Keeping the Citizens Scientists:

Participant Motivations in Citizen Science

Research Proposal Final Draft

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Introduction

Citizen science is a method of collecting data from non-professionals to use in scientific research. According to Dickinson et al. (2012), citizen science projects may vary in scope and technique, but most involve volunteers submitting location-based ecological data via (mostly) web interfaces. eBird, for instance, encourages participants to record sightings and locations of birds. Raddick et al. (2009) note that the term citizen science may additionally apply to nonprofessionals interpreting data via a (mostly) online interface—for example, in the citizen science project GalaxyZoo, participants classify types of galaxies by looking at images from the Sloan Digital Sky Survey. This study, however, will only refer to the former definition of citizen science: nonprofessionals collecting and submitting location-based ecological data via an online interface.

While scientists gain massive quantities of data across broad chronologic and geographic scales, citizen participants benefit from associated project resources, as well as satisfaction derived from the participant community. Raddick et al. (2009) parsed the participant community benefit as: “Enjoyment,” “Social Community,” and “Ability to Participate in Real Science.” Project resources may include tools to keep track of personal sightings (e.g. bird lists), knowledge bases, training opportunities, and online analysis programs to visualize the aggregate project data.

Research Problem

The field of research on citizen science has only emerged in the past twenty years, and primarily covers quality of data, data modeling techniques, and specific project evaluations. However, approximately half of the 25 papers reviewed for this proposal (see “References”) mentioned the importance of recruiting and keeping quality citizen scientist volunteers. Finding "appropriate methods for maintaining the motivation of volunteers" (Hochachka et al., 2012) is a critical challenge for citizen science success because these two are directly proportional. And yet, volunteer motivations and maintenance is not a topic well covered by the research.

A study to explore this topic would greatly benefit the field because existing and future citizen science projects could be designed to maximize the motivations volunteers most respond to. Therefore, this study proposes evaluate twenty citizen science projects for insight into the question: "How do project resources and participant community affect citizen science activity?"

Literature Review

Citizen science is changing the traditional research process for ecology. Conventionally, humans are necessary for species-level ecological observations, but Hochachka *et al*. (2012) explain that such research is limited by the expense of labor. Citizen science allows ecological research to expand its scope by harnessing the power of volunteer fieldwork, while balancing increased data quantity with potentially decreased data quality (Hochachka *et al*., 2012). Researchers and research institutions are intrigued. Dickinson, Zuckerberg, & Bonter (2010) reported that there were 600 extant citizen science projects on the Cornell Lab of Ornithology (CLO) directory, and these projects addressed everything from protein folding to astronomy to ecology; collectively, citizen science projects "gather tens of millions of observations each year," (Bonney *et al.*, 2011, p. 977). In addition to the concept of crowdsourcing fieldwork, Newman, Wiggins, Crall, Graham, Newman, & Crowston (2012) elaborate on how "emerging technologies influence the scientific research process by streamlining data collection, improving data management, automating quality control, and expediting communication," (p. 298). Designing citizen science projects in the context of emerging technologies offers an unprecedented opportunity to advance landscape scale ecology.

Citizen science also offers an opportunity for its nonprofessional participants. Dickinson and Bonney (2012) point out that citizen science is an essential tool to engage new audiences who don't consider science to be within their realm. Not only can participation help these audiences improve their scientific understanding (Couvet, Jiguet, Julliard, Levrel, & Teyssedre, 2008), but it can also bring home the importance of scientific issues, such as climate change (Dickinson & Bonney, 2012).

Why Citizen Scientists Participate

According to Dickinson & Bonney (2012), citizen science participants are motivated by several concurrent factors: 1) the satisfaction of being productive, 2) willingness to collect data of personal value, 3) the pleasure of interacting with others, and 4) altruism and the collective data assembly goal. While citizen science marketing may focus on the final factor, depending on altruism is an unsustainable motivation for continued project participation. Dickinson & Bonney (2012) also state, "contributory citizen science has thus followed a model of selfish altruism in which the majority of participants likely experience altruistic motivation, at least to some degree, while also receiving tools and resources that support their interests and hobbies," (p. 7). Thus, project resources with personal value may supplement altruism.

Social interaction is the second key factor in participation (Matteson, Taron, & Minor, 2012). In fostering a member community, online citizen science projects face many challenges, and may need to rely on volunteer management practices more common to non-profits, e.g. recruitment, orientation, training, selection, supervision, evaluation, recognition, retention (Wiggins & Crowston, 2010). As Wiggins & Crowston (2010) go on to say, an online organization is not effective if it achieves short-term project goals but drives away long-term participants.

Providing Project Resources

Experiential accounts suggest that projects providing the right resources to their participants will experience an exchange of increased data observations. For example, Bonney *et al.* (2011) recount how one CLO project, eBird, upgraded their project website to offer participants observation tracking and report comparisons. Directly following, the number of individuals submitting data increased almost threefold. Project resources may be used equally by participants, scientists, and external decision makers such as land managers or politicians (Bonney *et al.*, 2011). This makes them both broadly beneficial, and an effective reward for participation. The type, variety, and number of project resources vary widely across different projects, however they may be categorized as educational, analytical, organizational, or social.

Educational project resources provide content to support participants' learning about project goals, the scientific process, and subject-specific topics. These may be in the format of identification guides, posters, manuals, videos, podcasts, newsletters, and FAQs (Bonney *et al.*, 2011). Educational resources may be interactive—a certificate after passing a quiz on identification or data collection protocols, for instance (Bonney *et al.*, 2011)—and their effectiveness is often variable and difficult to measure. For example, although it is widely accepted that online training is an educational necessity for citizen science participants, Newman, Zimmerman, Crall, Laituri, Graham, & Stapel (2010) found that online training in context, rather than via an external link, was an important sub-factor.

Analytical project resources engage participants by allowing them to visualize and manipulate project data. Dynamic charts and graphs, interactive maps, and the ability to save analyses are all examples of analytical resources (Newman, Graham, Crall, & Laituri, 2011). eBird and other CLO citizen science projects have resources for participants to explore data through tables of species by region, dynamic animated maps, population trend graphs, rare bird tracking, and data summaries (Dickinson & Bonney, 2012). Each of these analytic resources may be limited to personal observations or extended to the entire database, thus enhancing the personal value of the resource. Some projects may expand the analysis capacity of their resources by linking to data from other databases, e.g. allowing users to view historical weather (external) along with historical species distribution (internal) (Dickinson & Bonney, 2012).

Organizational project resources provide personal services such as keeping track of species observations, or generating data reports. Other example organizational resources include alerts for species or location observations, being able to mark favorite locations, sharing observation and/or species lists, event calendars, and language translation (Newman, Graham, Crall, & Laituri, 2011).

Deciding how to incorporate educational, analytical, and organizational resources into a project's online portal is vital to the motivation of participants, and thus success of the project. Some resources will be more beneficial to particular segments of the project's participants—for example, Dickinson & Bonney (2012) report that certain resources have an experience effect, where they become more valuable as users become more experienced. This experience effect is important to consider, as projects should strive for longevity. Perhaps the best evaluators of potential resources are the target participants themselves. When CLO was developing eBird, it hired project leaders from the community they were interested in reaching (birders); these leaders' input is how eBird ended up with tracking for bird life lists, bulk data uploading, reporting and displaying info about rare birds, and creating downloadable output charts (Dickinson & Bonney, 2012).

Social Project Resources and the Participant Community

The final project resource category is social, that is, the ability of the citizen science project to facilitate a participant community surrounding its data collection process. Dickinson & Bonney (2012) introduce the idea that citizen science is a collective action, that is, collaboration towards a common good. In this case, scientists and citizens collaborate to collect data and acquire knowledge. Collective actions depend on face-to-face communication and training, and thus citizen science may be limited because of its online, anonymous system; social networking, however, offers a digital bridge to having personal interaction despite the constraints of geography (Dickinson & Bonney, 2012; Hochachka *et al*., 2012).

While a traditional research team would have a shared output, as a collective action, citizen science project participants share practices and a social identity, but not outputs (Wiggins & Crowston, 2010). This social identity is fostered by social interactions, and is integral to the sustainability of a participant community (Dickinson & Bonney, 2012). Triezenberg *et al.*, as quoted by Dickinson & Bonney (2012), claim that, "social networks via the Internet may increase participation in citizen science by creating communities of practice that increase the awareness of others' participation, quickly spread new ideas, and allow individuals to create or maintain relationships that influence each other's knowledge and behaviors," (p. 219). Although internet-based social networking is not currently adopted by most citizen science projects, it is likely to be (Dickinson & Bonney, 2012).

Existing social resources that support the participant community include forums and commenting, user feedback, and community competition. Forums provide a space for participants to communicate both with each other and with project staff and scientists. Although citizen science projects generally tend to operate on a top-down hierarchy, forums break free from this, providing a vitally unprescribed social outlet (Wiggins & Crowston, 2011; Dickinson & Bonney, 2012). Commenting may be on individual observations of another user, or on blog posts, etc. Like forums, commenting creates a free voice space for participants to engage with each other and form a group social identity.

User feedback is another important social resource. Participants are often encouraged to communicate with project staff about upcoming trainings, field data collection events, and data quality concerns (Newman, Zimmerman, Crall, Laituri, Graham, & Stapel, 2010). Communication between staff and participants fosters an integrated community, rather than a tiered social structure. Another form of feedback is flagging. Flagging sub-par observations allows project staff to identify participants who need extra help (Dickinson & Bonney, 2012), thus strengthening the data and the community rather than discounting a potential contributor.

Finally, community competition appeals to some participants more than others. eBird, for example, allows contributors to be ranked against each other for most species seen, most lists submitted, etc. (Hochachka *et al*., 2012).

Whatever the method, social project resources are the building blocks of a successful participant community, which, in turn, is necessary for citizen science research to go full circle, with scientists providing results, feedback, and updates to volunteers (Newman, Zimmerman, Crall, Laituri, Graham, & Stapel, 2010).

Community Contributions to Science

Motivating citizen science participants with educational, analytical, organizational, and social project resources is extremely valuable, but it is not the bottom line. At the end of the day, participants want to know that their observations contribute real data to real science (Dickinson & Bonney, 2012). Bonney *et al.* (2011) list the following measures of scientific contribution: the "numbers of papers published in peer-reviewed journals, numbers of citations of results, numbers of researchers publishing citizen science research papers, numbers and sizes of grants received for citizen science research, size and quality of citizen science databases, numbers of graduate theses completed using citizen science data, [and] frequency of media exposure of results," (p. 982-983). Devictor, Whittaker, & Beltrame (2010) report knowing over 200 peer reviewed papers published wholly or mostly on citizen science data. Measurable benchmarks of scientific contribution may also be the amount of data exchanged annually, and the ways or extent that practitioners use data to address problems (Newman, Graham, Crall, & Laituri, 2011).

The field of citizen science may be relatively new, but it is already making important scientific contributions, as evidenced by the wealth of published analysis noted above. According to Dickinson, Zuckerberg, & Bonter (2010), "citizen science data have been critical for documenting pole-ward range shifts for numerous taxa across the world, providing some of the strongest evidence that species are responding to recent climate change," (p. 157). Other research areas to which citizen science is contributing include global climate change effects (e.g. species range shifts, phenology, species richness, and community composition), macroecology, landscape ecology, population and community ecology (e.g. life history evolution, ecology of infectious disease, interspecific competition, and invasive species), biocontaminants, biogeochemistry, and ecosystem ecology (Dickinson, Zuckerberg, & Bonter, 2010).

Science Benefits to Participants

The unifying strength of citizen science is the curiosity and pleasure of volunteers observing and learning in familiar places (Devictor, Whittaker, & Beltrame, 2010). This experience ties together the scientific contribution with the participant's personal motivations, and also underlines the importance of supporting participant curiosity. Online project resources do this by helping participants parse the meaning of their observations with tools to visualize data, plus content and simulations to discuss potential implications (Couvet, Jiguet, Julliard, Levrel, & Teyssedre, 2008).

Curiosity is further stoked by scientific understanding, and several studies have been done on the ability of citizen science to increase participant's understanding of science. Trumbull, Bonney, Bascom, & Cabral (2000) found that 80% of 700 unsolicited letters to the Cornell Lab of Ornithology from citizen science project participants indicated that the participants were engaging in scientific thinking processes, such as hypothesis formation and experimental methods. Brossard, Lewenstein, & Bonney (2005) measured the increase of adults' knowledge in bird biology through their involvement in CLO's The Birdhouse Network citizen science project. Again, project resources are beneficial to improving scientific understanding; as Bonney *et al.* (2011) state, "allowing and encouraging participants to manipulate and study project data is one of the most educational features of citizen science," (p. 981).

Future Research

Newman, Wiggins, Crall, Graham, Newman, & Crowston (2012) speculate that in the near future, better data management protocols—covering topics such as Application Programming Interfaces and metadata documentation—will allow scientists to share and use shared data more easily. Citizen science participants will know that their contributions can be used effectively, and consolidated databases will allow researchers to better attribute data sources to citizen scientists. The authors envision a process in which citizen scientists, scientists, students, and educators contribute data to online consolidated databases, such as those from citsci.org, eBird, and the National Ecological Observatory Network. This data will conform to data exchange protocols, e.g. those put forth by the Data Observation Network for the Earth (DataONE), and can be used for analysis. Finally, the results of data analysis should be disseminated back to the original contributors, as well as natural resource managers, tribal governments, the private sector, and policy makers.

This is an inspiring future, but cannot be accomplished by improved data management practices alone. Without participants to contribute observations, there will be no citizen science data to manage. Hochachka *et al*. (2012) affirm that "the acquisition and management of large volumes of data requires planning not only of the data-management infrastructure, but also for appropriate methods for maintaining the motivation of volunteers," (p. 130). Although past examples of citizen science successes and failures provide insight into this topic, future research on participant motivations is needed in order to realize the full potential of new and existing project designs.

Methodology

This research study will use a stratified sampling design—part randomized, part non—within the context of a compiled sampling frame. The researcher will use a standardized data collection form to assess each element. Quantitative data analysis will identify any correlations between the independent variables—project resources and participant community—and citizen science activity, or the average quantity of complete data submissions per month. "Complete" data submissions may vary from project to project, but are generally defined as those submissions with enough information (date, location, species, etc.) to be used in a scientific study; one complete data submission may be, for example, a recorded sighting of a California Seagull on August 31, 2013 at Point Loma Lighthouse in San Diego, CA.

Study Population

The study population consists of all citizen science projects currently active and having been active since at least December 2011. Again, here "citizen science project" (or "project" for short) refers only to those with an established online presence. To ensure that projects included in this study population are established, they must have been actively collecting citizen science data for at least two years prior. A single institution may have multiple citizen science projects, for example, the Cornell Lab of Ornithology hosts a total of seven projects with different themes or audiences.

A comprehensive study population is difficult to determine because the citizen science community lacks an authoritative directory of projects. However, several incomplete directories exist from: 1) the National Science Foundation's CitSci.org, 2) *Scientific American*'s Citizen Science Projects, 3) SciStarter.com, and 4) the Cornell Lab of Ornithology's Gateway. These directory listings will be compiled and refined to include only eligible projects. The result will be the working population for this research study.

Sampling Design

This study will employ a stratified sampling method to draw a total of 20 projects for inclusion. The first strata will be non-probability, and will consist of five handpicked projects: eBird, Project BudBurst, iNaturalist, the Big Butterfly Count, and the Great Sunflower Project. These five projects are all established, prominent examples within the citizen science field. Including them will establish an assured variety of project resources and participant community examples. Many smaller, less prominent citizen science projects may lack sufficient funds or other resources, and therefore be designed without the careful considerations and methodology of these first strata projects. This study proposes to conclude with recommendations for future citizen science project design—to make these without including the top existing projects would be inadequate.

The five first strata projects were chosen based on a holistic understanding of the field through this author's personal experience and literature review. A brief summary of each project is provided for context:

- eBird (http://ebird.org/content/ebird) was created by the Cornell Lab of Ornithology (CLO) to track birds, and has consistently been a top recommended example of citizen science for over 10 years. CLO actively monitors the success of eBird, and faculty such as Rick Bonney and Janis Dickinson are familiar names in the citizen science research field.
- Project Budburst (http://www.budburst.org) is sponsored by the National Ecological Observatory Network (NEON) and encourages participants to submit phenology observations. This project incorporates many educational resources.
- iNaturalist (http://www.inaturalist.org) originated as a U.C. Berkeley Master's project in 2008, and continued on to become a multi-taxon, customizable platform for citizen science observations. It connects observations to multiple external resources, such as Catalog of Life.
- The Big Butterfly Count (http://www.bigbutterflycount.org), based in the United Kingdom, strives to measure environmental health with a simple task: observe butterflies for one month every summer since 2010.
- The Great Sunflower Project (http://www.greatsunflower.org) also has a limited scope, as it focuses on visible pollinators. This project has been collecting data

since 2008, and is currently the largest single body of bee pollinator service information in the United States.

For the second strata, the study will create a frame from the working population, as described above, and sample randomly within this. The working population is expected to consist of approximately 75 projects; the study will use simple random sampling to narrow this total down to 15.

The proposed stratified sampling design for this research is the best option because, as Babbie (2012) states, stratified sampling obtains “a greater degree of representativeness by decreasing the probable sampling error,” (p. 150). Renowned citizen science projects and smaller scale ones comprise a non-homogenous population when sampled together, which would increase the sampling error. By stratifying the sampling design and selecting a proportional number of elements from both population subsets, this study aims to better represent the area of research.

Data Collection

The researcher will collect data for this study unobtrusively, by recording observations on a data collection form (see Appendix A) for each of the 20 citizen science project websites. The data collection form consists of three parts: 1) administrative, 2) project resources, and 3) participant community. The administrative section records the project name, sponsor, and URL, as well as the date of observation and observer.

The project resources section is only Question #1, which asks the researcher to record presence or absence of project resources using codes detailed by the Project Resources Codes table in Appendix B. This table separates project resources into the four categories described in the literature review—educational, organizational, analytical, and social. Educational, organization, and analytical project resources directly measure the nominal variable "project resources," which is one of the two independent variables of this proposal.

The other independent project resource is "participant community," which is measured nominally by the social project resources aspect of question #1, as well as by questions #2-5 on the data collection form. Question #2 asks for the number of peer-reviewed papers published that cite considerable data from the project under observation. Here, considerable data means that the paper's findings must be at least 50% based on project data. While Question #2 assesses the project's scientific impact within the scientific community, Question #3 is aimed at assessing the project's science impact in the media, by identifying the number of search results on the project's name (in quotation marks) on Google News. Question #4 is a three-part one, asking the researcher to holistically evaluate the project's social identity, shared practices, and online social hierarchy. This freeform response question will be coded based on the grounded theory method after the data collection process is complete, since this study found no prior research to base an existing code on. Question #5 is designed to quantitatively determine the vibrancy of any discussion forums present in a project.

This second variable of participant community is less defined than project resources, and encompasses a larger variety of influences, which means that the data collection methods to measure it must be adapted. Participant community includes the internal social community—which may also be supplemented by external social media like Facebook—and the community's science impact. The latter component may seem out of place, but Dickinson and Bonney (2012) report that science impact is an essential component of citizen scientist satisfaction.

Data Analysis Techniques

The researcher will examine resulting data in a variable-oriented, cross-case analysis. The measures for project resources (i.e. answers to Question #1) will be analyzed based on frequencies, which may vary greatly, due to the expectedly broad nature of the sample population. Participant community will require more complex data analysis in order to combine the results from frequency measures (Question #1), ratio answers (Questions #2, #3, and #5), and qualitative answers (Question #4). The qualitative answers from Question #4 will be analyzed using grounded theory, and as categories emerge, coded so as to be comparable to the other coded answers.

After the data is processed initially, each of the two independent variables will be analyzed against the dependent variable in separate bivariate analysis tables. They will be analyzed separately because the study hopes to identify individual correlations, which makes multivariate analysis inappropriate for this situation. That is, the study may find that project resources do not affect citizen science activity, but participant community does.

Project Schedule

TASK	TARGET COMPLETION DATE
Phase 1: Design	
Determine research question and variables	Sept. 15, 2013
Literature review	Nov. 10, 2013
Draft data collection form	Nov. 20, 2013
Test data collection form	Nov. 25, 2013
Final research proposal	Dec. 8, 2013
Finalize data collection form	Dec. 15, 2013
Research proposal approval	Dec. 20, 2013
Phase 2: Research	
Finalize sampling frame from directories	Jan. 4, 2014

Select strata two random sample elements	Jan. 6, 2014
Data collection	Jan. 20, 2014
Data analysis	Feb. 1, 2014

Phase 3: Conclusions

Rough draft of findings write-up	Feb. 15, 2014
Finalize findings write-up	Mar. 1, 2014
Submit to publication	Mar. 3, 2014

Qualifications

This research study will benefit from my personal experience using citizen science for the past three years under multiple perspectives: as a citizen participant, as a scientist participant, and as a project organizer. While my personal insight must be held aside to allow the research data to speak for itself, being familiar with this field allows me to identify the importance of and contextualize any research findings. My professional connections as a citizen science project organizer additionally will facilitate opportunities for this research to be applied in practice.

Significance

The proposed research study has several primary beneficiaries: citizen science projects, citizen science participants, and scientists. Citizen science projects can benefit by applying this study's findings to their own projects—depending on the stage of project development and the type of finding recommendation, it may be easy for projects to incorporate simple resources and participant community tools to increase their potential success in citizen science activity. This research may also provide a basis for funding additional project resources and participant community tools. Citizen science participants can benefit from a potential response by projects to provide more (or different) resources and enriched participant community experiences. Individuals may find that satisfaction in their citizen science involvement increases. If the findings show that project resources and participant community variables may increase citizen science activity, scientists can benefit from this. Finally, on a broader scale, the benefits of increased citizen science activity reach an endless variety of populations, depending on the goals and results of specific citizen science projects.

Summary

Citizen science is evolving the way ecological research is conducted, and yet, research into citizen science project design and efficacy is limited. Further research, including this proposed study, can provide theory to enhance both citizen participant satisfaction, and scientific result quantity and quality. This study will examine the affect of project resources and participant community on citizen science activity in 20 stratified sample cases, using unobtrusive data collection methods and bivariate data analysis.

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Appendix A: Data Collection Form

Participant Motivations in Citizen Science
Research Data Collection Form

Use one data collection form per citizen science project case.

DATE: RECORDED BY:

NAME OF PROJECT: PROJECT SPONSOR:

PROJECT URL:

1. Record the codes of all free project resources available online on the date of access:

Code	Comments

2. Number of peer-reviewed papers published which cite considerable data (provides basis for over 50% of the paper's results) from this project:

3. Number of Google news results for "[project title]":

4. Briefly comment on your holistic impression of the following participant community aspects.
   a. Social identity:

   b. Shared practices:

   c. Online social hierarchy:

5. If the project has discussion forums, what is the average monthly amount of posts per registered member?

Appendix B: Project Resource Codes

<table>
<tr><th>EDUCATIONAL</th><th>ORGANIZATIONAL</th></tr>
<tr><td>E01 - Online tutorial (non-interactive)
E02 - Online tutorial (interactive)
E03 - Download tutorial (non-interactive)
E04 - Download tutorial (interactive)
E05 - Procedure video
E06 - Procedure manual
E07 - Certification via quiz
E08 - Identification guide/key (non-interactive)
E09 - Identification guide/key (interactive)
E10 - Thematic poster
E11 - Viewable maps
E12 - FAQs
E13 - Online technical support
E14 - Phone technical support
E - Other</td><td>OR01 - Data validation
OR02 - Data auto entry
OR03 - Click on map data entry
OR04 - Download all data for project
OR05 - Download data by species
OR06 - Download data by location
OR07 - Download advanced query data selection
OR08 - Log in/log out
OR09 - Favorites
OR10 - Alerts for location
OR11 - Alerts for species
OR12 - Alerts for other
OR13 - Saved maps
OR14 - Saved analyses
OR15 - Observation photos
OR16 - Mobile app
OR17 - Automated reports
OR18 - Language translation
OR19 - Event calendar
OR20 - Bulk data upload
OR21 - Personal contribution statistics
OR - Other</td></tr>
<tr><th>ANALYTICAL</th><th>SOCIAL</th></tr>
<tr><td>A01 - Basic search
A02 - Advanced search
A03 - Historical data available (>10 yrs)
A04 - External data available
A05 - Data conform to integration standards
A06 - View project statistics as visualizations
A07 - Long term visualizations
A08 - Online statistical analysis
A09 - Dynamic charts
A10 - Dynamic graphs
A11 - Dynamic maps
A12 - Animated visualizations
A - Other</td><td>S01 - Discussion forum
S02 - Blog (maintained by project)
S03 - Blog (open to participants' posting)
S04 - Commenting on observations
S05 - Flagging on observations
S06 - News feed
S07 - Professional network directory
S08 - Member recognition
S09 - Member subgroup recognition
S10 - User profile
S11 - User personal photo
S12 - Share maps
S13 - Share analyses
S14 - Variable user roles/permissions
S15 - Subtopic projects (e.g. by region, species)
S – Other</td></tr>
</table>