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Position paper:
When designing citizen science projects, it is important to understand who your target participants are, what motivates them to participate, and the context they work in [1]. This is a relatively straightforward task when projects are based in a particular place. For example, in BioBlitz events, scientific experts can meet with local communities and ask for their feedback [2]. However, for online citizen science projects, also known as "virtual projects", the task of understanding target audiences is more challenging. Project activities are ICT-mediated and there is no physical place where project coordinators and volunteers meet [3]. *Galaxy Zoo* [4] is one of the best-known online citizen science projects. Anyone from around the world can visit the project website and work on classifying images of galaxies. Data quality is ensured by having each image evaluated by multiple volunteers. Terms such as "crowdsourcing" and "crowdworkers" reflect the largely anonymous nature of these digital contributions: being in a crowd implies a degree of faceless anonymity.

In our research we aimed to gain a better understanding of online volunteers. What are their backgrounds? Why do they choose to contribute to a given project? Where do they do their work and how do they structure their time? We used a variety of different research methods, such as interviews, questionnaires and behavioural activity measures. Each of these research methods provided us with useful insights, yet at the same time, each method also comes with various constraints and limitations.

Interviews: We carried out 28 interviews with volunteers of various online citizen science and humanities projects, including BOINC [5], Old Weather [6], Eyewire [7], Transcribe Bentham [8], and Bat Detective [9]. The interviews were carried out over Skype because volunteers were from different countries (e.g. UK, France, USA). We found that participants shared an interest in science/humanities and a desire to help research. They contributed in various locations and times depending on when they were free. The most committed volunteers tended to get into a "rhythm" of working where they check the project website on a regular basis for project news and community updates [10]. For example, we talked to a retired person who contributed to his project every morning and this had become part of his daily routine. Other participants "dabbled" in projects for short periods and were less interested in the community aspects [11]. For example, we talked to a student who contributed to projects during some of her lecture breaks as a way to "pass the time" while also doing something useful. Overall, remote interviews are a good way of gaining an in-depth understanding of volunteers. However, a limitation is that it is time-consuming to transcribe and analyse interview data. It can be difficult to arrange interview times when volunteers are in different time zones. Also one should not assume that all volunteers will be English-speaking (e.g. some of our interviews were conducted in French). A further issue is that there is likely to be self-selection bias - this method is more likely to attract people who are highly engaged in the project, as people not so involved will probably not volunteer to be interviewed.

Multi-tasking Inventory: The Multi-Tasking Inventory (MTI) was designed to collect behavioural activity measures as well as respondent's subjective reports of their task

management. It consists of 130 mixed-response items. The tool also collects background telemetry on how the questionnaire was completed. We collected MTI data from 31 citizen scientists, who had experience of a variety of different citizen science projects and platforms, including GeoTag-X [12], eBird [13], The Zooniverse [14] and OpenStreetMap [15]. Our results revealed that typically citizens have seven tabs open at any one time, they contribute from various locations (e.g. office, home), and are often distracted while contributing. We were able to conclude that citizens value the flexible working that citizen science offers. Designers can support flexibility by automatically saving citizens' work, allowing citizens to bookmark their work, etc. Overall, the MTI is a good way of gaining insights into multitasking behaviour and habits in crowd settings. The inventory is well documented and therefore easy for other researchers to deploy. However, sample size was a limitation of our study. Typically survey-based studies aim for hundreds of participants. The length of the survey might explain the high drop-out rates. We hope to shorten it in future research and make it publicly available so that other researchers can use it.

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