

Zooniverse: Growth by Fostering a Culture of Experimentation

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Abstract

Zooniverse is a platform that helps non-scientists participate in activities that further scientific aims. Since its creation over a decade ago, the platform has become home to nearly 100 live crowdsourcing projects, which are used by over one hundred thousand active volunteers each year. The platform has continued to grow due to several key factors - the willingness of the project leads to be alert to new opportunities as they arise, to benefit from scale where possible, and to permit the team to explore and experiment. This approach has resulted in an in-demand service with a growing user base, which in turn has permitted the team to develop a diversified range of funding types to support the enterprise.



ZOONIVERSE



Zooniverse - Many Projects. Credit: Zooniverse.

Origins

Zooniverse is “the world’s largest and most popular platform for people-powered research,”¹ a new formulation for what is often called citizen science. What is today a platform hosting hundreds of projects began as a single project created by a group of friends and colleagues. The Zooniverse team had the idea that the collective wisdom of a large number of people, including non-scientists, was more accurate than any individual judgement, even if that individual was a trained scholar.

As a postdoctoral student at Oxford University, Chris Lintott worked with a colleague on the notion that morphologies - shapes of galaxies - were best assigned by human review. With 900K galaxies to categorize, the notion of crowdsourcing was appealing, and a recent project called “Stardust at Home” involving dust grains, had captured their interest. The first website for GalaxyZoo was created very quickly; Chris estimates it took a colleague one day to build out the site, which in its first iteration was “just a few pages and a login.” The aim was to keep it simple and free. As Lintott put it, “if we’d needed to apply for funding, we would not have done it.”

Despite its experimental and modest origins, the site was successful from the start. In part, due to the media connections of the project founder,² the launch of GalaxyZoo in 2007 was covered by the BBC, which helped to give it a huge boost. In its first day as a live site, 70,000 users visited to identify images of galaxies. Today, the site boasts contributions from over 100,000 volunteers each year.

Over the last several years, what began as a single website hosting one project has grown into a multi-tenanted platform that permits hundreds of projects to run citizen-science efforts themselves. Zooniverse was started in 2007 as a partnership of the University of Oxford, Chicago’s Adler Planetarium, the University of Minnesota, and the University of Portsmouth. While its initial goal was to permit the Zooniverse team to build out customized versions of crowdsourcing projects, it eventually morphed into a platform. Allowing research leads to use the software to build their crowdsourcing projects, often with little or no contact with the original Zooniverse team. This highly decentralized model has permitted the project to scale up quickly. Today Zooniverse hosts nearly 100 active projects and close to 200 projects either completed or on pause.

Sustainability Status & Strategies

By several measures, Zooniverse has been successful. The team can point to quantitative measures of growth, including in its audience size, the number of projects it hosts, and the

¹ More information about Zooniverse: <https://www.zooniverse.org/about>.

² Chris’ program, The Sky at Night: <https://www.bbc.co.uk/programmes/profiles/4jqzzH6CBH7b5K0qblb73nZ/professor-chris-lintott>.

number of published papers that have relied upon data drawn from these projects. And yet Lintott somewhat contrarily describes the sustainability strategy of Zooniverse by stating, with a touch of mischief, that “we have completely ignored sustainability.” By that, however, he pinpoints some of the very characteristics that have led to their success. Rather than attempting to preserve any particular version of Zooniverse or its hosted projects, the team remains focused on the future, while paying close attention to the actions of its users and the evolving interests of its leads.³ “We’ve never said ‘should we do it so that we can maintain it for three years?’ Instead,” he notes, “we ask ‘is it interesting?’”

The core Zooniverse team includes Lintott and up to 15 people, split between Oxford and Adler Planetarium. Oxford covers his time, while Adler supports one to three members. The remaining staff is grant-funded, with most support coming from Sloan and Google. The team is actively also seeking core operating support and has been experimenting with a range of ways to derive income from value-added aspects of Zooniverse, from custom reporting to commercial services.

Their approach to sustainability is deceptively simple when it comes to technology: “to be skeptical about adopting new technology; keep the stack simple; use standard tools.” Another key to their sustainability is in creating a simple-to-use tool - the Zooniverse Project Builder. This tool has been valuable to hundreds of people engaging in citizen science, and in successfully finding ways to make it very easy and enjoyable for non-academics to actively engage in the work of scientific research by participating in Galaxy Zoo or other Zooniverse-hosted projects.⁴

Perhaps less obvious, but just as crucial to its success over time, has been a series of strategies and practices that have permitted the small team at Zooniverse to continue to identify promising directions, both for the citizen science platform, and their approaches to funding them. Making the leap from a single project to an organization that has quickly grown to be a platform hosting many projects was not a sure thing; below are some of the vital approaches to making that transition.

Sustainability Strategy #1: Awareness of user needs and alignment with PI goals

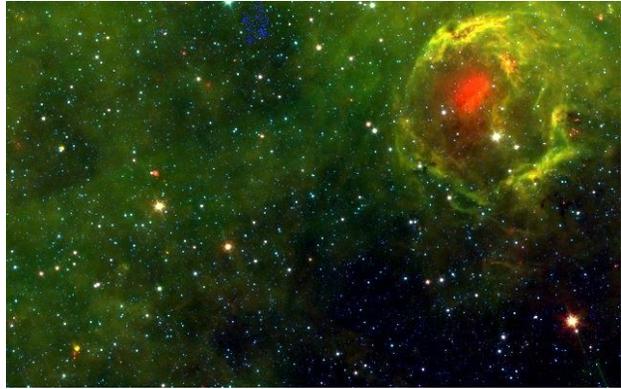
An initial sustainability strategy took the form of project-based partnerships; teams of researchers would approach the Galaxy Zoo leads, or respond to calls for proposals to apply for research grant funding to make use of Galaxy Zoo functionality, or otherwise work with the Galaxy Zoo team. The trouble was that this approach did not at all scale. According to founder

³ This definition of sustainability is well aligned with the definition of sustainability used in the Gateways Focus Week is derived from Maron, cit. “Sustainability is the ability to secure recurring sources of financial and non-financial support by delivering value to users”.

⁴ Much has been written about the strategies and tactics the team used to incentivize participation and to coach other project leads in doing the same. See: (include 1-2 key articles here from the “meta” section of publications).

Lintott, “our time was being eaten up by maintaining so many different instances” of the platform.

From its early days, the team noticed that people were engaging with Galaxy Zoo “in ways we didn’t expect them to.” The team “wanted to see what else they would do with it.” Funding from a Google Impact Award permitted them to build a “more robust” Galaxy Zoo, a single platform that could run multiple different projects. But even then, the demand for customized work soon became apparent. According to Project Manager Grant Miller, they’d put out a call, receive 100 proposals and accept five to ten of them which they would build. This led the team to wonder, “how can we get to the point where we are not rejecting everyone?”



Galaxies. Credit: Zooniverse.

Sustainability Strategy #2: Decentralizing control to fuel growth (platform as a service) “Not just astronomers”

According to Grant, this observation, along with the realization that there was “demand for this general solution,” of crowdsourcing, led the team to build a system that could support more projects, more efficiently.

The project evolved in three stages. First, with a more robust platform, they were able to build out about nine projects, in each case using different instances of the codebase. This turned out to be too time-consuming/costly an approach. They decided instead to rebuild the platform so that it could smoothly run several projects on the same main code. But even then - from 2010-2014, they found they were spending a great deal of time on the front-end customizations. “We were close to doing the same things for many projects again and again.” according to Chris. While this was a good experience, these experiments helped the team learn how to build lots of types of projects in different fields beyond astronomy. But it was not what the team wanted to spend their time doing. According to Lintott, “we decided not to waste people’s time and money and not to be a web design company.”

In 2015, they launched the Zooniverse Project Builder” - a different approach that permits project teams to build citizen science projects themselves, using tools hosted on the Zooniverse site.

Sustainability Strategy #3: Entrepreneurial mindset: Letting demand lead & low-risk experimentation

When thinking about what direction to take, The GalaxyZoo (then Zooniverse) team can point to several moments along the way when even its leads thought “it would fail badly.” And yet, this willingness to experiment has led to some worthwhile discoveries that have helped fuel growth.

The Zooniverse team has continued to be alert to the need to change course and grow, as the need or opportunity presents itself. In part this has been possible thanks to the early decision to secure his time and the time of a developer as part of the funded core team. As Lintott notes, they did not think it would be a good idea to have “a postdoctoral student doing some coding even though they want to be doing astrology.” Unlike many project teams that are run with fractions of staff time or must hire outside developers on a project basis, the Zooniverse team includes people with the stability, skill, and flexibility to try things when they need to. Hiring a developer and keeping that position in-house enabled strategic conversations and the ability to experiment.

Some other examples of this entrepreneurial mindset include:

- The realization that the demand for doing citizen science far surpassed the available time from the team. This led to choosing a path of decentralizing the work on Zooniverse, creating the Zooniverse Project Builder to permit users to build their projects.
- Exploring ways to generate revenue from private companies, to generate additional non-grant revenue (“whatever else we can find!”). Some areas they are exploring include:
 - Digital Corporate volunteering: companies want to tell employees to volunteer time, and in exchange, Zooniverse asks for donations. They are also piloting a fee-based service that would include custom reportings of staff contributions.
 - They recently created a spin-out company called 1715Labs⁵ that does labeling for commercial companies, using the same notion of crowd-sourced identification, but not the same volunteers who donate time to the research-focused projects on Zooniverse. Instead, 1715Labs is a fully commercial, entirely independent entity with separate leadership, to avoid any possibility of the scholarly and public work being overtaken by commercial concerns. As the Zooniverse FAQ page notes, “We are a platform for people-powered research, not a company or non-profit,” so keeping 1715Labs distinct from the Zooniverse is a priority.

⁵ The 1715Labs website: <https://www.1715labs.com/about/> and This blog post offers background on the founding and organization of 1715 Labs: <https://blog.zooniverse.org/2018/08/03/a-zooniverse-spin-out-company/>

Closing Thoughts

To listen to the Zooniverse team talk about it, they have done the opposite of the plan for sustainability. Lintott insists, "Please don't get the impression that we know what we are doing!" And yet, this "group of friends" developed an extremely successful project - GalaxyZoo - and shepherded its evolution into a major platform hosting hundreds of projects. A consistent willingness to try new things and to be alert to how users in different settings are engaging with the platform in different ways has permitted them to broaden their appeal to users from a wide range of disciplines and opened up opportunities well beyond their initial grant funding.