Tree Testing the tugraz.at/en Information Hierarchy

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Abstract

This paper introduces the approach of applying the theoretical knowledge of tree testing within a real world study. To get an insight in how the various methods of tree testing work, the official webpage in english version of the University of Technology in Graz (tugraz.at/en) was examined regarding the information architecture. As discovered while writing the survey concerning the theoretical background of tree testing as part of this Master course, it appears that there are a lot of different types and methods in how tree testing can be performed, like the moderated (supervised) and also the unmoderated (unsupervised) type. During the study described in this paper, all those different methods were applied. For the purpose of so called "Thinking-Aloud" tests, to which the moderated variants of testing belong, all the participants were recorded by camera. So during the study there were a lot of video footage accrued, which are attached to this paper. For the unmoderated type of testing, the software tool UserZoom was used. This paper gives also an overview on how UserZoom will be configured and how a new project can be created. Finally, the results of all tests(moderated and unmoderated) will be investigated and the analytic tool of UserZoom will be explained based on the results.

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Chapter 1

Theoretical Background about Tree Testing

Tree testing is simply an usability technique, which is used for evaluating findability in information architectures. The fundamental work of tree testing was made by Spencer [2003].The name tree testing was first mentioned by Dave O'Brien. Dave O'Brien and his team named it tree testing for the reason that it seemed to stick with the participants during an usability test and it is sure easier to type, he mentioned in Brien [2009] .

But tree testing is not the only way to call this technique. In many articles also other names are mentioned. Here a small overview of names, which also refer to tree testing, introduced by Brien [2017].

- Reverse card sorting

- Inverse card sorting

- Task-based category testing

- Taxonomy testing

1.1 Findability

Findability describes how easy an user can find a certain information within an information architecture like a website. High findability can be reached by defining a good information architecture (IA) and also by a well-designed navigation system (UI). Since this survey is about tree testing, the main focus should be on the information architecture and not on representational things as well as the interface. It could lead to enormous costs of redesigning, if there is an issue in the information architecture. Therefore, tree testing is a very good idea at the beginning of each project.

1.2 Why Tree Testing

The main point for usability testing is to check if an information architecture works. But there are also other techniques which can be used. So what benefits does tree testing offer? Primarily tree testing can be done without great effort. This makes it very cheap and popular. At the very first version, which was introduced bySpencer [2003], the test was done without any technical equipment. Only a pack of index cards and a pen were needed. Tree testing only tests the information architecture respectively the labelling of categories. For that reason it can be performed very early in the design process of a project. At this time no final implementation of the information architecture is needed - only a structure of information given in a hierarchical form is necessary. To sum up, tree testing provides getting early informations about the behaviour of the information architecture. If some issues occur, changes can be performed quickly before the whole layout, navigation system or the interface are finally developed. The results of tree testing can also be used to verify and compare existing information hierarchies. So it is possible to develop different kind of trees and compare them to each other.

1.3   Types of Tree Testing

There are different types of how tree testing can be performed. Since this decision is essential for the further process, it should be done with great care at the beginning of each test. This decision influences also the preparation for the test itself. The types of tree testing are based on KIU [2017]. There are two main ways of how tree testing can be performed:

- Moderated (Supervised)

- Unmoderated (Unsupervised)

Is a direct contact to the participants necessary, maybe to explain ambiguities, or can the test also run without human support? A typical example of a moderated type of tree testing is the paper-based version. This type of testing requires human interaction with the participants. At the beginning of a paper-based test, it is common to introduce oneself and give a short explanation why this test is necessary. But not only paper-based testing can run in moderated form. Also, the online testing version can be handled in this form. Performing an online moderated testing, the moderator can interact with the participant by using a web service, similar to an online meeting. The participant has the opportunity to share the display with the moderator. In this case the moderator is able to see if the participants hesitates choosing some answers. Generally online tests are unmoderated, which leads to the main advantage of moderated testing: If something in the procedure of testing is ambiguous, the moderator can clarify immediately and can control the whole test procedure. Also, a moderator can observe the behaviour of the participants and add some impressions to the final test results. On the other hand, there are also some advantages for the unmoderated test version. First thing is, that no extra manpower is needed for the testing purpose. The unmoderated testing is cheaper and tests can be performed simultaneously - much more informations (test results) can be acquired over the time. Last but not least, a fact which should not be ignored: The behaviour of observed users might be different which could falsify the data.

Chapter 2

Project Introduction

The aim of the project was to apply the theoretical knowledge about tree testing, in the course of a real world study. For this purpose, the webpage of the University of Technology in Graz (English version) should be examined regarding the information architecture. As already mentioned in the theoretical part above, tree testing can only be used to test the information architecture and not the presentation or the interface of the webpage. Therefore it is necessary to extract the information architecture from the webpage. This could be done by dissolving the relevant information, in this case all the links included in the webpage and represent them in a hierarchical structure. This form of representation is called information hierarchy, which is nothing but a tree structure of relevant informations. Now as the information architecture is available in a hierarchical form, the tree can be tested regarding the findability of certain informations.

As already known from the introduction, there are two main ways of performing tree testing. The moderated (supervised) way and also the unmoderated (unsupervised) way. In case of the tree testing presented in this paper, both methods have been performed. For the moderated way the classic paper-based card test as well as a special software tool, called UserZoom, were used. Both tests were performed as a so called "Thinking-Aloud" test, were the participants has to talk out loud and give reasons why they made some particular decisions. The software tool UserZoom was also used for the unmoderated (unsupervised) way of performing tree testing, which is the major part of this study.

For this purpose a link to the tree test, created in UserZoom, was sent out via e-mail to various participants. All these participants are current students at the University of Technology in Graz. They could open the link in their web browser and start executing the test online. Keep in mind, that there is no option to get help or ask an instructor, it is a classical unmoderated online test.

2.1 Preparing for Testing Purpose

For the moderated (supervised) way of tree testing, 9 different participants were needed, and also a special place and equipment for recording them. The moderated test was split into the paper-based card test and the software supported UserZoom online test. Also the UserZoom test itself was split into the mobile and desktop version. UserZoom provides views for desktop devices as well as for mobile devices.

- 9 participants moderated (supervised) Thinking-Aloud test
  - 3x paper-based card testing
  - 6x online (software) UserZoom testing
    * 3x UserZoom desktop version
    * 3x UserZoom mobile version

For the unmoderated way of testing, 20 participants were invited by a special link to the UserZoom test environment via e-mail.

Figure 2.1: Hierarchical Structure of Categories in the Spreadsheet

2.2   Create the Hierarchical Structure

As described, for testing the information architecture, the hierarchical structure of the webpage www.tugrat.at/en is needed. At least to get the tree structure, all links included in the webpage have to be extracted. This information is necessary for both tests, the paper-based card test as well as for the software supported online test. Since there was no special tool, which could have provided the date in an appropriate form, the links had to be extracted manually by hand. As the tree structure can also be uploaded to the UserZoom tool, it makes sense to store the tree in a spreadsheet, which is at least a simple Excel file. Each column of this file represents a category of the tree. All data in the leftmost column represents the main categories, the data in the next column the subcategories and so on as shown in Figure: 2.1

After uploading this spreadsheet to UserZoom the tool automatically creates the tree structure internally, as shown in Figure: 2.2 But it is not mandatory to upload a spreadsheet, the tree can also be created by typing in the categories separately by tabs. However, the tree for this study is very large, uploading the structure as spreadsheet should be preferred.
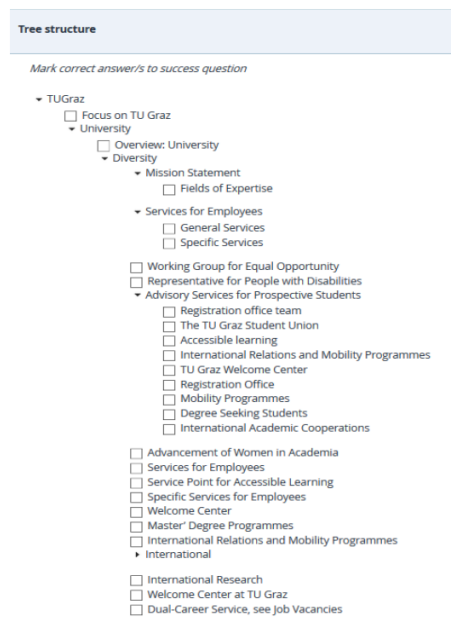
Figure 2.2: Internal Tree of UserZoom

2.3 Creating the Tasks

An important point regarding tree testing are the tasks. The goal of each participant is to find a category within the tree which contains the searched information described by the task. Indeed finding good tasks are one of the most important and also one oft the hardest parts within the workaround for preparing a tree test. So each task should test a different part of the tree and should be written in the same language style as the information within the tree. So the average recommended number of tasks during the common literature about tree testing is 10. For the study carried out in the course of this paper, the number of created tasks was 12. As the target group of the study are current students at the Technical University in Graz, the tasks are mostly designed for them concerning the content.

The tasks in the table below are used for both tests, the moderated paper-based card test as well as for the online test in moderated and unmoderated form.

Number	Search Task
1	Which degree programmes does TU Graz offer?
2	Find information about discounts for public transport for students offered by Holding Graz.
3	Find information about the history of the TU Graz.
4	Find information about strategic partnerships with international universities.
5	Find information about forthcoming events at the university.
6	Find the opening hours of the university's own kindergarden.
7	Find information about the university's portfolio of affiliated companies.
8	Where can you find information about Doctoral Schools?
9	Find information about doing a semester abroad at cooperating universities.
10	Who are the members of the senate of the TU Graz?
11	Find information about grants for short term stays abroad for researchers.
12	Find information about semester breaks for the current academic year.

Table 2.1: Search Tasks for Moderated and Unmoderated Testing

2.4 Recruiting the Participants

It is important to understand that the study stands and falls with the selection of the participants. It makes no sense to perform a study with participants which has no relatedness to the content which should be tested, because they can not deliver comprehensive results and may falsify the whole study. To avoid this case for the study described in this report, the selection of suitable participants has been restricted to two target groups:

- Current students at the University of Technology in Graz

- Potential students, which want to study at the University of Technology in Graz

For the target group of potential students there was designated a group of school kids. But they could not attend to the test and cancelled their participation short-term. Since there was not much time left to prepare the test and find new participants for potential students, the test of this target group needed to be cancelled.

For the group of current students the members of the project team invited some of their friends and other people which are registered as a proper student at the Universities of Technology in Graz.

To sum up, there were 29 participants which performed the tree test, divided to 9 participants for the moderated and 20 participant for the unmoderated test.

Chapter 3

Performance of the Tree Test

As already mentioned the tree test was divided into two parts. For the moderated version of the test, it was necessary to prepare a suitable testing environment. Therefore a room at the University of Technology in Graz exactly in the Inffeldgasse was reserved. The moderated test took place at 20. January 2018 and started at 10:00. The unmoderated test using UserZoom was available also from the 20. January until the 30. January 2018 for invited participants.

3.1 Moderated Tree Testing

The moderated way of tree testing includes the paper-based card test and also the test with the software tool UserZoom. In the beginning of the test, every participant has to sign a so called consent form, to allow video and audio recording and also allow others who are not present to observe the recorded sessions.

As mentioned above this type of test is a so called Thinking-Aloud test, were the participants need to talk out loud every thought they made.

Also an moderator is necessary which provides a short introduction to the test procedure and ask for some particular personal background informations (so called Initial Questions) of each participant concerning age, educational background, experience with computers, experience with usability tests and so on. The real tests starts with showing the first task card in the paper-based version or with displaying the first task at the computer or the mobile device for the UserZoom test.After the participants have finished the 12 tasks, the moderator asks for feedback (so called Final Questions) how the test for the respective participant was. In Table:3.1, the Initial Questions are listed which were ask to the participants. Table:3.2 shows the Final Questions.

During the paper-based card test, the questions will be asked from the moderator and the participants has to answer verbal and it will be recorded and written down in the result spreadsheet by a team member. In the desktop and mobile version of UserZoom testing, the Initial Questions and also the Final Questions are part of the software, as shown in Figure: 3.1 and Figure: 3.2. The participants should also explain why they choose a given answer, so that it can also be recorded, in the meaning of a Thinking-Aloud test.

3.1.1 Paper-based Card Testing - Workaround

For this version of tree testing a lot of workaround is necessary. As within this treatment the whole tree needs to be mapped on so called index cards. Every category must be written down to a single index card. For the whole testing procedure around 320 index cards were necessary. The template of the index cards, shown in Figure: 3.3, was created in a Power-Point file and copied for each category. Per page 4 cards are possible. Afterwards this cards needs to be cut out. Also the 12 tasks are written down to index cards. As known from

Number	Question
1	What is your gender?
2	What is your age?
3	What is your educational background?
4	What do you study?
5	How long have you been using a personal computer?
6	How many hours per day do you use a personal computer?
7	Which kind of personal computer do you use most?
8	How many hours per day do you use the web?
9	Which kind of device do you use most often to surf the web?
10	What kind of internet connection do you normally use?
11	Which web browser do you normally use?
12	Do you have experience as a web site administrator?
13	Have you participated in a usability study before?
14	How often do you visit tugraz.at?

Table 3.1: Initial Questions for the Participants

Number	Question
1	How easy was it to find what you were looking for?
2	Would you have needed some additional information to solve some of the tasks?
3	If there were ambiguities in any of the tasks, please describe them here

Table 3.2: Final Questions for the Participants

the theoretical part, this type of testing is recommended if the information hierarchy is not fully implement or in an early design stage.

For testing full implemented hierarchies like the webpage of the Universities of Technology in Graz, the paper-based version it is not the best way because the workaround is too much for the gained information. But as it was part of the project requirements the test was executed with 3 participants related to the target group of current students at the University of Technology in Graz.

During the test, each participant was recorded with a camera from behind, so that it was possible to see, what card every participant chooses depending on the specific task card. The voice of each participant was also captured with an external microphone, connected to the camera to increase the quality. Therefore the participants were asked to read out load the task from the card before beginning a new task and also to talk out load everything they think. But as recognized, it was really hard for them not to forget this important fact. Every participant had to be reminded several times, sometimes without success..

So generally the procedure of the paper-based card testing can be summarized as following:

- Meet and greet the participant

- Giving a short explanation of the testing procedure and why this this is important

- Asking for some personal background informations (Initial Questions)

- Starting the test by showing the first task card

- Asking for some feedback when the participant had finished the test

Figure 3.1: Initial Questions - UserZoom

3.1.2 Paper-based Card Testing - Gerneral Participant Informations

The general informations about the personal background are extracted from the answers to the Initial Questions of each participant. Also each participant has evaluated the test procedure itself, regarding the Finial Questions. This information can be found in the tables:3.3, 3.4 and 3.5.

3.1.3 Paper-based Card Testing - Performing the Test

The tests of the "tree-test" participants were successive accomplished with the same tasks and also in the same order for all of them. The average testing time was about 20 minutes per test. During the testing procedure every participant had to go back once at least to a previous category, because of not beeing sure that the information in the actual chosen category match the search task. It was noticeable that every participant was very committed and tried to solve every task immediately. Just participant number 2 skipped a task, all other participants finished every task. Also a funny insight was that no participant, also no one from the UserZoom testing group did know, that the University offers an own kindergarden.

Figure 3.2: Final Questions - UserZoom

3.1.4   Paper-based Card Testing - Results

This section gives a short overview about the testing results of the paper-based card test related to the moderated type of tree testing. It is important to keep in mind, that only 3 participants were tested within this testing process. So it is not possible to get in great insight if the information hierarchy works or not. Therefore much more participants were necessary. But it will give some outcrops about the behaviour of participants between supervised and unsupervised testing. This test also shows the problem, that paper cards are not manageable in tests with big sized trees with many categories. Publishing the paper cards on the table and also searching for the related subcategories was extremely time-consuming, which led to inattention among the participants. The bulk of cards are shown in Figure: 3.6. In the end the participants reached an overall correctness rate of 47,2% of all tasks as shown in the Figure: 3.7. The best performed tasks were task 1, task 3, tasks 10 and task 12 with an success rate of 100%. The worst tasks were task2, task 4, task 5 and task 9 with an success rate of 0%. The results of each participant are shown in Figure: 3.8

3.1.5   Testing with UserZoom

As mentioned above, the moderated (supervised) way of tree testing was also done by using the software tool UserZoom instead of the paper cards, described in the last section. The testing environment was the same as for the paper-based test. But additionally to the video recording using the camera also the screen of the device running UserZoom was screen captured. As UserZoom offers a mobile and also a desktop version, both types were tested.

- Mobile version with Android Tablet
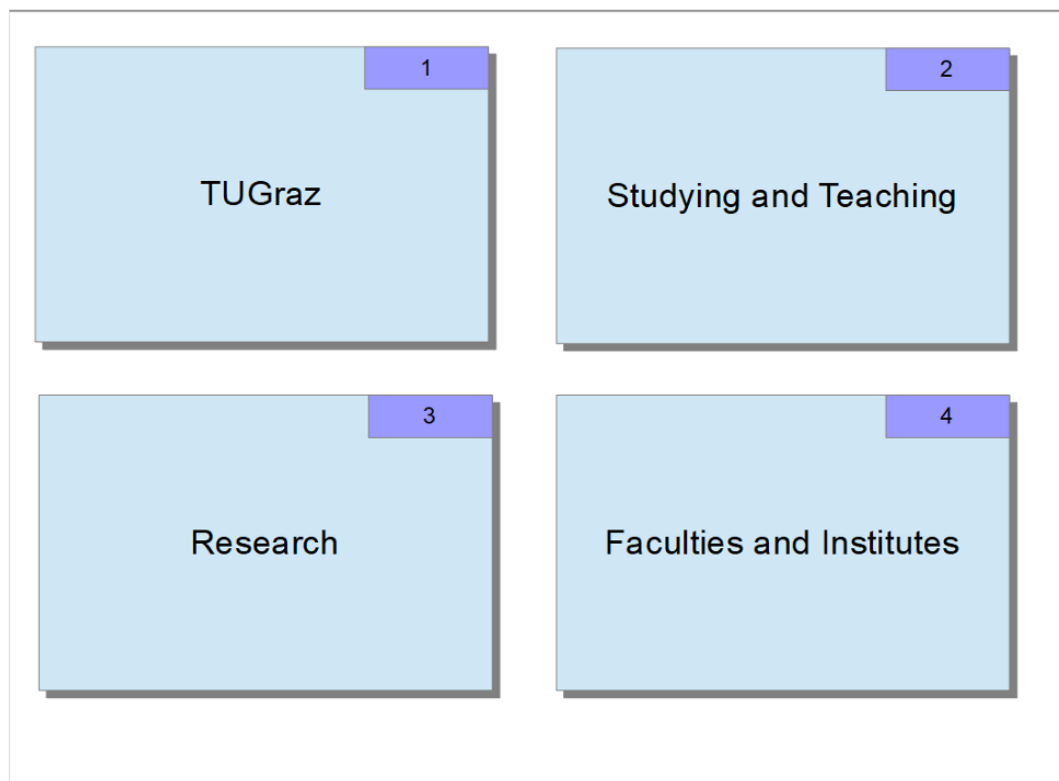
Figure 3.3: Template of the Paper Cards (One Page)

- Desktop version with Windows Notebook

For capturing the desktop version of UserZoom the tool Morae Recorder in the version 3.3.4 was used. For the mobile device screen capturing the tool DU Recorder in version 1.6.3.1 was used. To capture the UserZoom setting up demo video Ashampoo Snap 7 was used.

The environment for the moderated online testing is shown in Figure: 3.9

The results of the moderated UserZoom tests are included in the overall results together with the results of the unmoderated tests, which will be treated later in this paper.

Question Number	Answer
I1	Male
I2	25
I3	HTL
I4	Computer Science
I5	PC for 15 years
I6	10 hours (working day), 5 hours (no working day)
I7	Windows, Linux
I8	2-3 hours
I9	PC, Notebook, Smartphone
I10	LTE, ADSL
I11	Firefox
I12	No
I13	Yes, in HCI
I1	1-5 times
F1	Quite Okay
F2	Concerning the question about events
F3	No

Table 3.3: Initial Questions- Answers of Participant 1

Question Number	Answer
I1	Male
I2	26
I3	AHS
I4	Mechanical Engineering and Business
I5	PC for 15 years
I6	5 hours
I7	Windows
I8	4,5 hours
I9	PC, Smartphone, Tablet
I10	LTE
I11	Firefox
I12	No
I13	No
I1	2 times per month
F1	Not difficult
F2	Problems with the skipped task number 5
F3	No

Table 3.4: Initial Questions- Answers of Participant 2

Question Number	Answer
I1	Male
I2	27
I3	AHS
I4	Computer Science
I5	PC for 10 years
I6	8 hours
I7	Windows
I8	4 hours
I9	PC, Notebook
I10	LTE
I11	Chrome
I12	Yes (Admin about 2 years)
I13	Yes
I1	Once a semester
F1	Easy to find, good categories
F2	Task 2, Task 7
F3	No

Table 3.5: Initial Questions- Answers of Participant 3
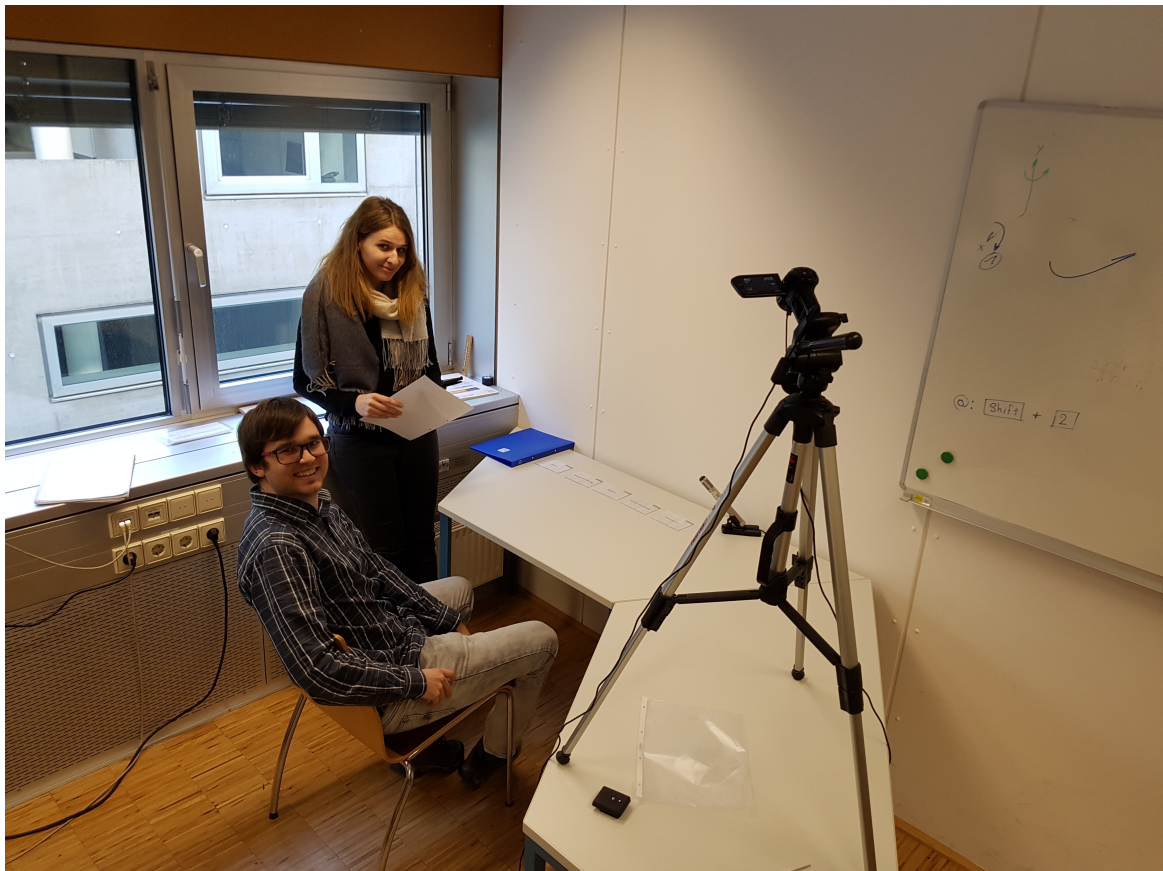
Figure 3.4: Testing Environment for Paper-based Card Test

Figure 3.5: Testing Environment for Paper-based Card Test
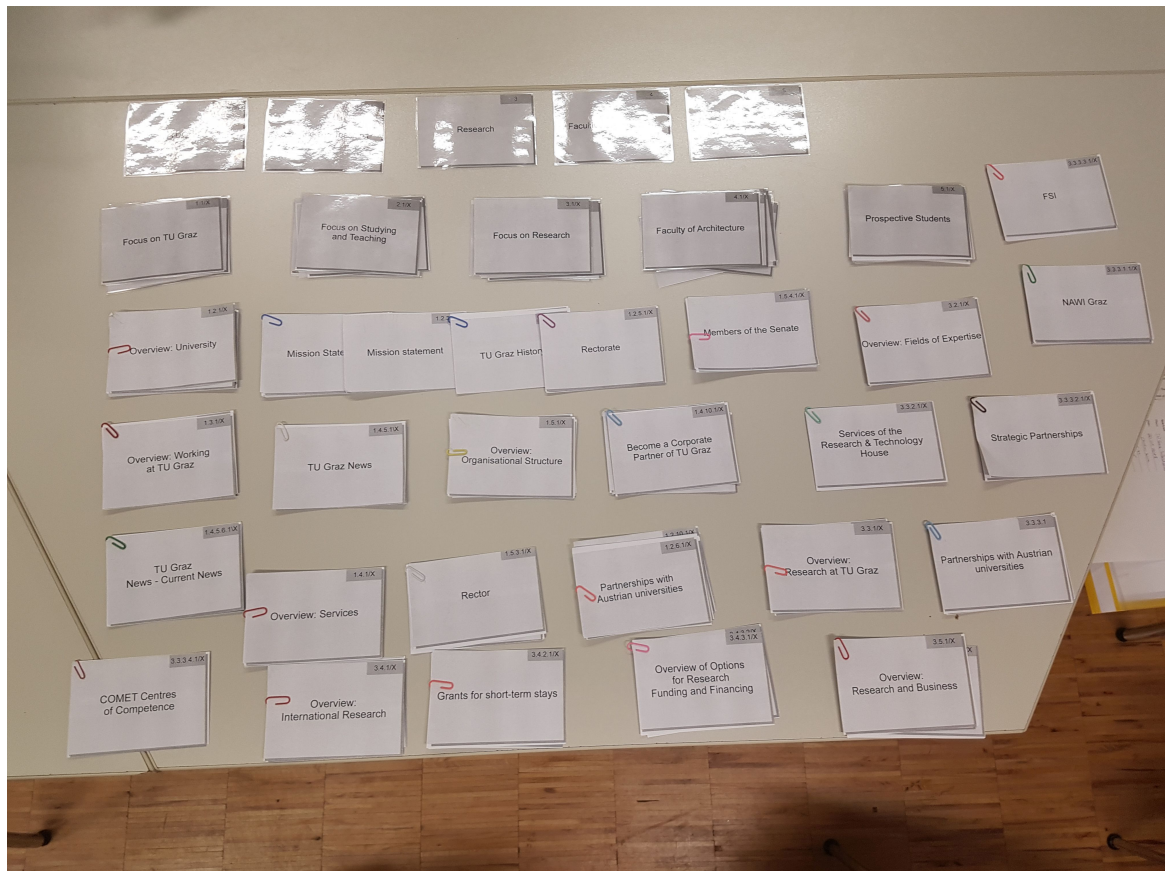
Figure 3.6: Sorted Paper Cards for Testing Procedure

General

Tasks	Right Path	Name	Most wrong Answer	Correctness per Task [%]
Task 1	2.2.3 or 2.2.4	Bachelor's Degree Programmes		100,00
Task 2	2.3.1.8	Mobility and Transport		0,00
Task 3	1.2.11 or 1.2.4.1	History		100,00
Task 4	3.3.3.2.1	Strategic Partnerships	1.2.6.2	0,00
Task 5	1.4.5.6.5	TU Graz Events - Event Calendar		0,00
Task 6	1.4.12	Childcare	5.3	33,33
Task 7	1.2.10.3	Management Unit	1.2.10.1	33,33
Task 8	3.3.4	Doctoral Schools	2.2.5	33,33
Task 9	2.4.6	International Cooperation Ventures	2.4.4	0,00
Task 10	1.5.4.1	Members of the Senate		100,00
Task 11	3.4.2.1	Grants for short-term stays		100,00
Task 12	2.3.7	Academic Calendar		66,67

Figure 3.7: Overall Results of Paper-based Card Testing

Participant 1

Chosen Path	Return	Correctness [%]	Skip Task
2.2.4	0	1	0
5.6	0	0	0
1.2.11	0	1	0
1.2.6.2	0	0	0
4.3	1	0	0
5.3	0	0	0
1.2.10.1	0	0	0
2.2.5	0	0	0
2.4.4	0	0	0
1.5.4.1	0	1	0
3.4.2.1	0	1	0
2.3.7	0	1	0
	1	41,67	0

Participant 2

Chosen Path	Return	Correctness [%]	Skip Task
2.2.3	0	1	0
5.1	0	0	0
1.2.11	0	1	0
3.4.1	0	0	0
1.2	2	0	1
5.3	1	0	0
1.2.10.3	0	1	0
3.3.4	0	1	0
2.4.4	0	0	0
1.5.4.1	0	1	0
3.4.2.1	0	1	0
5.4	0	0	0
	3	50,00	1

Participant 3

Chosen Path	Return	Correctness [%]	Skip Task
2.2.3	0	1	0
1.4.1	1	0	0
1.2.11	0	1	0
1.2.6.2	0	0	0
1.4.2.1	0	0	0
1.4.12	0	1	0
1.2.10.1	0	0	0
2.2.5	0	0	0
2.4.4	0	0	0
1.5.4.1	0	1	0
3.4.2.1	0	1	0
2.3.7	0	1	0
	1	50,00	0

Figure 3.8: Results of Paper-based Card Testing per Participant

Figure 3.9: Testing Environment for Online Test

Figure 3.10: Inserting Questions to UserZoom

3.2   Unmoderated Tree Testing

To perform an unmoderated tree test the software solution developed by UserZoom was used. For the purpose of online tests, a test project in the desktop version was created and goes live on the 20. January 2018. For this test 20 participants were provided and investigated by an e-mail including a link to the UserZoom test project. As it turned out later, it would have been better to create a mixed project (desktop and mobile) instead of an desktop version only because most participants tried to start the test on their smartphones, which did not work. So there was a lot of bad feedback regarding this issue. The results of these tests will be treated together with the moderated results later on.

3.2.1   UserZoom

Userzoom [2018] is an US software company which offers different tools for usability testing, like card sorting, click testing, timeout testing, tree testing and others. UserZoom also provides an moderated solution where you can interact live with the participants. UserZoom and Treejack [2017] are the most used usability testing solutions. UserZoom does not explicit list up their prices. You have to get in touch with them to get a customized offer. Prices varies based on specific needs. Student projects like this are promoted by UserZoom. Universities get free access and can use the whole portfolio of UserZoom.

3.2.2   Setting Up UserZoom

After logging in to the UserZoom platform it it is not only possible to perform tree tests, but also the other tools can be tested. It is all handled from the 'Dashboard' UI. Decided to do a tree test, between desktop, mobile and both can be distinguished. Tree test is then set up easily. Three set up steps have to be handled, (see Figure 3.11) templates help to be very fast: At first you have to define general project details like name, language, goals, etc. Second step is to manage the study participants. It is possible to define different segments. For example

if there are two different types of participants (female/male) two different invitation links can be generated. Different tasks can be added to those segments later. Last step is to define the the welcome page, instructions, initial questionnaire, the tree test tasks, final questionnaire and the final page. For the questionnaire there can be selected different question types like single choice, multiple choice, matrix choice, rating scale, text only and some more. (see Figure 3.10) Questions can be asked before/after the whole test and also before/after single tree test tasks. The tree for the tree test can be generated by pasting a spreadsheet into a text area (see Figure 3.12), whereby the hierarchy is symbolised by columns - cell 'A1' would be the root-node, cell 'B2' the first child, cell 'B3' the second child and so on. A second possibility to create the tree is manually by their UI. Also it is possible to import a tree from other tasks or other projects. This is an unique method in UserZoom: each task has its own tree. So there can be different trees in one study. Different settings like the correct answer, mandatory task, order, randomization, skip opportunity can be set easily. The last step is to launch the tree test study and to distribute the invitation urls to the participants.
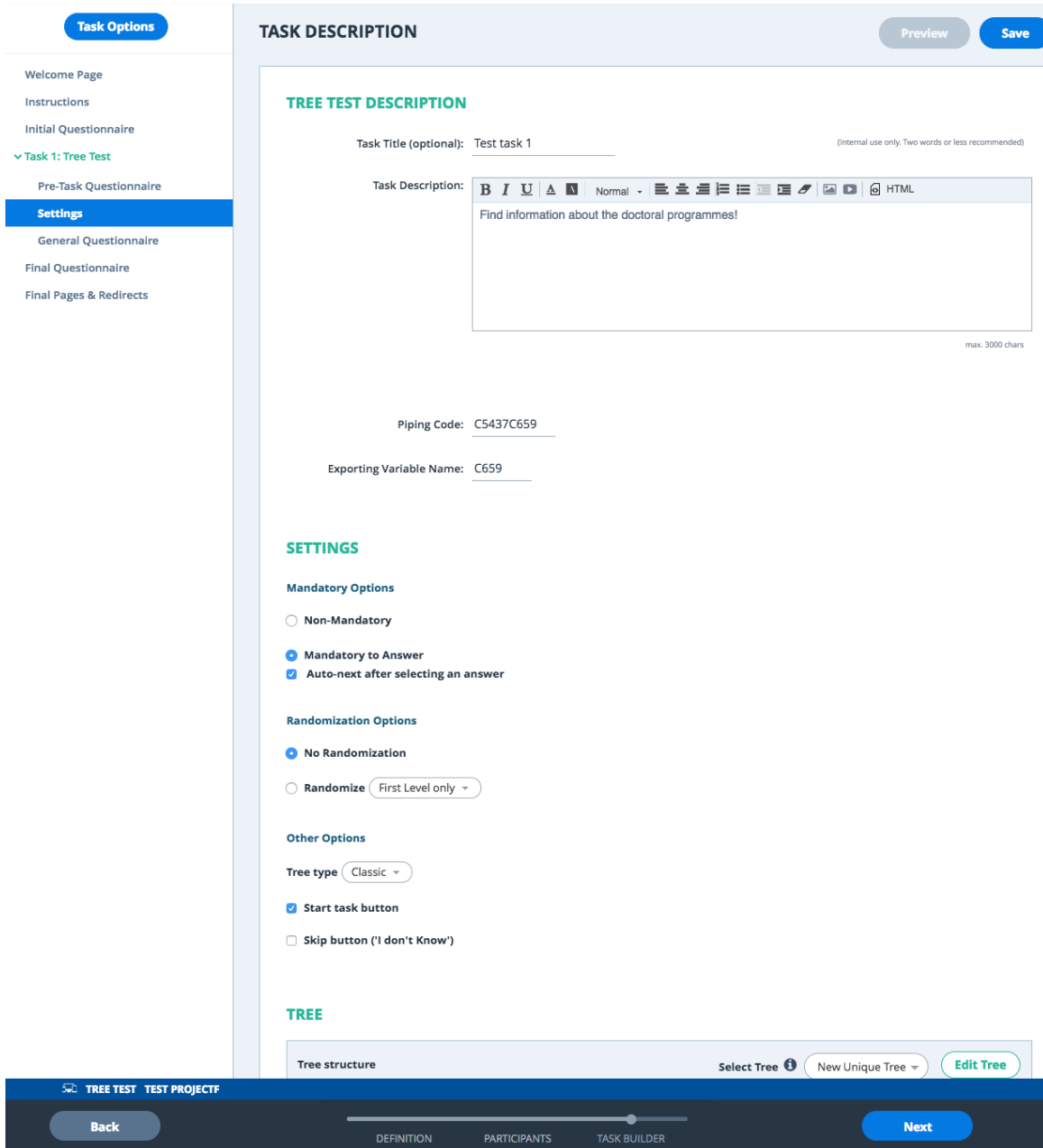
Figure 3.11: UserZoom Task Builder

INSERT TREE

INSERT A TREE STRUCTURE

- Paste a tree structure from spreadsheet or text file
- Each item should be on a separate line. Use tabs to define the tree level.

Tree structure:

```
TUGraz
    Focus on TU Graz
    University
        Overview: University
        Diversity
            Mission Statement
                Fields of Expertise
            Services for Employees
                General Services
                Specific Services
            Working Group for Equal Opportunity
            Representative for People with Disabilities
            Advisory Services for Prospective Students
                Registration office team
                The TU Graz Student Union
                Accessible learning
                International Relations and Mobility Programmes
                TU Graz Welcome Center
                Registration Office
                Mobility Programmes
                Degree Seeking Students
                International Academic Cooperations
```

Insert   **Cancel**

Figure 3.12: Creating an Information Architecture

Chapter 4

Results of the Online Tree Tests

4.1 General

Depending on the chosen method of tree testing, the results will be different. So a paper based testing process will basically deliver less information than online tools can do. But at least there are some quantitative measurements for each test, which will be provided from both, online testing and paper based testing methods [Whitenton, 2017]:

- Success Rate

- Directness Rate

- Time Rate

4.2 Quantitative Measurements

4.2.1 Success Rate

The success rate indicates the percentage of how many participants found the right location in the tree for a given task. But keep in mind, tree testing only evaluate the structure of a tree (no search function, ...), so a low success rate does not necessarily mean that it will be as low in the final designed version for example of a web page. Also, there are two different types of success rates. At first, there are the overall success rate, which provides information about the success rate of all task together. Furthermore, there also exists the success rate per task, which is much more important. The goal is not to get a 100% success rate overall, but it is important to take into account how each success rate (per task) compares to other similar tasks. This is important because the overall success rate does not provide information about the success rates of the individual tasks. So for example an overall success rate of 60% may be not as bad as it sounds, if 60% of all tasks have an individual success rate of 100% and 40% have an individual success rate of 0%. Therefore, a breakdown of the success rate per task is mandatory.

4.2.2 Directness Rate

Also, a necessary test result is the information about the directness. It is a measurement how many participants selected instantly the right path to the answer without backtracking or to reconsider their decision. Backtracking mostly occur, if participants expect some subcategories after clicking a main category, but this does not appear. Then they return and try another category. Also, the directness rate distinguishes between directness over all tasks and directness per task. A good practice to deal with directness rate is, to take a look at the directness rates they are much lower than the average rate of the result set.

4.2.3 Time Rate

Additionally, to the success rate and the directness rate also the time plays an important role for interpreting the test results. The time rate gives an overview of how long a participant needs to find the right path in an information architecture. Depending on these factors an information architecture with high success rate, can still be rather poor if participants must backtrack several times (directness rate) or take a very long time to find the appropriate results (time rate). Therefore, to investigate an information architecture all these factors must be considered together.

4.3 The Participants of the Online Tree Test

At first the participants answered some general questions about their background to get to know the participants. This section gives a little insight about the participants and shows their answers to the initial questionnaire.

- What is your gender?

- What is your age?

- What is your educational background?

- What do you study?

- How long have you been using a personal computer?

- How many hours per day do you use a personal computer?

- How many hours per day do you use the web?

- Which kind of device do you use most often to surf the web?

- What kind of internet connection do you normally use?

- Which web browser do you normally use?

- Do you have experience as a web site administrator?

- Have you participated in a usability study before?

- How often do you visit tugraz.at?

Answer	Percentage
Female	16%
Male	84%

Table 4.1: Gender of the Participants

Answer	Percentage
21-23	5%
24-26	79%
27-29	11%

Table 4.2: Age of the Participants

Answer	Percentage
HTL	32%
AHS	21%
HAK	11%
Kolleg	11%
Abendschule	11%
HLW	5%
Other	11%

Table 4.3: Educational Background of the Participants

Answer	Percentage
Software Engineering and Business Management	47%
Mechanical Engineering and Business Economics	21%
Computer Science	16%
Civil Engineering and Construction Management	5%
Electrical Engineering	5%
Electrical Engineering and Audio Engineering	5%

Table 4.4: Field of Studies of the Participants

Answer	Percentage
More than 10 years	89%
7-9 years	11%

Table 4.5: Years of Computer Use of the Participants

Answer	Percentage
Less than 1 hour	5%
1 - 3 hours	21%
4 - 6 hours	53%
7 - 9 hours	11%
More than 9	11%

Table 4.6: Hours spent on Computers by the Participants

Answer	Percentage
1 - 3 hours	53%
4 - 6 hours	32%
7 - 9 hours	11%
More than 9 hours	5%

Table 4.7: Hours spent on Web by the Participants

Answer	Percentage
Smartphone	58%
Notebook	21%
Desktop Computer	16%
Tablet	5%

Table 4.8: Devices to surf the Web by the Participants

Answer	Percentage
LTE mobile internet	42%
xDSL	32%
3G mobile internet	11%
Optical fiber	11%
Modem cable	5%

Table 4.9: Internet Connection used by the Participants

Answer	Percentage
Firefox	53%
Chrome	26%
Safari	16%
Opera	5%

Table 4.10: Web Browsers used by the Participants

Answer	Percentage
None	68%
less than 1 year	11%
1 years	5%
2 years	5%
3 years	5%
more than 3 years	5%

Table 4.11: Experience as Web Site Administrator of the Participants

Answer	Percentage
Yes	53%
No	47%

Table 4.12: Experience in Participating in Usability Studies of the Participants

Answer	Percentage
Less than once a semester	21%
Less than once a month	16%
About once a month	16%
Several times a month	5%
Several times a week	26%
Everyday	16%

Table 4.13: Visitation of tugraz.at by the Participants

4.4   Results of the Tasks

In the following table the success rates of each task is shown ordered by success rate. In the first column the task number is shown. It is interesting that the success rates really are mixed and not connected to the task order. At late tasks the participants already had a look at the information hierarchy a couple of times, but the participants did not find the answers more easily.

Number	Task Description	Success Rate
3	Find information about the history of the TU Graz.	84%
1	Which degree programmes does TU Graz offer?	68%
12	Find information about holidays and semester breaks for the current academic year.	68%.
6	Find out the Opening Hours of the university's own kindergarden.	68%
10	Who are the members of the Senate of the TU Graz?	47%.
11	Find information about grants for short term stays abroad for researchers.	42%.
2	Find information about discounts for public transport for students offered by Holding Graz.	32%
7	Find information about the university's portfolio of affiliated companies.	21%
5	Find information about forthcoming events at the university.	11%
9	Find information about doing a semester abroad at cooperating universities.	11%
8	Where can you find information about Doctoral Schools?	5%
4	Find information about strategic partnerships with international universities.	0%

Table 4.14: Online Results by Success Rate

4.4.1   Results Tasks 1 - Which degree programmes does TU Graz offer?

Task 1 was quite easy for most participants. The participants with wrong answers needed quite a lot of time for finding their category (for details see Figure 4.1).
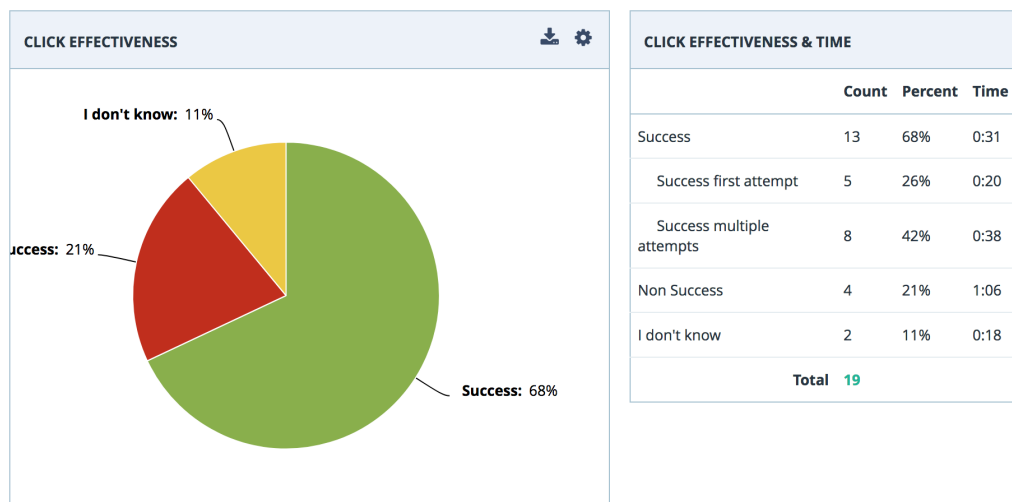

Figure 4.1: Screenshot of UserZoom's Analysis Charts for Task 1

4.4.2 Results Tasks 2 - Find information about discounts for public transport for students offered by Holding Graz.

Task 2 not that easy for the participants. No one was able to find the right category at first attempt, only 32% found it after searching through the structure (for details see Figure 4.2).

Figure 4.2: Screenshot of UserZoom's Analysis Charts for Task 2
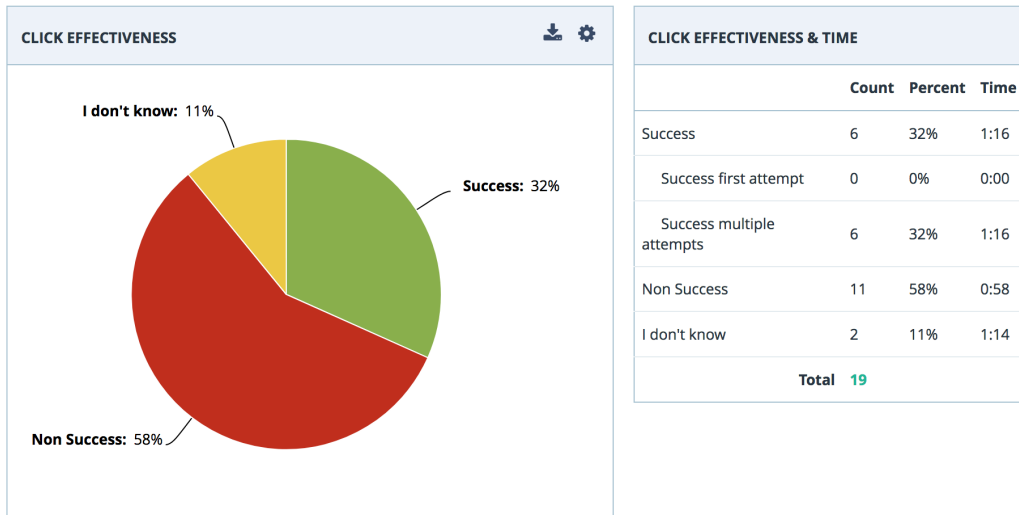
4.4.3 Results Tasks 3 - Find information about the history of the TU Graz.

Having a look at the time spent indicates that most participants found the right category quite quickly therefore the placement of the information within the hierarchy is quite good. (for details see Figure 4.3).
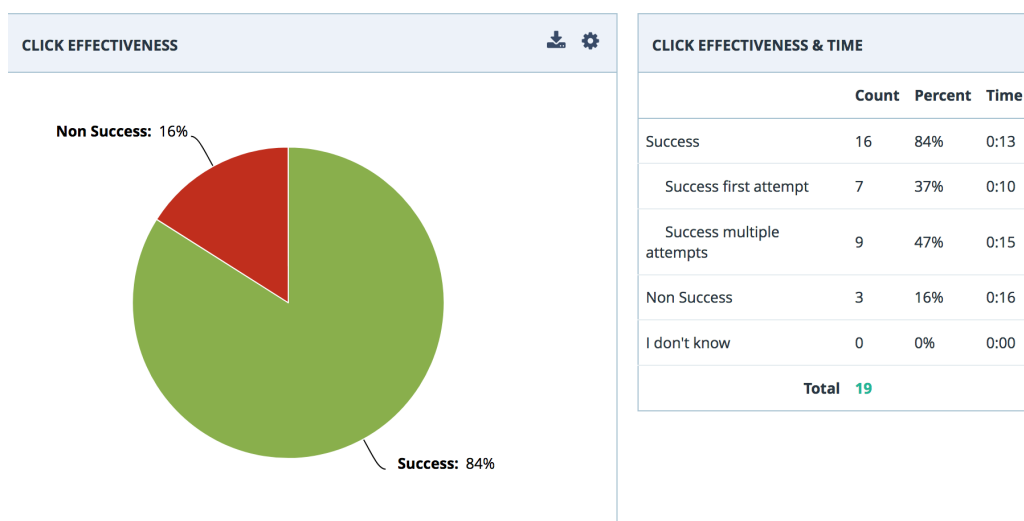

Figure 4.3: Screenshot of UserZoom's Analysis Charts for Task 3

4.4.4   Results Tasks 4 - Find information about strategic partnerships with international universities.

This was a tricky task since a lot of lables somehow can be related to strategic partnerships. No one selected the right answer, but nearly all participants chose some similar terms. For details see Figure 4.4 and see what the participants chose in Figure 4.5.
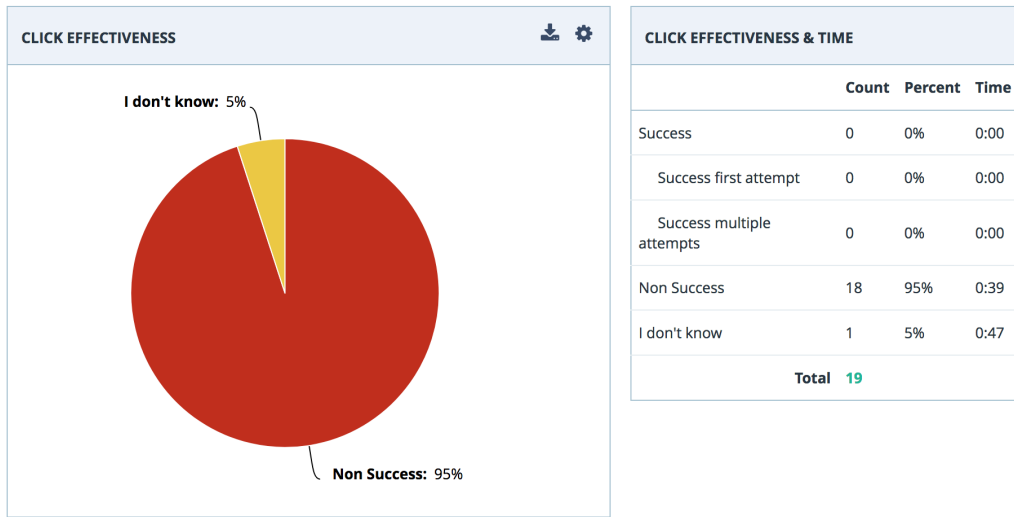
CLICK EFFECTIVENESS & TIME	Count	Percent	Time
Success	0	0%	0:00
Success first attempt	0	0%	0:00
Success multiple attempts	0	0%	0:00
Non Success	18	95%	0:39
I don't know	1	5%	0:47
Total	**19**		

Figure 4.4: Screenshot of UserZoom's Analysis Charts for Task 4

Answer	Count	Percen...
Cooperations > International partnerships with universities and research institutions	7	39%
International: Studying and Teaching > Overview: International: Studying & Teaching	5	28%
International: Studying and Teaching > International Cooperation Ventures	2	11%
Information for... > Internationals	2	11%
International: Studying and Teaching > Study Abroad	1	6%
Form a Partnership with TU Graz > Strategic Partnerships	1	6%

Figure 4.5: Screenshot of UserZoom's Analysis Charts for Task 4

4.4.5   Results Tasks 5 - Find information about forthcoming events at the university.

The events of the university also were quite hard to find for most participants. But about half of the participants found related categories and expected the information to be stored in there (for details see Figure 4.6).

4.4.6   Results Tasks 6 - Find out the Opening Hours of the university's own kindergarden.

This task was also done quite successful and without big troubles (for details see Figure 4.7).

4.4.7   Results Tasks 7 - Find information about the university's portfolio of affiliated companies.

Task 7 was also not quite clear to the participants, but most of them chose related categorys (for details see Figure 4.8 and 4.9).

Answer	Count	Percen...
TUGraz > Focus on TU Graz	4	24%
TU Graz events > Month	4	24%
TU Graz events > summary of all event-related news articles	4	24%
News+Stories > **TU Graz Events**	2	12%
Information for... > Prospective Students	2	12%
University > Mission Statement	1	6%

Figure 4.6: Screenshot of UserZoom's Analysis Charts for Task 5
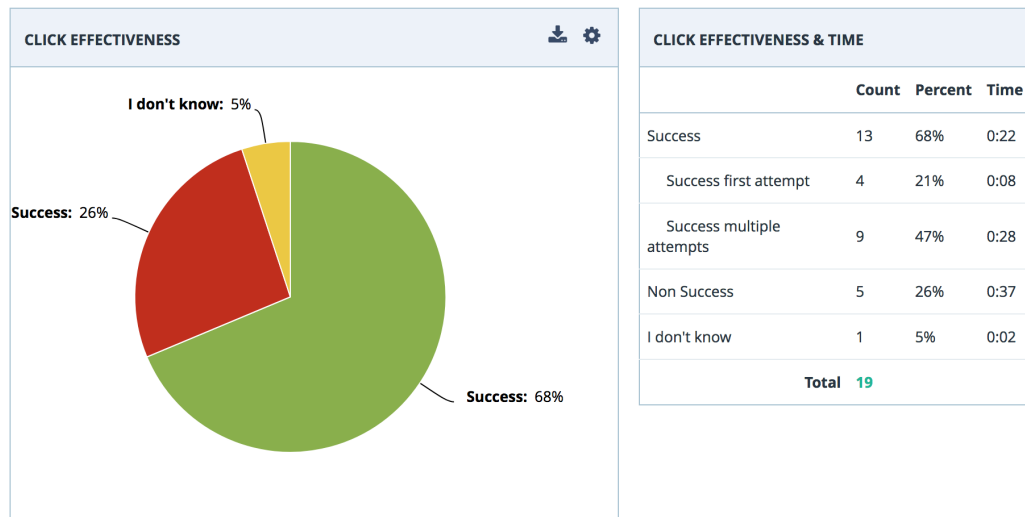

Figure 4.7: Screenshot of UserZoom's Analysis Charts for Task 6

4.4.8   Results Tasks 8 - Where can you find information about Doctoral Schools?

Results of task 8 were quite interesting. Only one participant chose the correct label but nearly all others chose another label, where actually the same information can be found (for details see Figure 4.10 and 4.11).

4.4.9   Results Tasks 9 - Find information about doing a semester abroad at cooperating universities.

Participants also found right categories for this task, but only some chose the completely correct answer (for details see Figure 4.12 and 4.13).

4.4.10   Results Tasks 10 - Who are the members of the Senate of the TU Graz?

Most participants found the correct category quite quickly, but an interesting fact is that a lot of participants got into wrong main categories and therefor hit the "I-dont-know"-Button after just a couple of seconds (for details see Figure 4.14).

4.4.11   Results Tasks 11 - Find information about grants for short term stays abroad for researchers.

Similar to the last task the participants found the right category quite quickly, but others struggled a lot. Maybe this results into the long duration of the test and that the task was at the end of the test (for details see Figure 4.15).
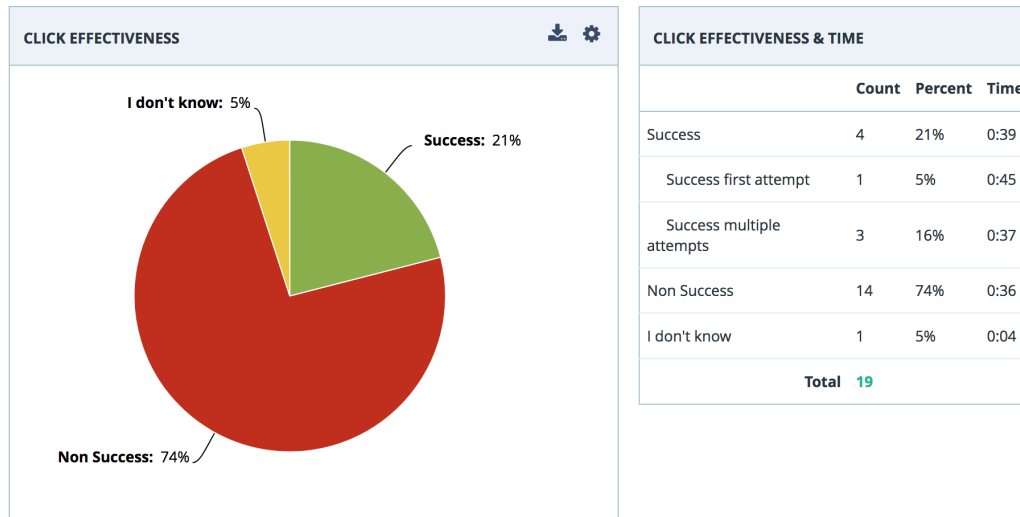
CLICK EFFECTIVENESS

CLICK EFFECTIVENESS & TIME

	Count	Percent	Time
Success	4	21%	0:39
Success first attempt	1	5%	0:45
Success multiple attempts	3	16%	0:37
Non Success	14	74%	0:36
I don't know	1	5%	0:04
Total	**19**		

Figure 4.8: Screenshot of UserZoom's Analysis Charts for Task 7

Answer	Count	Percen...
Cooperations > Collaboration with business and industry	5	28%
TU Graz Portfolio of Affiliated Companies > **Portfolio Management Unit**	4	22%
TU Graz Portfolio of Affiliated Companies > Competence Centres und Research Cooperation	3	17%
Projects with Companies > Best Practice Examples	2	11%
Projects with Companies > Become a Corporate Partner of TU Graz	1	6%
Studying and Teaching > Focus on Studying and Teaching	1	6%
Information for... > Prospective Students	1	6%
Information for... > Companies	1	6%

Figure 4.9: Screenshot of UserZoom's Analysis Charts for Task 7

4.4.12   Results Tasks 12 - Find information about holidays and semester breaks for the current academic year.

Task 12 has quite a high success rate even though it was the last task for the participants (for details see Figure 4.16).
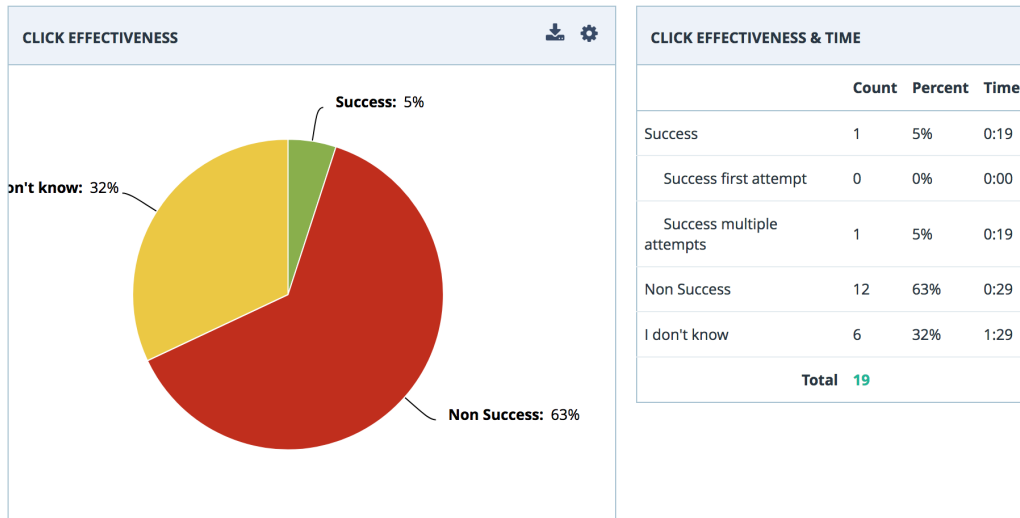
Figure 4.10: Screenshot of UserZoom's Analysis Charts for Task 8

Answer	Count	Percen...
Doctoral Programmes > Architecture	2	15%
Doctoral Programmes > Information and Comunication Engineering	2	15%
Information for... > Continuing Education	2	15%
Studying and Teaching > Focus on Studying and Teaching	1	8%
Degree and Certificate Crogrammes > Teacher Training Programme	1	8%
Doctoral Programmes > Electrical Engineering	1	8%
Doctoral Programmes > Mechanical Engineering	1	8%
Teaching at TU Graz > Overview: Teaching at TU Graz	1	8%
Researach at TU Graz > **Doctoral Schools**	1	8%
Faculties and Institutes > Faculty of Electrical and Information Engineering	1	8%

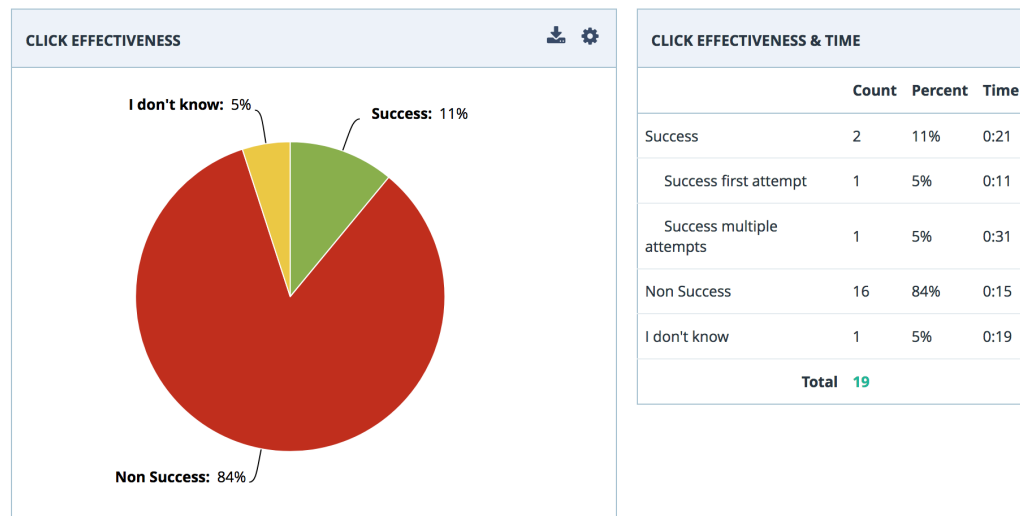**Figure 4.11:** Screenshot of UserZoom's Analysis Charts for Task 8

Figure 4.12: Screenshot of UserZoom's Analysis Charts for Task 9

Answer	Count	Percen...
International: Studying and Teaching > Study Abroad	9	50%
International: Studying and Teaching > Overview: International: Studying & Teaching	3	17%
International: Studying and Teaching > **International Cooperation Ventures**	2	11%
Cooperations > International partnerships with universities and research institutions	1	6%
Exchange at TU Graz > Studying at TU Graz	1	6%
Information for... > Prospective Students	1	6%
Information for... > Internationals	1	6%

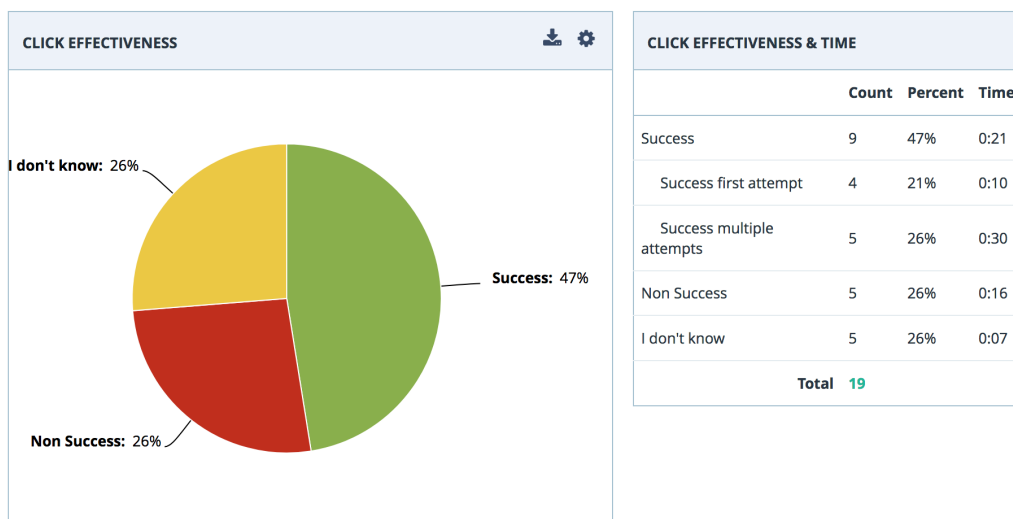**Figure 4.13:** Screenshot of UserZoom's Analysis Charts for Task 9

Figure 4.14: Screenshot of UserZoom's Analysis Charts for Task 10
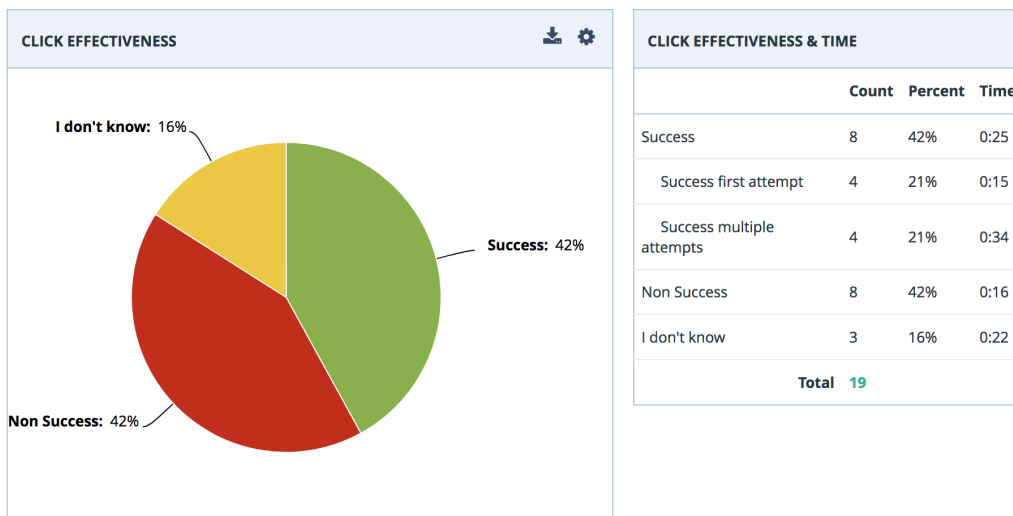

Figure 4.15: Screenshot of UserZoom's Analysis Charts for Task 11
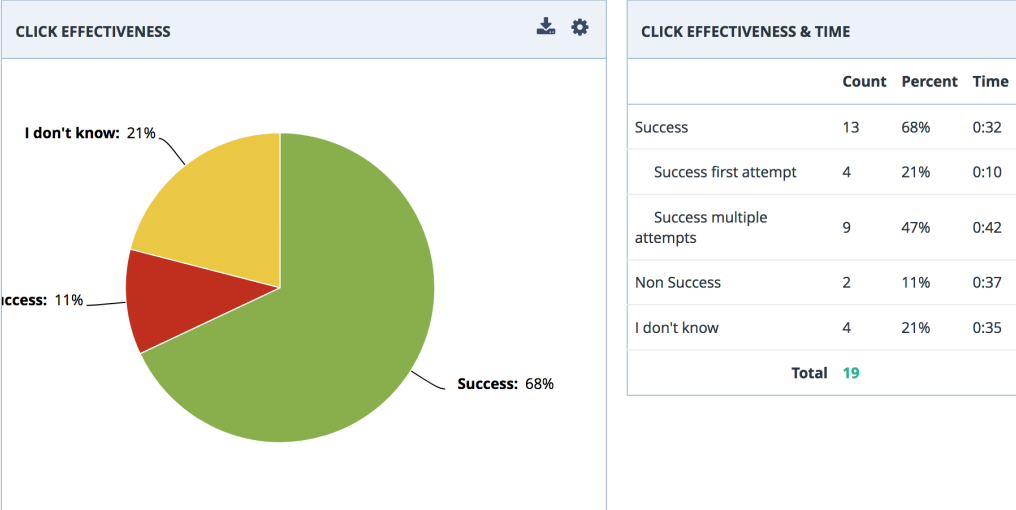
Figure 4.16: Screenshot of UserZoom's Analysis Charts for Task 12

4.5   Final Questionnaire

The participants were asked how hard or easy it was to find what they were looking for. No one found it very hard and no one found it very easy. All participants chose some answer around the middle as shown in Figure 4.17. Moreover in the open question if they would have needed some additional information nearly 2/3 stated, that they would have needed some help to find the exact right category since some lables could mean several things and some lables sound quite similar.
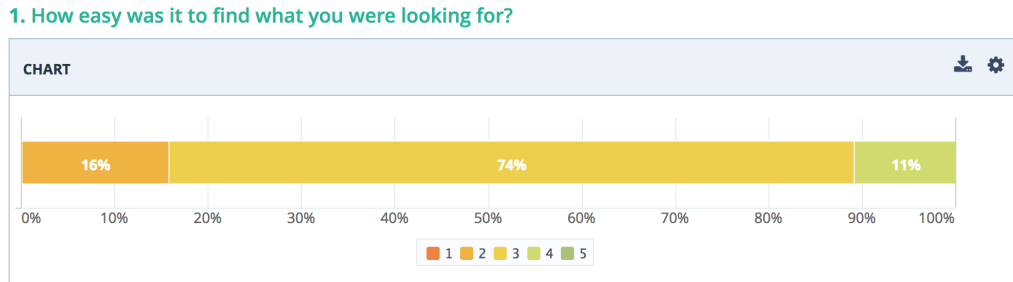

Figure 4.17: Screenshot of UserZoom's Chart of the Final Questionnaire

Chapter 5

Summary

5.1 Overall Findings

Doing a paper-based tree test is just an convenient solution, if the information hierarchy is not too big. With about 320 index cards it was very hard and time consuming to do the test, because laying out and collecting all cards in every category took a couple of minutes and it is important to keep some kind of structure within the cards to avoid chaos and a mess. The online test fits better to such big structures because it is really easy to do. Participants have also the possibility to browse the structure and go back or have a look in categories more easily than in a paper-based test. As seen in the test result of the online test, participants skipped tasks which were near the end. Maybe less than 12 tasks would have been better to avoid disctraction or frustration of the participants. Some answers were quite strange and completely wrong, which leads us to the problem that not all praticipants were good english speakers. Some participants would have needed additional help and information to understand tasks and categories and labels better. For interpreting the results UserZoom's analytical tools were not that helpful. TreeJack provides much more detailed information about the results.

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