The Road to Finding Interesting Contexts for Teaching Data Literacy at School

Objectives

Aims of the overall project

1. Investigating 7th up to 10th graders' interests in the digital world and make use of knowing them to support students in acquisition of digital competencies and in particular data literacy competencies
   - All students must acquire competencies in the field of data literacy which can be seen in the "Digital Competence Framework for Citizens" (Carretero, Vuorikari & Punie 2017)
   - A **positive influence** can be taken on the **learning motivation** and **success** (Hidi & Harackiewicz 2000, Kpolovie, Joe & Okoto 2014)
2. Investigating the influence of the familiarity of a teaching context to learners on their situational interest in the field of data literacy
   - Contexts in terms of familiarity can be distinguished between **everyday life-related** contexts which occur often in the daily life of the students and **uncommon** contexts which are not part of their daily life
   - **Contradictory** research **results** can be found regarding its influence on learners' situational interest (e.g. Bennett 2016, Habig et al. 2018)

Research Project Overview

Pilot Study
Aim: Test the comprehensibility of the questionnaire and of the context descriptions, and help estimate the processing time for the 1st main study. Results are presented here (N=28).

1st Main Study
Aim: Finding contexts which, from the students point of view, most likely are either everyday life or uncommon contexts.
September/October 2020

Pilot Study
Aim: Testing the questionnaire for 2nd main study and its comprehensibility.
Spring 2021

2nd Main Study
Aim: Investigating the situational interest of learners on data literacy aspects depending on everyday life and uncommon teaching contexts.
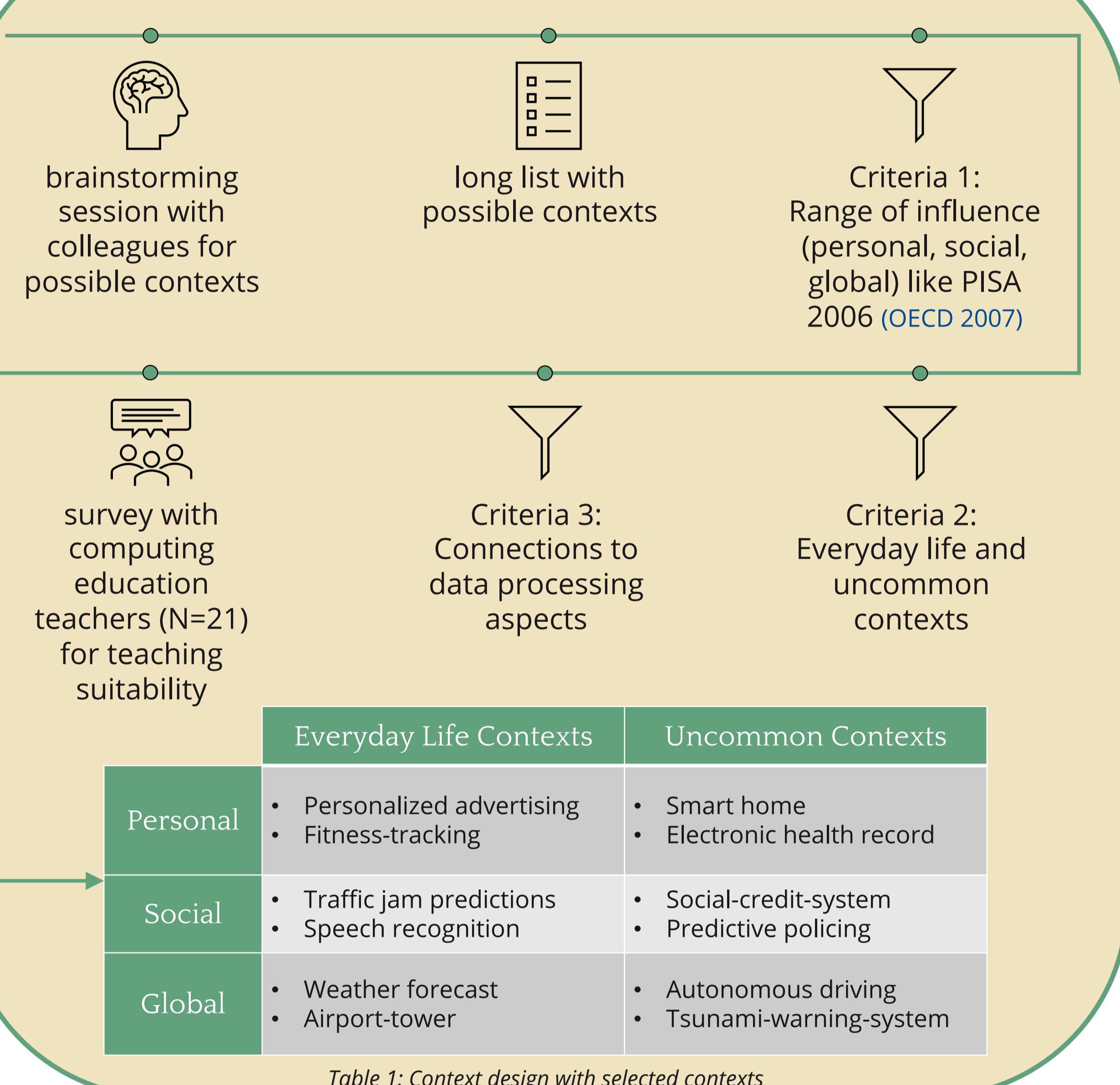Spring till summer 2021

Steps in Context Selection Process

brainstorming session with colleagues for possible contexts

long list with possible contexts

Criteria 1: Range of influence (personal, social, global) like PISA 2006 (OECD 2007)

survey with computing education teachers (N=21) for teaching suitability

Criteria 3: Connections to data processing aspects

Criteria 2: Everyday life and uncommon contexts

	Everyday Life Contexts	Uncommon Contexts
Personal	• Personalized advertising • Fitness-tracking	• Smart home • Electronic health record
Social	• Traffic jam predictions • Speech recognition	• Social-credit-system • Predictive policing
Global	• Weather forecast • Airport-tower	• Autonomous driving • Tsunami-warning-system

Table 1: Context design with selected contexts

Example from the Questionnaire

Smart Home

In the future, intelligent technology is to be installed in houses more often. It should make life in the house easier, more environment friendly and more comfortable.

Image by geralt from pixabay

They are called smart homes. In such houses, electric locks in doors, lamps, shutters and heaters are connected to each other. For example, the light turns on by itself when the front door is opened. Or the temperature in the rooms is raised before you get back home. Motion detectors recognize if and where someone is in the house. This data is sent to other devices in the house for further processing. For this to succeed, a lot of data must be collected and processed. Only in this way, all devices in the house could work perfectly together.

Items (cf. Habig et al. 2018)

- I would say I have understood the context description. (Yes / No)

Please indicate to what extent the following statements apply to you: (5 point-Likert-scale)

- Smart Home is something strange to me.
- In my own environment, Smart Home does not normally occur.
- Smart Home is ordinary for me.
- Smart Home is something that belongs to my own world.
- Smart Home is something extraordinary, that rarely/never occur in my environment.
- Smart Home occurs in my immediate environment.

Please enter terms or phrases you did not understand on this page (open text field)

First Findings and Implications for the 1st Main Study

Processing Time

- Average processing time was **13.55 minutes** (SD = 6.48), less than expected
  - Consideration could be made to add an additional fourth context for the main study
  - Instead, we decided to add three short items per context measuring whether the context is of interest to the students. This gives us important insights for the 2nd main study
- No response patterns were found nor were there any inconsistencies in the processing time of the contexts
  - The contexts seem to be comparable and therefore **nothing will be changed** for the 1st main study

Comprehensibility

- Only one student indicated that the context descriptions *autonomous driving* and *weather forecast* were not understood. Unfortunately, the one student did not used the text field to specify what exactly was not understood in the context descriptions
- The terms **database** and **algorithm** seem to be difficult for the students to understand
  - These terms will be **replaced or explained** for the 1st main study

Students' rating on the familiarity of the contexts

- Indications that the students rate the contexts in a similar way as we did
- Some contexts are already emerging which seem to be more from *everyday life* (e.g. fitness-tracking) or more *uncommon* (e.g. social-credit-system)
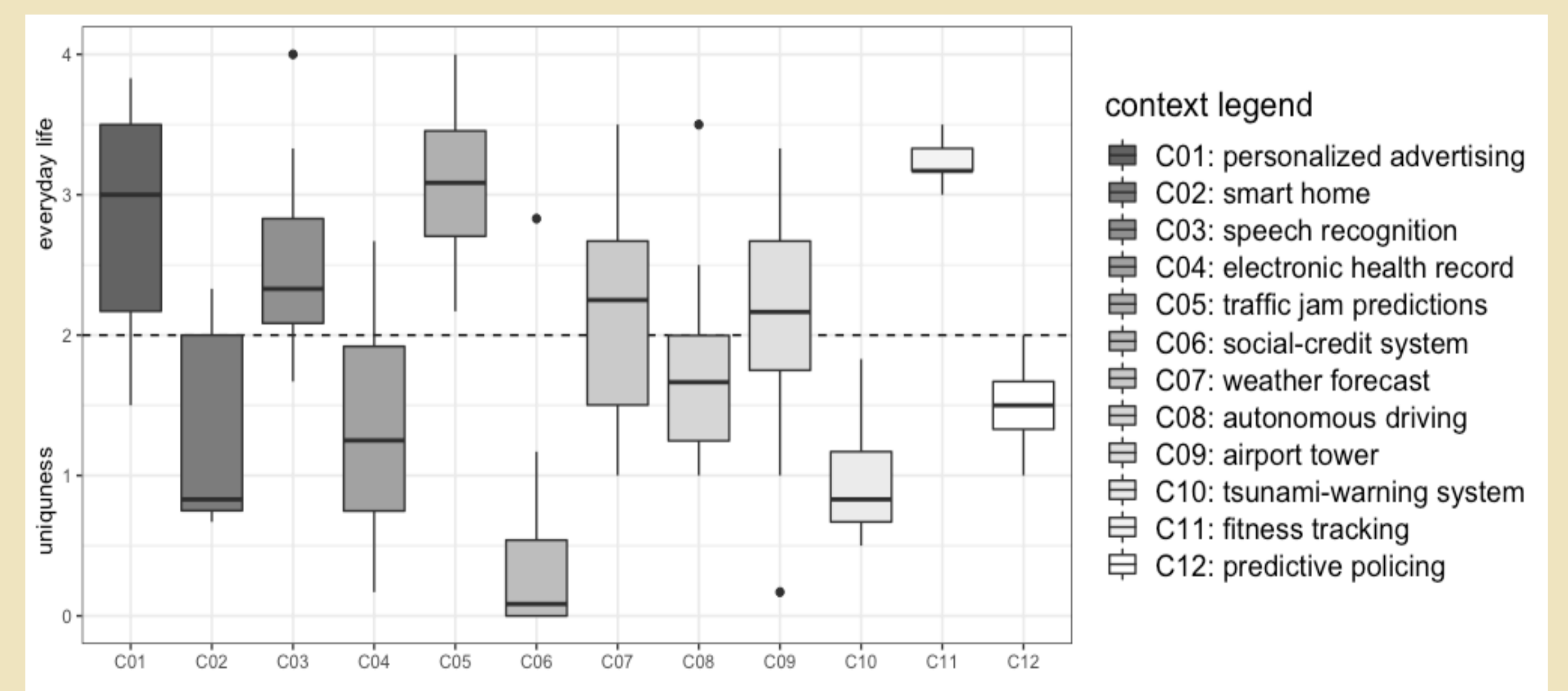 - **None** of the 12 contexts will be **removed** or **changed** for the 1st main study

context legend
- C01: personalized advertising
- C02: smart home
- C03: speech recognition
- C04: electronic health record
- C05: traffic jam predictions
- C06: social-credit system
- C07: weather forecast
- C08: autonomous driving
- C09: airport tower
- C10: tsunami-warning system
- C11: fitness tracking
- C12: predictive policing

Figure 1: Students' rating of contexts in terms of familiarity

References

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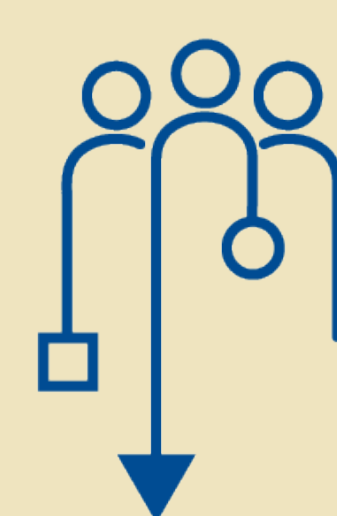
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