
Creativity in Citizen Cyber-Science: All for One and One for All

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Abstract

We interviewed researchers and volunteers about their experiences of creativity in citizen cyber-science (CCS). Our preliminary results reveal two types of creativity – imaginative self-expression and solving project problems. We conclude that a good project community is important for encouraging creativity in CCS.

Author Keywords

Citizen Science; Creativity; Online Communities

ACM Classification Keywords

H.1.2. User/Machine Systems: Human Factors

General Terms

Human Factors

Introduction

Citizen science is a type of crowd-sourcing, where volunteers ('citizen scientists') collaborate with professional scientists to conduct scientific research. In the early days volunteers would collect data and mail it to scientists [7]. However more recently, Web 2.0 applications have been used to widen accessibility, enabling scientists and volunteers from disparate locations to work together towards a common goal. This is referred to as 'citizen cyber-science' (CCS) – citizen science facilitated by the Internet [9]. For example in 'Old Weather' [12], volunteers visit the

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project's website and use an online transcription tool to transcribe digitized pages of 19th century handwritten ship logs. In 'Noise-Map' [11], volunteers download a mobile phone app, which they use to collect and send data about levels of noise pollution in their local area.

Creativity and CCS

The nature of creativity, and the processes that underpin it, continue to be debated. Some researchers argue that creativity can consist of ideas novel to the individual mind [2], while others view recognition from external judges as crucial [6]. Some look for the 'Eureka moments' in which a great breakthrough occurs [13] whereas others look at what might be termed 'everyday' creativity [2, 4].

There have been a few cases where CCS research has led to important scientific discoveries, 'Foldit' being the most famous [5]. However could there be other kinds of creativity from volunteers that are less groundbreaking, but also valuable for a project's success? In our research we explore the question 'What does it mean for volunteers to be 'creative' in CCS?' By gaining a better understanding of creativity in this context, we hope to develop guidelines for designing a CCS platform that fosters creativity.

Work-In-Progress

We are currently conducting exploratory interviews with scientists (researchers) and volunteers involved in CCS projects. The interviews are semi-structured to cover a range of topics, including volunteers' motivations, engagement, learning and creativity. As of yet, we have conducted 12 interviews – 7 with researchers and 5 with volunteers. These participants were recruited via personal contacts with project leaders and ads posted

on project forums/blogs. The projects involved were 'Old Weather' [12], 'Galaxy Zoo' [8], 'Transcribe Bentham' [14], 'Bat Detective' [1] and 'Noise-Map' [11]. The interviews took place either in person or via Skype. Interviews were audio-recorded and varied in length, from 30 minutes to 1 hour. At the end of each interview, participants were debriefed and received a gift voucher for taking part.

In this paper we report preliminary results for the topic of creativity, based on our sample and analyses so far. Using 'Thematic Analysis', a widely-used qualitative method in psychology research [3], we coded our data and identified two main themes for creativity amongst volunteers: imagination and problem-solving.

Creativity as Imaginative Self-Expression

When asked to give an example of creativity, several participants described instances where volunteers contributed artwork and humour to the project forums. These contributions were viewed as creative because they were imaginative and served as interesting discussion points for the project communities.

Artwork

Two participants gave examples of volunteers contributing artwork to the project forums. These contributions were appreciated by the project community because of their aesthetic value:

"There are instances where people said, 'Well I like this let's start a thread on it.' There is a pure art thread where people can take a little part of the galaxy and then enhance it and do something to the colors and they call it art but it's just pretty pictures..." ~ P1, Galaxy Zoo volunteer

"There is one person I know that has done artwork on the forums, taking the ships and doing color formatting, outlining, and I thought 'Oh we need to get that on T-shirts!'" ~ P9, Old Weather volunteer

Humour

Two participants gave examples of volunteers starting humorous forum threads and posting amusing comments. These contributions were appreciated by the project community because of their comedic value:

"One of the things, as an editor you can add notes, you can transcribe what's there and then say 'What I think they really meant was this...' Or you know you can leave a comment saying 'They must've been pretty bored by now, because nothing has happened for weeks!'" ~ P8, Old Weather volunteer

As one volunteer describes, it is possible that a forum thread that started off as 'just for fun' can also end up having scientific value for the project:

"[...] found a little green galaxy and she started a thread called 'Give peas a chance' with peace spelled p-e-a-s and everyone thought it was funny and we started collecting these green blobs [...] then we asked the scientists 'well is there something special or is it just for fun?' and apparently they are a special kind of galaxy. And there are papers written about it too, about green peas, and the peas are an accepted term!" ~ P1, Galaxy Zoo volunteer

Creativity as Solving Project Problems

Other examples that participants gave of creativity involved problem-solving. Several participants described instances where volunteers took it upon

themselves to suggest ideas or create content in order to solve problems experienced by project members.

Suggesting Improvements

Volunteers' feedback and suggestions are valuable for helping researchers to improve their project interface:

"The volunteers are our experts really in updating the transcription interface. It's been suggested by them if we could eliminate the mark-up, if we could introduce an automatic save feature [...], improvements to the image viewer [...] They've certainly offered a lot of input in that regard. And when we update the transcription interface and test it, they will be the key audience for doing so." ~ P3, Transcribe Bentham researcher

Creating Additional Content

In some cases, participants created additional content in order to make the research task easier. These contributions are appreciated by both researchers and volunteers because of their value to the project:

"I would say a well-run forum is an extremely important part of any Citizen X project. And it also has other values in that it generates a lot of additional information and data [...] what I've done, working with the moderators, is pull together all the naval-related lists that people have developed, like sea-states and types of ice, contacts and whatever, and put them in one single page, which I have now published [...] It's not just 'Do we have this ship's log?', but we will actually have these tools, these glossaries and so on, to actually understand the ship's logs to interpret them." ~ P2, Old Weather researcher

Conclusions

Based on our preliminary findings, we suggest that researchers should encourage creativity from volunteers for two reasons:

- Creativity appears to be an indicator of high engagement in the project;
- Creativity can lead to innovation and helping the project to operate better.

Being part of a project community appears to be an important motivating factor for creativity to take place. It is through the community that creative individuals have an audience to share their ideas with and to receive validation for their efforts. Also knowing that you are part of a group provides further motivation for solving project problems, as improvements can benefit other volunteers as well as yourself.

Design Implications

There is a growing body of HCI literature about designing user interfaces to support creativity [10, 13]. In our research we focus specifically on designing for CCS contexts. Based on our preliminary findings, we propose that in CCS it is important to design for good communities, and then, if volunteers are feeling inspired, creativity will follow. Our next steps will involve figuring out what factors are necessary for a good community in CCS.

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