Lab Assignment 3

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You should complete given exercises and submit them in separate files to LMS before the deadline.

Your completed assignments will not be graded, but will be marked for completion. The maximum mark for completing all assignments in this semester is 10 points. Although it is an individual assignment and you cannot use other student's work in this assignment, you can still use publicly available online resources in this assignment. You must properly reference all resources. Otherwise, it will be considered as plagiarism.

1 Organizing Students into Teams using Google Form

Imagine that you are an instructor who has around 300 students and you want to assign them a team project. You should know who is in which team, so you can evaluate their projects and assign the same mark for each team member. The problem may sound simple, but let's analyse how it can be accomplished using Google Forms. Consider this Google Form as sample.

Think about a simple procedure of organizing students into teams. Conduct PACT analysis for this procedure where you should identify people involved (e.g. students, instructor, administration), technologies being used (e.g. Google Form, mobile phone, desktop computer), activities (e.g. registering team and corresponding team members) and contexts where these activities may happen (e.g. at the university, canteen, bus, home). You should analyse interactions for different people in different contexts. For example, how student will register his team and teammates? How will instructor learn about teams and their members? Where will these activities take place?

Put every interaction you wish to analyse into Norman's "7-stage actions" framework in Figure 1. First determine the *goal* that initiates the interaction and then continue to answer following questions:

1. What affordances does user see to achieve his goal? How they were emphasized with signifiers?
2. How affordances (or controls) are mapped to functions?
3. What conceptual model the UI communicates to the user?
4. What constraints were used to prevent users from error?
5. What feedback is shown per user action?

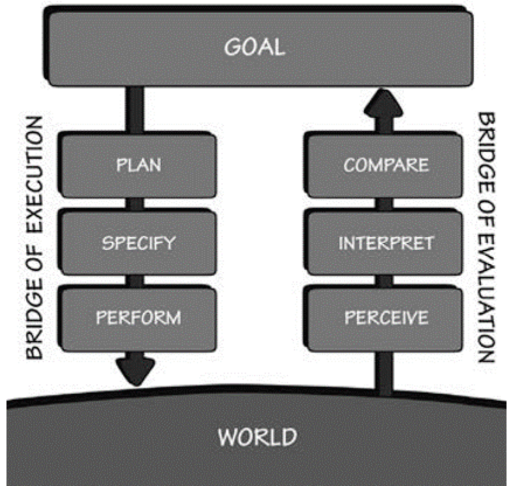

Figure 1: Gulfs of Execution and Evaluation

Once you evaluate different key interactions, try to identify human errors that may arise during each interaction with this system:

- Mistakes:
  - Rule-based mistakes
  - Knowledge-based mistakes
  - Memory-lapse mistakes
- Slips:
  - Action-based slips
  - Memory-lapse slips

For each mistake you have found, propose a different solution or a change that would prevent, correct or mitigate it.

You may use following FigJam file as a template for this task.

2 Experiments on Interaction

2.1 Fitt's Law

The amount of time it takes to point at things on a digital device is surprisingly predictable, and we're going to explore a common way to make predictions about this based on the work of the psychologist Paul Fitts.

Try this tool to see how quickly you're able to point at different "targets". This experiment demonstrates how the amount of time it takes to point at object depends on two parameters:

- the width of the object and
- the distance you have to move to point at it.

Figure 2: Distance and Width of Object

This observation can be measured mathematically using a formula known as Fitts' law.

$$ID = \log_2(1 + \frac{D}{W})$$

where ID is the Index of Difficulty.

This particular graph can be used to work out how long it would take someone to point at a different sized object at a different position; all you need to do is work out the ID using the formula above, and then look it up on the chart.

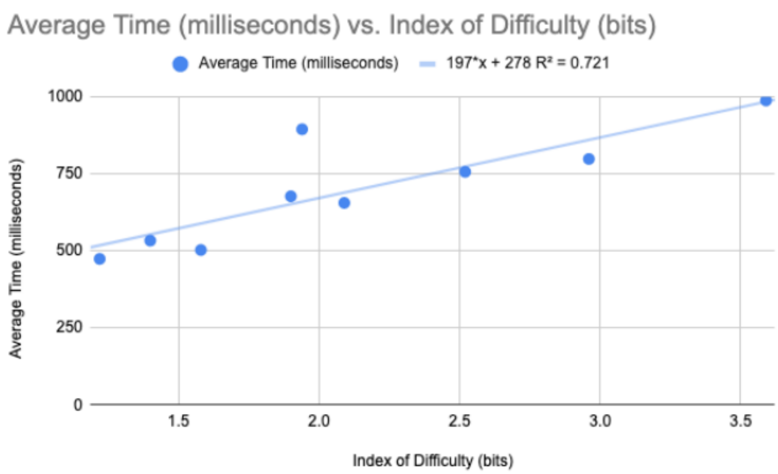

Figure 3: Linear Function for matching ID to average time

You can experiment with your finding on this Google Colab notebook. For more examples, you can try this online Fitt's law test

2.2 Non-stable Environment

Sometimes pointing at objects in a device is difficult, particularly if you are being bounced around in a vehicle. Imagine you're on a fire engine racing through traffic, or a plane being bounced around by turbulence. In these situations, operating devices to find a route or get information is critical, yet the environment can make it challenging.

Try the following interactive tool where you'll get to experience this firsthand. Determine how Fitt's law can be extended taking into account the turbulence factor.

For a more controlled experiment on how shaking affects the index of difficulty, the following interactive lets you try clicking on a button while the interface is moving around. It's hard work, but this will give you insight into how people need to design interfaces for people working in difficult environments where they are moving around a lot!

This kind of experiment is used to inform people making mobile devices, such as a radio that police or firefighters would use while driving or working in a dangerous situation. They also need to take into account factors such as the user wearing safety equipment like gloves and helmets. An ordinary mobile phone interface just won't work in those situations!

Solutions to this problem including providing anchor points on a touch screen to rest you hand on, having larger targets, and a simpler interface (such as "push to talk" on a radio, rather than dialling a number).

2.3 Delay Analyser

Open this tool for analysing your perception of delay while interacting with computer. Below are the instructions:

1. Click on any tile of the grid. This will reveal a small tile of a larger image.
2. If you perceived any delay in the tile being revealed, in other words 'it didn't feel like it
3. appeared instantly' then click on this tile again. The tile will be coloured green, indicating that you have decided there was a perceivable delay.
4. If you made a mistake by clicking it, you can change your mind by clicking again.
5. Repeat this on all other cells to reveal the complete image.
6. View the statistics page to see experiment results.

3 Measuring the Usability of Hero System

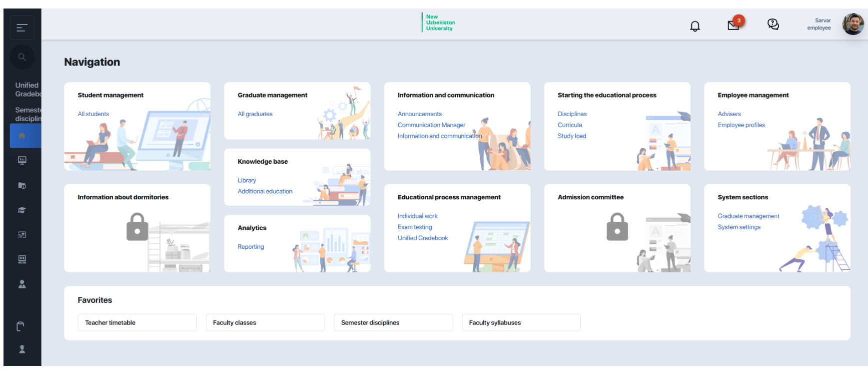

Figure 4: Hero Study Home Screen

In this exercise, you must conduct a usability survey on our new Learning Management System - Hero Study. You should approach at least 2-3 professors and perform following tasks:

1. Ask them to perform some task on Hero Study (e.g. attendance check, assign homework, download submissions, input grades, etc)
2. (Done by you) While professor is performing the task, observe (or record) the entire process and determine following parameters:
   - Time spent to complete the task
   - Number of steps to complete the task
   - Number of errors made while performing the task
3. Ask them to complete this SUS Form immediately afterwards. It must be quick.

4. Calculate SUS score accordingly as illustrated at the back of the SUS form
5. Share your scores with other students and find the average score for all professors interviewed. If it is higher than 70, Hero Study is adequately usable.
6. (Optional) If you have time, you may ask professor to rank the website based on additional metrics, such as:
   - Ease of learning (1-5)
   - Ease of remembering (1-5)
   - Effectiveness in use (1-5)
   - System responsiveness (1-5)
7. (Optional) If you still have time, ask open-ended questions about Hero Study, such as:
   - What is the most useful feature?
   - What is the most painful feature?
   - How would you improve this system?

Allocate professors you want to approach among yourselves, so there is no need to disturb the same professor with the same request multiple times.