Citizen Scientists: The Importance of Being Needed and not Wasted

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Introduction

The seemingly relentless advance of modern day technology has not only made the world a more connected place, but has also increased our capacity to collect and store information to an unprecedented level. This has resulted in a flood of scientific data being produced, particularly be increasingly advanced and automated instruments carrying out large-scale surveys. The amount of data being collected has reached such a point that existing professional communities are struggling to realise it's full potential. Citizen science, or "public participation in scientific research" [1] has been used to address this issue, and can be described as research conducted, in whole or in part, by amateur or nonprofessional participants often through crowd-sourcing techniques. It increasingly utilises Virtual Citizen Science (VCS) platforms [2] that gather scientific analysis from remotely sensed imagery through a website interface.

In order to be successful VCS platforms require a large, dedicated community and gamification, both extrinsic and intrinsic, has been used as a method to attract and keep volunteers returning to the project. However, while research has considered the initial motivations of VCS platform volunteers [3], little has considered the volunteers' experience of using the site, or sort their opinions regarding its design.

The research presented addresses this shortfall, by surveying volunteers of an existing VCS project across a number of design themes. The results are summarised in terms of how they can be used to influence gamification design and assess its appropriateness.

Research Approach

To determine the views and concerns of volunteers regarding an existing VCS project, an online questionnaire was developed and disseminated to registered users of the Zooniverse's Planet Four platform. Four sections regarding the infrastructure of the site were included: *design & usability, tasks & tools, imagery* and *feedback.* 178 participants completed the questionnaire between 2nd April and the 15th September 2013.

Results

Participant responses covered a range of themes, the most prevalent being *feedback, contribution* and *efficiency.* Responses included in the feedback category specifically refer to participants' requesting a greater amount of communication and feedback from the experts involved in the project (Participant 9):

> *"It would be good to have more regular blogs, if possible, and maybe a bit more feedback on progress of the project…"*

The contribution category concerns statements participants have made requesting extra information about the contribution they are making to science when taking part (P112):

> *"I think this is important? Why bother? Throw me a bone here people…"*

Finally, responses included in the efficiency category concerned volunteers' need for reassurance that there time was not being wasted, and was being used as efficiently as possible (P4):

> *"The way the tasks are set up seem to require a lot of repetition, is this really the best use of my time?"*

Discussion & Conclusions

The responses from volunteers highlighted the importance of contribution, feedback and using their time constructively when considering their motivation to participate. In agreement with previous research [3], volunteers are driven by the opportunity to contribute to a project or goal that will have a tangible impact on the scientific community. Furthermore, knowing the overall goal of the project is not enough. Volunteers have also indicated the need for regular feedback from the expert community that both informs them of how the project is progressing, and how their input is contributing to this progression. Responses also show that there needs to be a clear, understandable link between each click and task the volunteer undertakes and its contribution to the aims of the project. Volunteers do not want to feel that any of their time is being wasted on erroneous tasks.

These findings could have a profound influence when considering the gamification of VCS projects. Any type of gamification mechanism employed needs to ensure that the visibility of volunteers' contribution to the scientific goals is maintained, and that feedback mechanisms not only give information on individual progress but also that of the overall project. It is also imperative that the link between the tasks of the 'game' and how completing them contributes to the science required is maintained and communicated so that volunteers do not feel their time is being wasted.

When considering gamification, future citizen science platforms will need to perform a balancing act. Developers and the science teams involved will need to consider if gamification can be achieved with the core scientific tasks required of the volunteer, and if it can be implemented in such a way that their scientific contribution remains intact and clearly communicated. VCS platforms currently cover a huge range of topics and disciplines, asking a range of different tasks and judgements to be undertaken by the volunteer. Therefore it is likely that each one will have to be reviewed on a case-by-case basis when considering the suitability of using gamification to attract and engage a volunteer community.

Acknowledgements

The first author is supported by the Horizon Centre for Doctoral Training at the University of Nottingham (RCUK Grant No. EP/G037574/1) and by the RCUK's Horizon Digital Economy Research Institute (EP/G065802/1).

References

[1] E. Hand, "Citizen science: People power," *Nat. News*, vol. 466, no. 7307, pp. 685–687, Aug. 2010.

[2] J. Reed, W. Rodriguez, and A. Rickhoff, "A Framework for Defining and Describing Key Design Features of Virtual Citizen Science Projects," in *Proceedings of the 2012 iConference*, New York, NY, USA, 2012, pp. 623–625.

[3] J. Raddick, G. Bracey, P. L. Gay, C. J. Lintott, C. Cardamone, P. Murray, K. Schawinski, A. S. Szalay, and J. Vandenberg, "Galaxy Zoo: Motivations of Citizen Scientists," *Astron. Educ. Rev.*, vol. 12, no. 1, 2013.