# Informed Consent Form

Dear Participant,

thank you for your participation in the study.

In this study, you'll be asked to perform certain tasks wearing Microsoft HoloLens and to answer some questions. The whole process will take around 30-60 minutes. You are free to stop, quit the study and retract your data at any time during the study with no further consequences. **Privacy:** Original data obtained from this study will be anonymized and only processed in aggregate. In such form, it might be published in academic journals, presentations or other media, but never in a way that would allow individual identification. One week after the study it might no longer be possible to retract your data from such aggregated analyses.

If you have any questions, please contact Jiongyan Zhang via jiongyan.zhang@tum.de.

☒ I confirm I volunteered to participate in this study.

☒ I confirm I was allowed to ask questions and that I was provided with responses.

☒ I confirm I was presented with this document prior to the beginning of the study.

☒ I confirm and I understood my right to quit the study at any time.

☒ I confirm I was informed that a conversation with researcher will be recorded after navigation during the study.

_14/07/2023_

Date

Signature of researcher

Signature of participant

If you would like to be informed about future studies, please let us know your email address:

Email address (optional)

# Pre-task questionnaire

Gender: ☒Male ☐Female ☐Other     Nationality: Turkish     Age: 25

Field you are working/studying in:
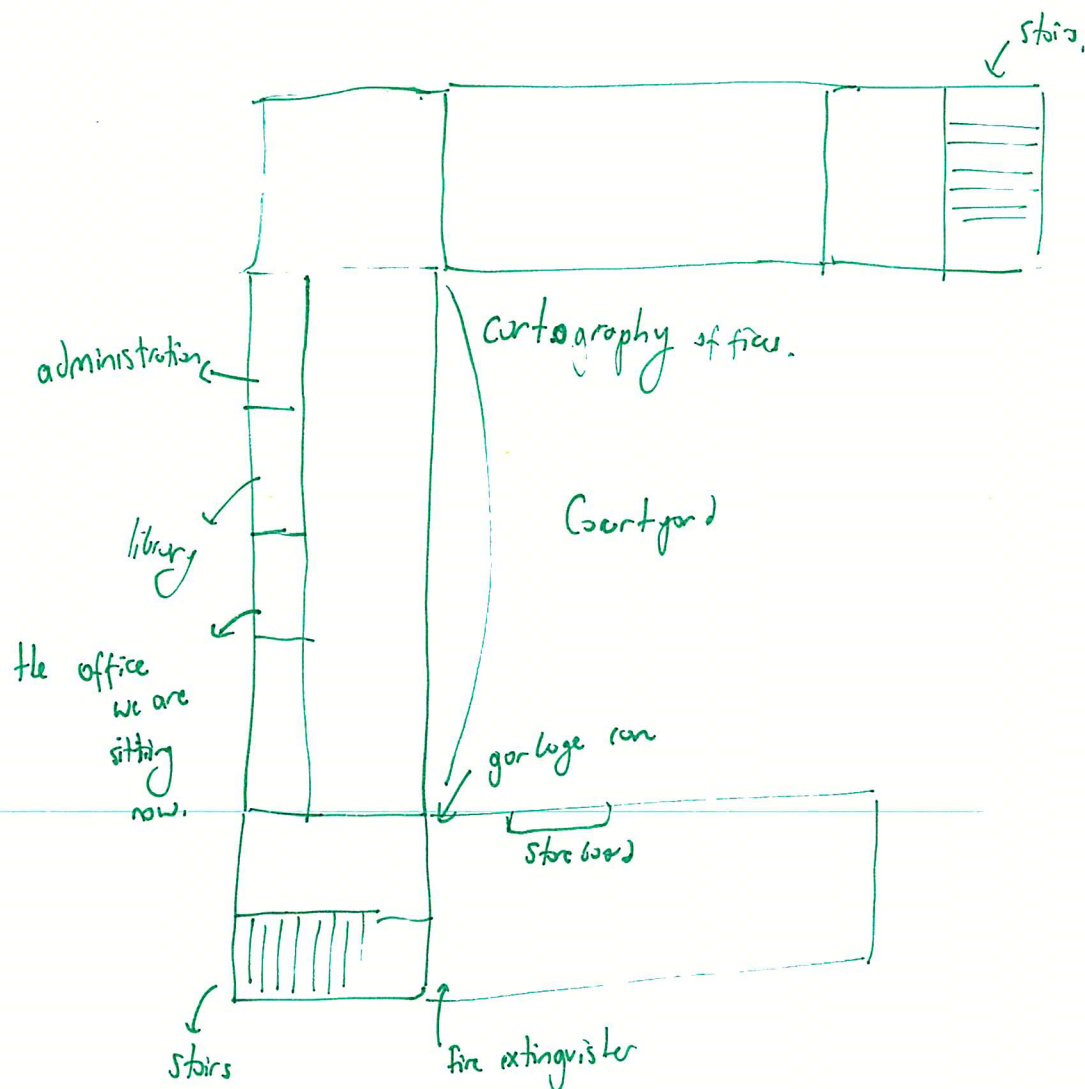
Electronics.

This questionnaire consists of several statements about your spatial and navigational abilities, preferences, and experiences. After each statement, you should circle a number to indicate your level of agreement with the statement. Circle "1" if you strongly agree that the statement applies to you, "7" if you strongly disagree, or some number in between if your agreement is intermediate. Circle "4" if you neither agree nor disagree.

1= strongly agree / none, 7 = strongly disagree / a lot of

| # | Statement | | | | | | | | | |
|---|-----------|---|---|---|---|---|---|---|---|---|
| 1 | I am very good at giving directions. | strongly agree | 1 | 2 | 3 | 4 | ⑤ | 6 | 7 | strongly disagree |
| 2 | I have a poor memory for where I left things. | strongly agree | ① | 2 | 3 | 4 | 5 | 6 | 7 | strongly disagree |
| 3 | I am very good at judging distances. | strongly agree | 1 | 2 | ③ | 4 | 5 | 6 | 7 | strongly disagree |
| 4 | My "sense of direction" is very good. | strongly agree | ① | 2 | 3 | 4 | 5 | 6 | 7 | strongly disagree |
| 5 | I tend to think of my environment in terms of cardinal directions(N, S, E, W). | strongly agree | 1 | 2 | 3 | 4 | 5 | 6 | ⑦ | strongly disagree |
| 6 | I very easily get lost in a new city. | strongly agree | 1 | 2 | 3 | 4 | 5 | ⑥ | 7 | strongly disagree |
| 7 | I enjoy reading maps. | strongly agree | 1 | 2 | ③ | 4 | 5 | 6 | 7 | strongly disagree |
| 8 | I have trouble understanding directions. | strongly agree | 1 | 2 | ③ | 4 | 5 | 6 | 7 | strongly disagree |
| 9 | I am very good at reading maps. | strongly agree | 1 | 2 | ③ | 4 | 5 | 6 | 7 | strongly disagree |
| 10 | I don't remember routes very well while riding as a passenger in a car. | strongly agree | 1 | 2 | 3 | ④ | 5 | 6 | 7 | strongly disagree |
| 11 | I don't enjoy giving directions. | strongly agree | 1 | 2 | 3 | 4 | ⑤ | 6 | 7 | strongly disagree |
| 12 | It's not important to me to know where I am. | strongly agree | 1 | 2 | 3 | 4 | 5 | ⑥ | 7 | strongly disagree |
| 13 | I usually let someone else do the navigational planning for long trips. | strongly agree | 1 | ② | 3 | 4 | 5 | 6 | 7 | strongly disagree |
| 14 | I can usually remember a new route after I have traveled it only once. | strongly agree | ① | 2 | 3 | 4 | 5 | 6 | 7 | strongly disagree |
| 15 | I don't have a very good "mental map" of my environment. | strongly agree | 1 | 2 | 3 | 4 | ⑤ | 6 | 7 | strongly disagree |
| 16 | I usually get lost indoors. | strongly agree | 1 | 2 | 3 | 4 | 5 | ⑥ | 7 | strongly disagree |
| 17 | I usually get lost outdoors. | strongly agree | 1 | 2 | 3 | 4 | 5 | ⑥ | 7 | strongly disagree |
| 18 | I have __ experience with Augmented Reality. | none | 1 | 2 | ③ | 4 | 5 | 6 | 7 | a lot of |
| 19 | I have __ experience with Virtual Reality. | none | 1 | 2 | 3 | 4 | ⑤ | 6 | 7 | a lot of |

TASK1: Please draw and label all the spatial information you remember, including rooms, room names, stereoscopes, fire distinguisher, garbage can and anything else you can recall.

3:09



stairs.

cartography offices.

administration

Courtyard

library

the office we are sitting now.

garbage can

Stre board

stairs

fire extinguisher

# TASK 2: Please complete the following questionnaire ("1" = not at all, "7" = very much).

*COLORS stands for the color of landmarks including transparency, LABELS stands for the label text and icon, LANDMARKS stands for the shape, position and orientation etc.*

1. Before this walking, how familiar were you with the study area?

   not at all　　**(1)**　2　3　4　5　6　7　　very much

2. How do you like the device/hardware?

   not at all　　1　2　3　4　5　6　**(7)**　　very much

3. How do you like the interface?

   not at all　　1　2　3　4　5　6　**(7)**　　very much

4. How do you like each element you saw?

   Colors　　　　not at all　**(1)**　2　3　4　5　6　7　very much

   Labels　　　　not at all　1　2　3　4　5　6　**(7)**　very much

   Landmarks　　not at all　1　2　3　4　5　6　**(7)**　very much

5. How do you think each element helps you remember the area?

   Colors　　　　not at all　**(1)**　2　3　4　5　6　7　very much

   Labels　　　　not at all　1　2　3　4　**(5)**　6　7　very much

   Landmarks　　not at all　1　2　3　4　5　6　**(7)**　very much

6. How do you think each element helps you locate your position?

   Colors　　　　not at all　**(1)**　2　3　4　5　6　7　very much

   Labels　　　　not at all　1　2　3　4　**(5)**　6　7　very much

   Landmarks　　not at all　1　2　3　4　5　6　**(7)**　very much

7. How do you think each element helps you identify your orientation?

   Colors　　　　not at all　**(1)**　2　3　4　5　6　7　very much

   Labels　　　　not at all　1　2　3　4　5　6　**(7)**　very much

   Landmarks　　not at all　1　2　3　4　5　6　**(7)**　very much

8. How do you think of the spatial information overload in this system?

   not at all　　**(1)**　2　3　4　5　6　7　　very severe

9. Do you think the landmark design has a certain sense of hierarchy and classification?

   not at all　　1　2　**(3)**　4　5　6　7　　very much

10. Do you think this kind of sense of hierarchy and classification assists you to remember the space?

    not at all　　1　2　3　4　5　6　**(7)**　　very much

11. To what extent does the landmark design help you to judge the distance between landmarks?

        not at all     1     2     3     4     (5)     6     7     very much

12. To what extent does the landmark interfere with your eyesight?

        not at all     (1)     2     3     4     5     6     7     very much

13. To what extent does the landmark interfere with your observation to the real world?

        not at all     (1)     2     3     4     5     6     7     very much

14. To what extent does the design help you with understanding the local spatial layout?

        not at all     1     2     3     4     (5)     6     7     very much

15. Please compare your preference between AR and map: which help you understand the indoor space more?

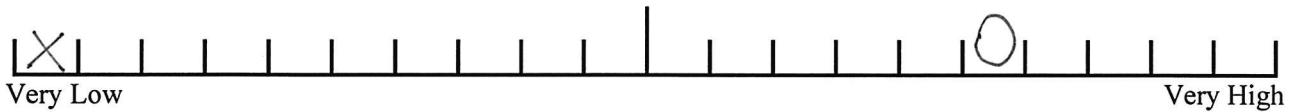Map          not at all     1     2     3     4     (5)     6     7     very much

AR           not at all     1     2     3     4     5     6     (7)     very much

TASK 3: Just imagine there is a fire alarm, and you need to extinguish a controllable fire: where do you think you could find the fire extinguisher?
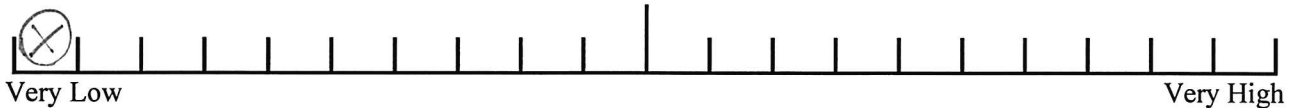
**Legends**

Space

Stairs

★ Start Point

# NASA Task Load Index

*Hart and Staveland's NASA Task Load Index (TLX) method assesses workload on five 7-points scales. Increments of high, medium and low estimates for each point result in 21 gradations on the scales.*
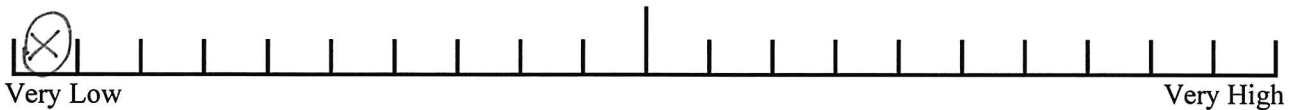
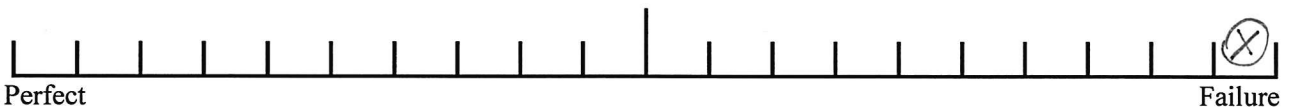1. Mental Demand: How mentally demanding was the task?

Very Low                                                                 Very High

2. Physical Demand: How physically demanding was the task?

Very Low                                                                 Very High

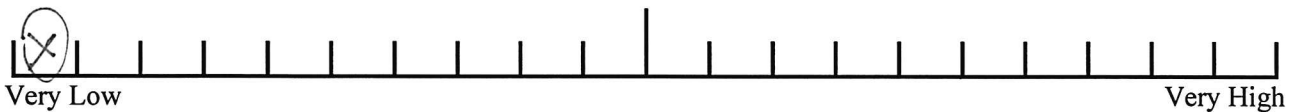3. Temporal Demand: how hurried and rushed was the pace of the task?

Very Low                                                                 Very High

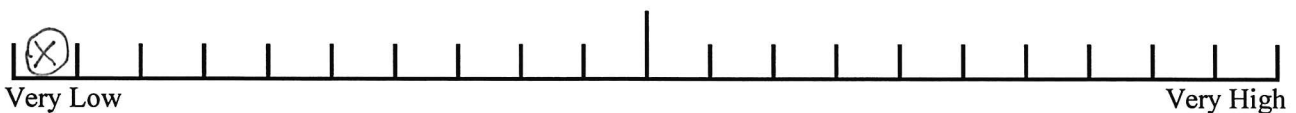4. Performance: How successful were you in accomplishing what you were asked to do?

Perfect                                                                    Failure

5. Effort: How hard did you have to work to accomplish your level of performance?

Very Low                                                                 Very High

6. Frustration: How insecure, discouraged, irritated, stressed, and annoyed were you?

Very Low                                                                 Very High

<span style="color:red">Please confirm the authenticity of data in this document (including pre-task questionnaire, post task questionnaire and task quiz).</span>

☒ I confirm the authenticity of all data in the document (including pre-task questionnaire, post task questionnaire and task quiz).

_____
14/07/2023

**Date**

_____

**Signature of researcher**

_____

**Signature of participant**