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Tap. Talk. Tell a Story

Designing a simple interface, suitable for People with Dementia
Part of the project "A Storytelling Robot for People with Dementia" - proposed by the Interactive Intelligence Group

TU Delft

FINAL PROJECT FOR: CSE3000 Research Project

01. Motivation and Questions

Design a simple interface, for use with a social robot, to support cooperative storytelling

- How to - **guide and support** storytelling without causing confusion
- What - can **show progress or completion** in a cognitively supportive way
- Which - **interface elements** are easiest for People with Dementia to use
- Which - **input methods** are most intuitive and accessible
- What - **feedback** best reassures and engages users
- How to - **integrate** an interface and robot for a smooth, supportive experience

02. What we already know

Interfaces effective for PwD rely on **simplicity, clarity, and personalization** to **reduce cognitive** load and **support varied abilities**.

- Plain layouts, large readable fonts, and high-contrast visuals
- Clear buttons, minimal distractions, and consistent navigation
- Subtitle support and multimodal cues (e.g., audio, visuals, touch)
- Emotionally supportive design and caregiver involvement to promote engagement and dignity

03. Research & Design Approach

- Developed a cognitively accessible tablet interface for storytelling with Milo the robot, using a **user-centered, expert-informed** process
- Applied a **qualitative**, **iterative** approach based on literature, supervision, and feedback from HCI students and a medical expert
- Followed three key stages—**requirements gathering**, **prototyping**, and **expert evaluation**—aligned with dementia-focused design practices and adapted to ethical constraints

04. Prototype Evolution

- **Low-fidelity** sketches to **explore layout, user flow, and interaction design**, focusing on structural clarity over visual detail
- First **mid-fidelity prototype** created based on supervisor feedback, adding **simplified** storytelling screens (hiding transcript), mute and save story buttons, **clearer** tutorials
- Second **iteration** of mid-fidelity prototype, based on heuristic **evaluation**, addressing **confusing** terminology, **passive** screens, **inconsistent** exit messages, **lack of** volume control and creating debate about the effectiveness of the progress bar, and mute button

05. Evaluation and Results

A medical expert reviewed the prototype in a guided session simulating a robot-led storytelling experience. Feedback **confirmed** the interface was **clear, intuitive, and not overwhelming**, with **helpful** multimodal cues. Key improvements based on feedback:

- Transcripts made optional and icon views default
- Added +/– volume controls, help button, and color-coded popups
- Clarified transitions with a "Finish Session" button and ensured consistent exit options

Final prototype was deemed **suitable for 1:1 use**, supporting **emotional safety** and **clarity**.

06. Limitations

- **Impossibility to directly involve PwD** in the evaluation, due to:
  - **ethical considerations** (special consent and safeguards needed to prevent distress or overwhelming)
  - **accessibility constraints** (limited time and scope to form clinical partnerships)
- **Proxies** can't capture PwD's **emotional** or **cognitive responses**. Assessing well-being, distress, and verbal feedback remains a challenge.

07. Conclusion

- This research designed a **cognitively accessible interface** supporting storytelling between a PwD and a caregiver, guided by a social robot.
- Expert-informed, iterative design helped facilitate storytelling, simplify input, reduce cognitive load, and align robot-interface integration.
- The project contributes to dementia-focused HCI through **progress cues**, **feedback**, and **multimodal interaction**, despite the limitation of not involving PwD directly.

08. Future Work

- **Integration:** All the projects that were conducted in parallel should be fully integrated in order for the robot to perform as intended
- **User Testing:** Future studies should involve real users through medical partnerships to validate the design
- **Caregiver and personalization features:** Adding statistics, session histories, and user accounts would support long-term use