

# Chapter 1

## Civic Education and Citizen Science: Definitions, Categories, Knowledge Representation

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### **ABSTRACT**

*The first goal of this chapter is to propose a slight re-framing of citizen science, which will contextualize the information presented in the rest of the book. The authors propose a perspective on and a definition for citizen science (which is alternative to the numerous previously documented definitions) as: “work undertaken by civic educators together with citizen communities to advance science, foster a broad scientific mentality, and/or encourage democratic engagement, which allows society to deal rationally with complex modern problems”. By explaining the rationale behind this definition, the authors also hope to raise awareness of the role that the meaning of words and phrases (semantics) plays in understanding and supporting citizen science. A second goal of this chapter is to explain how different organizations already use certain software solutions to organize knowledge about citizen science, how these systems can be classified and how they can facilitate or impede interoperability – the ability of humans and machines to pass information between each other.*

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## INTRODUCTION

According to numerous surveys and news reports (e.g., in the US: Dimock, Kiley, Keeter, Doherty, & Tyson, 2014; Annenberg Public Policy Center, 2014), the mass public appears to know very little about politics, government, policy and the environment. When pollsters ask even simple questions on any of these topics, many people fail to give correct answers. In response to such evidence, the question is “What can be done about it?”

Some people are very critical and frustrated about citizens’ inability to answer basic questions on policy and the environment. In democratic countries, they ask how we can expect ignorant citizens to choose qualified candidates for office or offer defensible views on social or environmental topics. In response to what can be done about this, some seek a constructive approach to the evidence of civic ignorance (Lupia, 2015), and try to open new avenues for civic education. Former US Supreme Court Justice Sandra Day O’Connor, for example, argues that “we have to ensure that citizens are well informed and prepared to face tough challenges. If there is a single child not learning about civics or not being exposed to what they must do as citizens, then all our lives are poorer for that.” (Terhune, 2013)

The extraordinary amount of work undertaken by volunteers in all areas of society across the world is testament to the fact that many people are answering calls for this kind of education. They include researchers, teachers, scientists, issue advocates, journalists, reporters and political campaigners - to simplify, the authors consider all of these individuals and groups as *civic educators*:

*Civic educators are people who believe that providing information to others, and/or creating opportunities for others to learn, are paths to greater civic competence and a better future.*

Civic educators are principal instigators for the engagement of citizens (e.g., the public) in affairs of public interest (including, but not limited to, scientific research). They develop and implement educational strategies; design plans to provide certain kinds of information to certain people; or, open up opportunities for others to learn in certain ways.

Civic educators’ strategies are diverse. Some write articles. Others teach students. Some seek to draw attention to important facts and causes while working for widely recognized and highly reputable organizations. Others seek educational innovation through startups. Some seek to educate at places of work. Others operate in settings like high schools, colleges, fabrication laboratories and universities. Some educators do many of these things. Educators differ in their ambitions. In the context of this book (citizen science, which the authors define and explore in detail later), civic educators often wish to educate a specific audience (e.g., young adults, fishermen, inhabitants of particular neighborhoods, residents of a particular city) about a specific or a general topic.

Civic educators also have diverse identities. Some consider themselves *advocates*. These advocate educators (e.g. Greenpeace, the Sierra Club, etc.) are motivated by a desire to achieve policy outcomes for social and environmental equity such as a safe and healthy community in which to live; securing appropriate regulatory standards for air and water pollution; and many more.

Others identify themselves as *experts* on a topic rather than as policy-driven advocates. Many expert educators are motivated by ideas from science and do not make explicit appeals for or against specific policies. Instead, these experts seek to involve the public in their scientific endeavors, sometimes to educate audiences about how things or the environment work, and sometimes to collect data for their public interest research. Many academics think of themselves in this manner.

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