Usability Test Report

NC State University Citizen Science Campus
SciStarter Website

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Executive Summary

Purpose of Testing

This usability test explored how users accomplish common goals on the NC State SciStarter website, an online citizen science database. By observing participants using the website, collecting feedback about their experience, and measuring their time on task, errors, and successes, this test is designed to expose issues, concerns, and limitations that may stand in the way of the participant's ability to navigate the website effectively in order to complete tasks easily and efficiently.

Test Procedure

Five participants were recruited for this test, each of which represent one of the three personas for the main user groups: science student, science novice, and science activist. Each participant met with me virtually and independently. Meetings were scheduled through Zoom, a video conference platform, that allowed me to observe the participants as they worked through completing the five predetermined common tasks. During the observation, I made notes about body language and anything the participant said as well as measured each user's time on task, number of errors, and whether or not the task was completed successfully. After each task, I asked users to rate the relative ease of the task. At the end of all tasks, participants provided feedback about the overall user experience.

Summary of Findings and Recommendations

The test revealed a number of potential problems that are summarized below with recommended solutions.

Severity	Study Findings	Recommendations
High	Difficulty adding projects to their main dashboard.	Replace "Save to Review Later" icon with "Save to My Dashboard"
High	3 out 5 participants had used the "add to list" icon to add a project to their main dashboard and were unable to save projects.	Remove "add to list" icon or place at bottom right of project description.

Medium	2 out of the 5 users indicated that specific tasks were difficult to complete. When asked to find specific aspects of projects (location and type of project) they were unable to locate search criteria.	Darken “Project Finder Tool” text and search criteria.
Low	Participants indicated that there were too many options when selecting the Dashboard icon.	Limit the number of options when selecting “Dashboard” or just indicate “My Dashboard” option.

Table 1: *Summary of Findings and Recommendations*

Introduction

The purpose of this usability study was to identify what works, what doesn’t work, and what could be improved on the NCSU SciStarter Home website. This site serves as a hub for individuals interested in engaging in active scientific research through citizen science projects. Some of the objectives of the website include:

- Provide a searchable database for active citizen science projects
- Provide a user dashboard where individuals can save and organize projects of interest
- Provide information (including goals and how to participate) about active citizen science projects

Test Goals and Objectives

The goals of this usability test include identifying potential concerns in what Quesnbury calls the “5 Es”: End-user efficiency, effectiveness, engagement, errors, and ease of learning. The results of testing the “5Es” will establish a baseline of user engagement while also providing performance measures for future use that may be utilized for a later redesign. The test will use both qualitative and quantitative measures to evaluate user experience. The questions informing the usability test objectives are:

Efficiency

- Are users able to find information relevant to their field of interest?
- Are users able to successfully navigate the core features of the website?
- If users are successful in navigating the core features, how long does it take them to do so?

Effectiveness

- Are users able to identify the different functions of the website?

- Are users able to find and participate in projects?
- Can users complete basic tasks (like account creation)?

Site engagement

- While users navigate the website, will they express/present positive or negative experiences?
- What will users have to say about their overall experience with this website?

Error tolerance

- What kind of errors, if any, occur as users try to complete tasks?
- How frequently do errors occur? How long does the correction take?
- Are users able to recover from errors? If so, what resources helped get them on track?

Site learnability

- Do users understand how to find and participate in projects of interest?

Methodology

Participants and Recruitment

Five participants were recruited for this test. After developing skeletal personas for the main user groups (Appendix A), I sent a screener survey (Appendix B) to help to categorize participants according to one of the following main groups:

Science Student
Actively attends an academic institution
May or may not have previous experience with SciStarter or similar Citizen Science websites

Science Novice
Has not previously used SciStarter or similar Citizen Science websites
Is looking for a way to engage in public science despite not having a science background

Science Activist
Has previously used SciStarter or a similar website to participate in citizen science projects
Is always looking for ways to expand their engagement in public science

- Of the 7 completed screeners received, I selected five participants based on both their qualifications and their availability. Basic information about each of the five participants can be found in Table 2.

Participant	Gender	Age	Role	Previous knowledge of Citizen Science?	Used SciStarter before?	Used similar citizen science websites?
P1	M	25-34	Science Novice	No	No	No
P2	F	35-44	Science Activist	Yes	No	Yes
P3	M	18-24	Science Student	No	No	Yes
P4	F	25-34	Science Activist	Yes	No	Yes
P5	F	25-34	Science Novice	No	No	No

Table 2: *Screener data for selected participants*

Test Procedure

Test environment and equipment

The test was conducted virtually via Zoom with testing sessions lasting approximately 30 minutes. In order to participate in the test, individuals needed access to the following:

- Hardware: computer with web camera and microphone
- Software: Zoom

I administered the test, recorded observations, tracked task time, and took overall notes throughout each test session. At the time of the test, I provided participants with a brief overview of the test using a pre-written script (Appendix C) which was used to guide each participant through the test.

During the test session, participants were asked to think aloud while completing tasks. In addition to written notes, sessions were recorded through the Zoom platform and saved for review. Participants acknowledged their consent to be recorded verbally by reading the consent

form (Appendix D) at the start of each session. Time on task was tracked with a mobile stopwatch and recorded, along with observation notes and errors, on the observation form (Appendix E). Notes on errors made, if any, include what kind of error was made, how the participant recovered, and how long it took to do so.

After each task, participants provided an answer to a post-task questionnaire as seen in (Appendix F) before we moved on to the next task.

At the end of the test, when all tasks had been attempted, participants were asked a series of questions outlined on the post-test questionnaire (Appendix G).

Task List & Scenarios

Task	User Subgroup	Task Description	Success Criteria	Failure Criteria
1	science student, novice, adult activist	*Create an account*	Clicks on "Sign Up"	Fails to create an account
2	science student, novice, adult activist	*Find a local public project to participate in that focuses on conservation*	Enters "conservation" and "raleigh" into the search fields under "Project Finder" tab and clicks "find projects"	Fails to locate both local project and type in conservation into drop down menu
3	science student, novice, adult activist	*Select a project & Identify the goal of your selected project*	Clicks on one of the projects and verbally reports the goal of the project	Fails to verbally state the goal of the project
4	science student, novice, adult activist	*Save the project to your dashboard*	Clicks on "Save to Review Later" button	Clicks on any other icon to save project
5	science student, novice, adult activist	*Navigate to your SciStarter dashboard*	Logs in to their account and opens the dashboard	Clicks sign up instead of log in

Table 3: *Tasks, NCSU SciStarter Home website usability study.*

Evaluation Methods

Qualitative

- *During the test:* Participants were asked to vocalize their thoughts as they work through each task. Notes on what they said, how they said it, and what they were doing when they said these things were recorded in my observations.
- *After each task:* Participants were able to explain or elaborate on their rankings for the ease of the assigned tasks.
- *At the end of the test:* Participants were asked about their overall experience using the SciStarter website.

Quantitative

- *During the test:* The total time for each task was recorded as well as the number of and type of errors made and whether or not a task was completed successfully will be recorded as well.
    - **Time on Task:** Total time a user spent on a task. Recorded in min:sec.
    - **Errors:** Non-critical and critical errors made by a user while attempting a task
    - Task Success/Failure:
        - **Success:** User completes a task as defined by the predetermined task descriptions
        - **Failure:** User completes the goal of a task in a way that is not outlined in the task descriptions, is unable to complete the task, gives up on completing the task, asks to move on, or has spent more than 2 minutes on the task.
- *After each task:* Participants provided feedback for each given task using a Likert scale indicating the relative ease of completing each task as measured from 1 to 5 (1 indicating the task was easy; 5 indicating the task was difficult).
- *At the end of the test:* Participants provided feedback on the overall usability of the website using a Likert scale indicating the degree to which they disagreed or agreed with predetermined statements regarding the usability of the website as measured from 1 to 7 (1 indicating Strongly Disagree; 7 indicating Strongly Agree).

Results

In the following section, I provide the aggregated results from all five participants. As all user subgroups were asked to perform all tasks, I chose not to break up the results into subgroupings and instead provide a summary of trends specific to each subgroup below the complete table.

Task 1: Create an account				
Participant	**Time on Task (min.sec.ms)**	**# of Errors**	**Success? (Y/N)**	**Post-task Participant Difficulty Rating (1-very difficult, 5-very easy)**
P1	00.09.66	0	Y	5
P2	00.08.73	0	Y	5
P3	00.03.57	0	Y	5
P4	00.15.04	0	Y	5
P5	00.08.23	0	Y	5
Task 2: Find a local public project to participate in that focuses on conservation				
Participant	**Time on Task**	**# of Errors**	**Success? (Y/N)**	**Post-task Participant Difficulty Rating (1-very difficult, 5-very easy)**
P1	02.00.40	4	N	4
P2	00.15.29	0	Y	4
P3	00.20.43	1	N	5
P4	3.02.12	1	N	1
P5	2.05.40	2	N	3
Task 3: Select a project & Identify the goal of your selected project				
Participant	**Time on Task**	**# of Errors**	**Success? (Y/N)**	**Post-task Participant Difficulty Rating (1-very difficult, 5-very easy)**
P1	01.36.39	3	N	1
P2	00.05.02	0	Y	5

P3	00.03.03	0	Y	5
P4	00.03.48	0	Y	4
P5	00.09.16	0	Y	4
Task 4: Save the project to your dashboard				
Participant	**Time on Task**	**# of Errors**	**Success? (Y/N)**	**Post-task Participant Difficulty Rating (1-very difficult, 5-very easy)**
P1	00.20.85	0	Y	5
P2	00.09.30	0	Y	4
P3	00.20.19	1	N	3
P4	00.10.14	1	N	4
P5	00.19.13	1	N	2
Task 5: Navigate to your SciStarter dashboard				
Participant	**Time on Task**	**# of Errors**	**Success? (Y/N)**	**Post-task Participant Difficulty Rating (1-very difficult, 5-very easy)**
P1	00.18.98	0	Y	5
P2	00.05.12	0	Y	4
P3	00.08.53	0	Y	5
P4	00.03.30	0	Y	5
P5	00.30.37	0	Y	5

Table 4: *Results from task observations*

Overall, participants agreed that the tasks were relatively easy to complete even when tasks were not completed successfully or experienced failure. This is best explained by the website's ease of navigation which allowed the users to meet the goal of some of the tasks in a way that worked around the tools or resources the website presents. Because of the ability to achieve the

goal of the task, despite failing the task objective, it can be concluded that the website provides ease of use but lacks clarity in its overall design and layout. This leads to the inability of users to utilize helpful tools such as the “find projects” feature or the “save for later” feature.
Of the five participants, two assumed the role of science novice, two assumed the role of science activist, and one assumed the role of science student. There were no discernable trends amongst any of the subgroups.

Findings

In analyzing the test results, I identified a critical usability issue that extends throughout the SciStarter website. Though there were also four main common failures. The global problem of the website affected multiple users across tasks and can broadly be described as an issue with the website layout. The way the elements are arranged on the page do not accommodate users, often leading to errors and failures. Here, I provide a break down of prioritization regarding these errors and subsequent failures using severity rating scale that considers frequency of occurrence, impact on user experience, and impact on the program’s goals.

Problem Category	Problem Description	# of participants impacted	Severity Rating
Layout	The “find projects” search feature is not prominently displayed	2	Medium
Layout	The search fields on the “find projects” search page are in a color and font that does not look to be editable	2	Medium
Layout	The “save project for later” button is difficult to find	3	High
Layout	The “Dashboard” tab does not take you to the dashboard but instead provides a dropdown menu of dashboard options	5	Low

Table 5: *Usability problems, NCSU SciStarter Home website.*

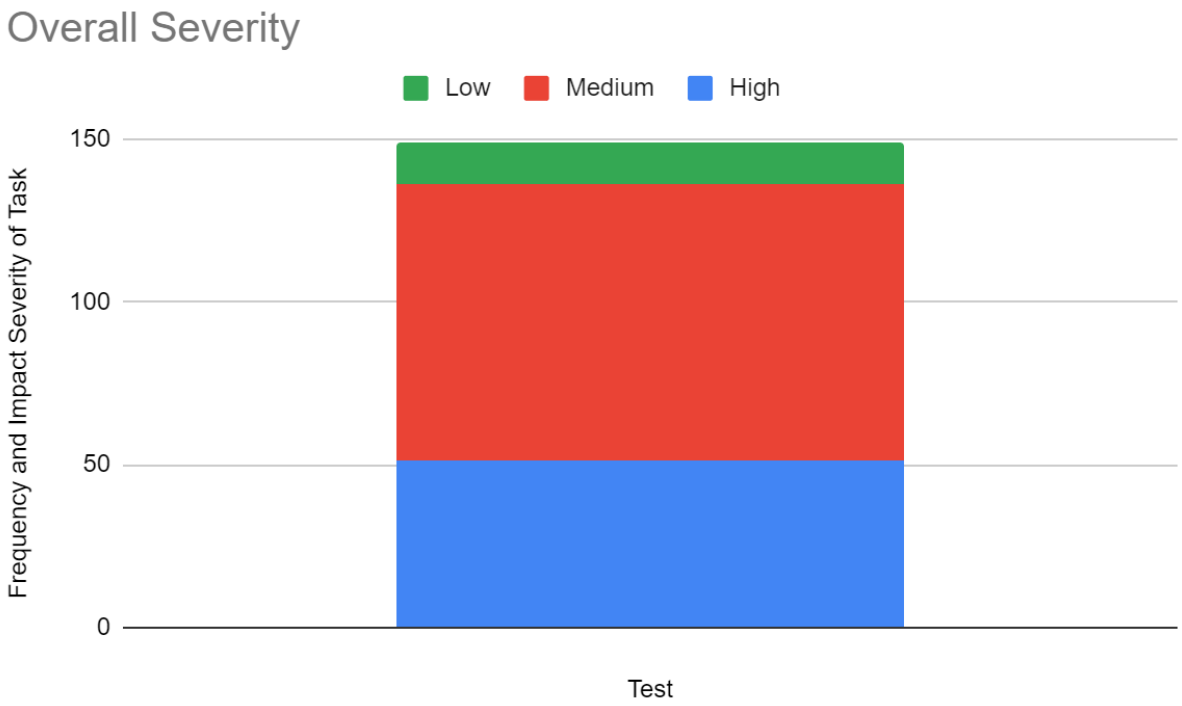

Chart 1: *Overall severity by impact and frequency of task.*

Chart one represents the impact severity of each task given. Each task was assigned an error score to represent severity.

Layout Problem: Users unable to locate “Project Finder” feature

As a database, the SciStarter website offers a “project Finder” tool which allows users to search for a relevant project by various search criteria. On the main homepage of the SciStarter website, this “project Finder” tool is prominently displayed, however when entering through the NCSU SciStarter Home page, this feature is only accessible by the tab that reads “Project Finder”. Furthermore, the NCSU Citizen Science projects are featured heavily on this page making it seem as if they are the only active projects. Of the five participants, two did not use the “find projects” tool at all. It is recommended that the “project finder” tool be displayed on the NCSU SciStarter Home page.

Image 1: *Screenshot of NCSU SciStarter Home*

Layout Problem: Users did not use search fields

When asked to find a project that fit within the specific parameters of "local" and "conservation focused", three of the five participants were unable to complete the task successfully even if they had used the "project finder" tool. This is most likely due to the placement and coloration of the search criteria boxes that would allow a user to search for a project under specific criteria. It is recommended that the search boxes be moved to a more prominent location and the text be darkened.

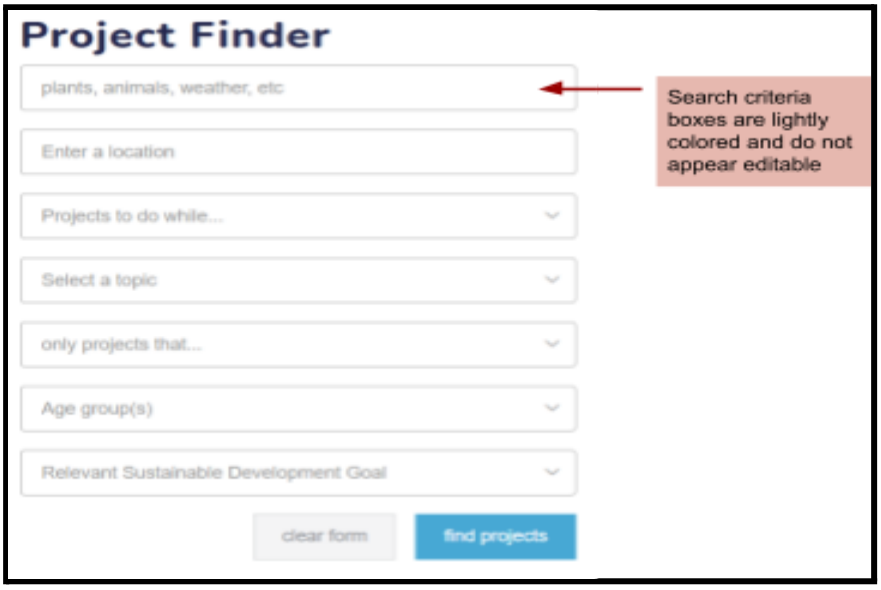

Image 2: *Screenshot of Project Finder tool from SciStarter website.*

Layout Problem: Users unable to locate "Save Project for Later" feature

The majority of users had difficulties adding projects to their main dashboard with 3 out 5 participants using the "add to list" button located at the top of the page to save the project to

their dashboard as opposed to the “save project later” button that the success criteria was based upon. Though both buttons add the project to the user’s main dashboard, the “add to list” option requires an additional step of setting up a list. Additionally, there is a button that allows users to “like” a project which also adds the project to the dashboard. Since the “save project for later” button is the main button that allows you access the page directly from the dashboard, it is recommended to move this button to a more prominent location (such as the top) and either move the other buttons lower or remove them altogether.

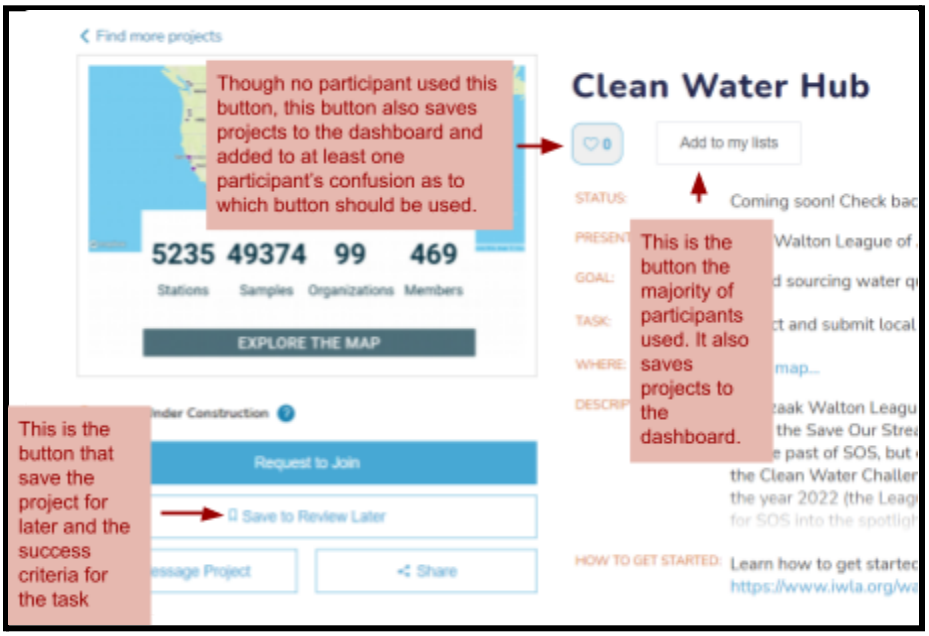

Image 3: *Screenshot of “Save to Review Later” options on SciStarter project page.*

Layout Problem: Users uncertain about how to access the Dashboard

Participants indicated that there were too many options when attempting to navigate to the Dashboard. All five participants indicated that though it was easy to get to the Dashboard, the placement of the Dashboard tab, along with the need to navigate a secondary dropdown menu for the “main dashboard” option, made it confusing. It is suggested that the “Dashboard” tab direct users to the main dashboard when clicked rather than providing a dropdown of additional dashboard options.

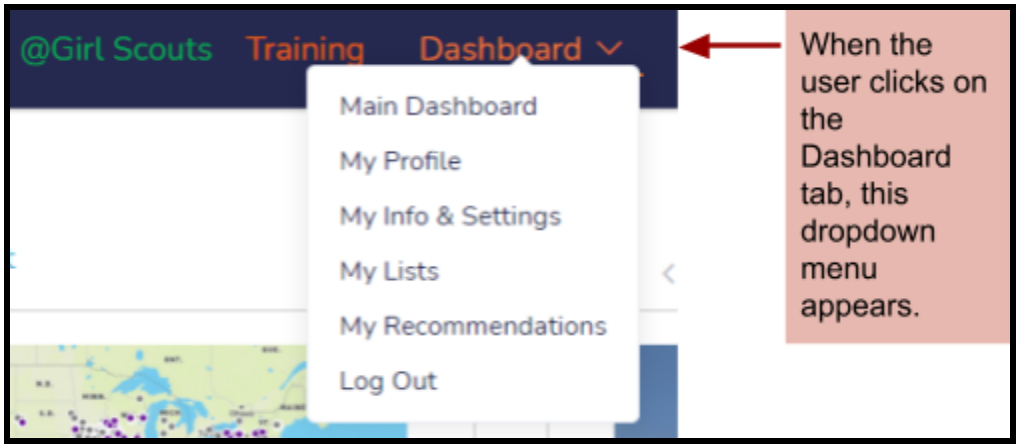

Image 4: *Screenshot of the Dashboard dropdown menu.*

Materials

Appendix A: Skeletal Personas

Personas	Persona 1: As an advanced science student, I want to expand and apply my scientific knowledge by participating in active research opportunities.	Persona 2: As a novice with little scientific background, I want to learn more about the scientific world around me and better understand science as a part of my daily life.	Persona 3: As an adult activist interested in conservation, I want to engage in active conservation efforts near and far to help preserve the world for future generations.
Quote	"Knowing about science is only helpful when we apply our knowledge through action."	"I try to be involved in science but without a background it's hard to find appropriate resources and engaging activities for which I qualify."	"If we do nothing in conservation today, we will be greatly impacted tomorrow."
Type of devices they use	Laptop, smartphone	PC, TV	Tablet, smartphone
Where do they learn about current research efforts?	Textbooks, research papers from courses, science journals, course lectures & labs	Science journals & news articles reporting on new research, library books on scientific topics	Social media posts & online communities focused on conservation
How do they share information about public science?	Public presentations related to course assignments	Talking to people in person	Various social media including Twitter, Facebook, and Reddit
What type of science are they most interested in?	Physics, biomechanics	Biological behavior, evolutionary science	Animal husbandry, ecology, environmental sciences

What happens when they encounter science concepts they're unfamiliar with?	They research independently before asking peers and instructors	They search for similar topics in related journals and news articles trying to piece the concept together from a variety of sources	They google the concept and read related headlines
How will they curate their contribution to public science and citizen science?	A record of learning is kept by the individual and submitted to the instructor for evaluation	Saves articles and journals to browser and online cloud storage to review as needed	Social media posts and activity accounts for their contribution to the science community

Appendix B: Screener

Hello,

My name is Bill and I'm a graduate student studying Technical Communications at NC State University. I'm looking for participants to help me conduct a usability test on a website about public science.

If you are interested in participating, please complete the following questionnaire. The study will take place online with a session that is approximately 30 minutes in length. Once selected, we will work together to schedule a time that works for both of us.

Thank you.

First name:

Last name:

Gender:

Select your age:

- ☐ 18-24
- ☐ 25-34
- ☐ 34-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65-74
- ☐ 75+

Are you interested in public science?

- ☐ Yes
- ☐ No

Are you currently a student at an academic institution?

- ☐ Yes
- ☐ No

Are you affiliated with North Carolina State University?

- ☐ Yes

- [ ] No

Are you able to connect remotely to participate in this study via Zoom?

- [ ] Yes
- [ ] No

Have you ever used the SciStarter website?

- [ ] Yes
- [ ] No

Which role would be most comfortable for you to slip into for this study?

- [ ] A student looking for public science information to help their career
- [ ] An adult seeking information about public science for personal education or teaching purposes
- [ ] An activist seeking information on public science projects to contribute to

Appendix C: Moderator Script + Checklist

Prior to participant arriving

- ☐ Print out script+checklist, observation form, post-task questionnaire, and post-test questionnaire
- ☐ Set up and test microphone, camera, and recording function of Zoom
- ☐ Prepare link to SciStarter website

Prior to test

- ☐ Introduction and covering of test methods
- ☐ Explain purpose of the test

Hello, my name is Bill Lewis. Thank you very much for your time. Today, you will be helping me assess the existing SciStarter website in order to help understand the overall functionality of the site. Throughout the test, I will ask you to complete a few tasks on the SciStarter website each of which will be followed by a question asking you to rate the relative ease of completing said task. After the completion of all tasks, I will ask you a few more questions about your overall experience before ending the session. The entire testing session should be approximately 30 minutes in duration. Your feedback about the website's navigation capabilities is extremely important to us. During the sessions, we would like to comment verbally as much as possible. For example, if you are having difficulties with a task, you could say "I'm having trouble finding the link" or if you find a task to be particularly effortless you could say "That was easy." Please be as honest about your experience as possible. Though I am an NCSU Graduate student, I did not make or work with the website or its designers and giving your honest opinions will not offend me. Keep in mind this is a test of the website and not your skills. The goal is to improve the usability of the website, so the more detail you can provide about your experience, the better. Lastly, this test session will be recorded. At this time, I would like to give you the opportunity to read and sign our informed consent form. You are not, at any point obligated, to participate in this and are free to leave at any time without penalty. I know this was a lot of information. Before we begin do you have any questions for me about the consent form, study, or sessions?

- ☐ Provide time for participant question/response
- ☐ Screen share consent form
- ☐ Begin recording on Zoom
- ☐ Record participant's consent statement

During test

- ☐ Introduce the first scenario
- ☐ Begin timer

"The first task is …"

- ☐ Record observations, errors, and time on task

"Now we will complete the post-task questionnaire for task 1…"

- ☐ Record post-task questionnaire response

“The second task is …”

- ☐ Record observations, errors, and time on task

“Now we will complete the post-task questionnaire for task 2…“

- ☐ Record post-task questionnaire response

“The third task is …”

- ☐ Record observations, errors, and time on task

“Now we will complete the post-task questionnaire for task 3…“

- ☐ Record post-task questionnaire response

“The fourth task is …”

- ☐ Record observations, errors, and time on task

“Now we will complete the post-task questionnaire for task 4…“

- ☐ Record post-task questionnaire response

“The fifth task is …”

- ☐ Record observations, errors, and time on task

“Now we will complete the post-task questionnaire for task 5…“

- ☐ Record post-task questionnaire response

- ☐ Remind participants to think out loud where necessary

After test

- ☐ Present post-test questionnaire

“Thanks for your participation. Before we end our session, I will ask for your responses to the post-test questionnaire. At the end of the questionnaire, you will be thanked again for your time and the call will end.”

Appendix D: Consent form

I hereby grant permission to have myself, my screen, and my audio recorded for the usability test being conducted on ___(today's date)_____ remotely via Zoom.

My first name may be used for reporting following this usability test on the SciStarter website.

I give up any rights to the recording and understand that they may be used for the purposes outlined in this test and explained to me during the test.

As the test is conducted remotely and virtually, this verbal recording serves as my official consent.

My name is ____(state your first and last name)___

Today's date is: ___(restate today's date)___

Appendix E: Observation form

Participant #___					
	Notes	**Success? (Y/N)**	**Time on Task**	**# of Errors**	**Description of errors**
Task 1					
Task 2					
Task 3					
Task 4					
Task 5					

Appendix F: Post-task Questionnaire

Rate each task depending on how easy or difficult it was on a scale from 1 to 5. 1 indicates the task was very easy and 5 indicates the task was very difficult.

Sample Question: *"Find a local public project to participate in that focuses on conservation"*

	Participant 1	**Participant 2**	**Participant 3**	**Participant 4**	**Participant 5**
Task 1					
Task 2					
Task 3					
Task 4					
Task 5					

Appendix G: Post-test Questionnaire

Based on the Perlman questionnaire.

Perlman, G. (2018). *Computer System Usability Questionnaire.* Available at https://garyperlman.com/quest/quest.cgi.

There are 17 quantitative questions that ask you to rate how usable SciStarter was on a scale from 1 to 7. 1 means strongly disagree, 7 means strongly agree. N/A is also an option. The final question (question 18) will be an open-ended question about your overall experience with the website.

	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
1. Overall, I am satisfied with how easy it is to use this website					
2. It was simple to use this website					
3. I can effectively complete my work using this website					
4. I am able to complete my work quickly using this website					
5. I am able to efficiently complete my work					

using this website					
6. I feel comfortable using this website					
7. It was easy to learn to use this website					
8. I believe I became productive quickly using this website					
9. The system gives error messages that clearly tell me how to fix problems					
10. Whenever I make a mistake using the website, I recover easily and quickly					
11. The information (such as online help, on-screen messages, and other documentati					

on) provided with this website is clear					
12. It is easy to find the information I needed					
13. The information provided for the system is easy to understand					
14. The information is effective in helping me complete the tasks and scenarios					
15. The organization of information on the website screens is clear					
16. The interface of this system is pleasant					
17. I like using the interface of this system					

Please describe your overall experience navigating SciStarter.					