Of Citizens and Scientists: Preface to Special Issue on Learning and Creativity in Citizen Science

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"The principle goal of education in the schools should be creating men and women who are capable of doing new things, not simply repeating what other generations have done; men and women who are creative, inventive and discoverers, who can be critical and verify, and not accept, everything they are offered."
— [Jean Piaget](#)

2016 marked the 120th anniversary of the birth of Jean Piaget, a giant in the field of child developmental psychology, a keen advocate throughout his career of experience-based learning methods and a professor at the University of Geneva for over 50 years.

Perhaps less well known is the fact that Jean Piaget was a citizen scientist long before he became a professional one. He wrote his first scientific article at age 11, based on observations he made of an albino sparrow. By 15, he had published several articles on mollusks, earning himself an early reputation as an expert in the field of malacology (Barrelet & Perret-Clermont, 1996).

So it is historically fitting that the Citizen Cyberlab Summit, an event marking the completion of a coordinated European initiative investigating learning outcomes in citizen science should have happened in the very city where Piaget spent most of his professional career.

Most of the articles in this special issue reflect different outcomes of the Citizen Cyberlab project, or of related research efforts. Ramanauskaite and Haklay succinctly summarize these outcomes in the opening article.

For historical context, I would like to briefly unpack the name of the European project that inspired this issue, "Citizen Cyberlab", which is also the name recently adopted by the partnership between University of Geneva, UNITAR and CERN, which was previously known as the Citizen Cyberscience Centre[1].

While the prefix "cyber" today is intimately associated with computers and the Internet, its origin is in the ancient Greek word for rudder or governor. With this meaning in mind, the French physicist André-Marie Ampère coined the term cybernétique to describe a new field he envisaged, the science of civil government, in his 1834 Essai sur la philosophie des sciences. The MIT mathematician Norbert Wiener subsequently popularized this term in his 1948 book Cybernetics or Control and Communication in the Animal and the

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[1] http://citizencyberlab.org/

Machine (Wiener, 1948), following which his pioneering work on robotics, computer control and automation cemented the link between the prefix "cyber" and the computer age.

Yet, as the reader peruses the pages of this Special Issue, it is worth returning to the Greek origin of the word "cyber", which harks back further than Ampère, to the writings of Plato himself, who used the term to invoke the independent spirit of a pilot guiding a vessel, when describing the self-governance of people.

It is in this sense that the most important conclusions of this issue should be considered. Citizens who participate in research have the opportunity to learn and, sometimes, to be scientifically creative. The ways in which the research is presented – the specific online and in-person formats of citizen science projects – can be optimized to enhance learning outcomes and assist creative processes, as many articles in this issue describe. But a fundamental question remains: why bother? What is the purpose of citizens participating in scientific research?

There are several valid answers. Human computation – the power of the human mind to solve pattern recognition problems that still stymie computers – is a practical motivator for the scientists behind many popular citizen science projects. But there is a more existential reason for citizens to participate in research, and for scientists to welcome and encourage this. It is reflected in Piaget's opening quote for this preface.

A goal of citizen science should be, through the learning and creativity that such projects offer, to help citizens "…be critical and verify, and not accept, everything they are offered". Science is often identified with scientific facts. Yet the scientific method describes a journey, not a destination. It is about moving forward cautiously, like the pilot of a ship, constantly questioning methods and results. It is not about achieving certainty and truth, but about ceaselessly daring to doubt.

At a time when the opinions of scientific experts are being put in doubt by some politicians, with potentially disastrous consequences for the planet, it might seem foolish to emphasize the importance of scientific doubt as a goal of citizen science. However, more confidence in science must pass through a deeper appreciation of the scientific method, and a more open and inclusive approach to achieving scientific progress. This process can no longer be short-circuited by insisting on the authority of the professional scientist or the pedigree of journals in which results are published.

Here is where citizen science can make a difference, opening a new form of dialogue and collaboration between citizen and scientist, and increasing mutual respect between two categories of people where all too often, there is mutual distrust. If the results in this volume help, even a little, to hasten this new dialogue and to build new trust between citizens and scientists, then the hard work of the authors to prepare the manuscripts, and the tremendous effort of the editors to compile this issue, will have been all worthwhile.

REFERENCES

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