Micro:bit
Usability Test Plan

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Document Overview

The goal of this usability test is to test how the Micro:bit graphing application will work and how users will interact with it. From these tests, we can hope to both improve the instructional text that is embedded in the application, along with the application's design. Furthermore, the data collected can test the limits of the application, and may shine light on to whether or not further training is needed.

The objectives of the usability test are as follows:

- To determine if there needs to be a robust on-boarding process through the application, or if an instructional section will be sufficient in the process of use.
- To determine if the participants can correctly use the Micro:bit device or precoded data in order to accurately graph data.
- To see if the act of graphing is understandable and to see if participants can understand the different features that are available.
- To see how effective the visual data is effective and how it can be more pleasing and easy to understand by the participants.

Executive Summary

The usability test plan will provide the appropriate information needed to make changes to the instructional material and design of the app. The metrics collected will also show us how effective the uses of the app are in terms of teaching people how to use the app's software and hardware. Even though college students will be tested for the usability test, they can still give insight into how people in general will react to the program.

Methodology

Participants

The team will be testing six participants on April 18th. All of these participants are college students that are in some sort of computer science class. This means that they will have some previous knowledge of how software and hardware works. What the team is anticipating is that they have never tried this combination of hardware and software before. Because of this computer experience, we hope that the participants will be able to give valuable feedback as they will know what to look for.

Training

The participants will either receive a physical Micro:bit device or a code that could mimic the data of the microbit device. They will also receive a PDF of the same instructions that are available on the device. The Trainer will talk the participant through the procedure and the participant will continue with no verbal instruction from the testing team.

Procedure

The test will take place on Zoom meetings that have already been scheduled. The reason for this is that Zoom will allow for the testing team to see the participants perform the test, and there is a very usable recording element to the software. As there is a shelter in place in order due to COVID-19, this is the best scenario for the team to use.

Once the Zoom meeting starts, the participants will be directed to follow the link to the website to the Micro:bit website and then will also be asked to open the PDF for the instructions for the website (which can also be found on the google calendar invite).

We will let the student know that the team will start to record the process. Then, the recording will start, and the team will solicit a verbal confirmation that the participant will agree to being recorded.

From there, we will ask the pre-test questions (that are found later on in this document). We will then give the testing participant to look over the instructions for about five minutes. Then we will make sure that they can either plug in their Micro:bit into their computer, or that they can implement the “fake” microbit in their program. From there, the testing team will announce that they will give the test participants 30 minutes to work throughout the entire instructional data with the website. We will let the participant know that we will not be able to help them during this experiment, and we will encourage the participant to verbally talk through what they were doing. We will also make it aware that if the participant finished before the 30 minutes, to let the team know.

Once the participant is finished, the team will ask the post-test questions, and also inquire if there are any updates that we could incorporate. From there, the team will stop the recording and thank the participants.

Roles

Trainer

The trainer will assist with the onboarding process. This can be either a developer or a usability expert. They will make sure that the meeting starts and that the participant has the appropriate material for the test. This person will do the majority of the pre-recorded process.

Facilitator

The facilitator will take over from the trainer once the recording starts. This can be either a developer or a usability expert. They will make sure that the time limits are adhered to, as well as ask the pre- and post-test questions. They will also make sure to track the time and give the participant time warnings.

Data Logger

The data logger will be the one that records the video, along with making notes about the test. This preferably should be a usability expert.

Test Observers

These positions will encompass the rest of the testing team that does not have a specific role. These team members will be encouraged to observe and take their own notes on the test.

Test Participants

The test participants will be college students, as stated before. They will be responsible for completing the usability test and providing feedback on how the test and product was, and how it can be improved.

Ethics

When performing this test, it will be important for the team members to not talk out of turn, nor to give any assistance to the test subjects that are not outlined. Standard professionalism must be observed at all times.

Usability Tasks

The usability tasks that the participant must complete are as possible:

- The successful connection of the Micro:bit, or the fake Micro:bit program, to one's computer.
- The successful opening of the application
- The successful graphing of recorded data on the application.
- To be able to navigate all of the Micro:bit features like starting and stopping graphing, and analyzing the graph.
- Finally, the ability to download the graph as a CSV file.

Usability Metrics

Scenario Completion

The goal of this test is to have all of the scenarios blend together and not really see where one starts and another ends. The reason for this is because this is how users will interact with the application in the real world.

Critical Errors

The only major critical error that can occur is if there is an issue with the Micro:bit or the data. If these do not work, then there will be a major issue and the test cannot continue.

Non-Critical Error

In terms of non-critical error, there are just a few that could occur within our test. First, would be if there is a confusion of the graphs. If there is a confusion on how to read it, this can be fixed in the post debrief. Secondly there is the start, pause and stop buttons. These should be straight forward, but there could be

issues. Finally, there could be an issue with downloading the graph and the fact that it can only be downloaded as a CSV.

Evaluation & Completion Time

The entire test should take around 40 minutes at the most.

- 5 minutes for onboarding.
- 2.5 minutes for pre-test questions.
- 30 minutes for the actual usability test.
- 2.5 minutes for post-test questions.

We will provide the test subject with a google form to see what they thought of the test and what the team could do to improve the process.

Usability Goals

The goal for this test is to have 100% completion of the scenarios within the time provided.

If the tests have a 100% to 80% success rate, then the tests would be considered a success and there may be a few small implementations that would need to be made to the instructional documentations and the website.

If the test has a 79% to 60% success rate, that will let the team know that there are some aspects of the tests that are successful, but some serious changes must be made in order for it to be usable.

If the test has a 59% or lower success rate, then the design has been a failure. It will be extremely important for the team to make major changes as either the instructional documentation or the website are completely unusable.

Problem Severity

The metrics below will be used by the team to pinpoint specific problems with the designs and how severe these complications are.

Impact

The ranking below will let the team know how the problem impacted the task that was trying to be finished.

- High - the problem made it impossible to complete the task
- Moderate - there was some difficulty with the completion of the task, but it only slowed the progress of the participant
- Low - there was a minor, momentary lapse, but it did not affect the overall completion of the task.

Frequency

This will be the combination of the errors with the participants on specific tasks. The frequency will be expressed in percentages.

- High - 33.4 or more problem experienced
- Moderate - 33.3% to 16.8% problem experienced
- Low - 16.7% or fewer problem experienced

Severity Classification

This will serve as a general ranking for problems encountered. They are as follows:

- Level 1 - high impact and high frequency of problems encountered
- Level 2 - either high impact and moderate frequency, or moderate impact and high frequency of problems encountered
- Level 3 - moderate impact and moderate frequency of problems encountered
- Level 4 - either moderate impact and low frequency, or low impact and moderate frequency of problems encountered
- Level 5 - low impact and low frequency of problems encountered

Reporting Results

A usability test report will be created after the test to make sure that there is a place to put the data collected. This will include metrics like success of completion, answers to questions, and other relevant information. This will provide a proper conclusion to the test, while also allowing future actions to be illuminated.

Pre-Questions

- What type of device are you using for this test?
    - What model is your device?
- What type of browser do you usually use on your device?
- On a scale of 1-10, with 10 being an expert, how would you rank your coding and programming ability? Why?
- Have you ever worked with a Micro:bit before?
- How often do you find yourself needing to collect data?

Post-Questions

- On a scale of 1-10, with 10 being extremely easy, how would you rank the difficulty of using this program? Why?
- Were the instructions helpful with the tasks?
    - What could be improved with the instructions?
- What did you think about the design?
- Is the program usable?
    - How would you improve it?