UNIVERSITY OF LJUBLJANA
Faculty of Electrical Engineering

LUCAMI The User-adapted Communications and Ambient Intelligence Lab

Segmentation of students with special needs at UL

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Introduction

- The goal:
  - Segmentation of special needs students at UL
  - A base for understanding their needs
- Procedure:
  - Operacionalisation → questionariee: five aspects
  - Data acquisition: direct invitation
  - Segmentation using machine learning (unsupervised clustering): for three aspects
  - Manual explanation of clusters as segments
- Results:
  - Segments, explanations

Baseline and objectives

Baselines:

- The main challenge is the available time of teachers and students
- We need ready-to-go products: a demo room where it is possible to test
  - The technology is WORKING
  - Get support to set up - install and use

Objectives

- Which students do we have and what do they need: segmentation
- How they use assistive technologies: segmentation

Operacionalisation of instrument

Sources and background:

- Practices of foreign universities?
- Teaching experience?
- Knowledge of special education?
- What can assistive technology do?
- How the impact of technological support is measured – existing instrument

The instrument is used as self reported student feedback instrument providing input to the segmentation procedure.

Five selected aspects

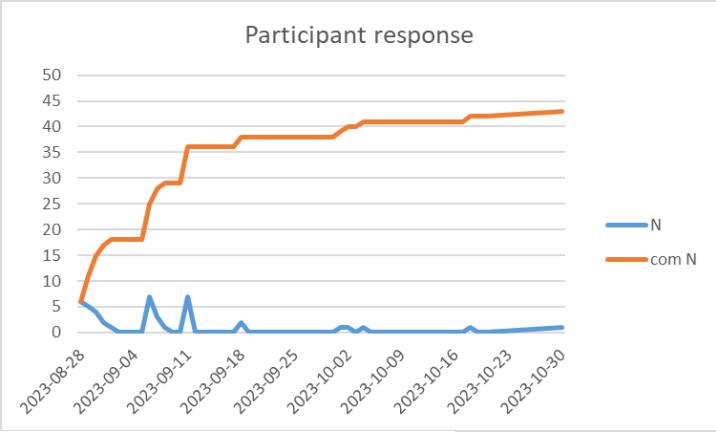
We have identified five aspects:

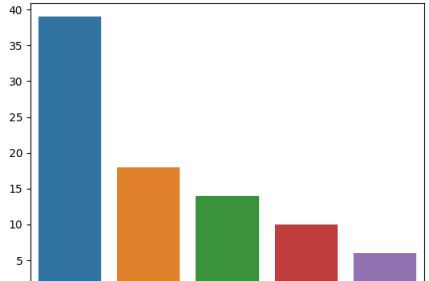
- (1) Technology and overcoming study barriers
- (2) Technology and study outcomes
- (3) ICT and Study Obligations
- (4) ICT and Study Skills
- (5) Opportunities to use ICT technology

Demographics: gender, age, special needs, level of study, university

Participants and data collection

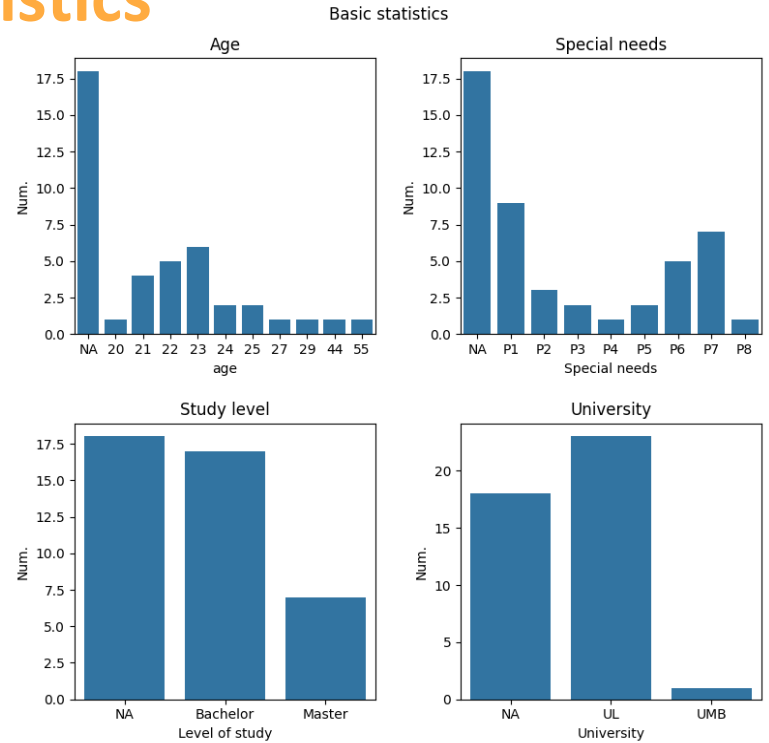
- Sample is biased
- Why such low response:
  - n = 43, invited 720
  - Distrust of technology?
  - Distrust of university?
  - General skepticism towards questionnaires?
- Challenge: how to motivate students to participate



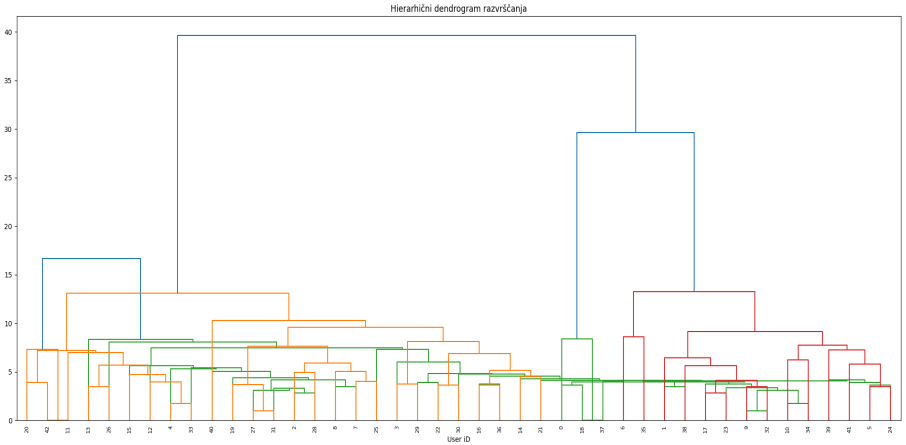


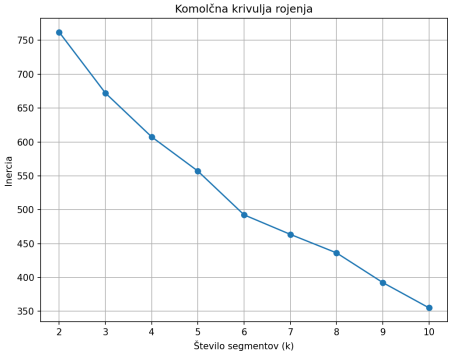
Basic statistics

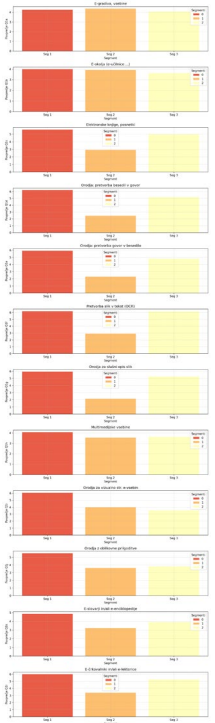
- P1: ’Deficits in certain areas of learning (dyslexia, dysgraphia,dyscalculia ...)’,
- P2: ’Physical disability’,
- P3: ’Partial or total hearing loss’,
- P4: ’Partial or total loss of vision’,
- P5: ’Speech-language difficulties’,
- P6: ’Emotional and behavioral disorders’,
- P7: ’Long-term or chronic illness’,
- P8: ’Autism spectrum disorder’,



Segmentation methodology: unsupervised clustering







Aspect Q1: Technology and overcoming study barriers

- **Seg. 1**: The answers to all questions are the highest, i.e. all technologies are rated as very important. These are **technology enthusiasts**.
- **Seg. 2**: Most questions are answered with low values. These are **technology sceptics**. Little importance is attached to most technologies, with the exception of e-materials, e-environments and multimedia content. This segment therefore scores well for e-materials, but not for content conversion tools, etc.
- **Seg. 3**: Importance varies considerably on average. These are those who believe in and use some technologies but not others. They rate most technologies well, with the exception of visual and design customization tools.

Aspect Q2: Technology and study outcomes

- **Seg. 1:** Technologies are of varying importance. These are **critical users**. They rate most technologies well, with the exception of audio-to-sketch, dictation, e-interpreting and audio-to-text tools.
- **Seg. 2:** They rate all technologies as very important. This is **technology enthusiasts**, the first segment from a segmentation into two segments.
- **Seg. 3**: All technologies are classified as unimportant. These are **technology sceptics**. They classify most technologies as unimportant, with the exception of electronic communication and customized hardware.

Aspect Q3: ICT and Study Obligations

- **Seg. 1:** The technologies are characterized by different applicability. These are **Critical Users**. All technologies are classified as useful, with the exception of ICT to support independent work, to support group work and to support examination requirements.
- **Seg. 2:** In this segment, all technologies are rated as very useful. This is **Technology Enthusiasts**.
- **Seg. 3:** Here, the majority of respondents consider the technologies to be of little use. These are **technology sceptics**. They describe all technologies as not very useful, with the exception of support for direct distance learning.

Conclusion and future work

- Conclusions
  - The instrument needs next round adaptation to make it shorter
  - In-depths interviews are needed to clarify identify segments
  - Motivation of special needs students needs to be addressed

- Future work
  - Identifying main usage scenarios
  - Understanding their usages scenarios, define main personas
  - Bring usage scenarios and supportive ICT technology together