Exploring the usability of SEESAW: An educational kiosk-based mobile application

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Outline

- Introduction & Motivation
- Background and related work
- The SEESAW app
- Methodology
- Results & Discussion
- Conclusions & future work

Introduction and motivation

- Self-Service Kiosks (SSKs) have become a part of everyday life [1, 2]
  - Commercial apps (e.g., ordering food at restaurants)
  - Advertising (e.g., malls/shops)
  - Information points (e.g., airports, malls)
  - Healthcare services (hospitals)
  - Education (e.g., universities, training facilities)

- Peculiarities in developing applications for SSKs :
  - Environmental factors (e.g., noise/light levels, etc.)
  - Context (e.g., activities, distractions, level of concentration, etc.)
  - Variety of device types (e.g., orientation, resolution, responsiveness, etc.)

Research aims

Explore the usability of kiosk-based mobile applications:

1. *What are the **main usability challenges** in designing educational kiosk-based applications?*
2. *How **effective** is SEESAW's UI in enabling a **good level of task performance**?*
3. *How do **users experience** the SEESAW app and how do they **perceive its usability**?*

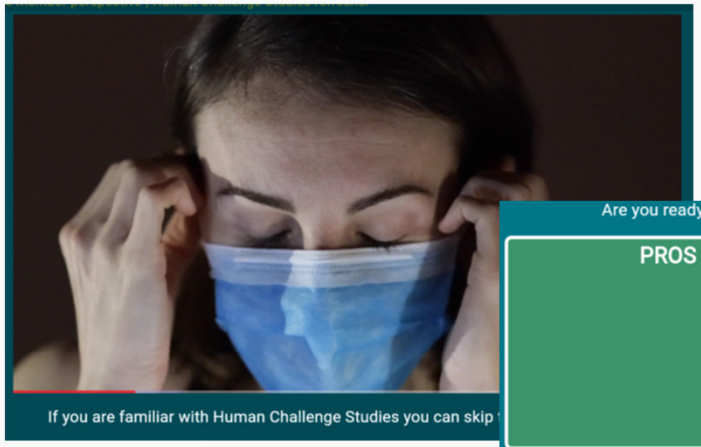
Related work

- Usability evaluation methods for kiosk apps:
  - Heuristics (e.g., Nielsen) [4]
  - User observations
  - Task-based assessment
  - Expert analysis
  - Usefulness Satisfaction Ease of use (USE) questionnaire
- *Domain-specific* usability evaluation:
  - Fast-food industry → order accuracy, transaction numbers [5]
  - Transportation → reduce frustration
  - Healthcare → Ease of use, accessibility [6]
- Features: high-contrast, text-to-speech, multilingual support, etc.

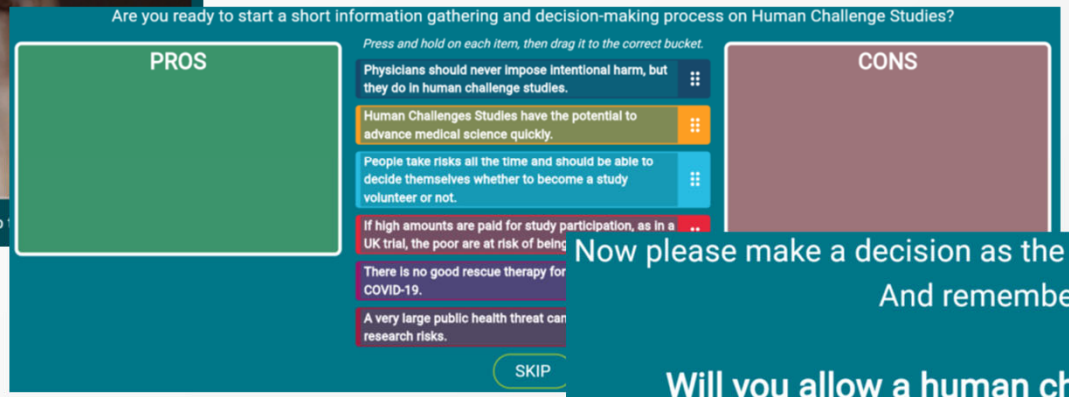
Implementation of the SEESAW app

- Cross-platform web app: Flutter framework
- Prototyping w/ low & high-fidelity wireframes
- Aims to educate learners regarding research ethics through 2 perspectives:
  - Policy makers (8-10 mins)
  - Research Ethics Committee member (12-14 mins)

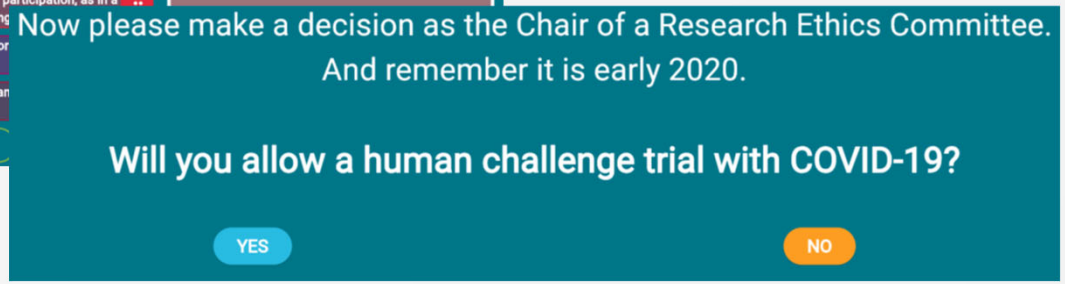
The SeeSaw app – Components



Video



Decision-making sorting activities



Poll/Vote activities

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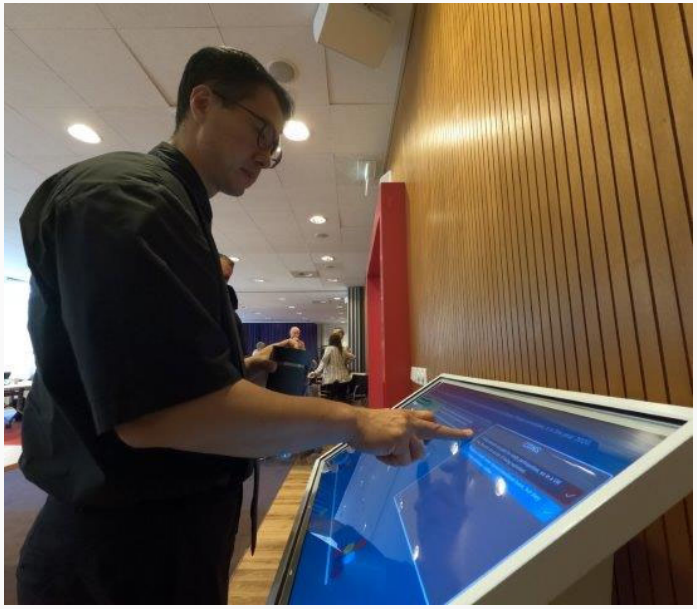

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The SEESAW app – Kiosk features

1. **Forward progression:** forcing users to only move forward
   - Ensures a predictable learning path and controls interaction duration.
2. **Skippable content**: Users may skip content they are already familiar with
   - User-tailored experience
3. **Layered UI design**: Incorporates a looping screensaver video to attract users
4. **Reset options**: Allow users to restart the app
   - Start a new experience after another person
   - If abandoned mid-session, the app starts a countdown and resets after a period of inactivity

Usability evaluation: Research methodology

Mixed methods approach:

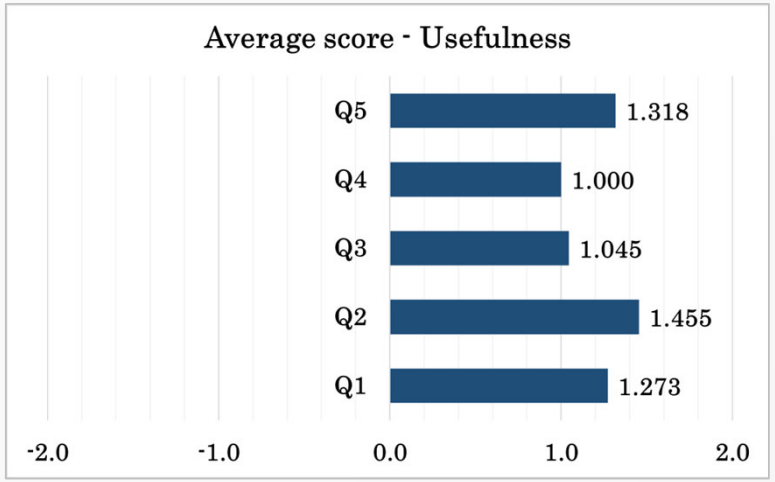
- Assess user experience & educational effectiveness
- Combine quantitative responses w/ open-ended feedback

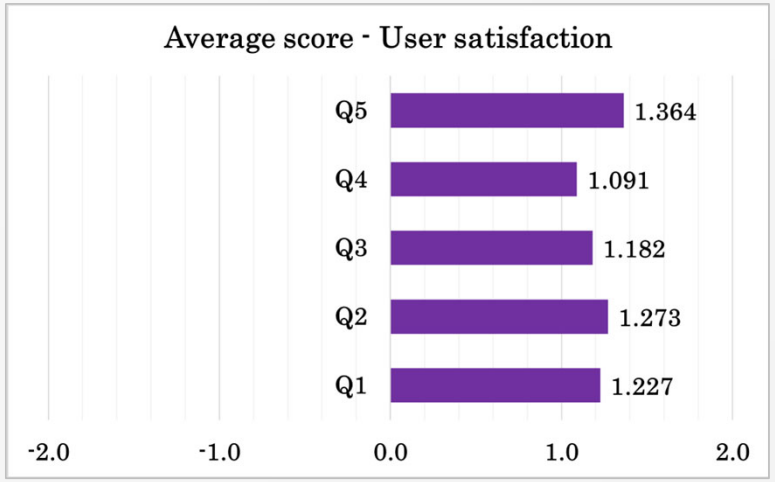
- Identify the main usability challenges

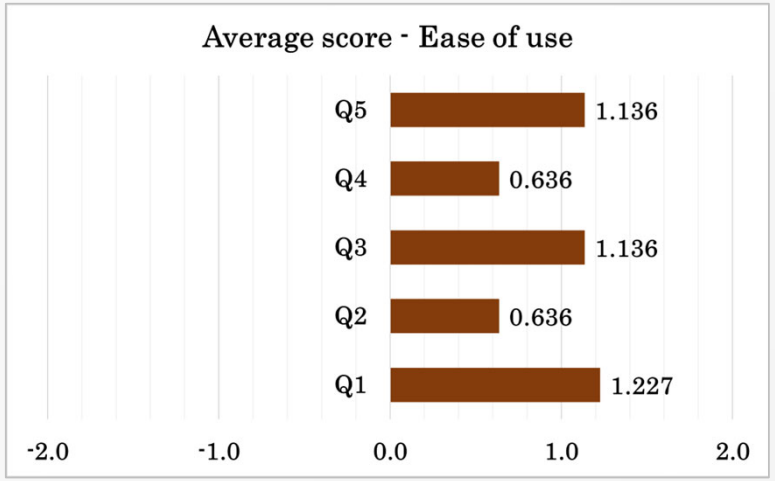
<u>Sampling process:</u>

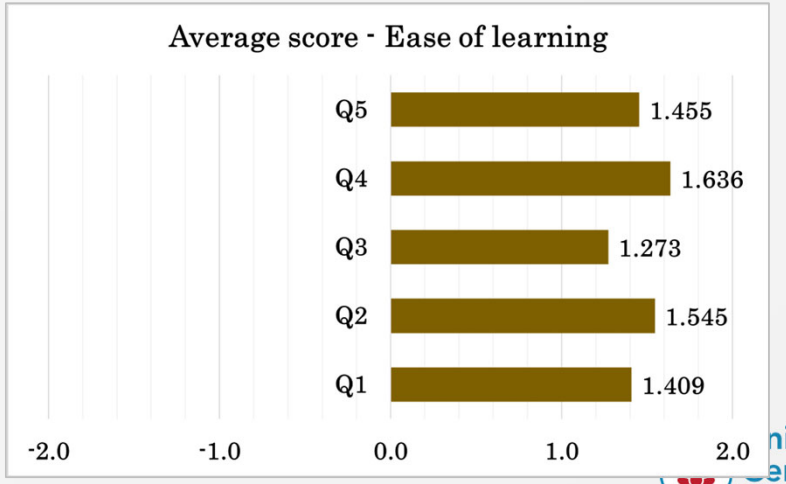
- 22 participants (multiple level of experience & domains)
- 10-minute introduction to SEESAW and its purpose
- Allow participants to use the app on the same devices (controlled environment, consistency)
- Follow either of the two perspectives (same structure)
- Complete an online questionnaire which records:
  - Usefulness, Satisfaction, Easy of Use (USE), Ease of learning
  - Usability (Nielsen's heuristics) [4]
  - Open-ended feedback regarding usability issues & recommendations

Results – Usefulness, Satisfaction, Ease of use









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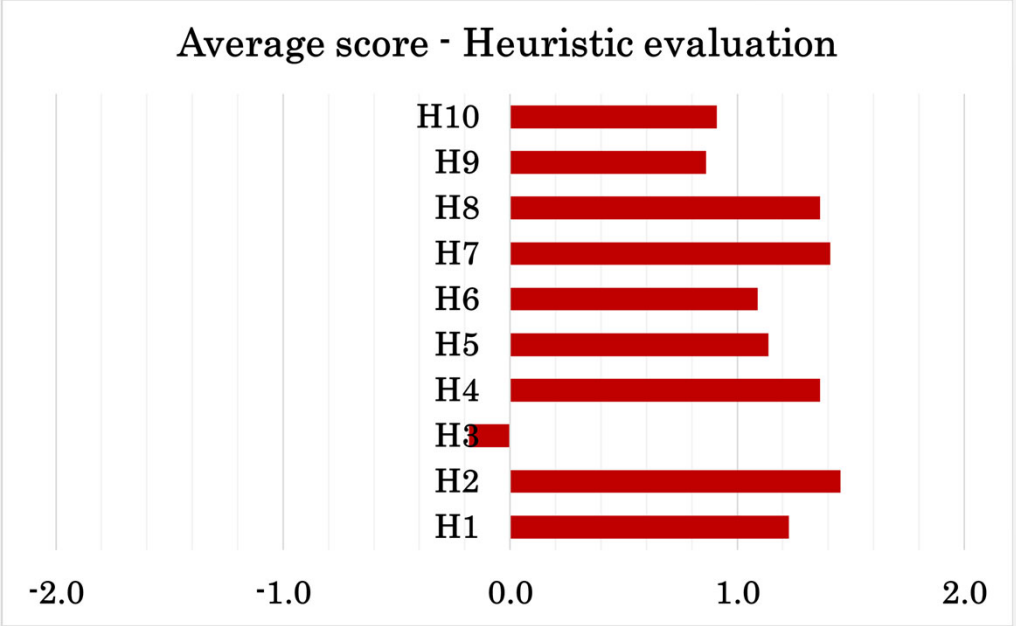
Results – Heuristic evaluation

Nielsen's heuristics [4]:

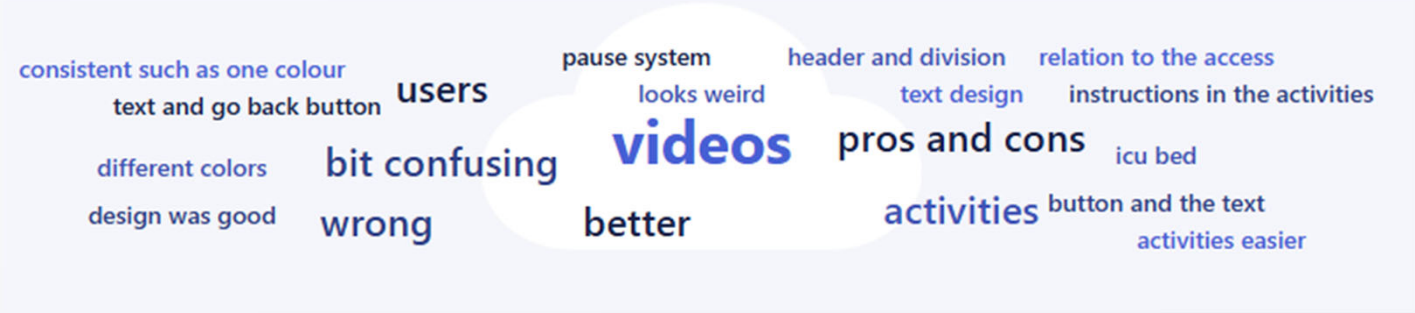
1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize diagnose and recover from errors
10. Help and documentation



Results – Qualitative feedback

Reported problems

Suggestions



Discussion & Conclusions

RQ1: What are the main usability challenges with using the educational kiosk-based application?

- Lack of control (H3) – Video pausing/seeking, pros/cons undo
- Navigation issues
- Option to rewatch videos

Discussion & Conclusions

RQ2: How effective is SEESAW's User Interface (UI) in enabling a good level of task performance?

- User Interface supports a high level of task performance
- Clear, organized
- Easy to learn and use
- Improvements needed in interactive components (e.g., drag and drop not very accurate or responsive)

Discussion & Conclusions

RQ3: How do users experience the SEESAW app, and how do they perceive its usability?

- Very positive experience
- Pleasant activities
- Visually appealing and engaging
- High usability may not be consistent across all parts of the app

Limitations

- Limited number of participants (n=22)
- Evaluation based on only 1 device (for consistency, but also a limitation)
- Evaluation context was a ‘protected environment’ which allowed to focus on specific features but ignored real-wolrd variability (noise, light, social interactions, etc.)

See also…

http://prepared-project.eu

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[3] Mishra, B.K., Choudhary, B.S., Bakshi, T.: Touch based digital ordering system on android using gsm and bluetooth for restaurants. In: 2015 Annual IEEE India Conference (INDICON). pp. 1–5. IEEE (2015)

[4] Nielsen, J.: How to conduct a heuristic evaluation. Nielsen Norman Group 1(1), 8 (1995)

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