 EMPIRICAL STUDY

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Introduction

This document contains key findings regarding the Tutor app. By conducting an empirical study, this report details how the end user will expirence this app, and what changes are needed to be made.

Empirical research is broadly defined as the observation-based investigation seeking to discover and interpret facts, theories, or laws.

Here we have collected and analysed end user data for determining usability of an interactive system. As it is an “observation-based investigation”, hence it qualifies as empirical research.

**Questionnare**

Question 1

Assumption: We have sufficient number of results for the given query

How much time will it take to output ‘y’ number of results, if the user inputs a string of length x?

Independent variables

2 applications design , Tutor Discussions, Ubuntu Discussions which is evaluated on the basis of above question

Dependent variables

Time taken to show the output

|  |  |
| --- | --- |
| **Factors** | **Levels** |
| String length x | **1,2,3,4,5** |
| Number of results ‘y’ | **1,2,3** |

The string lengths will be rounded off to fit these level descriptions.

\*For string length x 1=10, 2=13, 3=16, 4=19, 5=22

\*For Number of results y 1=5, 2=10, 3=15

Question 2

The whole 3D model is a made up of a fixed number of frames, let’s say we need to move ‘p’ (depends on quality of model) number of frames to move through ‘k’ degrees in any direction (as the model is symmetrical with the co-ordinate system p should be same for the same value of k). Factor is defined as the number of frames changed in the model divided by distance scrolled in screen.

For a given value of ‘factor’, how much % delay is observed while scrolling the distance ‘x’ on screen, where % delay is defined as the difernce in actual time taken to perform the activity and time taken to scroll the distance ‘x’ divided by time taken to scroll the distance ‘x’.

Independent variables

2 applications design , Tutor, AppX which is evaluated on the basis of above question

Dependent variables

% delay observed

|  |  |
| --- | --- |
| **Factors** | **Levels** |
| Distance scrolled on screen ‘x’ | **1,2,3,4,5** |
| Value of ‘factor’ | **1,2,3** |
| Quality of model(p) | **1,2** |

The distances will be rounded off to fit these description

\*For distance scrolled ‘x’ 1=1, 2=2 and so on till 5=5 m

\*For value of factor 1=2, 2=4, 3=6

\*For quality of model 1=360p, 2=480p

**Participants details**

Sr. AGE GENDER BACKGROUND

1 18 Male Expert

2 19 Female Intermediate

3 18 Female Intermediate

4 20 Male Beginner

5 19 Male Advanced

6 21 Female Beginner

7 21 Male Expert

8 20 Male Intermediate

9 18 Male Advanced

10 19 Female Beginner

**Procedure for data collection**

* The participants were first explained the general objective of the Experminent.
* Then the app was launched and the control handed over to the participants.
* The participants were shown “How to search a query” interactive tutorial.
* The participants were shown “How to navigate” interactive tutorial
* The particiapnts were allowed to explore the app for a while for familiarization
* The collection of data was initiated after this.
* Each participant was allowed to search the query 1 times.
* Each participant was allowed to navigate through all the models.
* In total 10 observations were collected for the first question.
* In total 10 observations were collected for the seond question.

**Experiment Design**

The design specifications for the two dependent variables are as follows:

* Question 1: A (5X3) between subjects design has been employed. This means that I have 2 Independent variables, with 5 levels for the first independent variable and 3 level for the second independent variable, and each participant has been tested on only 1 level of each independent variable.
* Question 2: A (10X5X3) between subjects design has been employed. This means that I have 3 Independent variables, with 10 levels for the first independent variable and 5 levels for the second one, while there are 3 levels for the third independent variable. Each participant has again been tested on only 1 level of each independent variable.

**Data Table for Question 1**

|  |  |  |
| --- | --- | --- |
| **Participant (x,y)** | **My method** | **Ubuntu discussions** |
| 1 (13,10) | 4 | **3** |
| 2 (10,10) | 3 | **5** |
| 3 (13,5) | 3 | **2** |
| 4 (19,10) | 6 | **5** |
| 5 (16,10) | 5 | **6** |
| 6 (22,5) | 6 | **7** |
| 7 (22,10) | 8 | **7** |
| 8 (10,15) | 4 | **3** |
| 9 (19,5) | 5 | **6** |
| 10 (16,5) | 4 | **5** |

## RESULT

|  |
| --- |
| **P value and statistical significance:**  The two-tailed P value equals 0.8932  By conventional criteria, this difference is considered to be not statistically significant.   **Confidence interval:**  The mean of Group One minus Group Two equals -0.10  95% confidence interval of this difference: From -1.64 to 1.44   **Intermediate values used in calculations:**  t = 0.1362  df = 18  standard error of difference = 0.734 |

|  |  |  |
| --- | --- | --- |
| Group | My method | Ubuntu Discussions |
| Mean | 4.80 | 4.90 |
| SD | 1.55 | 1.73 |
| SEM | 0.49 | 0.55 |
| N | 10 | 10 |

**Data table for question 2**

|  |  |  |
| --- | --- | --- |
| **Participants(x,factor,p)** | **Tutor (delay in percentage)** | **AppX (delay in percentage)** |
| 1 (1,2,360p) | 8 | **11** |
| 2 (2,4,360p) | 46 | **14** |
| 3 (3,6,360p) | 73 | **60** |
| 4 (4,2,360p) | 12 | **20** |
| 5 (5,4,360p) | 41 | **35** |
| 6 (1,6,480p) | 51 | **53** |
| 7 (2,2,480p) | 30 | **40** |
| 8 (3,4,480p) | 59 | **54** |
| 9 (4,6,480p) | 146 | **91** |
| 10 (5,2,480p) | 61 | **67** |

**RESULT**

|  |
| --- |
| **P value and statistical significance:**  The two-tailed P value equals 0.5835  By conventional criteria, this difference is considered to be not statistically significant.   **Confidence interval:**  The mean of Group One minus Group Two equals 8.20  95% confidence interval of this difference: From -22.66 to 39.06   **Intermediate values used in calculations:**  t = 0.5583  df = 18  standard error of difference = 14.687 |

|  |  |  |
| --- | --- | --- |
| Group | Tutor | AppX |
| Mean | 52.70 | 44.50 |
| SD | 38.84 | 25.46 |
| SEM | 12.28 | 8.05 |
| N | 10 | 10 |

**The above ANOVA calculations are generated using:**

**https://www.graphpad.com/quickcalcs/ttest2/**