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Change – The transformative power of citizen science

Young volunteers on Zooniverse: exploring the relationship between participation and background characteristic

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Abstract

This study explores the participation patterns and demographic characteristics of young citizen scientists engaged in online citizen science through the Zooniverse platform. By analysing log data from 242 participants and survey responses from 64 individuals, the research sheds light on the contributions and behaviours of these young volunteers. Key findings highlight the significant engagement of young participants, each contributing to various projects and demonstrating consistent activity on the platform. Surprisingly, demographic factors like age and gender showed no significant association with participation levels. However, confidence in using the platform positively correlated with increased engagement, emphasising the role of self-efficacy in fostering participation. Additionally, systematic participation was linked to higher project contributions, underscoring the importance of structured engagement. The study highlights the need for targeted strategies to empower young individuals to contribute meaningfully to scientific research while promoting inclusivity and engagement across diverse demographics.

Keywords: young volunteers, Zooniverse, participation.

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Introduction

Participation in online citizen science benefits young people's science learning and empowers them to take action and engage with science meaningfully (Herodotou et al. 2022). This study explored the participation and background characteristics of young citizen scientists on Zooniverse, highlighting their potential and the impact they can make. Understanding volunteer contribution, including young participants, and tracing their participation behaviour can enable scientists and project coordinators to make decisions about a project and platform design by adjusting the technology, content or engagement techniques (Skarlatidou et al. 2019).

This study was part of the LEARN CitSci project, an international research project studying how young people (aged 5–19) learn through participating in citizen science. Zooniverse is a citizen science platform that enables crowdsourced research in many disciplines (e.g., astronomy, ecology, biology) and via many projects. Volunteers contribute by classifying, annotating, drawing, and ranking images and illustrations or transcribing diaries and texts.

Methods

Log data from 242 Zooniverse young participants were used to calculate metrics indicating their participation and contribution levels. The participation metrics, as described in Aristeidou et al. (2021), included how active young volunteers were in days (activity ratio), how long they have been linked to Zooniverse overall (relative activity duration), the time they spent on Zooniverse tasks (task devotion), and how systematic (with regular intervals between visits) they were in joining the platform (participation periodicity). Additional contribution metrics looked at young volunteers' daily submissions (project contribution) and overall submissions (overall contribution).

A survey ($n = 64$) also collected data on participants' demographics and relevant information. The final aggregation of the collected survey data included gender (male, female), age (integer), previous experience with online science-related activities (yes/no), and confidence levels in using the platform (scale with high/low/no confidence). These variables were of interest due to studies on adult citizen science participation identifying gender and age imbalances (e.g., Pandya and Dibner 2019). Some variables were excluded from the inferential analysis due to low numbers (e.g., $n < 5$, binary gender).

Similarly, science capital (e.g., previous experiences with science) (Archer et al. 2015) and efficacy in technology (Howard et al. 2016) have been shown to explain diverse participation levels in various science learning contexts. Ethical approval was obtained from The Open University Human Research Ethics Committee (reference number: HREC/3003/Herodotou), and participation was voluntary.

Statistical analyses were conducted to calculate the participation and contribution metrics and assess the degree of association among the metrics. These included descriptive statistics and non-parametric tests. The latter involved Spearman correlations to test any associations between participation and contribution metrics and Mann-Whitney tests to assess the relationships between participation or contribution metrics and survey information as described earlier.

Results

The analysis revealed significant contributions among young participants on Zooniverse, with a remarkable total of 237,727 contributions spread across 233 projects. Each participant contributed to 1–105 projects, showcasing diverse interests and involvement. Young citizen scientists demonstrated a relatively low activity ratio, being active on Zooniverse for about two out of ten days they were linked to the platform. On a daily average, they submitted 12.5 contributions, investing approximately 9.5 minutes on Zooniverse tasks, indicating a dedicated commitment. However, these findings are interpreted with caution, as the sample group involved a few super-users (i.e., contributing more than the average). Interestingly, the study found no evidence of systematic participation.

Further analysis showed that an increase in confidence in using Zooniverse correlated positively with extended overall duration and enhanced task contribution, suggesting that confidence plays a pivotal role in fostering continued engagement and active involvement in scientific endeavours. Furthermore, findings indicated that a more systematic approach to participation on the platform resulted in increased project contributions. This underscores the importance of structured engagement and methodical involvement in achieving meaningful outcomes within the Zooniverse community.

Contrary to initial expectations, factors such as age, gender, and prior engagement in online science-related activities were not significantly associated with increased participation in Zooniverse. This suggests that the platform offers a wide-ranging environment where individuals from different backgrounds can actively contribute to scientific research, irrespective of demographic factors. More information about the young people's activity on the platform can be found in Herodotou et al. (2022).

Discussion

Considering the practical implications of the findings on young people's participation in online citizen science is essential. One notable takeaway is the positive correlation between confidence in using Zooniverse and both increased duration of engagement and contributions. This aligns with previous research in other contexts, indicating confidence and efficacy in technology as crucial in fostering engagement and active participation (Howard et al., 2016). However, it's critical to recognise the existence of the digital divide, which may hinder some young people (or even adults) from fully participating due to a lack of digital skills or access. To address this issue, initiatives should be implemented to support these individuals, such as offering tutorials and clear instructions to help them feel confident navigating the platform and contributing meaningfully to scientific endeavours.

Furthermore, systematic participation emerged as a key factor in driving increased contributions to Zooniverse projects. To capitalise on this insight, strategies can be implemented to make participation more engaging and enjoyable for young citizen scientists. For instance, incorporating gamification elements, such as achievements and rewards, into a citizen science platform can enhance motivation and maintain interest. Offering short, focused tasks and interactive platforms can make the experience more interactive and compelling.

Moreover, fostering a sense of connection to the project and its outcomes is essential for sustaining young people's engagement. Providing recognition for their contributions and facilitating direct communication with scientists can help them feel valued and invested in the research process. Leveraging their social connections by encouraging group activities at school or through social media platforms can further enhance their sense of belonging and motivation to participate.

Collaboration with schools and youth organisations presents another promising avenue for promoting systematic participation in citizen science. Integrating citizen science activities into educational curricula and extracurricular programmes can expose young people to scientific inquiry and provide them with structured opportunities to engage with real-world research projects. By partnering with educational institutions and youth organisations, citizen science initiatives can reach a broader audience and foster a culture of scientific curiosity and collaboration among young people.

Conclusion

In conclusion, by implementing targeted strategies to enhance confidence and systematic participation, on-line citizen science platforms like Zooniverse can empower young people to become active contributors to scientific research while also addressing barriers to participation and promoting inclusivity and engagement across diverse demographics.

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References

- Archer L, Dawson E, DeWitt J, Seakins A, Wong B (2015) "Science capital": A conceptual, methodological, and empirical argument for extending bourdieusian notions of capital beyond the arts. *Journal of Research in Science Teaching* 52: 922–948. <https://doi.org/10.1002/tea.21227>
- Aristeidou M, Herodotou C, Ballard HL, Young AN, Miller AE, Higgins L, Johnson RF (2021) Exploring the participation of young citizen scientists in scientific research: The case of iNaturalist. *PLoS ONE* 16. <https://doi.org/10.1371/journal.pone.0245682>
- Herodotou C, Ismail N, Aristeidou M, Miller G, Benavides Lahnstein AI, Ghadiri Khanaposhtani M, Robinson LD, Ballard HL (2022) Online Community and Citizen Science supports environmental science learning by young people. *Computers and Education* 184. <https://doi.org/10.1016/j.compedu.2022.104515>

- Howard SK, Ma J, Yang J (2016) Student rules: Exploring patterns of students' computer-efficacy and engagement with digital technologies in learning. *Computers and Education* 101: 29–42. <https://doi.org/10.1016/j.compedu.2016.05.008>
- Pandya R, Dibner KA (2019) *Learning Through Citizen Science: Enhancing Opportunities by Design*. Learning through citizen science: Enhancing opportunities by design. National Academies Press, Washington, DC, 1–183 pp. <https://doi.org/10.17226/25183>
- Skarlatidou A, Hamilton A, Vitos M, Haklay M (2019) What do volunteers want from citizen science technologies? A systematic literature review and best practice guidelines. *Journal of Science Communication* 18: A02. <https://doi.org/10.22323/2.18010202>