Eight Guidelines for Designing
Virtual Citizen Science Projects

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Abstract

Is it unknown how to best design virtual citizen science projects so as to meet the needs of both scientists and volunteers. We present 8 design guidelines that we developed as a result of common problems we identified in our usability evaluations of 3 Citizen Cyberlab prototypes.

Background

In virtual citizen science projects, scientists can potentially recruit help from a large network of people (Wiggins & Crowston, 2011). Yet virtual projects typically have a skewed pattern of participation, with the majority of volunteers contributing in small quantities and/or dropping out (Nov et al., 2011; Eveleigh et al., 2014). How can project owners design websites and applications that keep users engaged beyond the first couple of clicks?

Existing resources that provide guidelines for designers of new citizen science projects include the Citizen Science Toolkit (http://www.birds.cornell.edu/citscitoolkit/toolkit) and UK-EOF's Guide to Citizen Science (Tweddle et al., 2012). However, these focus on how to start a citizen science project rather than providing specific guidance on web design and user experience

In an expert-based usability evaluation, HCI experts estimate the likely reaction of users and explain why certain interface attributes are likely to cause difficulties. Over the past year we have conducted expert evaluations to inform the development work of 3 virtual citizen science projects developed as part of Citizen Cyberlab (http://citizencyberlab.eu/):

- GeoTag-X - a disaster mapping project developed by UNITAR/UNOSAT;

- Virtual Atom Smasher (VAS) - a particle physics project developed by CERN); and
- SynBio4all - a synthetic biology project developed by Université Paris Descartes.

Based on these evaluations we have identified 8 common areas for improvement and as a result created a list of 8 design guidelines for those creating virtual citizen science projects.

1- First impressions matter

Users should be able to understand what your project is about in a few minutes – avoid information overload! For example, when we first evaluated SynBio4all the layout was cluttered and unclear. After our evaluation they adopted a simple layout, portraying a clear message.

2- Less is more

When you explain the concept of your project, avoid technical terms. Reduce text and extraneous information. Also 'chunk' information (headings, bullet points) to make it easier to digest. For example, we observed that VAS had a nice design where they provided very basic information and included a button users could click if they wanted to 'Learn more.'

3- Create interactive tutorials and videos

Users are more engaged when they are actively involved in the tutorial and not just reading text. For example, when we first evaluated the GeoTag-X tutorial we found it to be text-heavy and it was read-only. After our evaluation they created an interactive tutorial, where users click their answer and receive feedback.

Videos are another great way of explaining science concepts and project interfaces to users. For example, we

liked that VAS created an introductory video that explains physics concepts akin to smashing plates from a tall building. They also had a tutorial video where the tutor moves in a pop-up box around the screen explaining different parts of the interface.

4- Support users in completing their task

Consider the users' task needs. For example, in GeoTag-X users need to identify items in a photo. Users are provided with a 'zoom in' option so that they can get a closer look at the photo. The items they need to identify are positioned alongside the photo so that users do not need to keep scrolling up and down.

5- Understand the expertise level of users

Project owners should also be careful not to be overly ambitious in the tasks that they assign to volunteers. Start users off with a basic contribution task and allow experienced volunteers to take on more advanced tasks.

6- Remind users why the task is important

Remind users why their contribution is important, particularly when a task is long or tedious. Also when aspects of a task aren't obviously related to the project's goals, explain why this part of the task is necessary.

7- Provide feedback on progress

Keep users informed about their personal progress and the project's progress. Utilize progress bars (e.g. you have completed 2 out of 4 steps), counters (e.g. you have contributed 6 photos), and project blogs. Gamification mechanisms, such as badges and narratives, might also be worth considering (Bowser et al. 2013).

8- Allow learning to occur on all 3 levels

In Kloezter et al. (2013) we identified 3 levels of learning:
- the project (i.e. the science behind the project),
- the task (i.e. the task mechanics), and
- the community (i.e. peer-to-peer learning).

Sometimes designers forget the third level – the community. This is unfortunate because we have found that a sense of community is linked to high levels of engagement and creativity (Jennett et al., 2013). It's important to provide volunteers with ways to interact with each other, such as forums, chat, and even social media (e.g. Facebook).

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