

ICOA1996: STIMULATING LOCAL AND GLOBAL CITIZEN INVOLVEMENT IN HERITAGE STEWARDSHIP THROUGH DIGITAL EMPOWERMENT

Subtheme 03: Protecting and Interpreting Cultural Heritage in the Age of Digital Empowerment

Session 3: Application of Digital Technology in Disaster Management Practices

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Arlene K. Fleming, an archaeologist and cultural historian, has worked at the Smithsonian Institution, and for three decades has advised numerous organizations on protecting and managing cultural heritage. She is currently conducting research on encouraging broad citizen participation, locally and globally, for documenting and managing heritage resources, using digital technology. Ms. Fleming has been a member of ICOMOS since 1993, and served on the Board of US/ICOMOS.

Abstract: The confluence of digital technology and community participation is appearing just in time to undertake the massive task of identifying, documenting, protecting and managing the world's cultural heritage resources. This task is especially urgent given the conditions of climate change, migration, conflict and economic stress in many regions. Detailed documentation of material heritage objects, sites and structures using digital technology provides the basis for cultural heritage restoration, reconstruction, management, and in the direst circumstances, for preserving heritage places in memory. There are many exemplary instances of increasing citizen participation in tangible and intangible heritage documentation and conservation, made possible by widely available digital tools. This presentation includes case studies illustrating the range of possibilities already evident in the cultural heritage field, as well as the exemplary phenomenon of citizen scientists in the realm of the natural environment.

Key words: *digital resources, conservation, dissemination*

The Urgency of Public Stewardship

As stewards of cultural heritage, our primary responsibilities include identifying, documenting, monitoring, and protecting tangible and intangible heritage. The scope and urgency of these responsibilities are increasing dramatically as we face myriad effects and ramifications of climate change, including natural disasters, increased urbanism, human displacement, armed conflict, and political and economic disturbances. Environmental impacts will include diminishing agricultural production and sources of fresh water, as well as other resource scarcities. In the future, as in the past, this will lead to conflict, population displacement and instability in governance¹. Natural and social conditions will strain economic resources and decrease the effectiveness of governmental authority in countries and regions rich in cultural heritage, making heritage stewardship according to established practice difficult or impossible, in certain instances resulting in damage or loss. Heritage places in some areas will not survive *in situ* and we must ensure their survival in memory.

Fortunately, there are now powerful resources for meeting the challenges of identifying, documenting, monitoring, managing, and promoting heritage. These include technological tools, methodological advances, and citizen volunteers throughout the world. Expert professionals, individually and through their organizations, can garner enormously expanded support from these sources and must engage them strategically and enthusiastically for the challenging work required. The advancement of nearly universal access to digital data and the internet raises new possibilities for managing cultural heritage. As global communication through news and social media has increased, so has the impetus for heritage institutions to respond to and assist with challenges and emergency situations. By extension, social media gives a voice to professionals and non-specialists in stewardship of cultural heritage that encompasses local, national, and international action.

Three Developments Provide Synergies and Opportunities

Citizen participation, technological advancements, and enhanced communication are three powerful resources available for use in varied combinations. Enlisting broad-based participation and support of non-specialists under the guidance of professionals offers the potential for vastly increased range and scope in heritage appreciation and stewardship. Involvement of citizens has existed under the rubric of 'local community participation.' However, with increased technological and communication capability, 'community' can be redefined as global, national or local. Collaboration may involve experts, as individuals or in groups, guiding non-specialists in various tasks including documentation, on-site monitoring and data analysis. Sharing project concepts and results by social media may inspire replication of initiatives throughout the world and a widespread sense of citizen responsibility and capacity for safeguarding heritage.

New and emerging technologies for discovery, documentation, analysis, management and presentation include: image capture by remote sensing from satellites, drones and other aircraft; three-dimensional imaging with LiDAR and photogrammetry; 3D reproduction; and virtual reality. These technologies generate huge quantities of data requiring analysis and organization in order to yield useful knowledge. In addition, non-specialists can also provide data by simple observation. Routine, labour-intensive data

¹ Werz and Conley, 2012

generation and analysis are essential tasks for heritage stewardship, well suited to non-specialists working under expert guidance.

Instantaneous electronic communication using various instruments, especially the ubiquitous smartphone, facilitates transmission of voice, text, and images, greatly enhancing the ease and value of combining widespread citizen participation with collection, distribution and presentation technologies. Social media adds significantly to communication effectiveness, and the ability to enlist human and technological resources in an infinite variety of initiatives.

Citizen Science, Digital Empowerment, and Cultural Heritage

Citizen science, a remarkable tool, employed extensively by the environmental and biological science communities, utilizes human, technological, and communication resources in synergistic combinations. Projects undertaken through the Citizen Science movement provide a bridge between technical research conducted by expert specialists and activities structured to engage communities and stakeholders. The fundamental principle of citizen science is to harness open and democratic public involvement and participation in scientific inquiry and in generating new knowledge. Projects can involve between one and millions of non-specialists in collaboration towards a common purpose that typically require on-site observation, data identification, collection, analysis, or reporting. With guidance provided by experts, citizen participants in each project use the same methods and protocol. Typically, the non-specialist participants in a project are given training or a tutorial at the outset to gain a clear understanding of the task and methodology and to ensure the quality and aggregation of the data. The ‘big data’ and information generated through mass observation, monitoring and analysis can be further utilized by researchers, the scientific community, and in policy formulation².

Over the past two decades, citizen science public participation initiatives through grassroots actions or technology-mediated crowdsourcing have been rapidly increasing, and their success has led to the establishment of numerous platforms and consortia. Subsequently, associations surrounding citizen science promotion and monitoring have created platforms for practitioners to advertise their campaigns and resources for educators, data managers, technology specialists, and evaluators, among others.

Citizen science projects attract wide participation primarily through major online clearinghouses, most notably, SciStarter³, Zooniverse⁴, the Citizen Science Association⁵, and the Citizen Science Alliance⁶, as well as numerous others established by various universities and research centres. SciStarter.com provides an example of the offerings and services of a citizen science platform on the Internet. In addition to basic information and a list of on-going projects, visitors to the site find links to ancillary sites addressing the interests of volunteers, educators, sponsors, partners, advertisers and researchers. Connectivity is encouraged by links to social media platforms, as well as to the SciStarter Newsletter and various specialized reports.

Volunteer public participation in citizen science projects garners impressive financial benefits. A study in 2015 surveyed seven astronomy-related initiatives from Zooniverse and estimated that over a period of 180 days during 2010, 100, 386 participants in projects contributed approximately 129,540 hours of unpaid labour, which (calculating a twelve dollar per hour research wage) is roughly equivalent to

² McElfish, et al., 2016

³<https://scistarter.com/>

⁴<https://www.zooniverse.org/>

⁵<http://citizenscience.org/>

⁶<https://www.citizensciencealliance.org/>

\$1,554,474 in contributions, or about \$220,000 per project on average⁷. In another paper published during the same year, it was estimated that according to data from over 388 biodiversity citizen science initiatives between 1930 and 2012, projects involving public participation included between 1.36 million and 2.28 million volunteers who contributed between \$667 million to \$2.5 billion in unpaid labour each year, and nearly 500 scientific publications⁸. These data are comparable to official statistics such as those from the Corporation for National Community Service which estimated an average of 34 volunteer hours for citizen science projects per person in 2011⁹ and the Bureau of Labour Statistics in the United States Department of Labour estimated an average of 51 hours of service per year in 2012¹⁰. While improvements can be made for existing projects to expand their influence, such as in project design, outcomes measurement, new audience engagement, and new directions for research¹¹, broad impact assessments of citizen science projects have been undisputedly positive.

The advantages presented by citizen science to the cultural heritage field have been noted; there are numerous diverse culture-related initiatives throughout the world that rely on public participation for observation, data analysis and other tasks, while utilizing crowdsourcing and social media for mitigating threats to heritage and addressing the challenges of identification, documentation, protection and management. Examples include: Scotland's Coastal Heritage at Risk Project (SCHARP)¹² which enlists local community participation for documenting and monitoring archaeological sites¹³; REKREI¹⁴, a global crowdsourcing project for image collection and creating 3D virtual records of damaged or destroyed cultural sites and objects¹⁵; and Global Xplorer¹⁶, which recruits volunteers to analyze satellite images in search of archaeological sites and features¹⁷.

Cultural heritage projects built on the citizen science model already have proven the feasibility for successfully mobilizing thousands of public participants through the world. Given the success of initial efforts in mitigating threats, in prioritizing effort, and for the actual and virtual conservation of sites, strategic action for increasing the scale and scope is proposed as follows.

1. Cultural heritage practitioners should invest in citizen science projects and outsource data gathering, analysis and organization, as appropriate, through increased public participation.
2. An institutional structure in the form of a digital public participation clearinghouse should be established and maintained by a large institution such as ICOMOS.
3. Institutions and organizations should subsequently incentivize heritage practitioners to undertake public participation projects and populate clearinghouse platforms.

A gradual approach in which centralized institutions encourage and incentivize public stewardship provides avenues for community engagement, outreach, and outsourcing. Such approaches will save long-term program costs in time and labour, and potentially pave the way for lasting relationships with stakeholder communities. Furthermore, participating in existing citizen science clearing house platforms increases visibility and exposure of such projects to new audiences and professionals in fields outside the heritage sector. Higher visibility could lead the way to partnerships with other programs, organizations, or

⁷ Sauermaun and Franzoni, 2015

⁸ Theobald, et al., 2015

⁹ Corporation for National and Community Service, 2011

¹⁰ Bureau of Labor Statistics, 2012

¹¹ Bonney, et al., 2015

¹² <http://www.ssharp.co.uk/>

¹³ Dawson, 2016

¹⁴ <https://rekrei.org/>

¹⁵ Nodjimbadem, 2016

¹⁶ <https://www.globalexplorer.org/>

¹⁷ Butler, 2017

institutions and increase the attractiveness of a project to donors or sponsors. Finally, recent high-profile cases of cultural heritage destruction and repatriation demonstrate general public interest in the protection of sites and monuments. Establishing a long-term centralized platform dedicated to global cultural heritage protection and preservation will channel this public enthusiasm.

Digital democratization and access to large data sets create unique opportunities for cultural heritage experts and practitioners to engage a global volunteer community to aid in the effort to protect heritage from the imminent and dynamic threats of climate change, migration, and political and economic fluctuation. The urgency to invest in models like citizen science is more pressing than ever and, as stewards of the world's tangible and intangible heritage and memory, we must look to technology and innovation to secure cultural heritage for future generations.

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