interesting activity that led to a clearer picture of the event day and their role in it. Through this festival approach, John was building the trust in and value for the network, step by step.

The science festival occurred on a beautiful spring day, and thousands of people attended. The partners each brought an activity, materials about their organization, and often a signature object that drew people's attention – a tree root at the horticultural society, a seedling to take home at the urban garden station, or a model home to demonstrate energy efficiency. Facilitators were in high gear throughout the festival, engaging hundreds of people. In response to learning researcher suggestions during observations, they often adjusted their opening lines to draw people into conversation and activity or to highlight a climate message. Otherwise, while climate change was in the title of each activity as an agreed unifying theme, the facilitators generally stuck to their institutional script. However, the local impacts and interconnectedness of systems in the city were discussed. Intercept surveys and observations revealed people understood rainwater can cause river pollution, and green infrastructure is part of the solution. They realized using energy in homes can cause air quality problems and cost a lot, that there are regulators for local air pollution problems, and that transportation's energy costs are a big factor in the price of shipping food. Each tent had "next-step" ways for people to get involved in solutions, such as tree-planting initiatives, energy audits, and ways to document air pollution sources in their community. The elements to

make a strong connection to climate change were all there, but the practice of making the connection was new for these facilitators at this first event.

John, informed by the emergent nature of his network and aware of the intensity of the activity development workshop in New York City, chose a measured introduction to the kit and festival aspects of CUSP and succeeded in bringing together multiple partners and reaching hundreds of visitors. His prediction that this would create momentum was realized as he continued, after this intervention, to coordinate Climate Cities in a variety of neighborhood settings. In the Philadelphia case, the festival became the first step in creating a shared process, but the network did not have an opportunity to share and document their various experiences and understandings of that process.

For Jackson, from a clean air advocacy group, the relevance of Climate City was to achieve organizational goals, build a foundation for strong partnerships, and connect audiences to 'next step' actions, all central to the CUSP model. Yet, Jackson talks about the CUSP approach as being the direct opposite of his approach:

> Our goals are almost the opposite … At the last (CUSP) meeting, the words "doom and gloom" came up a lot – that we're not going to do "doom and gloom." And, unfortunately, I've found that if you want people to really click on that button to send a message to their senator, it's most effective when it's getting a little bit scary.
>
> (Jackson, interview, line 73)

On the other extreme, Michael worked for a group that helped low-income communities with energy-efficiency upgrades. Because of his funding sources, he was leery of talking directly about climate change.

> We can't get too vocal about climate. We talk in terms of individual initiative, but we never talk in terms of "organize your community to pressure utilities and legislators and transition toward clean power" and all the macro-level climate moves that do need to happen.
>
> (Michael, interview, line 61)

Hannah, a long-time educator, was not convinced about the emphasis on local impacts and involvement over factual content. She lamented the lack of public interest in the facts she wanted to share at the carnival. "They didn't want to sit and hear a lecture; they wanted to see the activity, do it, and go on to the next!" (Hannah, interview, line 49).

However, the reuse center and water authority both found the content and approach to be well aligned with their current work. For the reuse center, it added something new, a climate change focus for the art-making programming using their reused materials.

Far from being a problem, this diverse set of approaches could increase network-building potential. Having an opportunity to work with kits as boundary objects, rather than as set and polished activities, might have provided the structure to raise some of these differences and given the group a chance to argue with the CUSP DNA, to learn from each other, and/or adjust their own practice. But at that point, the primary focus for Philly CUSP was getting partners to the event as a collective effort. The polished kits, headline positioning at the festival, and the large city-wide crowds were the draw, and the supportive Chat and Chew provided the cohesion to get this group excited about establishing the idea of Climate City setups as a vibrant element of CUSP Philly. John carefully cultivated his network, bringing them along step by step into the CUSP experience. He demonstrated his value for his partners' time and effort by providing useful tools, supporting the collective effort at a high-profile event and, over time, adding to the set of experiences the network had together.

Conclusion

The Climate and Urban Systems Partnership built capacity in all three cities – New York, Philadelphia, and Pittsburgh – to approach climate change education using the features of relevance, participation, and interconnectedness. Through the three urban networks, museums were able to expand audiences and engage organizations that otherwise might not have been connected to the museums' work, and who might not have seen themselves as part of a systemic approach that highlights the interrelated nature of local climate impacts. Over time, the chance to discuss, practice, and revise were observed to be key for strengthening the networks and for integrating new approaches into partners' ongoing work in climate change education.

This is a snapshot in a trajectory that describes how each city began the process, why they chose that route, and what happened as a result. We have been concerned with how new ideas were introduced and initially taken up by networks, rather than with ideas about how a network should take up a curriculum in "shrink-wrapped," standardized ways. The concepts of boundary objects and boundary crossing were useful for analytically framing and understanding how new knowledge and processes moved from one city network to another. We found the kits worked as boundary objects when their presence, along with a commitment to critique and revision, opened up conversation and meaning-making across members. Rather

than products, the kits served as the right *process tools*, giving networks what they needed to engage at various levels of intensity, at any point in the network's trajectory.

Across New York and Philadelphia we found dissemination processes are not uniform, but contextual. Since this study, each city has sustained and evolved their engagement with the CUSP kit platform. New York City CUSP partners have continued developing kit ideas, and Philadelphia CUSP partners have attended numerous festivals. TFI subsequently worked with CarnegieMNH to plan and hold a kit workshop for their network in the style of workshop that New York City held. The timing of this workshop, after the group had bonded during several successful Climate City events, provided a level of confidence for TFI that its network would be interested in collaborative kit building and that the request was not too much to ask of busy network members; sensitivity to the current needs of each network was essential to implementation of this new platform.

As we consider the rapidly evolving nature of climate change and its impacts, the flexible and rapid iteration processes of CUSP and the sustained support of a collaborative network that is committed to iteration are powerful tools in keeping the conversation open and evolving. Boundary crossing experiences allow us to draw from multiple pools of expertise as we work to generate as many solutions as possible for this pressing global issue. While some informal science education experiences can be designed and implemented in a variety of contexts with minimal to no professional support, both of our case studies showed that sustained support of the hub and network was essential as partners followed their local collaborative trajectories in unpacking and reconstructing relevant local examples and connecting the museum, organizational partners, and public audiences.

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Chapter 12

The participatory epistemic cultures of citizen humanities

Bildung and epistemic subjects

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Introduction

On February 21, 2016, a recipe was posted on the discussion forum of *Shakespeare's World*, a scholarly initiated citizen humanities[1] project on the *Zooniverse* platform.[2] The recipe was called "Miss Hampden's excellent sugar cakes" and had probably not been used for more than three hundred years. Handwritten, it had been digitized for volunteers to transcribe, letter by letter. Once transcribed, "Traceydix" commented: "I've just made these!" detailing every step in following the recipe. Traceydix did not just follow the recipe, but applied a historical interpretation: "I decided modern eggs are probably larger than the ones back then, and because I was doing half quantity it was easier to just put in a whole egg than work out proportions of an egg and extra white." The results of Traceydix's effort were mentioned in a blog post by the project researchers, and the cake was baked once more, to celebrate the four-hundred-year anniversary of Shakespeare's death. Browsing further through the *Shakespeare's World* online forum, numerous discussions of 17th-century cuisine can be found, translating expressions such as *pippins*, *iagging irons*, and *lemon pills* into *apples, pastry wheels*, and *lemon zest*. The task assigned to contributors in this citizen humanities project was quite simple: transcribe handwritten letters and recipes into digital text. However, the contributors went beyond this task, interpreting old texts and creating new knowledge discussed by researchers, moderators, and contributors on forums.

This is one of many accounts pointing to how contributors go from tasks that they were mobilized to do, to dynamically engaging with contextual and interpretative accounts of historical data. Archives and repositories have until lately been exclusively confined to university libraries and departments, accessible only to professional researchers. With the development of information and communication technology and digitization initiatives such as *Wikimedia*, *Project Gutenberg*, and *archive.org*, new formats for opening up

and distributing research in the humanities is emerging, often referred to and discussed as "digital humanities" (Meyer & Schroeder, 2015).

Several citizen humanities projects have been launched by professional scholars, particularly on platforms such as *Zooniverse*,[3] *Scholar's Lab*[4] and *MicroPasts*.[5] These projects are described as "open to anyone" regardless of training or knowledge, allowing contributors to participate in research processes. In this chapter, we map out epistemological relations between professional scholars and contributors and the role of the latter's engagement in developing a "participatory epistemic culture" in citizen humanities. Relying on concepts developed in social and cultural studies of science and research, our premise is that important features of the participatory epistemic culture result from the invitation of outsiders into work in the humanities, forming unexpected relations between individualized and more distributed epistemic subjects in citizen humanities. Our approach draws on the concept of "epistemic culture" as developed by Karin Knorr-Cetina (1999) to explore the appearance of knowledge not necessarily intended by the researchers initially. We suggest that such knowledge entails a reconfiguration of the traditional individual epistemic subject of the humanities. Concepts that are closely associated with research in the humanities, such as *Bildung* – traditionally denoting the individual's intellectual journey towards expanding knowledge and reflection – change when epistemic work in the humanities becomes more collective and distributed by means of new digital platforms. These platforms allow collective work among non-scholars, challenging the notion of the traditional individual epistemic subject in the humanities and thus adding new layers to *Bildung* in terms of how it is attained and what the role of the humanist scholar is in such processes; new digitally enhanced practices create a new interaction space between scholars and volunteers that did not previously exist.

Such interaction spaces are the focus of this chapter, through analysis of empirical material consisting of interviews with researchers, moderators and programmers, participant observations at project meetings with projects affiliated with the Zooniverse platform, and online material from several citizen humanities projects and discussion forums. The online material is primary data, comprising discussion threads that feature aspects of informal and spontaneous learning on behalf of the participants. The following citizen humanities projects were selected: *Shakespeare's World, Micropasts, Storycorps, Art Detective, Old Weather, Emigrant City, Decoding the Civil War, Science Gossip, Notes from Nature, AnnoTate, Orcid Observer, Merasuring the Anzacs, and Operation War Diary*. The inclusion criteria for the selection were projects that had a discussion forum and a disciplinary affiliation with humanities research.[6] We conclude with a discussion of participatory

epistemic cultures and their potential significance for the future of citizen humanities, both as a research approach and as a new way of communicating humanities research outside academia (Belknap, 2015).

We begin with a background and overview of citizen humanities, drawing on a number of projects that have invited volunteers to refine, collect, and classify data. The theoretical concepts epistemic culture, epistemic subjects, and distributed cognition are discussed, and we propose the concept of a "participatory epistemic culture of citizen humanities." We attend to online interactions between volunteer contributors, and to the role of researchers in taking advantage of discussions to add depth to the research. We consider interactions, also outside the planned project, that emerged dynamically but were not necessarily intended, and we discuss how these may be vital for giving meaning to otherwise mechanical tasks, for example, transcription or classification of data. Specifically, we draw attention to moments of interpretation that seem to take place at the intersection of strictly defined tasks and the human understanding of the source data. Many citizen humanities projects enable volunteers to move beyond strictly defined tasks to more interpretive investigations of the source data, yet few projects seem to have been explicitly set up to enable this transformation. We present data from numerous projects, revealing the moments and the mechanisms through which we believe such advanced participation can take place.

Mobilizing with tasks in the humanities

As in the natural sciences, the humanities are confronted with similar problems of handling large datasets (Kullenberg & Kasperowski 2016). Scanned texts and digitized photos of cultural artifacts have been accumulated into large digital collections and made available to researchers at unprecedented speed. However, the transcription of complicated texts, including those with elaborate handwriting and layouts that combine text and images, cannot be recorded automatically into these collections by current computer systems. Instead, they require the human eye and perception to be transformed into machine readable and searchable datasets. Since the eyes of professional scholars alone will never come close to being able to read through the existing data, several approaches have been developed in citizen humanities as viable alternatives that can be scaled up using web platforms. Three main tasks stand out when enrolling citizens into digital humanities research: refining data, collecting data, and (to a lesser extent) contributing domain expertise. These tasks, described below, are quite different from an epistemological point of view.

Refining data

One of the most common roles assigned to volunteers in citizen humanities is "transcriber" of handwritten historical manuscripts. This means that volunteers are mobilized into projects as distributed and displaced knowing subjects, not as informed scholars and recognized epistemic subjects. The aforementioned *Shakespeare's World* is an example of volunteer transcription. Other examples of transcription from the *Zooniverse* platform include *Decoding the Civil War*, *Notes from Nature*, *Measuring the ANZACs*, *AnnoTate, Orchid Observers*, *Science Gossip*, *Operation War Diary*, and *Old Weather.*[7] These projects consist of large repositories of text in need of transcription (see Figure 12.1 for example) to facilitate researchers' work. Further examples of refining textual data outside the *Zooniverse* platform are *Transcribe Bentham*,[8] or the optical character recognition (OCR) game *Smorball*,[9] the latter being designed to cater to gameplay rather than altruistic motivation (Seidman, Flanagan, Rose-Sandler, & Lichtenberg, 2016).

Other data-refining projects have a somewhat different character. *Georeferencer*[10] involves relating historical maps to current digital maps, creating a searchable archive for researchers and the general public. In *Global Xplorer*,[11] the volunteer contributors are asked to analyze satellite images to

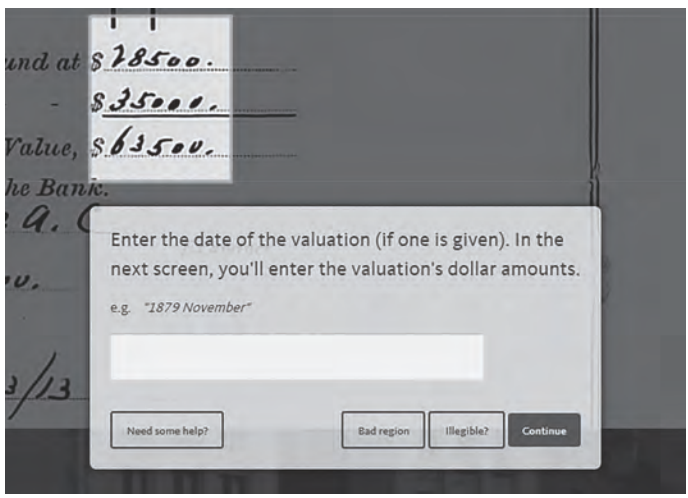

Figure 12.1 Typical example of volunteer transcription of handwritten text (Emigrant City).

Several citizen humanities projects share infrastructure and technical resources. Emigrant City is a New York Public Library (NYPL) project built with the codebase Scribe, also used for Zooniverse projects Anzacs and Old Weather. Scribe was developed by Zooniverse and NYPL in partnership (Funding from the National Endowment of the Humanities (USA)). (https://github.com/zooniverse-glacier/Scribe).

identify potential looting of archaeological sites. The platform *MicroPasts*,[12] on the other hand, works with archaeological finds and asks volunteers to mask the outline of objects for 3D imaging, among other tasks. All of these citizen humanities projects are similarly concerned with the task of ordering and refining existing repositories of data that are too large for researchers to analyze, and which cannot be processed with digital technologies alone, such as OCR, automatic image processing, or machine learning. Instead, many citizen humanities projects require several volunteers to look at the data in order to achieve validity in observation, thus rendering and parsing actions that the computer system cannot perform. Researchers configure the system's algorithms to require a specific number of observations before the data is considered valid. This process benefits from human capacities of observation and pattern recognition, while also minimizing the risks of error or bias. In some cases, such as *Decoding the Civil War*, this might be a raw number, for example, ten people see and transcribe each telegram. In *Transcribe Bentham*, in contrast, there is no specific limit on the number of people who must look at an image; any number of volunteers may transcribe and edit, but an expert performs the final arbitration. When there are many observations of the same phenomenon, it is possible to both discard erroneous observations and to calculate an average between several observations. This allows researchers to consider specific parts of the dataset in more detail, for example, looking at data where a certain number of observers agreed or disagreed.

Other projects ask contributors to add an additional layer of information to refine existing data. In *Prism*,[13] volunteers are asked to classify literary texts and poetry according to pre-defined categories. In this way, the source data can be refined by enabling categorization and classification of the *meaning* of the texts according to pre-defined interpretative formats. The purpose is to collect and quantitatively visualize the interpretations of literary pieces and to be able to describe their meaning. Along similar lines, a part of the project *Bostonography*[14] invites volunteers to contribute their spatial interpretation of Boston neighborhood boundaries. The data is then visualized quantitatively on city maps of Boston and made available publicly. Thus, many aspects of refining data in citizen humanities are examples of distributed cognition and are closely related to tasks prompted by the limits of automation present in many citizen science projects, such as classifying galaxies in *Galaxy Zoo* or identifying wildlife species in *Snapshot Serengeti* on the *Zooniverse* platform. Refining data as a citizen humanist is similarly concerned with the limitation of algorithmic automation, as these projects also deal with ordering and refining existing repositories of data that cannot be processed with digital technologies alone.

Collecting data

An activity often associated with citizen science is data collection, especially in biodiversity research where volunteers may help collect or document species in the field, and report observations that are very valuable for scientists, because large territories can be covered with the aid of volunteers. However, collecting initiatives in the humanities differ somewhat in scope and reach. First, as in the projects *Storycorps*[15] or *Kudaba*,[16] there are more general tasks of data collection. The former is concerned with collecting interviews on a variety of themes, with the purpose of creating and preserving a large repository of cultural heritage data for future research. The German *Kudaba* project also has a more general orientation, collecting images and data about public art and places of cultural significance. Then there are more specific data collection projects, such as *Bracero Archive*[17] and *Wir waren so frei*,[18] in which materials are collected from specific locations and historical periods. The *Bracero Archive* invites contributors to collect materials related to the Mexican guest-worker initiative in the United States between 1942 and 1964, while *Wir waren so frei* collects materials from East and West Germany around 1989/1990 to track changes in everyday life between the fall of the Berlin Wall and the reunification of Germany. Both projects collect private images, videos, and stories.

Although citizen science and citizen humanities have radically different objects, the epistemic problem remains the same: namely, how to collect and process data given logistical constraints of time and funding? Through the aid of volunteers, texts, photographs and other types of data are not only collected but result in citizen humanities collections that are closely related to the everyday lives of people, for example, personal photographs, diaries, and stories about local events not necessarily recorded by official repositories. Data collection projects may also involve data refining, for example, tagging and describing both their own and other volunteers' contributions, and they often cater to amateur as well as academic researchers. For example, *Gravestonephotos*[19] and *Billiongraves*[20] collect and transcribe images of gravestones to create databases for genealogists. In such projects, the collection and classification of data blends together, often seamlessly, as the Web-based interfaces are made increasingly easy to use.

Domain expertise

The majority of citizen humanities projects are, as mentioned above, concerned with mobilizing volunteers into refining and collecting data, with tasks that do not initially entail interpretation or meaning making. However, there are

citizen humanities projects asking for contributors' specific knowledge. In the project *Art Detective*,[21] participants are invited to answer questions posed by owners of paintings, including the provenance of specific paintings as well as the names of places or people depicted. Thus, it is not the interpretation in terms of the meaning of the artwork, but factual content and expertise that is requested. Although this mode of citizen humanities is not widely used, features of domain expertise involved in the interpretative practices may occur dynamically on the project forums, as discussed below.

To sum up, citizen humanities projects mobilize volunteers with specific and clearly defined tasks in mind. Usually, these are concerned with the collection and refinement of data using transcription and data-tagging tasks but, in some instances, domain expertise is requested. This does not mean that domain expertise prohibits a volunteer from taking part in projects devoted to the collection and refinement of data, only that these tasks are designed not to rely on domain expertise. Several projects also have spaces for interaction between volunteers, often in the form of discussion forums. Here, contributors discuss and develop knowledge, in many cases beyond what is asked for in the project tasks, thus realizing themselves as individual epistemic subjects. Often, such spaces develop into cultures of participation since they require collaborative knowledge practices and are shaped by discussions that develop over time.

A cultural understanding of citizen humanities

Bildung and epistemic cultures

The concept of epistemic cultures was introduced in science and technology studies (STS) as a way of understanding the individual and distributed characteristics of the epistemic subject in research. Karin Knorr-Cetina (1999) showed that different fields of research in their epistemic cultures either distribute or individualize the epistemic subject. In some fields, the individual person is minimized as epistemic subject, in that responsibility and authority are dispersed, rewards for discoveries are shared (as in multiple authorship), and a high level of trust is developed. This form of epistemic culture displays strong distribution and displacement of the knowing subject in favor of other epistemic organizing principles, for example, the experiment, the protocol, and new technological developments. Values in such epistemic cultures are not associated with the individual, and no single person is identified as producing the knowledge.

In contrast are epistemic cultures in which the individual epistemic subject "structures" research. The individual researcher remains recognizable, embodying the production of knowledge, and is associated with high cultural

value. This, we argue, is customary in the humanities, manifested, for instance, in the overwhelming frequency of individual authorship but also historically in the central concept of *Bildung*, a state of individual development accessible only through extensive education. Generally, the concept of *Bildung* refers to the individual epistemic subject and is essential in forming citizenship, as inscribed in the project of Western modernity and democracy formulated by reformers such as Wilhelm von Humboldt.

There is substantial debate over ideals and definitions of *Bildung* from perspectives on conservative versus utilitarian and emancipatory meanings, as well as studies of *Bildung* from the point of power and exclusion (Horlacher, 2016). To place citizen humanities in such a broad context would be a large undertaking, and this is not the purpose of this chapter. Rather, we evoke *Bildung* to argue that in order for humanistic scholars to contribute to research they must become members of an epistemic culture different from the practice of citizen humanities. Thus, we argue that citizen humanities is less constrained by ideals of *Bildung* compared to traditional scholarly humanities. In other words, volunteers are mobilized without the demands of *Bildung*. Many projects state that participation is for everyone irrespective of "skill levels." The Zooniverse platform,[22] for example, currently offers more than a hundred projects – in the humanities, social sciences, physics, and space – that rely on contributors for help. Volunteers are invited to accelerate research in processing large amounts of data as well as to make "real discoveries together" with professional researchers. New digital technologies have reconfigured epistemic relations between researchers and outsiders in epistemic cultures, such as those on large citizen science platforms like Zooniverse (cf. Kasperowski & Hillman, 2018), and seem likely to continue to do so in the future.

Distributed cognition in epistemic cultures

In the same way that cognition is intrinsic to the concept "epistemic subject," distributed cognition is intrinsic to the concept "epistemic cultures." Magnus (2007), referring to Giere and Moffat (2003), states that humans are able to do research since they have constructed systems of distributed cognition. Distributed cognition, in this context, simply refers to the notion of research being a collective enterprise, with research viewed as being far too complex for a single researcher to perform or comprehend. The distributed cognition necessary for scientific research is also what facilitates the mobilization of outsiders to perform scientific work.

While distributed cognition in the sciences is very visible, sometimes taking hundreds of researchers to conduct an experiment, and then sharing

authorship of published papers, the humanities express "distributedness" differently. Instead of sharing authorship, for example, citing and reflecting upon previous authors' achievements shows "with whom one has thought"; distributed cognition in the humanities (*Bildung*) is traditionally manifested in the use of references. However, in citizen humanities, a distributed cognition version of *Bildung* looks somewhat different. As our account of how the work produced by volunteers in citizen humanities projects unfolds, we return to the relation between epistemic agency and distributed cognition.

While potential tensions between distribution and individualization in epistemic cultures (and their configurations in different projects) are empirical questions, they also essential to understanding how epistemic cultures develop as "outsiders" to the scholarly institution of the professional humanities are mobilized into research. Originally, the concepts of epistemic culture and distributed cognition concerned only professional scientists and technicians. However, Knorr-Cetina (2007) acknowledges that not all contexts of knowledge production are "bounded spaces," suggesting that her observations of epistemic cultures might be extended to studies of distributed locations and networks of different size and scale: "Such networks are made possible by electronic connections, and they have global reach" (p. 367). We adopt the concept of epistemic cultures to illustrate how distributed and epistemic subjects are configured: the tensions between them and the implications and outcomes of mobilizing outsiders into a research process when they may hold different values than the research team or academia more broadly. We assert that such tensions are abundant in participatory epistemic cultures in citizen humanities, in that an important aspect of widening participation in citizen humanities is a mobilization of volunteers that is based on their intrinsic human abilities to perceive the world, reinforcing the value of the individual as an epistemic subject.

Protocols and interpretation

Valuing the individual as an epistemic subject may seem problematic given that the tasks most often required in citizen humanities cannot be performed by an individual subject alone (c.f. Magnus, 2007, p. 298) or by a machine. From a distributed cognition perspective, "the volunteer" is often constructed as a contributor without interpretative ability or pre-conceived standpoints, since valid input and value relies on strictly following standardized protocols. The cognitive contribution by a volunteer in such projects is thus constructed as distinct from a professional scholar in the humanities to ensure data of high quality. Moreover, as the cognitive threshold for the participation of the volunteer is designed to be low, the need for instruction, learning, or *Bildung*

is minimized. Other projects may rely on the domain expertise of mobilized citizens, positioning the volunteer on a par with the scholar as an epistemic subject and securing the validity of data created by citizens.

To mobilize contributors en masse, the required qualities from volunteers must be standardized and distributed, with classification tasks that are simple, yet relevant and valid. These are the strategies of ensuring data quality in citizen science as well: simplicity makes participation "accessible to anyone" (Riesch and Potter, 2014, p. 112), and it is regarded important to "keep it as simple and locally appropriate as possible" (Danielsen, Burgess, & Balmford, 2005, p. 2521). Still, Danielsen and others (2005) observed that "locally based methods are more vulnerable than professional techniques to various sources of bias" (p. 2524), and so comparisons between professionals and amateurs are badly needed. One approach to achieve parity between professionals and citizens would be to provide extensive and "thorough training" (p. 2526) for anyone wishing to participate in humanities projects. An alternative approach in many projects is to create stable protocols for participation. The use of protocols puts the citizen on a par with the professional scholar with regard to observations of natural phenomena, transcriptions of historical manuscripts, and classifications of previously collected data, for example, images from telescopes or wildlife camera traps. Parity can occur in more than one way, then, but most often at the level of distributed cognition. If stabilization cannot be attained, "professional scientists will remain skeptical about the results of local monitoring schemes" (Danielsen et al., 2005, p. 2537). Protocols and tutorials are constructed to engage citizens as the eyes of the professional researcher, that is, enabling contributors to "see" what the researcher sees, because the level of standardization ensures the validity and accuracy of the observations and classifications performed (Cohn, 2008). We suggest that such standardized protocols also minimize the need for learning and instruction on behalf of volunteer contributors to the humanities.

The configuration of distributed and/or more individualistic epistemic abilities are empirical questions that require attention as citizen humanities increasingly contributes to research in different disciplines.

A protocol is not only a means of guaranteeing valid data but is also an instantiation of the imagined epistemic subject that will perform it. In citizen humanities, the epistemic subject is not (to a large extent) conceived of in terms of interpretative abilities and *Bildung*. Rather, as discussed above, reducing interpretational flexibility and meaning making through a program or protocol is key to creating distributed cognition and making it possible for volunteers to perform observations or classifications (cf. Magnus, 2007). The relationship between the volunteer as a distributed epistemic subject in the protocols and his/her individual development in making interpretations

might imply aspects of contestation. However, the degree of contestation is an empirical question; some discussion forums are considered spaces in which people can explore, discuss, and interact with experts and other volunteers, rendering "contestation" an integral part of the experience offered.[23]

In sum, changes in the prerequisites for contributing to the humanities are related to digital collaboration technologies and the possibilities these provide to mobilize volunteers en masse. To safeguard the quality standards of contributions, tasks cannot be dependent on the competence or experience of volunteers: the opposite is rather the case. Typically, volunteers are deployed to solve problems that cannot be automated: for example, refining and collecting data, transcribing handwritten text, or adding layers of data to already existing data (data tagging). This work utilizes carefully designed and standardized protocols for participation, constructing volunteers as epistemic subjects on a par with scholars in empirical work. These tasks are distributed by technologies in ways that make individual content knowledge and experience less important, requiring less instruction about how to interpret the material in the tasks. At the same time, although data quality is attained by utilizing standardized protocols for participation, volunteers' ambitions or expectations for learning or interpretation (*Bildung*) need not excluded or discouraged. We suggest that large online citizen humanities projects can both rely on a strong displacement of the knowing subject and be intimately bound to it.

Participatory cultures in the humanities

We turn now to the dynamics of participatory cultures emerging from the quite restricted tasks in citizen humanities described above, directing our attention to the discussion forums in such project platforms. These forums are spaces for interaction that were either created by researchers for inviting volunteers or emerged as a result of contributor initiatives. *Zooniverse* is an example of a platform that offers forums ("Talk") for volunteers to discuss questions related to the data they are asked to refine. Such questions may concern the task itself, but also how other resources beyond the platform may help with this undertaking. Examples from the discussion forums show that volunteers also have and develop interests in the materials beyond the tasks assigned to them. In the following, we present five examples of what participatory cultures in citizen humanities projects can entail.

Solving task-related puzzles

At some point, contributors in citizen humanities may run into uncertainties concerning the assignment or their understanding of the assignment. Solving

these obstacles is not required by the protocols for transcription: from a research perspective it would be sufficient for the contributor to mark words as illegible, to make a guess and rely on other contributors to verify it, or to simply hop over the task. However, in a culture of participation, volunteers may instead use a discussion forum to try to solve puzzling questions they encounter, realizing themselves as epistemic subjects.

Such initiatives can encompass a variety of issues: for example, problems with identifying a single word for transcription. This problem was raised by a community member in *AnnoTate*: "Can anyone read the word after 'the …' as a decorative border?"[24] *AnnoTate* is a project for the transcription of British artists' personal letters, diaries, and sketchbooks from the Tate Archive. The original text was a sketch for decoration of a bathroom, and the answers covered both speculations about the content of the note as well as comments on Greek mythology to find the missing word. Thus, the task could not be solved by relying mechanistically on pattern recognition, but evoked *Bildung* on behalf of the volunteers as they incorporated a contextual understanding to solve the problem. The affordance of the online environment allowed for a collaborative solution and recognizable epistemic subjects.

Contributors also help each other to find resources outside the project for this type of puzzle solving. Often, such resources give contributors an opportunity to create meaning in relation to the materials. A post in the *Old Weather* project illustrates this observation. The purpose of this project is to extract weather data from ship logbooks over the past one hundred and fifty years. However, a survey of the Talk forum showed that users are engaged with logbooks on a much more detailed level than required by the project's research aim. One user posted a resource for others to learn more about the historical contexts of the logbooks, pointing them to a detailed introduction to whaling logbooks and journals on the website of the New Bedford whaling museum.[25] Given the proliferation of other online archives, the volunteer in citizen humanities increasingly makes use of auxiliary sources and databases, providing a form of synthetic knowledge that bears resemblance to conventional academic knowledge practices in the humanities.

Casual talk

Casual talk is a common category of forum thread found in several citizen humanities projects. Many fora have designated boards for discussions that are either off topic or are unrelated to the overall assignment. An example from the *Old Weather* forum illustrates a thread where volunteers noted funny words and expressions found in the materials:

> The ship's dog features again … "Dog fell overboard off of the Starboard quarter jumped on the ice to haul him out and fell in myself, and one of the men went through in coming to my rescue. Only damage, a good wetting." Can't help wondering if the dog is simply called "trouble"? Bless …[26]

At first glance, many of these comments seem trivial. On the other hand, the comments create relationships to the material as well as between members as epistemic subjects, building a culture that values individual contributions to the community. The logs capture the ship, its crew and the daily life on the ship, often relating everyday activities, as exemplified by the quote below (Figure 12.2).

The role of casual talk appears to be valuable in many online forums because it provides interaction with the source data that is freed from the serious tone of scholarly knowledge. However, from an epistemological point of view, such interactions may also serve as entry points to a closer understanding of historical data, realizing contributors as individual epistemic subjects. The value of these discourses, in their own right, is potentially of interest for researchers. Moreover, the everyday life of lesser-known persons in history has often been overlooked, even though the notion of "micro-history" is increasingly acknowledged. A cumulative examination of such "lesser-known" histories could certainly prove valuable to researchers and provide insight into the public development of historical interest.

Creating new knowledge in the community

Sometimes volunteers come across information in the materials that they follow up through independent research, sharing the results with the community. Such quests for further information might be quite advanced and

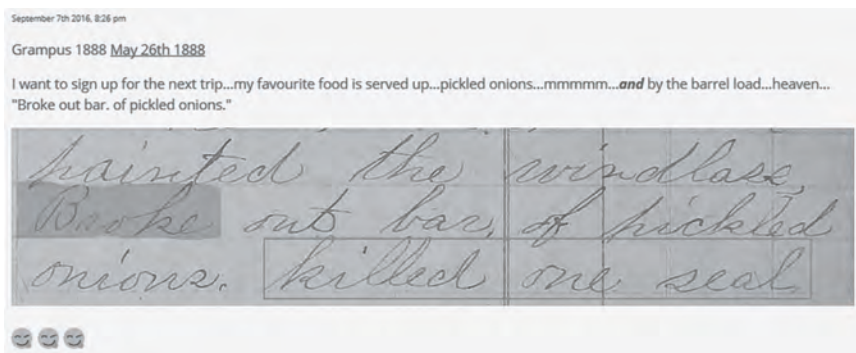

Figure 12.2 Casual talk on Old Weather.
www.zooniverse.org/projects/zooniverse/old-weather/talk/157/11870.

can include information from additional databases and resources outside the projects. While performing the transcription task in *Old Weather*, one user discovered a log entry in which the ship *Milo* encountered the ship *George Howland*. The user tracked down the second ship in the national maritime digital library to find out more about the ship and its fate, sharing the results with the community.[27] In this instance, data was put to test in relation to other sources to verify or falsify its authenticity.

The project *Emigrant City*, hosted by the New York Public Library, asks volunteers to transcribe statements from the Emigrant Savings Bank in New York from the 19th and early 20th centuries. One user started a thread on the forum asking why so many women appear on loan documents considering the fact that women were not allowed to vote until 1920 in the United States. Another member of the community, working at the New York Public Library, takes up the question and adds the story of Mary O'Connor, speculating that some of the women might have been widows taking out loans to invest in property. The user who had asked the initial question responds:

> Phil – I can confirm that some were widows. I found a loan in 1897 to a Sabrina Mitchell, 593 10th St, Brooklyn, 3 story brick. I looked her up on 1900 Federal Census. She was a widow, 62, with no living children, born in NY of parents from Ireland. There are three "households" counted in her building (one for each floor, I imagine). I would guess that she was supporting herself with a boarding house. What fun to discover![28]

Within a culture of participation, questions can thus turn into more collective forms of knowledge building and be combined with a critical engagement with the source data. While researchers often search for specific answers, volunteers ask and answer questions that emerge from their interactions with the material and within the community. In the quotation above we observe both how volunteers bring in auxiliary knowledge and generate new conjectural statements – in this case, that Sabrina Mitchell might have been supporting herself with a boarding house. These kinds of statements are related to different aspects of the materials that relate to the users' own interests and knowledge.

Interactions with researchers

Communities on citizen humanities discussion forums often include researchers affiliated with the projects, and researchers are thus also active in shaping the epistemic culture of participation. As such, researchers have several roles in the community. They often act as experts on the subject

matter, answering volunteers' questions in relation to the task as observed in *Decoding the Civil War*. This project is concerned with transcribing telegrams sent during the American Civil War. One of the volunteers wondered about the content of a coded telegram, making a suggestion about the meaning of the text. A researcher quickly responded, pointing out how to decipher the message and explaining the content of the telegram.[29]

However, the role of expert giving answers to volunteers' questions is only one task performed by researchers. In an example from *Shakespeare's World*, a researcher responds to a user's observation by acknowledging it as being new and important data beyond the transcription task:

> I'm really pleased to see we now have two examples of "taffity tartes"/ "taffytie tartes." This is giving us some great material for reconsidering the OED's [Oxford English Dictionary] entry for taffeta.[30]

Besides being experts, researchers on the forums also seem to offer appreciation and attribution to volunteers as individual epistemic subjects. Even though there exists an epistemic asymmetry between researchers and contributors, online environments seem, at least temporarily, to flatten out such structures and put researchers in the same line of discussion as volunteers.

Creating new research questions

Science Gossip aims to mark and collect metadata about illustrations from publications archived in the Biodiversity Heritage Library. In the discussion forum, a moderator took up a user's question about female contributors to the illustrations in the popular science journals. In doing so, the culture of participation generated additional tasks for the volunteers: collecting the names of female contributors to science illustrations. A researcher acknowledged this request: "Sounds like a fantastic idea!" and introduced particular names of female artists for the volunteers to look out for, extending the original task of the project.[31]

The extent to which user-generated discoveries are added to projects as "required" tasks must be studied empirically. However, we observed requests in many of the discussion forums for volunteers to look out for specific information to answer new research questions in addition to the project's original goals. Such requests were either initiated by researchers or by volunteers curious to engage more with the materials and to find answers to their own questions. In this way, volunteers transcend an assignment by drawing on contextual knowledge, often acquired during their long-term interactions with the source material, to formulate hypotheses and extend the scope of potential

research. Some of the questions might be of genuine value for researchers, in that they point to new interpretations of the data, convey volunteers' interests in expanding the scope of investigation, and create relevance for contributors outside the confinements of strictly delimited work packages. Accordingly, formulating new research questions may be viewed as both a challenge and as an opportunity. Due to limited resources, such initiatives could be warded off as not being in line with the current project, but they could also be seen as a valuable form of creating new research questions. However, more projects need to be completed and evaluated before estimating the value of such interactions.

Discussion

The hermeneutic epistemological ideal of the humanities implies extensive knowledge of the context of inquiry as a prerequisite for informed interpretation. Such extensive knowledge is often associated with the educated subject personifying *Bildung*. This way of reasoning would make the concept of a strictly protocol-based citizen humanities appear as a paradox, or at least rather incompatible with the idea that the mass mobilization of volunteer contributors to research is the main benefit of citizen science/humanities projects. In other words: mobilizing the masses through tasks that do not recognize the individual epistemic subject, instead relying on highly distributed cognition, stands in contrast to the humanities understanding of human education and culture. Much of the scholarly humanities research has defined epistemology as a reaction against positivist or empiricist ideals of breaking down the world into simple facts that can be classified and accumulated.

A break with mass mobilization designs appears when citizen humanities also ask for contributors' specific knowledge, thus realizing the volunteer as an epistemic subject. An example of such an exception is *Art Detective*, a project in which participants were invited to answer questions posed by owners of paintings. Questions included the provenance as well as information about the places or about people depicted in the paintings. Thus, the request was not for an interpretation of an artwork, but for knowledge about its factual content and provenance.

However, the path to moving beyond simple tasks to perform rich interpretations seems to have been conceived of by volunteers themselves and enacted in a "participatory epistemic culture." This, we propose, is a value that has the potential of taking citizen humanities to another level, serving as point of departure for the co-creation of scholarly knowledge and volunteer contributions rather than the diffusion of ready-made research results. This path could inform a new understanding of the ideal of *Bildung*. The educated experience and attainment of knowledge that shapes reflections on one's place

in history and human culture has been regarded as difficult to attain, and sometimes even reserved for an elite class with the means and social status to pursue truth and knowledge without immediate utility. *Bildung* was a tedious process, accessible only to a handful of people, and the humanities have often turned to popularizations and mass-mediated accounts aimed to make their research and knowledge accessible to a larger audience. However, such a model of mass communication had, and still has, the disadvantage of having to strip away the detailed and extensive research that made knowledge possible in the first place, that is, the processes and methodological struggles that underpin specialist knowledge production. It is possible that citizen humanities can engage members of the public as epistemic subjects, as well as participants in distributed cognition frameworks. In many of the examples above, there are numerous discussions about how source data should be interpreted, processed, and recorded. There are also instances of new research questions – hypothesis formulations and critical questions about the under-representation of certain groups in historical research. Although further research is needed to give a clear account of these processes, one can speculate as to whether volunteers are acquiring expertise in relation to subject matter – from historical cooking in Shakespeare's time to the fate of migrant women in 19th-century New York: expertise that is attained not by consuming popularized versions of historical research written by scholars, but by engaging directly with digitized historical data released from dusty shelves in a library and uploaded to an online platform, thus realizing citizens as epistemic subjects in practice and creating new relations to scholarship in the humanities.

Citizen humanities could benefit from reaching out to existing communities that already have interests related to a research project's aims and goals. Bird watchers, amateur entomologists, fishermen, and beekeepers are examples of communities that have become important co-creators of knowledge in biological and environmental citizen science. Likewise, communities of genealogists, historical societies, art collectors and local historians are relevant collaborators in citizen humanities, as they have both interest and domain expertise in the source data.

The future of citizen humanities will most likely depend on technological innovations that are currently being developed, and which may be applied in a near future. With increased efficiency of machine learning, the accuracy of training computers to transcribe handwritten documents is progressing. Some of these approaches involve humans in "training" the computer algorithms. In this respect, it is not necessarily so that computers replace the human eye. Instead, the human eye might become even more important in constructing useful technologies. Furthermore, increased digitization of historical and contemporary collections of text, images and objects have become less

expensive and easier to use as libraries, museums, and archives have created a market for such technologies. The future of digital repositories will probably change quickly with increased storage capacity and faster Internet connectivity. However, there is no linear relationship between technological advances and what people care about in citizen humanities. Many institutions still lack resources for digitization, especially in under-represented or marginalized communities (e.g., libraries in indigenous communities).

Conclusion

The purpose of this chapter has been to explore the epistemic cultures of large online citizen humanities projects. Based on our investigation, we suggest the notion of "participatory epistemic cultures" as a future field that studies the values and ideals in academic scholarship as practices configured to involve outside volunteers. The premise for this approach is that it may reveal aspects of epistemic cultures that result from inviting outsiders into the research process of the humanities. We have explored the tasks used to mobilize volunteers into the epistemic cultures of online citizen humanities projects and the cultural value of "anyone" being eligible for inclusion in this culture. Mobilization occurred almost exclusively in terms of distributed cognition and not by recognizing volunteers as individual epistemic subjects. An essential feature of this mobilization is that participants are configured as an algorithmic collective to perform, for instance, transcriptions or data tagging that refines data. Such activity seldom requires interpretative abilities from the volunteer, beyond following the protocol for transcription. These epistemic cultures of citizen humanities display a strong distribution and displacement of the outsider as a knowing subject in favor of the distributed collective. This we tentatively associated as not in concordance with more traditional epistemic values of the humanities, as they are realized in terms of *Bildung* and thus embodied by a clearly recognized individual epistemic subject. This aspect of the practice of citizen humanities can be epistemologically disturbing, as it departs from traditional values of *Bildung*.

However, we could also observe that the participatory epistemic culture of citizen humanities realized both distributed as well as more individual aspects of the epistemic subject. An inherent property of a protocol is that epistemic subjects have the power to contest or deviate from it. Whether this is an aspect of participatory epistemic cultures that motivate volunteers or, in the eyes of project owners, is distracting, is also an issue largely unexplored. The relationship between volunteers instantiated as distributed epistemic subjects in protocols and their development in terms of interpretation, contain some aspects of contestation.

We identified five aspects of a developing epistemic culture as volunteer contributors interacted and communicated with each other, and with professional scholars, on discussion forums. In solving task-related puzzles, casual talk, creating new knowledge in the community, and in interactions with researchers, new research questions were formulated as members of the participatory epistemic culture realized themselves as epistemic subjects. In this way, they transcended the distributed collective endeavor and epistemic roles they had been assigned.

Citizen science and humanities projects are often designed, for purposes of inclusion, not to rely on previous learning as a necessity for contribution. However, such processes might be said to be unavoidable and outside the control of owners of projects; a distinction between educational prerequisites and experiential learning even in simple, task-based citizen humanities projects is difficult to uphold.

On a speculative note, the involvement of outsiders in the scholarly process of the humanities will likely continue. The progress of such initiatives will possibly depend on how participatory epistemic cultures develop as projects evolve. To use an old metaphor, citizen humanities might not tear down the "ivory tower "of academia. However, it might open a door or a window, making new knowledge possible and reaching out to a wider public.

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Notes

1 The concept of "citizen humanities" is of recent date compared to "citizen science," see Belknap (2015). *Shakespeare's World* is a joint project between the Zooniverse offices in the UK and USA, the Folger Shakespeare Library in Washington, DC, and the Oxford English Dictionary.
2 www.zooniverse.org/projects/zooniverse/shakespeares-world/talk/228/40524.
3 www.zooniverse.org/.
4 http://scholarslab.org/.
5 http://micropasts.org/
6 In general, there are no clear boundaries between social science and the humanities. However, with regard to citizen science there is one important

distinction to be made. The social sciences have a methodological tradition of involving participants as study objects, not as active subjects in collection and classifying data. This is, however, to be found in the humanities and the natural sciences, see for example, Kullenberg and Kasperowski (2016).

7 www.zooniverse.org/projects?discipline=history&page=1&status=live.
8 http://blogs.ucl.ac.uk/transcribe-bentham/.
9 www.tiltfactor.org/game/smorball/.
10 www.bl.uk/georeferencer/.
11 www.globalxplorer.org/.
12 http://micropasts.org/.
13 http://prism.scholarslab.org/.
14 http://archive.boston.com/yourtown/specials/boston_neighborhood_boundaries/.
15 http://storycorps.org.
16 www.kudaba.de.
17 http://braceroarchive.org/.
18 www.wir-waren-so-frei.de.
19 www.gravestonephotos.com/.
20 https://billiongraves.com.
21 www.artuk.org/artdetective/.
22 www.zooniverse.org/ (Accessed 2017-06-07).
23 "We want people to be on Talk, even if that means they aren't classifying. It's an integral part of the experience, which is why we always invite people to participate after each classification." (Interview with Zooniverse researcher, 2017-11-08).
24 www.zooniverse.org/projects/drrogg/annotate/talk/38/95230.
25 www.zooniverse.org/projects/zooniverse/old-weather/talk/117/8719.
26 www.zooniverse.org/projects/zooniverse/old-weather/talk/157/11870.
27 www.zooniverse.org/projects/zooniverse/old-weather/talk/157/12046.
28 http://forum.emigrantcity.nypl.org/t/women-getting-loans/84.
29 www.zooniverse.org/projects/zooniverse/decoding-the-civil-war/talk/432/102223.
30 www.zooniverse.org/projects/zooniverse/shakespeares-world/talk/228/20744.
31 https://talk.sciencegossip.org/#/boards/BSC0000004/discussions/DSC00004s8.

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Chapter 13

The quest for reciprocity

Citizen science as a form of gift exchange

Per Hetland

Introduction

Over the last twenty years, citizen science (CS) has been understood as either democratized CS (Irwin, 1995) or contributory CS (Bonney, 1996). The present chapter will argue for a third understanding: CS as *participatory science communication* (Metcalfe, Riedlinger, & Pisarski, 2008). Although Metcalfe and others (2008) exemplify participatory science communication in terms of cross-sectorial activities, the authors do not provide a detailed discussion or definition of the phenomena. Consequently, one important aim of this chapter is to take the concept of Metcalfe and others (2008) one step further and propose that a definition of CS as participatory science communication is a direction for future research.

In recent years, several approaches to CS have been advanced by governments and other policymaking bodies. Most definitions focus on doing science, and that CS projects shall have a genuine science outcome.[1] However, a crucial reason for focusing on participatory science communication is that many participants in CS simply do not aim to do science or contribute to doing science. Rather they aim to contribute to environmental protection, biodiversity protection, or other similar activities. As such, they are occupied with communicating knowledge for a variety of other purposes that are not primarily scientific. In this context, environmental protection aims may be perceived as equally important to scientific aims.

To advance the notion of participatory science communication, I present a study of the use of Norway's largest CS project, the Norwegian Species Observations System (SO). The SO is managed by the Norwegian Biodiversity Information Centre, which has two crucial duties. The first is to bridge the gap between biodiversity science and policy, and the second is to disseminate biodiversity knowledge. This study focuses on CS, systematic biology, and biodiversity mapping, as well as how SO engages amateurs and volunteers in CS. The concept *amateur* has its roots in Latin (amator: lover) and is used here

to refer to persons practicing an activity without its being a livelihood (for a longer discussion see Hetland, 2011). The concept, amateur, also signals a certain passion and the strength of such passion is well described by Richard Conniff in his colorful history of the early naturalists (Conniff, 2011). In this chapter, I aim to answer the following research question: How do knowledge infrastructures such as SO facilitate reciprocity and participatory science communication? Aspects of reciprocity and participatory science communication are further explored through three sub-questions: (a) Who are the participants and what drives them? (b) What does participation mean to them? (c) How does SO encourage participation and the building of expertise?

Participatory science communication

The success of knowledge infrastructures like the SO depends on the structure's ability to reciprocate to its contributors and thus facilitate lasting participation in knowledge production and knowledge politics. Established in 2008, SO now has more than twelve thousand contributors and more than 21 million records. The Norwegian Biodiversity Network (Sabima) was formed when nine non-governmental organizations (NGOs) organized themselves to lobby for improvements in environmental policies and the education of its members. With more than nineteen thousand members, these NGOs embrace both the professional and the most skilled amateur naturalists in Norway. Sabima and the following five amateur organizations are collaborating partners with SO: the Norwegian Ornithological Society, the Norwegian Botanical Society, the Norwegian Foraging and Mycology Society, the Norwegian Zoological Society, and the Norwegian Entomological Society. Consequently, SO tries to combine "top-down" and "bottom-up" approaches.

There exists a wide range of different CS approaches (Eitzel et al., 2017; Hecker et al., 2018), including contributory, collaborative, co-created, collegiate, and contractual approaches, as well as more broadly defined approaches that value public participation in scientific research and emphasize civic education (Ceccaroni, Bowker, & Brenton, 2017). Hence, we will use Guy Bessette's (2004) definition of *participatory development communication* as a starting point (Bessette, 2004, p. 9):

> Participatory development communication is a planned activity, based on the one hand on participatory processes, and on the other hand on media and interpersonal communication, which facilitates a dialogue among different stakeholders, around a common development problem or goal, with the objective of developing and implementing a set of activities to contribute to its solution, or its realization, and which supports and accompanies this initiative.

Consequently, I will aim to include the following elements in a definition of participatory science communication:

(a) planned participatory processes
(b) well-functioning boundary infrastructures or knowledge infrastructures as well as dialogues among different stakeholders
(c) accommodation of the aims of the activities

I also aim to provide a definition of participatory science communication (PSC) that accommodates both the dialogue model and the participation model (Hetland, 2014). Consequently, I aim to bridge the instrumentalist point of view – collect, participate, and contribute – and the capacity-building point of view – openness, inclusiveness, responsiveness, democratic engagement, consultation, dialogue, and commons (Ceccaroni et al., 2017). Findings from this study are also relevant to the extensive literature on participants' motivations for taking part in CS, in that reciprocity is an important driver. We claim that by building knowledge infrastructures that facilitate reciprocity, one builds a long-lasting relationship between the participants and the activity undertaken. These kinds of relationships do not primarily build on a one-way motivation to contribute, but on a reciprocal relationship wherein all parties gain something.

Analytical framework

Boundary infrastructures and objects

Often, participatory science communication presupposes well-functioning knowledge infrastructures (Bowker, 2000; Bowker & Star, 1999; Karasti, Millerand, Hine, & Bowker, 2016a, 2016b; Star & Griesemer, 1989) as well as reciprocal relationships between the participants (Mauss, 1950 [2002]; Sahlins, 1974). Boundary objects refer to elements that link various groups and interests. Star and Griesemer (1989) defined boundary objects as temporary agreements by different actors and groups on how to relate to a given situation. They describe how a standardized method in natural history for collecting, conserving, marking, and describing finds functioned as a boundary object between amateurs and researchers in what was a research subject among researchers and a subject for a hobby, exercise of an occupation, or environmental protection activity among groups of the public. In other words, they established agreement about common points of contact. Boundary objects are negotiated agreements that contain different interests but, at the same time, open up for slightly different practices. By simultaneously maintaining stability and handling ambiguity, boundary objects create

a dialogue among various interests (Wells, 1999). In this way, boundary objects permeate borders while the established practice continues. Because this chapter departs from a user study, I will refer to "users" when discussing different user experiences with SO, while I will use amateurs, volunteers, and participants when discussing CS more generally (see also Hetland and Schrøder, this volume, for a discussion of the concepts of users, publics, and audiences in CS).

Scientific or knowledge infrastructures represent

> regimes and networks of boundary objects (and not unitary, well-defined objects), [and] boundary infrastructures have sufficient play to allow for local variation together with sufficient consistent structure to allow for the full array of bureaucratic tools (forms, statistics, and so forth) to be applied.
>
> (Bowker & Star, 1999, pp. 313–14)

Knowledge infrastructures, therefore, can be understood as facilitating cooperation among scientists, amateurs, and environmental authorities across disciplines and organizational boundaries (see also Hine, Chapter 5). Cyberscience, e-science, Science 2.0, and CS therefore become manifestations of scientific culture articulated in the face of a new technology (Hine, 2008, p. 34), manifestations shaping new *sciencescapes* that are openly accessible to all interested parties to the greatest extent possible. Boundary work occurs when people contend for, legitimize, or challenge the cognitive authority of those who control knowledge production, including the question of gender (Brenna, 2016; Rogan, 1998) and the credibility, prestige, power, and material resources that attend such a privileged position (Gieryn, 1995). In their famous study from the Salk Institute in San Diego, Bruno Latour and Steven Woolgar identified "the credibility cycle," through which grants allow researchers to conduct studies that lead to publications (Latour & Woolgar, 1979). One may assume that amateur naturalists shape their own credibility cycles and participatory practices that are similarly entwined with culture and identity (Davies & Horst, 2016).

Reciprocity

Sahlins's typology of reciprocity includes generalized reciprocity, balanced, or symmetrical, reciprocity, and negative reciprocity (Sahlins, 1974). All kinds of resources, whether tangible or intangible, can be transformed into a gift (Sherry, 1983). Gifts signify a relationship that is not solely exchange-based but includes emotional and social dimensions (Carrier, 1991; Harris, Wyatt, &

Kelly, 2013; Mauss, 1950 [2002]), such as specific ways of playing out environmental citizenship. Mauss (1950/2002, p. 50) describes three crucial obligations in a gift economy: "to give, to receive, to reciprocate." Reciprocity highlights one crucial element: personal relevance for different publics participating in CS (Frewer, Howard, Hedderley, & Shepherd, 1999). Stocklmayer attempts to map the science communication field by asking three basic questions about communicating any scientific material: "from whom?", "to or with whom?", and "to what end?" (Stocklmayer, 2013, p. 27). Underlying these three basic questions is the key issue of relevance in participatory science communication; participants are especially concerned about relevance, be it environmental protection, biodiversity protection, or other similar aims.

Apomediation

Public participation in biodiversity mapping creates large amounts of data in a short time, and the concept of *apomediation* represents a new strategy of validation (Eysenbach, 2008). Apomediation is a socio-technological term to describe a new way for users to identify trustworthy, credible information and services. *Apo* is derived from the Latin word for "stand by," and *apomediation* refers to Internet users' ability to bypass gatekeepers and intermediaries and go directly to sources, even those users not considered experts, when accessing information. In this way, the expert stands by the user. At the same time, unstructured CS databases like SO can be problematic when used for research purposes; one issue is that unstructured CS databases contain different forms of biases. These biases might lead to, for example, important long-term population declines (or positive trends) not being detected (Kamp, Oppel, Heldbjerg, Nyegaard, & Donald, 2016). However, the more structured CS databases provide important input for science (Jonzén, 2006), and within CS databases as SO one might also find parts that are highly structured.

Context and method

Boundary infrastructure for Norwegian biodiversity mapping

Successful boundary infrastructures presume two levels of boundary objects (Star & Griesemer, 1989). For systematic biology and biodiversity mapping, the first level of boundary objects facilitates communication and trust. This level includes objects such as the European Union Inspire Directive, standardized species names and thesauri, and the growing standardization of validation routines. These boundary objects are structured by both more formal standardization processes and informal self-organized processes. The convergence of these processes increases the level of trust in the information

provided by boundary infrastructures. The second level of boundary objects facilitates activities that involve different communities and society at large. One important boundary object is Norway's Species Map Service (as one of SO's services), which has become a crucial tool for planning new construction activities as well as changing use of natural environments. Species Map as a tool is essentially an obligatory passage point (Callon, 1986) within planning, and is a crucial tool for PSC. Two similar prominent PSC activities are collaboration regarding rare species (The Norwegian Red List) and collaboration regarding invasive species (The Alien Species List). Of all the observations recorded in SO to date, 15.5 % are on the Red List, and 1.2% are on the Alien Species List.

One of the most significant aspects of collaborative technologies is their facilitation of bridging activities and thereby co-exploration. For many years, museum collections have been vital boundary objects between amateurs, professionals, and environmental authorities. However, the collections have been difficult to access for a growing number of new purposes. The digitization of the collections has built bridges across several more or less well-structured boundary objects in local use. The ability to link boundary objects into boundary infrastructures thus depends on bridging activities between a heterogeneous set of actors and repositories. Four steps toward building a new boundary infrastructure for Norwegian biodiversity mapping have been identified in a previous study (Hetland, 2011). First, the digitization of museum collections has been an important starting point for bridging activities. Digitization has challenged the privatization of collecting activities; professionals and amateurs have begun to meet in new arenas, and the natural history collections from all Norwegian museums have been connected together in a digital format. Second, the establishment of the Global Biodiversity Information Facility has connected the Norwegian collections with an increasing number of collections worldwide. This step has also made standardization an even more important precondition for scientific collaboration. Third, the establishment of the online portal SO in 2008 has provided a new opportunity for volunteers and amateur communities to participate in a national mapping activity and has expedited new ways of bridging activities between science and the different publics. With SO, a successful knowledge infrastructure has been established between the scientific communities, the amateur communities, and environmental authorities. The mapping of biodiversity has turned into a huge collaborative enterprise that builds on bundles of rights and obligations (Ostrom & Schlager, 1996). The SO builds on five basic principles[2]: (a) your sightings are displayed openly; (b) sensitive species are protected; (c) you are the owner of your own sightings and are responsible for the quality of the same; (d) certain selected sightings

require validation; (e) SO provide safe long-term storage and open access in accordance with CC BY 4.0. The fourth step entails the bridging activity between the science-driven museum collections and the interest-driven SO that facilitate PSC, such as the Norway's Species Map Service, the Red List, and the Alien Species List.

The fast-growing number of records in SO highlights some notable ambiguities, as it is not possible to quality control all data in an organized manner. As boundary organizations, different NGOs, such as Sabima, together with the NBIC, have organized quality control or validation with the help of national coordinators and a network of experts. Validation involves two kinds of activities. The formal validation of observations in SO is carried out by designated amateurs and professional biologists. About a hundred volunteers participate in formal validation activities for bird species; around sixty additional volunteers are responsible for validating all other plant and animal species. Informal validation activities have also developed within SO. Observers may ask their fellow naturalists for assistance in validating their identification of a species, or comment on pictures posted by other observers. Smaller interest groups focused on a particular species or geographic area, have also established other online forums, such as Facebook groups, in which they conduct pre-validation activities before a record is made public in SO. Consequently, SO utilizes apomediation in data collection and validation along two lines (Hetland, 2011): (1) Both professional and amateur scientists are nominated to validate the records in some prioritized areas, and (2) everybody is free to participate in the general validation processes if they find questionable information that they think should be corrected.

Surveying SO users

The Web-based survey was conducted in May 2017.[3] The survey was developed in collaboration with the NBIC, Sabima, and the Natural History Museum of the University of Oslo. The survey was posted on the SO webpage from May 10th–31st, 2017 and comprised 19 questions, of which 7 were closed-ended, 8 were closed-ended with an option for comments, and 4 were open-ended. In total, 404 respondents completed the survey within the deadline. In total, the respondents provided 1,129 qualitative comments. Comments were coded using HyperRESEARCH, which is a program that performs computer-assisted qualitative data analysis. HyperRESEARCH is useful for organizing, managing, and analyzing a textual corpus of the mentioned size. The qualitative comments were coded several times to test hypotheses and facilitate a repeating comparison of the compiled responses (Hesse-Biber & Dupuis, 2000).

Survey results

Who are the participants, and what drives them?

Of the survey respondents, 97% were still using SO, while 3% had stopped doing so. Two main reasons were given for the latter: the most important reason was the difficulty in using the new user interface from 2015. The second reason cited was dissatisfaction with other users who were "not serious" (e.g., reporting every "tree in the forest" just to obtain a high score on the ranking lists). Because we do not know exactly who answered the survey compared with the total population, we cannot discuss the question of representativeness. However, the Web survey was posted on NBIC's website, so it is fair to assume that those who found the survey to a large extent are the most active. The more than 21 million records in the database come from more than 12,000 contributors. Both the contributors and their contributions exhibit a heavy-tailed distribution; at the "head" end, about 1% of the contributors have provided more than 40% of the records, while at the "tail" end about 80% of the contributors have recorded approximately 1% of the records. Consequently, the majority of those who answered quite likely were those who most actively use SO and were most experienced in using SO; thus, these were individuals who contributed a large amount of data.

The demographic profile of SO users is similar to that found in other studies of CS. Approximately 78% were men, while 22% were women. In terms of age, 45–66 was the most dominant age bracket (see Figure 13.1).

One might have assumed that retired people would have been a larger part of the user group; however, some amateur naturalists are quite likely active as amateurs without being active users of the portal, and this most likely applies to older amateur naturalists as well. The participants' educational

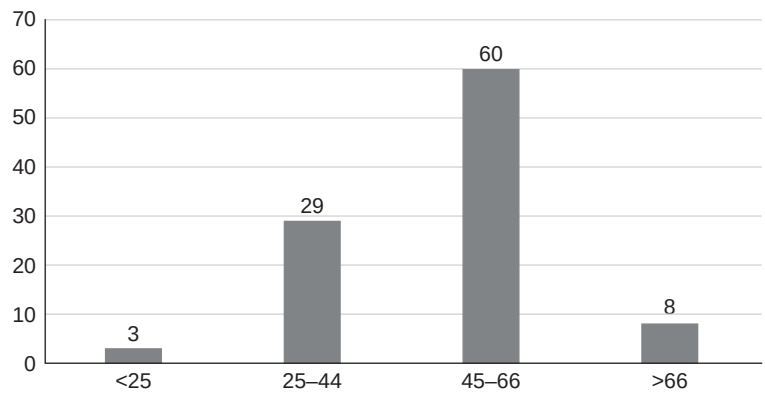

Figure 13.1 Age distribution (percent).

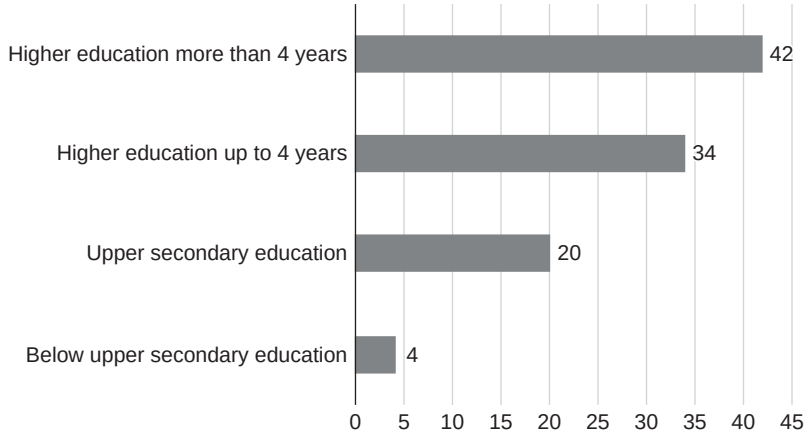

Figure 13.2 Education (percent).

levels were generally high (Figure 13.2): in 2017, 33% of the general population of Norway had higher education according to Statistics Norway, while in the SO population, the figure was 76%. To summarize, three out of four SO users were men, the majority belonged to the 45–66 age bracket, and most were well-educated.

Of the SO users, 377 remembered how long they had been using SO: 49% for more than 5 years, 37% between 1 and 5 years, and 14% for less than a year. Of the 394 people who indicated their frequency of use, 38% did so once or more times per day, 37% once or more times per week, 13% once or more times per month, and 12% from less than once to once or twice per year. Consequently, 75% use SO every week or more. When asked how they could participate more, several users simply stated that they "already use SO enough" or "use it 24/7." Regarding using SO more, several participants made statements such as the following: "more spare time = more time outdoors = more use of SO – consequently, [there is] nothing [more] you can do to help me" or "when I retire and have more time."

The SO users have different roles, and they were able to select more than one role in the survey. Approximately 94% participate as private persons, 7% work in public management, 7% are landowners, 5% serve as consultants, and 7% are involved in organizations for people interested in natural history. Around 5% have other jobs, such as validators and researchers. We also directly asked the respondents "why do you use SO?" (See Figure 13.3). They had 13 options and the possibility of specifying a 14th reason (they could cite a maximum of three). Figure 13.3 presents participants' answers related to motivations geared toward individual or collective outcomes.

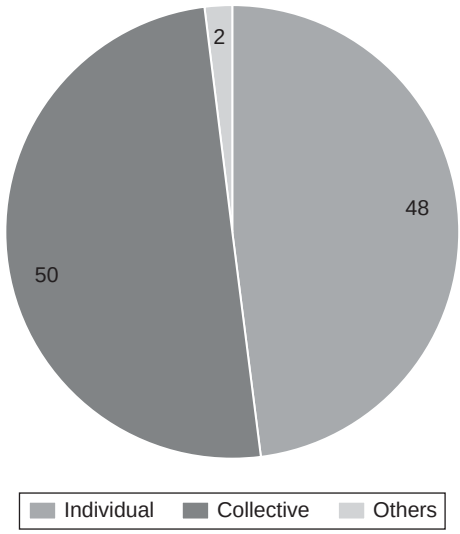

Figure 13.3 Why people use SO (percent).

Questions that transitioned into deeper discussions of engagement provided more insights into the multidimensional aspects of engagement; however, two dimensions stand out. First, engagement involves personal rewards or individual outcomes, be it keeping track of one's own sightings, enhancing knowledge, being active outdoors, or competing/collaborating with others. Second, it is engaging to contribute to general and local knowledge, including science, as a more collective outcome. Many respondents emphasized their general concern about how people take care of nature; for example, one response was, "I want to contribute to biodiversity mapping so that more accurate decision-making data is obtained when planning interventions in nature." Others were especially concerned about the time dimension (e.g., "historical statistics that provide migration data about birds over the years to study the effects of climate changes") or about more problematic species (e.g., "more precise information about which species should be mapped [e.g., invasive species])" or simply wanted "to see what is observed where I am planning to hike." This statement sums up many of the comments: "I find it motivating to record my sightings since it gives me new knowledge about nature, and I feel I contribute in a positive manner to society – besides, it keeps me physically active, with interesting challenges every day." A range of comments shifted between "I feel important when an observation is marked 'not found before'" and "SO has made field work more fun and enjoyable." A few participants commented on the large volume of free labor, as they noted that a salary or other encouragement and incentives would have been helpful.

Individual and collective outcomes

At this point, we summarize the answers to the question: "Why do you use SO?" (Figure 13.3). For the *why* question, the 14 options were classified into two groups. The first group of options emphasized individual outcomes, such as users like to compete or display their own pictures, study others' pictures, learn something new, spend more time outdoors, increase their own knowledge, promote their future careers, and, most importantly, keep track of their own records. The second group of options highlighted collective outcomes, including contributing to species mapping in general or in the users' places of residence, contributing to research, and collaborating with other naturalists. Around 48% of the answers emphasized individual outcomes, 50% of the answers emphasized collective outcomes, and only 2% mentioned other options. Consequently, SO users perceive individual and collective outcomes as equally important.

What does participation mean?

Most observers belong to one amateur organizations, and some are members of more than one organization. Traditionally, the Norwegian Ornithological Society has the highest number of active members (62%) using SO, followed by the Norwegian Botanical Association (16%), the Norwegian Entomological Society (11%), the Norwegian Zoological Society (10%), and the Norwegian Foraging and Mycology Society (8%). Several (9%) also mentioned memberships in other relevant amateur organizations.

Sabima and the five amateur organizations that partner to maintain SO coordinate activities during which the members can learn more about biodiversity mapping. Among the respondents, 37% have participated in activities coordinated by Sabima or the amateur organizations, 28% have taken courses in higher education institutions, 30% have used the NBIC and its services, 59% have employed social media and other Internet resources, and 16% have used other services (including self-learning from books and consulting friends).

Expertise is not evenly distributed across the species groups. On the contrary, both historically and geographically, some species groups have received more attention than others. Figure 13.4 presents SO users' reports on the different species groups: 14% report on all species groups, while the rest report on nearly three groups on average. Unsurprisingly, birds have the largest group of reporters, followed by vertebrates, invertebrates, vascular plants, and amphibians and reptiles.

All knowledge infrastructures assume certain user skills, so the ways in which different skills are facilitated are of interest. Regarding the question

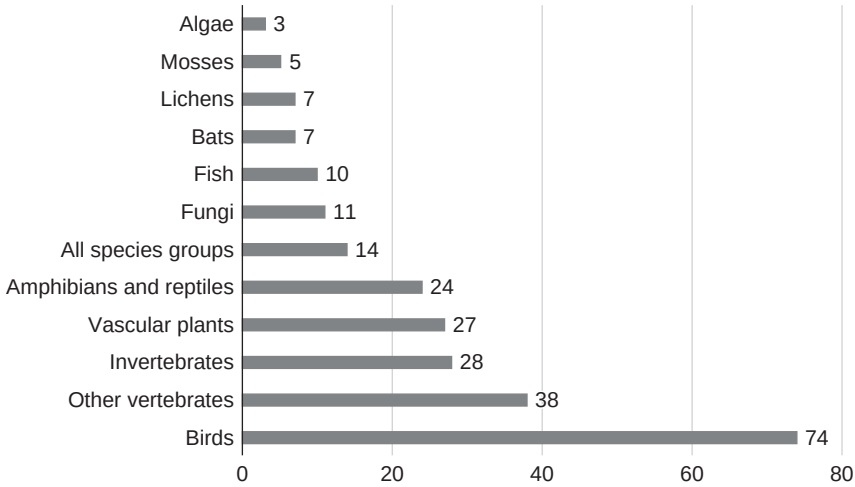

Figure 13.4 SO users' reports on species groups (percent).

of how they found help when using SO, many users read the information on SO's webpage, while others requested support or asked questions via "My Opinion" and some preferred inquiring the member organizations. Many users would like more assistance in species identification or "more information about the different species," as "[it is] difficult to do the species identification yourself without more information and better pictures." Some users would also appreciate the possibility to discuss observations and species identifications. Several also requested "offerings of courses and training to improve [my own] knowledge and skills." However, many of the comments emphasized the respondents' networks as helpful, including friends, relatives, acquaintances, colleagues, other users, and "talking to like-minded [people]" or "experienced and skilled users." Others also used more organized sources, such as the user forum on Facebook, YouTube, SO's own Facebook page, and the "Ask a biologist" service. Many reported being autodidacts (e.g., "I have been self-educated for close to fifty years"); as such, they participate in arranged trips together with people with more knowledge, participate in local projects, use libraries and sound archives of bird songs, and collaborate with other amateurs. They used SO for tips about rarities and other topics of interest and noted that SO is an arena for knowledge sharing that is independent of one's level of expertise, even though some participants were somewhat resigned regarding their own lack of knowledge.

Approximately 39% of the users contacted scientific institutions to obtain help with species identification; a few do so to hand in specimens and conduct DNA analyses. The museums depend on amateurs to submit specimens

and 17% of the users stated that they still do so. Users also contact scientific institutions to get help with species identification (19%); 6% ask for DNA analyses, while 7% have other requests.

Some users also comment about their special concerns or observations, such as the following:

- I have been in contact with a university about electric cattle grids that kill a lot of frogs and toads.
- I have handed in several bird bandings to the local museum; however, I miss the promised feedback.
- I tried to contact the local university college about wolf observations, but they didn't answer.

Usually, people reported being well taken care of, but some miss the promised feedback. Sometimes, such contacts were initiated by others; for example, one participant stated, "I have been contacted about birds of prey observations by planners." Consequently, participation implies that the participants follow their own commitments, use their skills, learn something new through both individual and collective activities, collaborate with both known and new partners, and contribute to either the scientific community or the environmental community by creating new records and participating in validation processes. A specific participatory epistemic culture develops as a result, as new knowledge is created through a variety of participatory processes and with SO as a well-functioning boundary infrastructure accommodating a variety of aims.

How does SO encourage participation and the building of expertise?

Knowledge infrastructures have two important aspects that were investigated through the questions posed in this survey. First, we can explore the question of how knowledge infrastructures facilitate communication and trust. Second, the survey responses provide insight into how knowledge infrastructures reach out to different communities and society at large. Most of the respondents used SO actively but in different ways. When asked "How do you use SO?" (Figure 13.5), respondents could choose from 15 options and specify a 16th option (they could cite several options). The variety of responses was organized into two categories, which focused on either uploading information or downloading information (Figure 13.5). The large number of users uploading information were mainly using the portal to submit sightings, while the larger number of users downloading information were looking at

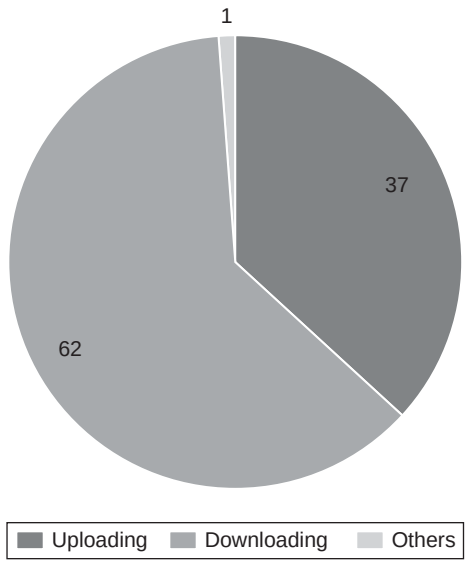

Figure 13.5 How users use SO (percent).

images and sightings, reading statistics, and searching for species information. A smaller number used other options.

Two questions engaged many users: the first concerned the "missing app," and the second was about validation. The first question encouraged input, eliciting responses such as "I think it is a problem that SO has not implemented a good app that we can use in the field; such an app would have increased my use considerably – everybody I know would like such an app." Concerns about validation were also expressed: "[We need] more validation and quality assurance of data" and "a stronger focus on quality instead of quantity." Alternatives were also suggested, such as "a more serious version for skilled people." Regarding the last comment, however, one user noted that "I have seen that experienced users also misplace their observations in the wrong municipality, even the wrong county." Some respondents provided more technical comments to improve quality, including, "I would like to upload sound (mp3) and video as validation of [my] observations," and "[Make] GPS positioning more accessible." Others offered opinions on "ownership", such as "It should not be possible to remove pictures that are commented on." As mentioned earlier, the reporter owns the sighting; consequently, he or she is free to remove it. For those commenting, this may be experienced as an unbalanced way of practicing "ownership."

More than half of the users reported they looked at statistics in SO. These statistics include lists of which species are observed most or least frequently, as

well as ranking lists indicating how many observations a user has contributed and, by extension, which users have contributed the most observations. The ranking lists "lead to many wrongly identified species and thousands of uninteresting sightings." One participant suggested: "Drop the ranking lists; they invite people to misuse the system," and another stated: "I know people who would register their own grandmothers if [by doing so,] they [would be credited with] an extra sighting." Thus, these lists evoked strong emotions, although some respondents also underlined that "the quality is in the quantity." On the other side, some claimed "I have tested observations to see if they are plausible; my conclusion is that one can't use the data without being very critical," or "[It should] be possible to press an anonymous button to indicate misidentified species." According to NBIC, however, there is no reason to think that SO has more misidentified or misplaced records than more science-driven databases. Other services that were missed in the knowledge infrastructure included a discussion forum, an easier way to see all sightings by co-observers, an improved map service, and an improved geographical naming system (e.g., municipalities).

Approximately 44% of the users encounter interesting sightings that they do not record for several reasons. The most important reason was the users' fear of the misuse of data (14%). Several respondents claimed concerns: "I think that SO should shelter threatened species more; many will not register their observations for fear of exposing rare plants and nesting birds, " and "I am afraid of the misuse of data – last year, I registered an elm with [its] exact positioning; this year, it was cut down." More explicitly: "It is a big problem that developers check SO, and if they don't find any threatened species in the area, they think that they can just start digging." The individual observations made available in SO also constitute the observers' own diaries later, and users expressed preferences for future features of individual reporting activity. These features included the ability to "create maps with my own observations"; obtain "statistics of my own observations that are accompanied by pictures"; and have "a page with my own observations and pictures like on observado.org." Simply put, users want to "keep track of my own observations – and give me an indicator about my own knowledge compared with the more skilled and knowledgeable."

SO is not unique; several similar systems exist. In fact, SO has closely collaborated with its Swedish counterpart. However, several users noted that the number of collaborators could be increased, suggesting that other systems have important user functionalities lacking in SO. Although SO constantly undergoes both major and minor updates, experience has shown that updates can either be met with frustration or experienced as important improvements by users.

Experiencing reciprocity

To summarize responses to the question "How do you use SO?" (Figure 13.5), we categorized 16 options into two groups: whether the respondents uploaded information (implying that they provided new information to SO) or downloaded information (implying that they utilized the available information in SO). Approximately 37% of the respondents emphasized uploading information, 62% focused on downloading information, and merely 1% cited other options. We found that downloading information was an important activity for the users, and this included keeping private field diaries; looking at pictures, recent records, statistics, and inventories; and searching for information or data for management or research. Uploading information highlights the act of giving, while downloading information stresses SO's ability to reciprocate in a relevant manner.

Concluding discussion

The aim of this chapter was to provide a definition of participatory science communication by studying the use of species observation portals within new, evolving sciencescapes. The study found that knowledge infrastructures like the Norwegian SO link a large variety of actors – volunteers, dedicated amateur naturalists, amateur societies, scientists, and environmental authorities, among others – and facilitate collaboration in Norway's largest CS project. More importantly, anyone can participate – from a newcomer with only one recorded sighting per year or a veteran with several thousand observations. Some of the more skilled veterans may of course find the different levels of expertise a challenge; however, most of them recognize the value of this inclusive participatory principle.

Another aim was to explore how knowledge infrastructures such as SO facilitate reciprocity. A new knowledge infrastructure's success rests on its ability to accommodate many smaller projects within a larger one. SO encompasses a range from projects of single volunteers or amateur naturalists following their individual interests in natural history, to larger projects by scientists, amateurs, and environmental authorities cooperating across disciplines and organizational boundaries, to even larger national projects, including the Species Map, the Red List, and the Alien Species List. Among the smaller projects, standards and validation activities can be found. Consequently, knowledge infrastructures resemble Trojan Horses, with a unified exterior and a multiplex interior. The boundary objects constituting SO represent different interests and allow for slightly varying practices (Bowker, 2000; Bowker & Star, 1999; Star, 2010; Star & Griesemer, 1989). The layering of boundary

objects into knowledge infrastructures creates a form of irreversibility marked by the constant flow of incremental innovations, as, for example, several private initiatives to make an app indicate. Consequently, the frustration that several users experience is caused by the fact that knowledge infrastructures often have a dual mission: they aim to handle stability and innovation at the same time. This duality is also apparent in the users' answers, as some ask for more innovation, while others ask for more stability.

As important aspects of studying reciprocity, three sub-questions were asked. First, who are the participants, and what drives them? The users are mostly well educated; about three out of four have higher education. They represent a steady user group; about one out of two has been using SO for over five years. More than one out of three use SO every day. Consequently, they represent a competent and dedicated pool of free laborers mapping Norwegian biodiversity. The two most frequently reported reasons for using SO are to "contribute to biodiversity knowledge" (88%) and "keep track of my own sightings" (53%). However, summarizing the emphasis on individual outcomes and comparing this with the emphasis on collective outcomes show that they have more or less equal importance. The emphasis on individual outcomes also reflects the importance of personal relevance, which further underlines the importance of reciprocity when building knowledge infrastructures. Finally, three out of four survey respondents are men. Consistent with previous studies of natural history (Brenna, 2016; Rogan, 1998), it seems biodiversity mapping at present appeals mostly to men. This begs the question of whether SO as a knowledge infrastructure for natural history appeals differently to men and women. While data from this survey does not allow us to discuss this issue further, gender in biodiversity mapping is an important direction for further research.

Second, what does participation mean? Three out of four use the resources provided to enhance their own expertise, thereby providing an answer to Stocklmayer's question of "to what end"? (Stocklmayer, 2013, p. 27). Many users are members of one or several amateur societies and participate in different activities to enhance their own skills as field naturalists. About 39% contact scientific institutions to obtain help or submit specimens. Validation is a crucial issue that concerns many users. The organized network of validators prioritizes the species included on the Red List and the Alien Species List. For the remaining validation, apomediation (Eysenbach, 2008) is central, although many comments indicate that it works only to a certain degree; much of the material is never validated. Many users find this issue troublesome; however, an important group also perceives the validation a Sisyphean task; it is never ending, and what is done will never meet everyone's satisfaction. One way of understanding quality is illustrated by the claim, "the

quality is in the quantity." Moreover, there is no reason to think that SO has more misidentified or misplaced records than more science-driven databases.

Finally, how does SO encourage participation and the building of expertise? As mentioned, Mauss (1950/2002) describes three crucial obligations in a gift economy: "to give, to receive, to reciprocate" (p. 50).The users give their sightings, SO receives the sightings and some are validated, and SO reciprocates the gift by facilitating individual projects within the knowledge infrastructure for every user (if they so wish). Consequently, there are multiple levels of reciprocity and gifts. The participants' responses obviously show much appreciation for such reciprocation; some respondents wish for even more tailored reciprocations for each user. Regarding how the respondents use SO, the two most frequent user forms are "Submit sightings" (96%) and "Look at today's sightings" (72%). However, summarizing the emphasis on either uploading or downloading information reveals that 37% focus on uploading, while 62% emphasize downloading. Consequently, uploading information highlights the act of giving, while downloading information emphasizes SO's ability to reciprocate in a relevant manner. All in all, SO contains bundles of rights and obligations for those who participate. Furthermore, ranking lists may be experienced as important forms of visualizing a participant's reputation and consequently as symbolic return gifts in one specific version of credibility cycles.

The preceding analysis suggests five elements that are crucial for a definition of participatory science communication:

(1) open participation
(2) participation that involves all levels of skills and intensity
(3) knowledge infrastructures that facilitate dialogues and add-on-communication-forums that support the activity
(4) a purpose that includes both large national and international projects as well as participants' own individual projects
(5) and purposes that are also multidimensional, including scientific aims, environmental protection aims, and planning aims

This suggests that participatory development communication, as defined by Bessette (2004), lacks two elements that are important for PSC: attention to knowledge infrastructures and the possibility of accommodating local projects within a larger goal. Consequently, we propose the following definition:

> Participatory science communication is based on the one hand on participatory processes, and on the other hand on knowledge infrastructures, media, and interpersonal communication. Dialogue is facilitated among

different stakeholders around a common science communication problem or goal, as well as local problems and goals. Participants learn, with the objective of developing and implementing a set of activities to contribute to a solution, or realization, and the infrastructure supports and accompanies this objective.

An understanding of CS as PSC is consistent with the empirical findings of this study, underlining that many participate in CS not primarily to contribute to science, but instead to pursue a variety of individual and collective aims. For users of SO, individual and collective outcomes are perceived as equally important, and the capacity of boundary infrastructure to facilitate reciprocity is paramount to building participatory science communication. This is crucial since many participate in CS activities for a variety of individual and collective aims, not primarily to contribute to scientific aims but to contribute to environmental protection aims or other individual or collective aims. Consequently, two findings in this study stand out: individual and collective outcomes are perceived as equally important, and the capacity of boundary infrastructures to reciprocate to the participants is paramount in building participatory science communication.

Notes

1 See, for example, European Citizen Science Association's "Ten Principles of citizen science", https://ecsa.citizen-science.net/sites/default/files/ecsa_ten_principles_of_citizen_science.pdf.
2 www.artsobservasjoner.no/Home/Fundamentals.
3 I am grateful for all the assistance I got from NBIC, the Norwegian Biodiversity Network (Sabima), and the Natural History Museum of the University of Oslo while doing this survey. Furthermore, I thank the two reviewers and my colleagues at the Mediascapes project, University of Oslo, for their helpful comments.

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Chapter 14

Citizen science, citizen humanities

Relevance for museum research and practice

Palmyre Pierroux

Background

The selection of contributions for this book stems from two open seminars with guest researchers held in late 2016 at the University of Oslo as part of the research project Cultural Heritage Mediascapes: Innovations in Knowledge and Mediation Practices. The first seminar was organized by Per Hetland and focused on Citizen Science (CS) and science communication, while the second seminar was organized by Line Esborg and had Citizen Humanities (CH) and crowdsourcing as topics. Inspired by the interdisciplinary conversations and insights that emerged from the seminars, the idea formed of exploring developments in citizen projects by traversing longstanding epistemological distinctions between science and the humanities. Such interdisciplinary framings are not often undertaken; rather, research on citizen science in the social sciences, environmental sciences, and humanities is mainly "disconnected" (Mahr, Göbel, Irwin, & Vohland, 2018), with studies presented in books, journals, and conferences for the respective domains. Mahr and others (2018) ponder the potential benefits of multidisciplinary approaches:

> Even if researchers from the social sciences and humanities do not necessarily do much citizen science themselves, their perspectives could enhance the field when considered and operationalized by practitioners and policymakers. Taking perspectives from the social sciences and humanities into account would benefit the citizen science community, for example, by bringing more knowledge about the sociology of citizen involvement or addressing some of the tensions and dilemmas involved in citizen science work.
>
> (pp. 102–3)

In mapping out a possible interdisciplinary terrain in Chapter 1, we drew on metareviews of studies from the past decade or so to make *tacking stitches* across Citizen Science (CS) and Citizen Humanities (CH) research, establishing *Democratization, Divides, Drives* and *Developments* as "big themes" in both disciplines. These broad areas of investigation in CS and CH research and practice have also been used to organize the 14 chapters in this volume. Further, a particular interest in how these themes relate to modes of participation in museums and the cultural heritage sector runs as a red thread throughout the volume. To maintain a multidisciplinary balance, each thematic part has three chapters, and includes research from both CS and CH (Table 14.1).

Although not systematic in the way one might approach a research handbook, balancing the contributions allows for exploring aspects of the larger themes and how they are relevant both within and across disciplines. This is the aim of this chapter, then, to apply these themes as synthesizing lenses across the chapters in this book. Contributions in each part are analyzed to determine the type of research problem being addressed, the context and approach taken in the research design, the analysis and evaluation process, and the practical and scientific outputs. The contributions are also considered in light of theoretical frameworks, and how theory supports local (micro), middle-range (meso), or high-level (macro) research contributions (McKenney & Reeves, 2018). In CS and science communication research, Science and Technology Studies (STS) is the established theoretical framework: "An interdisciplinary field comprising approaches from sociology, history, philosophy and other disciplines" (Mahr et al., 2018, p. 103). However, as we see below, while CH chapters draw primarily on traditions of critical inquiry in cultural history, concepts and perspectives are also drawn from STS. This may be a convergence trend, Mahr and others note (2018), as the participatory movement has kindled collective interest among social scientists and humanities scholars in the "social structures, epistemologies and history of citizen science" (p. 103). This chapter concludes with reflections on how

Table 14.1 Disciplinary organization of chapters

Theme	*Citizen science*	*Citizen humanities*	*Chapters per theme*
Democratization	1	2	3
Divides	2	1	3
Drives	1	2	3
Developments	2	1	3
Sum	6	6	12

themes drawn across disciplines in the book as a whole are relevant for the museum and cultural heritage sector.

Democratization

Views on education, inclusion and participation have prevailed in museal and archival practices for the past two hundred and fifty years, spanning over Enlightenment ideas and practices like the "Republic of Letters" and Romantic notions of "the people" to radical ideas of "cultural democracy" and "crowdsourcing" in the 20th and 21st centuries. As discussed in Chapter 1, privileging the role of the public has also been the core consideration in building democratic relationships between science and technology (Jasanoff, 2004; Nascimento et al., 2018; see also Chapter 13), with the term "citizen science" used by Alan Irwin (1995) to highlight the value and types of knowledge generated by people outside of formal scientific institutions. This framing is different, then, from dominant trends in current practices and notions that enroll citizens into forms of science defined by the scientific community (see Chapter 4). Today, many citizen projects are critiqued for a "heavy use of democratic rhetoric, while being designed and run purely by professional scientists" (Mahr et al., 2018, p. 103), and outcomes for volunteers in terms of democratization and empowerment are largely absent in research findings. Despite such tensions, CS nonetheless strives to "recognize citizens as stakeholders who may frame issues in quite different ways to the framings used by scientists, policymakers and other experts" (Hine, this volume). Indeed, the importance of citizens' empowerment and scope of choice is key to historical underpinnings and understandings of democratization in CS (Jasanoff, 2005; Pielke, 2007; Perrault, 2013).

The contributions in this part explore ideas of "participatory democracy" at international, national, regional, and local levels, in science communication policy and in cultural heritage and museum practices. Broadly, these chapters address the question: In which ways do perspectives on democratization inform communication models and practices in citizen science and citizen humanities? In Chapter 2, an interdisciplinary group of authors from cultural history, museum studies, the learning sciences, and museum practice examined participatory practices in museums and cultural heritage organizations in Norway and Sweden in the mid-1700s and onward. The historical analysis considered how participatory strategies were used to involve citizens in early efforts to collect and document cultural heritage. The authors found that associations and crowdsourcing projects played an important role in motivating and soliciting volunteers, and that

such initiatives were often organized by prominent figures in a community, influenced by local and national politics, and modelled on international developments. At the same time, the democratic features of citizen participation in the 19th century were much narrower compared to the inclusionary aims of citizen humanities today. Moving to more recent developments, the authors present ongoing repatriation work with source communities in curating and designing new forms of socio-technological interactions with museum collections. Shifting from a historical study of participatory modes in CH to studies of how forms of collaboration are accomplished in practice, the authors draw on the concept of boundary objects (Star & Griesemer, 1989) to understand the emergence and negotiation of tensions across practices and cultures. The co-curating case illustrates how "open systems of innovation, crowdsourcing and democratic engagement" may be too easily conflated (Del Savio et al., 2016, p. 11), skimming over very real "equity" tensions that emerge, for example, when source communities are empowered to decide what scientists may publish about their culture, knowledge, and practices (Liboiron, 2019). In sum, the chapter situates contemporary co-design and co-curating practices in an historical context, identifies some of the ways that participatory practices in museums combine or straddle different conceptions and forms of democracy, and shows how these practices must also be understood in the context of the forms of politics that are operative in museums.

Communication practices in science underwent a paradigm shift in the 1980s according to Bernard Schiele in Chapter 3. This study traces some of the societal, political, and not least, disciplinary developments that have transformed science communication "from one-way to multi-way" in recent decades. Using a high-level analytical approach, the author identifies in the citizen-science research and policy literature specific features of participatory modes that promote (1) dialogue, (2) engagement and (3) knowledge co-production in citizen science. If democratizing practices may be understood on a continuum from representative to direct democracy (Aragonès & Sánchez-Pagés, 2009), Schiele's study finds that modes promoting engagement focus on deliberative processes between citizens in decision-making processes, and that this form of deliberative democracy is responding to the "shortcomings of representative democracy as practiced by most institutions." The overview, while necessarily schematic, offers a communication approach to modeling participatory democracy practices in CS. The author contributes a means of understanding links between the organization of citizen science projects at local levels and the larger societal, technological and cultural policy transformations in science communication.

A more critical stance toward democratization rhetoric in CH is adopted by Jenny Kidd in Chapter 4, which has crowdsourcing and other initiatives that rely on citizen labor in museums and cultural heritage organizations as context. Applying concepts from the fields of ethics, economics, and media innovation studies, the issue of asymmetrical power relations is highlighted, among other problems. The author makes the case that crowdsourcing projects, and the technological innovations in digital platforms that support this type of labor, may in fact be undermining democratic ideals. As in studies of media innovations (Storsul & Krumsvik, 2013), this chapter challenges CH to pose questions about who is gaining from such innovations, what interests are involved, and how these projects are organized. The high-level critical framework identifies ethical considerations in three areas that are relevant for CH, not least in the digital era: knowledge production, economic, and relational. The chapter links CH labor models to larger economic and societal trends, including the gig economy and microworking, and concludes with a "code of ethics checklist" of questions that museums may find useful in navigating future citizen project development.

Democratization: summing up

The chapters highlighted in this book as particularly relevant to the topic of democratization in CS and CH have drawn on historical analysis, Science and Technology Studies (STS), and critical inquiry as theoretical frameworks. In museum and cultural heritage studies, there is a similar and long tradition of historical and critical inquiry in studies of wider social, cultural issues, with STS emerging as an increasingly relevant framework (see, e.g., Drotner, Dziekan, Parry, & Schrøder, 2019). The questions posed and the contributions of these chapters are meta-level, spanning political and societal developments over many decades and even centuries. The two chapters that explore historical developments of CH in a museum context are noteworthy contributions in that previous studies have mainly focused on the history of CS (Mahr et al., 2018). The chapters in this part are all concerned with the rhetorical use – and misuse – of democratization discourse in CS and CH, pointing to a need for a framework across disciplines that allows citizens and institutions to identify, assess and articulate democratization features of citizen projects in a more critical and reflective manner. At the Citizen Science Association meeting in 2019, keynote speaker Max Liboiron illustrated what democratization has entailed in her work with source communities as a biologist, and the challenges for scientists in moving beyond "equality" research rhetoric to establishing real "equity" in research practice, for example, renumeration for participants' labor and knowledge and co-publishing (Liboiron, 2019). However, such

moves may also entail looking beyond post-Marxist critiques of exploitation, argue Popple and Mutibwa (2016): "to understand what is happening in new forms of collaborative affective labour, … a more nuanced understanding is necessary to fully explain engagement and innovation" (p. 205). Across disciplines, then, the democratizing features of knowledge (co-)production, increased dialogue and interactions between scientific institutions and participants, and enhanced citizen engagement and understanding in science and cultural heritage, are acknowledged, with new forms of labor capital in the cultural heritage sector also identified as an emergent and urgent economic and ethical concern for museums and archives.

Divides

How are knowledge practices in citizen projects in the sciences and humanities organized? In CS, this question frames enquiries that describe, compare and categorize diverse factors that structure and impact participation, engagement, task designs, data quality validation, and scientific outcomes. In our review of previous research in Chapter 1, we distinguished between different types of infrastructures that are often foregrounded in such studies, that is, structures associated with institutional, epistemic, and technological practices. While acknowledging such analytical approaches as both necessary and useful, the contributions selected for this part in the book approach infrastructures in CS and CH research from a different angle, zooming in on the implications such "divides" may have for the participants involved and their engagement in citizen projects.

In Chapter 5, Christine Hine unpacks the making of "knowledge infrastructures," with infrastructures understood as the technologies, tools, processes, and human capital that enable systems and enterprises to function effectively. In CS, knowledge infrastructures are used to store, produce, and provide access to knowledge through "distributed collaboration" (Brenton et al., 2018). Applying STS as analytical framework, the author is particularly concerned with how infrastructures, which are not necessarily apparent in the fabric of everyday life as long as they are functioning properly, are also embedded with taken-for-granted power relations that can ultimately shape "what counts as knowledge" in CS and CH (Ridge, 2014) research and practice.

Two cases are presented to illustrate contrasting approaches in knowledge infrastructures to securing *authenticity* and *accountability*: key dimensions of validation procedures that preserve the authenticity of knowledge contributions and keep contributors accountable. The cases consider how scientists and programmers' perspectives and aims enter into the top-down

development of authenticity and accountability features in biomedical and health platforms designed to capture patient data, and how alternative bottom-up knowledge processes involving lay people in online health and parenting discussion forums may devalue or reject standards in the scientific community. Hine reviews proposals in the research for more fluid approaches to overcoming such epistemic and technological divides in knowledge infrastructures, especially those pertaining to validation issues of authenticity and accountability.

The impact of institutional infrastructures in the recruitment of non-user populations to work in folklore heritage projects is explored in Chapter 6, in Line Esborg's study. The implementation of national, regional, and local policies to hire the disenfranchised and unemployed in citizen projects are explored in two cases initiated in the early 1990s. In cases from Ireland and Norway, welfare payments were translated into paid employment for the recruits to (1) accomplish the institutional aims of the projects, and (2) meet governmental aims to increase future employment opportunities by teaching the recruits new skills. In the field, researchers in the two cases assumed different roles in their communication with citizens who participated – not because of skills or interest, but because of their lack of employment and the project's need for cheap labor. Communication in the Cork Folklore Project in Ireland was particularly challenging, in that the contributory aspect of the oral history project required acceptance from a community with a strong cultural identity and an equally strong suspicion of social research. In tracing the transformation of communication practices between institutions, researchers and participants in the projects, Esborg considers how the archive may be seen as a collective tool through the lens of the concept *boundary object*. Oral history citizen projects aim to safeguard cultural heritage, and participants communicate and interview other participants about historical events, traditions, or daily life. As Hecker and others (2018) explain: "Communication can thereby lead to social cohesion, connect generations, encourage the valuing of cultural heritage and create cultural resources" (p. 453). Esborg similarly identifies exemplary cases of community-curated content and decision-making, and she reflects on how temporal and fluid modes of interpersonal communication, developed over time, may inform future "research on" and "practice in" community-building in citizen projects.

Approaches in museums to engaging non-users also frames the CS study in Chapter 7 by Karen Knutson and Kevin Crowley. However, the activity of shaping meaningful learning experiences in science for and by older adults is a type of engagement situated at the opposite end of the participatory continuum in CS, often referred to as "public understanding of science" or "science communication" activities (see Schiele, this volume; Hetland, 2014,

2019). Using an ethnographic approach combined with interviews, the study follows an intervention by a museum network to introduce educational programming in science for older adults across the city. The aim of the programs was to create a foundation for future engagement and action in science topics like climate change for older adults. Thematic analysis of the data examined changes in participants' communication and knowledge practices and identified how (1) local environment changes in the neighborhood, (2) social ties at the senior center, and (3) younger family members figured into and increased older citizens' engagement in climate change topics.

Divides: summing up

The three chapters in this part move from a macro-level perspective on how scientific and lay interests become embedded in infrastructures that shape data collection and support knowledge-building forums, to meso-level studies of overcoming divides between institutions, communities and the disenfranchised, including older adults. Chapters 6 and 7 include empirical studies of community building in CS and CH initiatives, showing how the activities constructed opportunities for trust, content, contributing, learning, and communication between museum, archive and "non-user" citizens. Interestingly, the question of how technological infrastructures organize participation and communication recedes into the background in these studies, bringing instead interpersonal and community level interactions to the foreground. Together, the three chapters illustrate developments in ideas and practices of *participatory cultures*, a concept first introduced into museums in the 1990s and initially associated with reallocating power – from institutions controlling distribution of information to those who had been marginalized (Anderson, 2019). By relating traditions and knowledge infrastructures in CS and CH to community work by museums with marginalized and disenfranchised citizens, these chapters contribute to reframing issues of authority, inclusion, and voice introduced by new museology decades ago, embedding the relevance of such work in a broader societal and cultural context.

Drives

The contributions selected for this part have focused on understanding the citizen and his or her motivations for participating in citizen projects. Central to research on this important topic is the concept of engagement: How are volunteers engaged, and what is their motivation for partaking? (Mahr et al., 2018). As described in Chapter 1, this fundamental question has been theorized

and modeled from many perspectives in CS, and is frequently studied in specific contexts or projects. Less is known about participants in cultural heritage projects, where participant tasks and contributions may involve, for example, interviewing other participants about historical events, traditions, or daily life (Hecker et al., 2018), as well as transcribing or annotating tasks similar to those used in citizen science.

An open question about engagement in cultural heritage is posed by Emily Oswald in Chapter 8, which studies citizens' responses to the same simple question that has been posed every day, for years, by a museum on its Facebook page about different images of buildings and sites from the city of Oslo: "Do you see where this is?" Applying a dialogic theoretical framework, the study analyzes participants' engagement as "communicative activities" that entail "remembering in public." Applying methods from conversation analysis, the author found three types of communicative activities: identifying a place, sharing historical information about a place, and reminiscing about a place. The middle-range (meso-level) analytical approach challenges previous research about the negative engagement effects of using such pseudo-questions in museums' social media strategies, and shows that participants' orientations to other participants – even in an online forum like Facebook not particularly designed for such interactions – play an important role in their engagement.

In Chapter 9, Per Hetland and Kim Christian Schrøder apply an interdisciplinary approach to examining previous "user" research with the aim of extending contemporary conceptualizations of "the citizen" in CS. In this high-level analysis, the authors show how notions of users, publics, and audiences construct distinct conceptions of citizens and their participation in democratic processes. The analysis of traits associated with *users*, *publics,* and *audiences* in innovation studies, media studies, and STS shows how institutions are more strongly positioning citizens as interpreters and producers, a trend that has developed over several decades in museum research as well (Anderson, 2019). As the move to digital audience measurement in museums continues to develop, this chapter responds to an urgent need for greater clarity in the conceptual and categorical work involved in studying and collecting data from citizens' behavior, contributions, and experience, which "can change who is recognized and counted within the museum's conceptions of the audience and how the museum responds to and thinks about those audiences" (Anderson, 2019, p. 90).

A contrasting approach is seen in Chapter 10, which uses life-story methods to study citizen participation "up close" in a folklore heritage project, specifically, the Archives of Latvian Folklore. Sanita Reinsone uses a questionnaire, interviews, and ethnographic observations to investigate the personal

motivations of high-level participants who devote time to cultural heritage crowdsourcing on a regular basis. She identifies four motivations: (1) the work is interesting, (2) the content is engrossing, (3) the materials are unique and of cultural value, and (4) participating in a team effort is rewarding. The qualitative material revealed that participants' engagement in the work was personally motivated, for example, content related to family history, but also that the nature of the work was relaxing and a pleasant break from TV watching or household routines. Insights provided by interviews with the main informant are unique in that they are derived from the close study of how participation in CH projects, but also cultural heritage itself, become intertwined in daily activities and personal interests.

Drives: summing up

In these chapters, studies of engagement and motivation in CS and CH are framed by perspectives in media and communication theory that are analytically applied at different levels. The methods vary from a broad interdisciplinary review of citizen concepts relevant to CS – users, publics, and audiences (Chapter 9) – to a more situated dialogic approach in the context of Facebook exchanges between users and a cultural heritage museum (Chapter 8), to narrative and discourse analysis of survey data, interviews and close observations of high-level participants like "Muris" in a folklore heritage project (Chapter 10). Across disciplines, applying a communication framework to the study of citizens' motivations and engagement has the benefit of being able to account for the mediating role of media, institutional framing, and technological platforms in communicative processes, but also to analyze on multiple levels the discursive forms and practices specific to types of content and context. In contrast to the CS study, which makes a synthesizing contribution to concepts of users, publics, and audiences relevant for visitor and audience research in all types of museum activities, the research designs in the CH studies are qualitative empirical studies of motivation, participation, and communication on cultural heritage platforms. Recently, research has been re-exploring the historical development of media and communication theory and perspectives in 20th-century museum studies (see, e.g., Anderson, 2019; Drotner et al., 2019; Pierroux & Ludvigsen, 2013; Pierroux & Qvale, 2019), and particularly the ways in which users, publics, audiences, and visitors have been positioned as participants and epistemic subjects in different communication models and traditions. The chapters in this theme thus contribute new breadth in approaches to understanding how media and communication in CS and CH projects are related to historical and contemporary museum practices: how communication is initiated, how participation

unfolds, and how motivation is driven by the relevance of cultural heritage in citizens' everyday lives.

Developments

The chapters selected for this part bring perspectives or approaches to CS and CH research and practice that are forward-looking in different respects. What are some of the emergent trends and issues in citizen science and citizen humanities and how are these relevant for museum and heritage studies? First, as mentioned in Chapter 1, although research has shown that citizen projects organized at the community level are perhaps most effective in terms of fostering public engagement and understanding in science, these types of activities are least frequently studied. There are methodological challenges to conducting community-level research, which entails describing and analyzing activities that are often loosely organized on multiple sites, with partners from multiple professions, institutions, and organizations. The cases presented in Chapter 11 illustrate this complexity and how it may be approached using an STS analytical framework. The study follows science and natural history museums that partnered with a broad range of organizations to help citizens learn about and respond to the local impacts of climate change. The authors investigate how partners in the respective networks collaborated to develop activities and resources to engage citizens in socio-scientific issues in three different cities. Drawing on the concept of "boundary objects" (Star & Griesemer, 1989), the study identified and traced how collaboration was negotiated and given purpose by the different participants through "kit-making." The analysis showed how the design of the kits, which were used as resources to engage the public in science issues at different kinds of events, was a malleable but "robust enough" object of activity to foster multi-professional partner collaboration, and that kit-making knowledge and processes were easily tweaked for new contexts and partners when moving from one city network to another. The study also found that sustained support from the museum hub and networks was essential to keeping museum, organizational partners, and public audiences connected. The chapter thus contributes to both museum studies and to CS research, extending the focus on museum practices *within* communities to a framework for studying how knowledge practices may be developed and sustained *across* communities and networks in different cities with museum support. Moreover, rich descriptions of the climate change resource kits and the dissemination activities contribute to the development of design approaches to fostering participation in museum-sponsored public events.

Extending conceptualizations of *disciplinary boundaries* is the aim of Chapter 12, which argues an impending and fundamental development in

humanities scholarship, from researchers positioned as individual epistemic subject to scholars and citizens positioned in a "participatory epistemic culture." Drawing on concepts of *epistemic cultures* from Knorr Cetina (1999), Dick Kasperowski and others view this development as inextricably entwined with socio-technological change and digital platforms that are modeled on and designed for distributed cognition. In media studies theory, such entwinements are understood as *mediatization*: "a long-term, longitudinal process that implies transformations of practice and institutions taking place as an interplay between changes in communication and media and the personal, societal, political, and cultural contexts in which they operate" (Drotner et al., 2019, p. 8). Moving beyond studies of crowdsourcing in the cultural heritage sector, then, the chapter proposes that engaging citizens as epistemic subjects in distributed cognition frameworks will also have far-reaching impact on humanities scholarship and research.

The final chapter in this part revisits the central theme of "participation" in citizen science. Based on a survey-based study of over four hundred users of a popular species observation portal, Per Hetland found that individual *and* collective outcomes were equally important to the users, and that knowledge infrastructures in the portal facilitated communication, trust, and knowledge sharing. The concept of *reciprocity* is proposed as central to collaborations on constructing CS knowledge infrastructures: for example, users give their sightings, the species organization receives the sightings, and some are validated, and the organization reciprocates the gift by facilitating individual projects within the knowledge infrastructure for every user. Applying an STS framework of analysis, such collaborative processes are described in terms of *boundary work*, with museum collections and databases serving as boundary objects between amateurs, professionals, and environmental authorities. The infrastructure's ability to reciprocate to the participants is paramount, Hetland concludes, to building participatory science communication in the future.

Summing up

The chapters in this part suggest some directions for future developments in CS and CH. As museums work toward greater societal relevance through participative strategies (Simon, 2016), there seems to be a real need for new skills, staff, concepts, and methods to support museum activities outside of museum buildings, including collaborations with community networks and organizations. In CS, community engagement is part of *science communication* traditions (see Schiele, this volume). Moreover, the relatively long trajectory of infrastructure designs for CS projects in natural history and

science museums has produced advanced methods for recruiting volunteers, designing tasks, establishing validation procedures, and disseminating results. In other words, CS methods and practices are firmly anchored in specific knowledge domains, with researchers in museums and universities leading and organizing CS projects in ways that correspond to disciplinary practices in those domains. At the same time, the need to design for reciprocity in knowledge infrastructures is flagged as a key value in developing sustainable collaborative processes in CS in the future. In contrast to CS research and practice, looking across disciplines, incorporating "participatory epistemic approaches" in humanities research and CH projects seems to suggest a far greater disciplinary transformation, given the history of a highly individualistic scholarly culture. Navigating disciplinary transformations is thus considered an important future challenge in CH projects, particularly those led by the museum and cultural heritage sectors.

Citizen science, citizen humanities, and museum research and practice

As public institutions with societal, educational and inclusionary mandates, museums, archives and other memory/culture institutions serve as important interfaces between science, cultural heritage, and citizens. ICOM (International Council of Museums), for example, explicitly calls for museums to work for inclusion, diversity, innovation, and also participatory democracy:

> To promote enabling and empowering frameworks for active inputs from all stakeholders, community groups, cultural institutions and official agencies through appropriate processes of consultation, negotiation and participation, ensuring the ownership of the processes as the defining element.
>
> (ICOM, 2010, § 2)

This is the rationale then, for having museums in focus in this book, which explores how institutions contribute to making science and cultural heritage relevant in citizens' everyday lives while also soliciting their assistance, engagement, and participation.

In reviewing the chapters in this volume, links between research in CS, CH, and museum studies are more apparent in some cases than others. Natural history museums, for example, are historically "well-placed to support the key challenge of recording life in the natural world by actively engaging the public," and can serve as a model for other organizations to develop citizen projects "since they are seen as trustworthy, visible portals to scientific research and

information" (Sforzi et al., 2018, p. 481). Similar strong connections between museums and citizens through participation in co-curating or crowdsourcing cultural heritage are still being forged in citizen humanities research and practice, and a concentrated, critical look at developments in the Global South seems warranted for future CS and CH research. Significant issues identified across disciplines included the need for reciprocity in view of the use – and misuse – of democratization rhetoric; ethical issues of unpaid labor and the recruitment of disenfranchised citizens in data collection; questions of how to conceptually and methodologically scale up for public engagement at the community level – including older adults and other traditionally marginalized citizens; and the need for media and communication perspectives that can shed a critical light on the epistemic, technological and institutional features of interactions between researchers and citizens in different kinds of participatory and contributory infrastructures.

Concerns have also been raised about whether museums are committedly working to meet educational and societal mandates in citizen projects or are driven more by the need for engagement from the public to meet short-term institutional, financial and political objectives. Janes (2011) questions the relevance of museums in addressing issues of climate change and global health, for example, adopting a critical stance:

> At the same time, I submit that the majority of museums, as social institutions, have largely eschewed, on both moral and practical grounds, a broader commitment to the world in which they operate. Instead, they have allowed themselves to be held increasingly captive by the economic imperatives of the marketplace and their own internally driven agendas. Whether or not they have done this unwittingly or knowingly is immaterial, as the consequences are the same. It is time for museums to examine their core assumptions.

In a recent chapter on how science and natural history museums are establishing community partnerships to communicate knowledge of climate change, Knutson (2019) similarly sees a need for greater activism and a stronger leadership role in museums in addressing pressing societal and scientific issues. Knutson urges thinking about the core values and beliefs that ought to characterize future directions in museums. Navigating a shifting landscape of values and relevance, the chapters in this volume contribute to reflexivity about the trajectory of participatory modes in museums, archives and other cultural heritage institutions, and how these intersect with "research on" and "practices in" citizen science and citizen humanities.

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