
User test of an improved grabber, group 18

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Abstract: In the user test the functionality and comfortability of a new improved grabber is compared against the old grabber from the participant. The participant is in a wheelchair and has less strength, energy and mobility. Each test is done for both grabbers. To test the functionality the participant needs to grab multiple items with both grabbers. After each item the participant needs to rate the difficulty. Each item is also timed. To test the comfortability the participant needs to fill in a questionnaire about the comfortability of the grabber he was using. In the questionnaire there are statements, and the participant needs to indicate how much he agrees with each statement.

Keywords: Functionality, comfortability user testing, grabber

1. Introduction

In the user test the comfortability of the grip and his ability to pick up items with an improved grabber is tested. The grabber is a prototype made of mostly 3D printed part and is focused on the arm mechanism as well as the handle.

The goal is to determine the effectiveness of the improved grabber in comparison to the old grabber. The participant of this user test is the co-designer of group 18 from module 7 Design for specific users 2022. The user has osteogenesis imperfecta type III. This results in him having less strength, energy, and mobility. For this reason, he uses a wheelchair.

2. Research questions

The two things tested in the user test are the functionality and comfortability of the grabber. The research questions are;

- How does the new grabber perform against the old grabber from the participant in under the metrics of time and effort it takes to grab an item?
- How does the handle of the new grabber perform against the handle of the old grabber in comfortability?

3. Methods

In both parts of the user test it was decided to compare the new improved grabber against the current grabber of the participant. In this way, improvements can be clearly seen.

2.1. Functionality

To test the functionality of the grabber, after allowing the user to grow accustomed to the new grabber, we will measure his ability to pick up items of varying difficulty with both his old and new grabber. This will be measured through noting the time it takes to pick up the items and noting how the user rates the difficulty. This will be measured on a scale from 1 being extremely easy to 10 being extremely difficult to pick up the item. Moreover, we will ask for an explanation for the reasoning behind the rating.

First the participant will pick up 10 different items with his old grabber. After each item he will rate the difficulty. Then there will be a small break for our participant to rest. This is because his fatigue can impact the results. After the break he will have some time to get accustomed to the new grabber. This is because he is very used to his old grabber and this

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difference can affect the results of the test. Then there will be another small break. The last task is picking the same items up in the same order that he did with his old grabber but with the new grabber. Again, he must rate the difficulty of each item. During the breaks for the participant the team will set up the next part of the test.

2.2. Comfortability

Secondly, we will test the effectiveness of the handle. This will be done by measuring several aspects through a statement questionnaire. Firstly, the user will be asked to rate the ergonomics of the new handle compared with the old handle. The user will then comment on whether the new grip improves his manoeuvrability and handling of the grabber. Lastly, the user will comment on how the grip affects, if at all, his ability to pick up an item. He will be asked to fill in the statement questionnaire for both the old and new grabber.

2.3. Question sheet

Table 1 shows the questionnaire the participant needs to fill in. For each statement he must indicate whether he agrees or disagrees for the grabber that he is using.

Table 1. Questionnaire to test comfortability of the grabber

Statement	Strongly disagree	Somewhat disagree	Neutral	Some-what agree	Strongly agree
The handle of the grabber fits my hand nicely					
The handle does not hurt my hand					
The handle is comfortable to hold					
The shape of the grip helps me pick up items					
I can easily get a firm/strong grip on the handle					
The handle gives me a lot of control over the product					

2.4. Schedule

In table 2 the time schedule is shown with the estimated time it takes to do each task.

Table 2. Time schedule of the user test

Time it takes	Task	Remarks
~5 to 10 min	Explaining the test to participant	
~5 to 10 min	Choosing items with participant	
~2 min	Pick up item 1 with old grabber	Record the time it takes to pick something up
~1 min	Rate item 1 on difficulty	Ask for rationale behind rating
~30 min	Repeat the last 2 steps 9 more times	
~5 to 10 min	Small break for participant	Ask the participant to fill in the comfortability questions for the old grabber
~10 to 15 min	Let the participant get used to the new grabber	

~5 to 10 min	Small break for participant	Ask the participant to fill in the comfortability questions for the new grabber
~2 min	Pick up item 1 with new grabber	Record the time it takes to pick something up
~1 min	Rate item 1 on difficulty	Ask for rationale behind rating

2.5. Equipment and location

The equipment needed for this user test is the old grabber of the participant, the improved grabber, common items that fall on the ground around his house and a timer. Additionally, we will need a document to take notes and times as well as a document where the questionnaire can be filled in.

His living environment. This is the location he uses his grabber the most.