Chapter 10
The Role of Citizen Science in Environmental Education:
A Critical Exploration of the Environmental Citizen Science Experience

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ABSTRACT

Citizen Science is increasing in popularity and used by many academics, community groups and Non-Governmental Organizations in scientific data collection. Despite this, little is known about the motivations and experiences of those who contribute to citizen science projects, nor about the impacts of involvement in citizen science upon the individual. Moreover, few have considered the pedagogic process that individuals undergo as they participate in these activities. Citizen science practitioners and program developers stand to benefit from increased understanding of these experiences in terms of their capacity to enhance environmental education. Such increased understanding of the implications of citizen science may also promote the development of sustainability education. This chapter synthesizes insights from existing literature, policy documents and practical projects to explore the pedagogic potential of the convergence of citizen science and environmental education. The chapter concludes that progressive evaluation approaches are needed to complement what is an emergent field.

INTRODUCTION

This chapter will explore the role of citizen science within environmental education or education for sustainable development, as it is also know. On the one hand, it will examine the motivations of scientists for developing environmental citizen science programs. It will also address what they perceive the motivations of those who contribute to citizen science projects to be. On the other hand, it considers the motivations of individuals who become involved in environmental citizen science programs. This chapter will explore the place of citizen science initiatives within the lives of those who choose to participate

within them. This is a rarely considered topic within the field of citizen science studies. However, this is perhaps unsurprising given the fact that studies of citizen science are a relatively recent research development. Within this chapter, it is argued that considering the motivations and experiences of the individuals who contribute to environmental citizen science projects is essential to understanding the role of citizen science within sustainable development, as Irwin (1995) originally set out to achieve.

THE APPEAL OF INVOLVING PUBLICS IN SCIENTIFIC RESEARCH

Citizen Science projects have grown rapidly since the mid-1990s. Involving publics in research, through citizen science, enables scientific institutions to expand their scientific endeavors. Twenty-first century technological advances are seen as tools to enable collaborative projects to be ever more ambitious. The current emphasis within science and society on 'big data', which involves collecting data across spaces and time spans previously unthinkable, means that there are ever more opportunities to contribute to global and significant research projects. Individuals can contribute, for example, to online projects like E-bird (http://ebird.org/content/ebird/) an online citizen science initiative. E-bird is an ornithology program, launched in 2002 by the Cornell Lab of Ornithology and National Audubon Society. The project receives over five-million contributions per month (Bonney, Shirk, Phillips, Wiggins, Ballard, Miller-Rushing and Parrish, 2014). Online, citizen science projects, such as E-bird, can be engaged with regardless of geographical location. They are, therefore, able to include a limitless number of participants as contributors, due to the technological advances of the latter half of the Twentieth and Twenty-First Century. Such projects become part of the expansion of scientific endeavor, which is portrayed as a benefit to all human beings, due to the capacity to 'do' science, at ever-larger scales. Therefore, technological innovations are often considered a driver of citizen science within the present day.

Nevertheless, the appeal to scientists of involving publics in scientific research predates the emergence of the internet. Indeed, environmental citizen science has evolved within disciplines that have traditionally depended upon contributors to help facilitate research processes. These include, for example, ornithology, paleontology and atmospheric science (Bonney et al., 2014). Currently, citizen science is regarded as incredibly important to environmental conservation research (Dickinson, Zuckerberg, & Bonter, 2010; Dickinson and Bonney, 2012 and Dickinson, Shirk, Bonter, Bonney, Crain, Martin, & Purcell, 2012 and Johnson, Acton, Popovici, Karanth, & Weinthal, 2014). It contributes to the study of a diverse range of ecological fields ranging from macro-ecology to landscape ecology and forest ecology to urban ecology, while land managers and conservationists, policy makers and activists widely use the results of such studies in practical settings (Bonney, Cooper, Dickinson, Kelling, Phillips, Rosenberg and Shirk, 2009).

Furthermore, for some, citizen science goes beyond merely being a method of collecting data. For these individuals, it is a revolutionary activity, capable of affecting how the environment is managed. For example, Cooper, Dickinson, Phillips and Bonney (2007) suggest that harnessing citizen science represents a 'new frontier to advance the theory and practice of conservation in residential ecosystems' (p. 8). They suggest that this is possible because of the scale upon which citizen science makes it possible to operate. Far from being an activity once reserved for English Gentlemen who considered natural history as a hobby, twenty-first century citizen science is regarded to be open to all amateur observers, irrespective of knowledge, background or social status.

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