

The Robotics Club at Iowa StateTM

Website Usability Test Report

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Introduction

The Robotics Club at Iowa State™ aims to teach students about robotics as they build robots to compete against other collegiate groups. As a result, their website should promote their club to gain new members and sponsors and inform faculty, students, robotics enthusiasts, and community members about the club. Their website is intended for current or soon-to-be Iowa State students, faculty, local businesses, and other collegiate robotics club members. However, the Robotics Club's officers do not feel their current website meets its goals or is positively seen by its audiences. As a result, a usability test was conducted to provide more concrete information about the audiences' thoughts on the website and specific places where the website needs improvement.

I conducted this usability test on behalf of the Robotics Club officers to understand how well the users can complete basic tasks on the website and find the information users typically want. Five individuals completed the usability tests. First, participants 1 and 2 completed the tests on a Dell 14-inch Windows laptop and had their audio, camera, and screen recorded in Webex meetings. Their tests happened off-campus. Second, participant 3 completed the tests in Ross's Studio for New Media on a Mac desktop with a 27-inch monitor and had their audio, camera, and screen recorded using Camtasia. Finally, participants 4 and 5 completed the tests in Durham's Usability Lab on a PC desktop computer that runs Windows. Their audio, camera, and screen were recorded using the lab's cameras, microphones, and software, and their eye movements were recorded using the lab's Tobii eye-tracking software.

During each test, I first asked the participant to attempt a series of small tasks on the site to find information that the primary audience members want to know. Second, they were given the option to explore the site on their own. Participants only took advantage of this opportunity when they wanted to see specific website pieces that they noticed while completing the tasks but were not relevant to the given tasks. Only participants 2 and 5 took advantage of this opportunity as the other participants felt the website was very limited and they had seen everything while completing the tasks. Finally, participants answered a series of short questions, providing their thoughts on the website.

Executive Summary

Participants 1 and 2 completed the tests at their homes in Cedar Falls, Iowa, on October 9, 2022. Participant 3 completed the test on October 17, 2022, in Ross's Studio for New Media. Participant 4 completed the test on October 18, 2022, in Durham's Usability Lab. Finally, participant 5 completed the test on October 25, 2022, also in Durham's Usability Lab. I chose to conduct the studies in various locations, on different computers, and with multiple software platforms because I wanted to experience all of the equipment and software that we discussed in lectures. Additionally, I spent time on my own to learn how to use each software and piece of lab equipment. As part of this learning process, I downloaded the Tobii eye-tracking software manual and spent time experimenting with the various data visualization options. Each session lasted, on average, 15 minutes.

The tests consisted of three phases. First, participants completed four short tasks. The goal was to see if participants could navigate the website easily and find information. I wanted to answer the question, "Was this website's organization user-friendly?" Second, participants were given time to explore the website on their own. This phase was optional. If the participants believed they had seen the entire

website while completing the first phase, they could skip phase two. Only two participants completed the second phase. The goal of the second phase was to prepare the participants for the last phase. Finally, participants answered a series of questions about their opinions of the website. The goal of the third phase was to get the participants' general impression of the website. I wanted to see if users would be positively persuaded by the club's website and view it as professional.

Overall, the participants found the Robotics Club's website visually appealing, but they saw the lack of content and broken features as problematic and unprofessionalism. Plus, participants ended the test with countless questions for the club and their questions caused them to have little desire to join or sponsor the club without further conversations with club officers.

As a result, I recommend the following improvements and updates to the Robotics Club's website to improve the website's users' perceptions of the site and the site's professionalism:

- Feature information about who the club is, their goals, meeting times, etc.
- Include more and updated media such as photos and videos.
- Improve the way that users contact the club.
- Incorporate more information about club projects and add content to the "Projects" page.
- Update the officers' page with a list of the current officers and advisors and add short bios about each officer and advisor.

The following document explains the usability test methodology and participants, task completion rates, participant comments, and recommendations for site improvements.

Methodology

Sessions

I asked family and friends to complete the tests as a favor, meaning I know each participant personally. I completed the testing on five participants because I felt each participant brought a different perspective to the test, and I wanted to gain more experience completing usability testing. Three participants are college students, each with a different major, background, and involvement in robotics activities and clubs. One participant is a high school student. The last participant is a businessman who makes sponsorship decisions about youth robotics programs for the engineering company where he works.

Each test lasted, on average, 15 minutes. Before each test, I asked the participants for permission to record and use their data. I also explained how the test would work. The first phase consisted of the participants completing four tasks. Each task was a scenario where the user had to imagine themselves as a specific and common website audience member trying to find a piece of information on the website that the audience member would desire. I recorded how long it took the participants to complete each task using a stopwatch on my phone. I read off all of the tasks to the users, ensuring each participant heard the same task wording. I gave participants the option to read the task as I read it aloud, and only participant 1 wanted that option. I did not ban users from using "Ctrl-F" to find information because the website includes little information and using "Ctrl-F" would not help them very much. (To see the tasks that I asked the participants, please see the document section called "[Tasks](#).") Second, the participants were allowed to continue exploring the website if they saw anything on the site that they wanted to explore

during phase 1 but it did not pertain to the given task. Because the site is very small, most users did not take advantage of this opportunity. Finally, I asked the participants to answer questions, providing their opinions and feedback about their experience finding information on the site. (To see the questions that I asked the participants, please see the document section called "[Follow-Up Questions](#)."

Participants

The five participants who completed the usability tests have the following characteristics. I did not formally ask participants these questions as part of one of the phases. Since I personally know all of the participants, I knew the answers to most of these questions and informally asked the participants if I was unsure. Had I not tested the website on family and friends, I would have added a fourth phase to the study and asked participants these questions.

Age:

Under 18	1
18-20	2
21-23	1
24+	1

Computer Literacy:

Low	0
Average	2
High	3

Knowledge about Website Development:

Low	1
Average	3
High	1

Experience Sponsoring Organizations:

Yes	1
No	4

Gender:

Male	3
Female	2

Knowledge about Visual Design:

Low	1
Average	2
High	2

Knowledge about Writing Website Content for an Audience:

Low	1
Average	3
High	1

Experience on a Robotics Team*:

Yes	4
No	1

*Note: Having experience on a robotics team means that the participant was either previously or currently on a robotics team or coached a robotics team. This robotics team could be an elementary, middle, or high school team or a collegiate robotics extracurricular that is not the Robotics Club. None of the participants are or were members of the Robotics Club.

Tasks

During phase 1 of the tests, the users were asked to complete the following tasks:

Task 1:

Imagine you are a freshman at Iowa State wanting to find a club to get involved in. You loved being on the robotics team in high school and want to find a similar club to continue participating in college. Where do you go on this website to find information about the Robotics Club's projects?

Correct Answer: The list of club projects on the homepage or the page titled "Projects".

Task 2:

Imagine you work at a local Ames business focusing on engineering projects. The owner wants to give back to the community and sponsor student engineering groups. You have been asked to provide recommendations for who to sponsor. You must provide the organization's contact information as part of that recommendation. You look at the Robotics Club's website. Where do you find the club's contact information?

Correct Answer: The button labeled "Start a Conversation" at the bottom of the homepage.

Task 3:

Imagine you are a freshman at Iowa State. You attended ClubFest and talked to the Robotics Club Vice President. Afterward, you are talking to another club member and trying to remember who you talked to. This person is new to the club and is still trying to get to know all of the club members so they also do not remember the name of who you would have talked to. Using the club's website, who is the listed vice president?

Correct Answer: Ryan Newell.

Task 4:

Imagine you are the president of the robotics club at the University of Iowa. Next week, your club has a competition against other collegiate robotics clubs, including the Iowa State University Robotics Club. You want to look at the Robotics Club's social media to see what they have been up to and scout the competition. What possible social media channels can you find on the club's website to learn what they have been up to?

Correct Answer: Facebook and/or GitHub.

Follow-Up Questions

During phase 3 of the tests, the users were asked the following questions:

- On a scale of 1 to 10, with 1 being the lowest and 10 being the highest, how would you rate the website's professionalism?
- Again, on that same scale of 1 to 10, how would you rate the website's visual design?
- Finally, again, on that same scale of 1 to 10, how would you rate the website's content?
- Would you join the club based on viewing this website, solely based on your interactions with this website and not based on your interests in robotics or opinions of robotics-related clubs?
- Would you sponsor the club? Again, answer this question solely based on your interactions with this website and not based on your interests in robotics or opinions of robotics-related clubs.

- What questions would you have after viewing this website or completing any of the tasks I gave earlier?
- Do you have any other comments?

Results

Task Completion Success Rate:

Task 1:

	<i>Final Answer Accuracy</i>	<i>Time Taken to Complete Task</i>
Participant 1	Incorrect	1 second
Participant 2	Incorrect	1 second
Participant 3	Correct	55 seconds
Participant 4	Correct	33 seconds
Participant 5	Correct	6 seconds
Overall	3/5 = 60% correct	19.2 seconds average

Task 2:

	<i>Final Answer Accuracy</i>	<i>Time Taken to Complete Task</i>
Participant 1	Correct	5 seconds
Participant 2	Correct	30 seconds
Participant 3	Correct	90 seconds
Participant 4	Correct	13 seconds
Participant 5	Correct	30 seconds
Overall	5/5 = 100% correct	33.6 seconds average

Task 3:

	<i>Final Answer Accuracy</i>	<i>Time Taken to Complete Task</i>
Participant 1	Correct	12 seconds
Participant 2	Correct	16 seconds
Participant 3	Correct	3 seconds
Participant 4	Correct	1 second*

Participant 5	Correct	2 seconds
Overall	5/5 = 100% correct	6.8 seconds average

*Note: The participant admitted that they had already found the answer to this question in another task.

Task 4:

	<i>Final Answer Accuracy</i>	<i>Time Taken to Complete Task</i>
Participant 1	Correct	4 seconds
Participant 2	Correct	17 seconds
Participant 3	Correct	3 seconds
Participant 4	Correct	35 seconds
Participant 5	Correct	3 seconds
Overall	5/5 = 100% correct	12.4 seconds average

Takeaways and Additional Notes from the Participants Completing the Tasks:

Overall, almost all of the users correctly and quickly completed each task, based on the content that the site currently includes. The participants who missed task 1 had the same incorrect answer, and I wonder if they misunderstood the question based on how fast and confidently they completed the task.

Additionally, I believe that the website containing little content helped produce these results. However, the high participant success rate and low average task completion time demonstrate that the site is very navigation-friendly and well-organized.

Responses to Questions:

Rating of the Website's Professionalism:

	<i>Rating</i>	<i>Reasoning</i>
Participant 1	7	No comments
Participant 2	6	<ul style="list-style-type: none"> • Missing information such as the “Projects” page • Broken links such as the links on the homepage about the projects • Casual officer photos
Participant 3	4	<ul style="list-style-type: none"> • Clean design • Lacking in layout and information • “Screams that someone slapped it together in about 15 minutes”

		<ul style="list-style-type: none"> • Does not seem like something a corporate sponsor would like to donate money to • Looks like a situation of “Hey, there’s kids doing things. Great.”
Participant 4	8	<ul style="list-style-type: none"> • Very professional, geometric • Lots of simple colors and white space • Most buttons do not link to anything, which is unprofessional
Participant 5	6	<ul style="list-style-type: none"> • Good start and potential • Be nice if it actually included information and was up to date • Easy to find information due to layout
Overall	6.2 average	

Rating of the Website's Visual Design:

	<i>Rating</i>	<i>Reasoning</i>
Participant 1	7	No comments
Participant 2	7	<ul style="list-style-type: none"> • Disliked the officer photos being inconsistent in how much you see about the person in the photo • Believed the homepage was the best part and very good • Liked the logos on the homepage
Participant 3	3	<ul style="list-style-type: none"> • Color scheme is “painfully Iowa State” • Combination of the composition and color scheme does not look great • Needs work • Minimalist design falls short
Participant 4	8	<ul style="list-style-type: none"> • Has a few areas which could be improved • Very clean • Nice small interactive elements such as elements jumping out at you as you hover over them
Participant 5	8	<ul style="list-style-type: none"> • Would not think it was a bad design if came across it • Good colors that do not clash • Important items stand out

Overall	6.6 average
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Rating of the Website's Content:

	<i>Rating</i>	<i>Reasoning</i>
Participant 1	7	No comments
Participant 2	5	No comments
Participant 3	1	<ul style="list-style-type: none"> ● Missing information about projects ● Cannot click on projects on homepage ● Great officer's page but outdated ● Social media feels outdated ● GitHub being the most up to date item is concerning
Participant 4	6	<ul style="list-style-type: none"> ● Items seem beneficial ● Numerous pieces missing ● Cool that honor sponsors ● Wants more information about projects
Participant 5	4	<ul style="list-style-type: none"> ● Did not know if content was current ● Some links provided nothing
Overall	4.6 average	

Likelihood of Joining the Club:

	<i>Answer</i>	<i>Reasoning</i>
Participant 1*	No	<ul style="list-style-type: none"> ● Has no interest in being a part of a robotics team
Participant 2	Maybe	<ul style="list-style-type: none"> ● Yes, if interested in one of the three projects on the homepage ● No, otherwise
Participant 3	Maybe	<ul style="list-style-type: none"> ● Does not have enough information to make a decision ● Freshman, especially engineering majors, need conversation starters to feel comfortable reaching out to the club; they have to initiate most of the work, which they may not feel comfortable doing
Participant 4	Maybe	<ul style="list-style-type: none"> ● Interested in learning more

		<ul style="list-style-type: none"> Not personally interested in robotics, but website does a good job of conveying professionalism and depth of experience
Participant 5	No	<ul style="list-style-type: none"> Little information about projects, meeting times, contact information, etc.
Overall	0% Yes, 60% Maybe, 40% No	

*Note: Participant expressed a biased opinion about being a part of a robotics club based on previous experiences.

Likelihood of Sponsoring the Club:

	<i>Answer</i>	<i>Reasoning</i>
Participant 1*	No	<ul style="list-style-type: none"> Would prefer to give the money to a homeless man
Participant 2	No	<ul style="list-style-type: none"> Has more questions before making a decision How are sponsoring companies recognized?
Participant 3	Maybe	<ul style="list-style-type: none"> Great to see big-name current sponsors and local community sponsors Website lacks professionalism and “screams auto-filled WordPress template” Lacks information to make decision
Participant 4	Maybe	<ul style="list-style-type: none"> Would want to talk to an officer first Not seeing anything that would deter them Lacks information to make complete decision
Participant 5	Maybe	<ul style="list-style-type: none"> Would not fully consider without talking to someone first Would use social media presence to make decision Needs more information
Overall	0% Yes, 60% Maybe, 40% No	

*Note: Participant expressed a biased opinion about being a part of a robotics club based on previous experiences.

Participant Questions about the Website:

	<i>Questions</i>
Participant 1	No questions
Participant 2	<ul style="list-style-type: none"> What happens if my company sponsors your club? What is the club’s goal?

	<ul style="list-style-type: none"> ● What does the club do? ● Does the club have any outreach activities? ● Is there a collegiate robotics competition that they are doing? ● Can you provide a little information about the members? ● Why are the advisors advising the club? What is their connection to robotics? Are they professors who teach robotics or complete research about robotics?
Participant 3	<ul style="list-style-type: none"> ● Who are you? ● What do you do? ● Do you still do anything? ● Can you provide current information about your projects?
Participant 4	<ul style="list-style-type: none"> ● What are your projects about? How were they built? When were they built? Do you have any videos demonstrating your projects? ● When do you meet? What do you meet about? What does a normal meeting look like? What qualifications do you need to have to join? What are you expected to do? ● Is there another way that you can chat with them? Can you get in contact with an officer directly?
Participant 5	<ul style="list-style-type: none"> ● Who is your president? (i.e. Who is the current president because the officers listed are outdated?) ● When do you meet? ● Where are the projects?

Other Comments:

Participants either did not give any comments or were repetitive of comments from other questions.

Eye Tracking Software Results:

I used the eye tracking software to record the eye movement of two participants, participants 4 and 5, while they completed all three phases. Unfortunately, participant 5 wears glasses, so the software did not record not all of their data, and I could not create any visualizations that accurately and clearly explain their data. However, I believe that looking at participant 4's data provides insight into their experience using the website and the positive aspects of this website.

Overall, a common comment that users made was that the site was well organized. When the website actually had the data the participants wanted, they could easily find the information. The eye-tracking data demonstrates this because it shows that participants mainly only looked at website areas that had information related to the tasks.

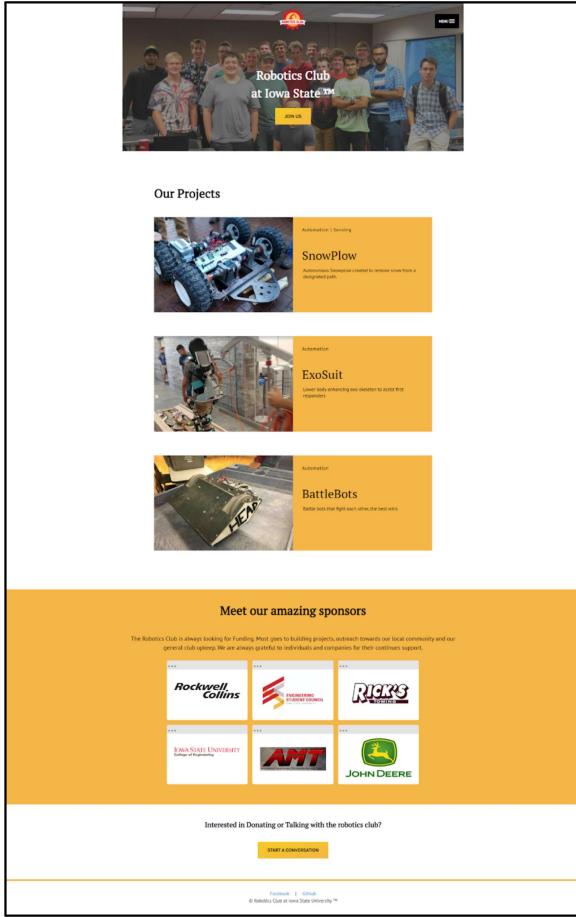


Figure 1: This is a screenshot of the regular homepage of the Robotics Club’s website.



Figure 2: This is a screenshot of the homepage of the Robotics Club’s website with a heat map showing where participant 4’s eyes viewed as they viewed the homepage. The green areas represent areas that the participant viewed but did not look at very much. The yellow areas represent areas that the participant viewed and looked at more than the green ones. Finally, the red areas represent areas that the participant viewed the most.

For example, by comparing figures 1 and 2, we can see that participant 4 looked at the areas of the website the most related to the tasks that they accomplished. The links to GitHub and Facebook are covered in yellow, and the user had to find those links to accomplish the fourth task. Also, the top left corner has many green spots because that is the area that the site menu pops up on. Participant 4 needed to focus on that area when they wanted to go to the “Officers” or “Projects” pages for tasks 1 and 3. Finally, there are many green spots around the “Meet our amazing sponsors” area “Start a Conversation” button on the homepage from when participant 4 looked for information related to contacting the club for

sponsoring them in task 2. Since participant 4 did not look at other spots on the homepage very much, it shows that they mainly just looked for the information related to the tasks. Also, the fact that all of the participants completed the tasks in phase one very quickly supports this theory that users can quickly navigate the website.

Another notable takeaway from this heat map is the top of the homepage must have the most important information about the site because that is what the participant looked at the most. Because the top of the homepage currently has the “Join Us” button, as shown in figure 1, the “Join Us” button is how potential new members learn how to join the club, and a major goal of this website is to persuade current Iowa State students to join the club, the current website including the “Join Us” button at the top of the homepage is a smart choice. Any improvements to the website must continue to include the most important piece of information at the top of the website’s homepage.

Recommendations

Obviously, the website needs a lot of work as none of the participants answered “Yes” to joining or sponsoring the club. Only two participants could not accomplish the first task, and all participants successfully completed all of the other tasks. Also, all of the participants quickly completed each task. As a result, navigating the website and finding the information is not the website’s problem. Participants consistently complained about the website’s content, meaning the website’s problem is that it is outdated and missing major pieces of information that users desire to decide whether to sponsor or join the club. Because those are the two major decisions that the website should persuade the users to make in favor of the Robotics Club, updating and improving content is critical to ensuring the website meets its goals.

Based on that analysis of the participant’s feedback and struggles, I recommend that the following changes are made to the website:

Change	Justification	Severity
Feature information about who the club is, their goals, meeting times, etc.	Four out of the five participants asked questions about who the club is and its goals. The reasoning behind one participant saying “No” and three participants saying “Maybe” to joining the club was because they had so many questions about who the club was. They did not feel that they had enough information to make a concrete decision. For the same reasons, one participant said “No” and three said “Maybe” to sponsoring the club.	High
Include more and updated media, such as photos and videos.	All of the pictures are obviously outdated, which the participants noticed. Having outdated photos decreases credibility and professionalism because it looks like the club did not care enough to keep the photos up to date. Participants 2 and 4 commented on the outdatedness of the photos. Furthermore, since the club is an engineering club, including	Low

	innovative media on their website would impress potential sponsors as it would show that they could easily use technology. Also, the media would make the club's projects look more impressive, further exciting potential sponsors.	
Improve the way that users contact the club.	If someone cannot contact the club, they cannot join or sponsor the club, which are two of the main goals to have the website users do. As a result, it is critical to have users easily be able to contact the club. Plus, participant 3 pointed out that while it is possible to contact the club, people may not feel comfortable doing so because of the lack of structure in the contact process. Again, if people do not feel comfortable or know what to say as they attempt to contact the club, they will not join the club, causing the website to fail in accomplishing its goals. The website needs to have an easy and structured way of contacting the club that users feel comfortable and confident in using.	High
Incorporate more information about club projects and add content to the “Projects” page.	All participants felt annoyed by the empty “Projects” page and that clicking on any project listed on the homepage did nothing. Specifically, participant 5 repeatedly expressed frustration at the blank page and called it unprofessional. Later, they said they would not join the club because they knew nothing about the club projects. Furthermore, including a blank page on the website is unprofessional, not impressing potential sponsors. Adding links to the project lists on the homepage is an opportunity to provide another way that directs users to project information on the website, making users more likely to see that information, which is good because participants said they would use information that they learned about club projects to decide whether to join the club. More users should learn about club projects because that could cause more people to join the club, helping the website better meet its goals.	High
Update the officer's page with a list of the current officers and advisors and add short bios about each officer and advisor.	Many participants said they would like to contact or talk to an officer to learn more about the club before joining or sponsoring it. They preferred to contact an officer directly instead of using the website's contact method. As a result, having an updated officers list is important so that website users can contact the correct people. Also, many participants asked, “Who are you?” This response means having short bios about the officers could help the website users create personas of the people leading the club. Specifically	Medium

	for students interested in joining the club, these bios would help them to know if they would be a good match or similar to the people in the club, helping them decide whether to join the club. Additionally, they can know if the advisors or club leadership would be good mentors or role models before joining the club.	
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Conclusion

In summary, participants believed that The Robotics Club at Iowa State™'s website needs improvement, and these usability tests prove that the website does not currently accomplish its goals. Participants did not see the website as professional and thought the content needed the most improvement. However, participants could navigate and find content on the website when the content existed. As a result, I recommend making improvements and updates to the website related to adding more information and simplifying the process of contacting the club. Making these enhancements will improve the website's professionalism and the users' impressions of the site, causing more people to consider joining and sponsoring the club while keeping the site user-centered.