

# Social Robots in Museums: Enhancing Engagement and Accessibility for People with Intellectual Disabilities

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# Introduction

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- **Museums** are rich cultural spaces but can be **overwhelming** for individuals with **intellectual disabilities** due to **complex exhibits**



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- Intellectual disabilities involve significant challenges in:
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  - learning and using new skills: abstraction
- It starts before adulthood
- Long-lasting impact

# Goal

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- Explore how **social robots** can be used to **enhance accessibility, engagement, and overall experience** for individuals with **intellectual disabilities** in **museum settings**

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- Research Question (**RQ**): "How can social robots engage individuals with intellectual disabilities in a museum setting?"

# Our Methodology

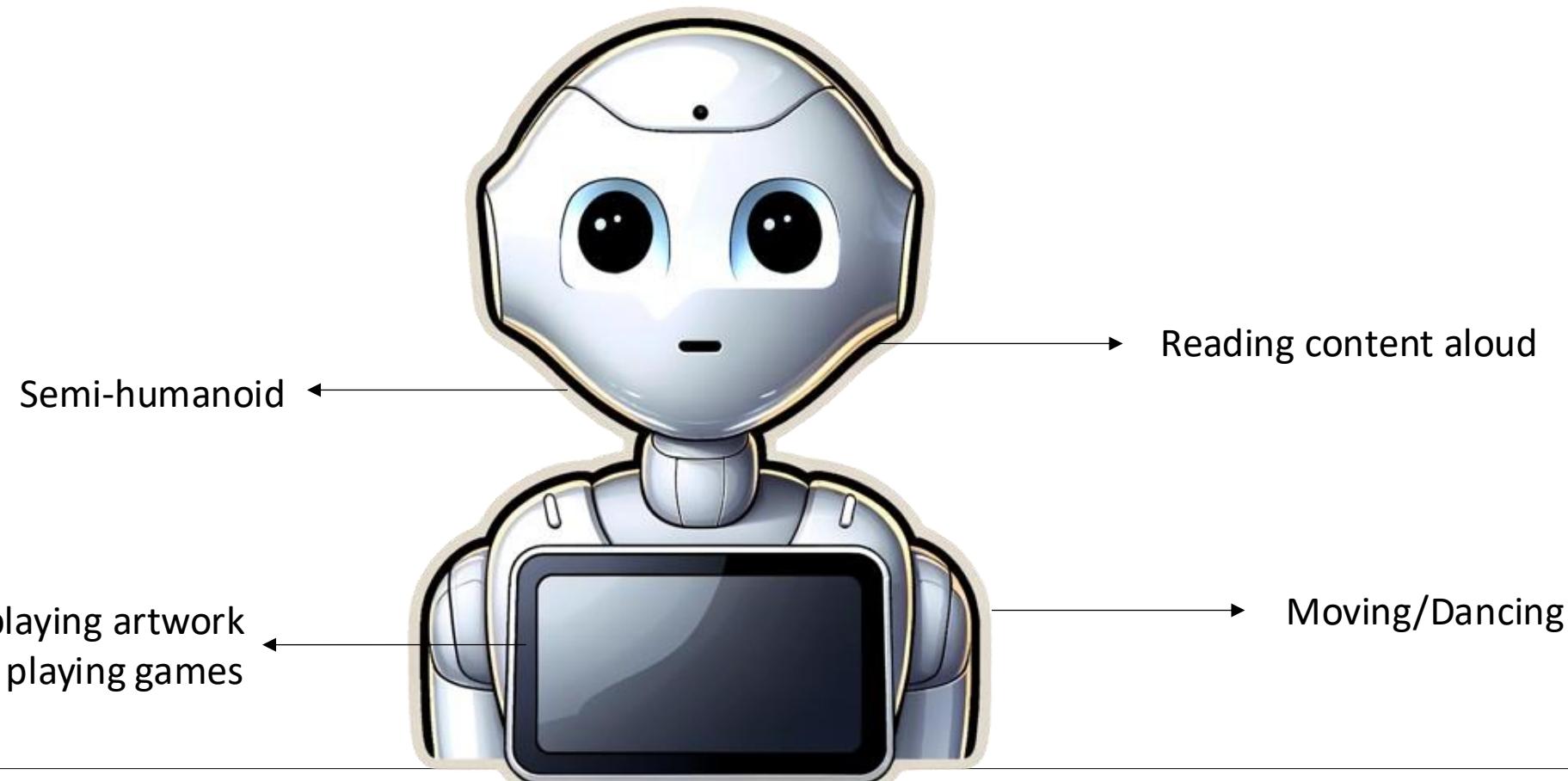
# Social Robot – Pepper

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# Research Design

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- 6 participants with intellectual disabilities (Australians, from 20s to 50s)
- University Campus (QUT) and University Museum (QUT Art Museum)
- 3 workshops conducted. One workshop per week

# Our Workshops

# First Workshop (W1)

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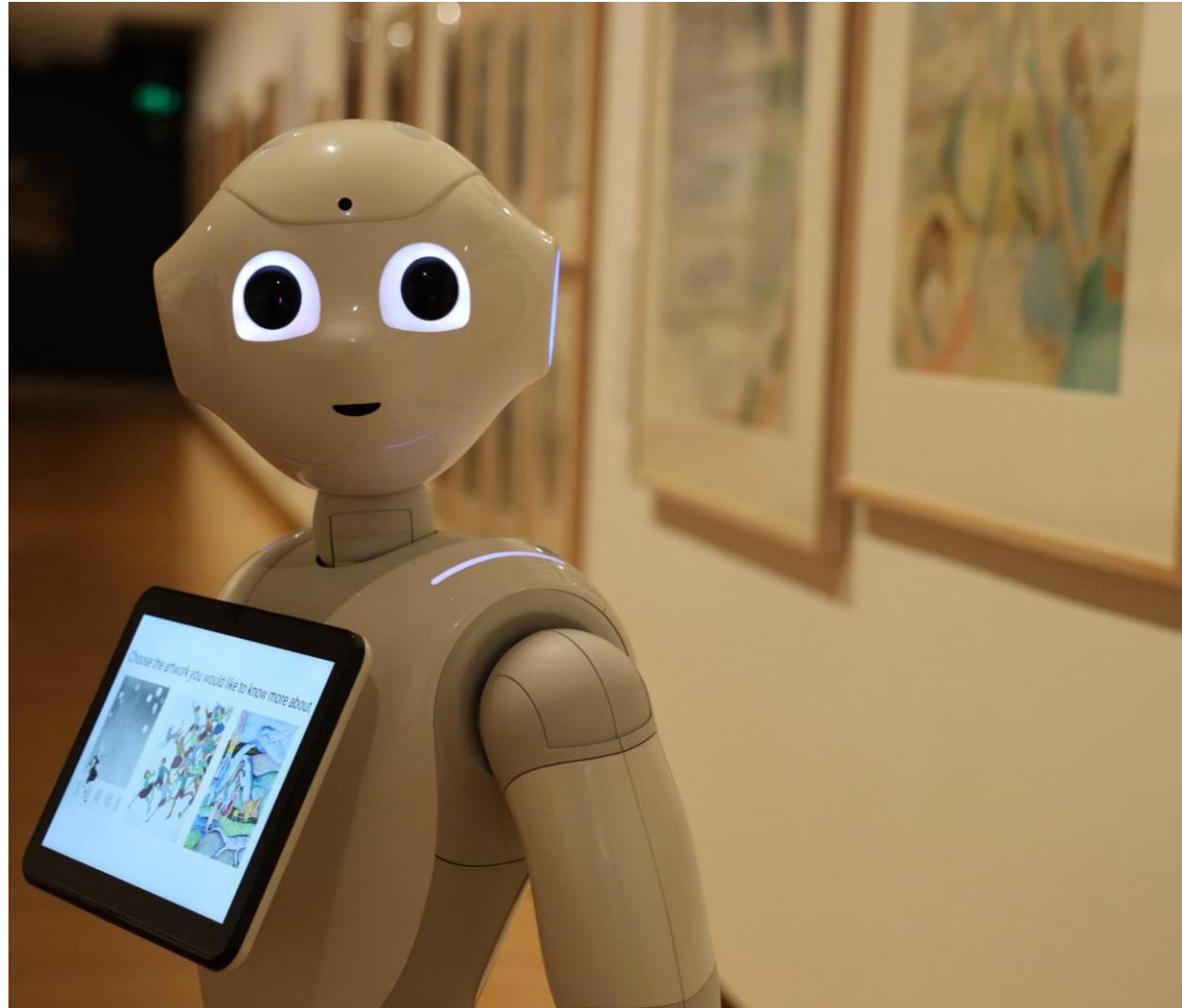
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- Familiarizing with Pepper and the museum content using ACCESS+
- Support and Scaffolding
- Pepper dancing



# Second Workshop (W2)

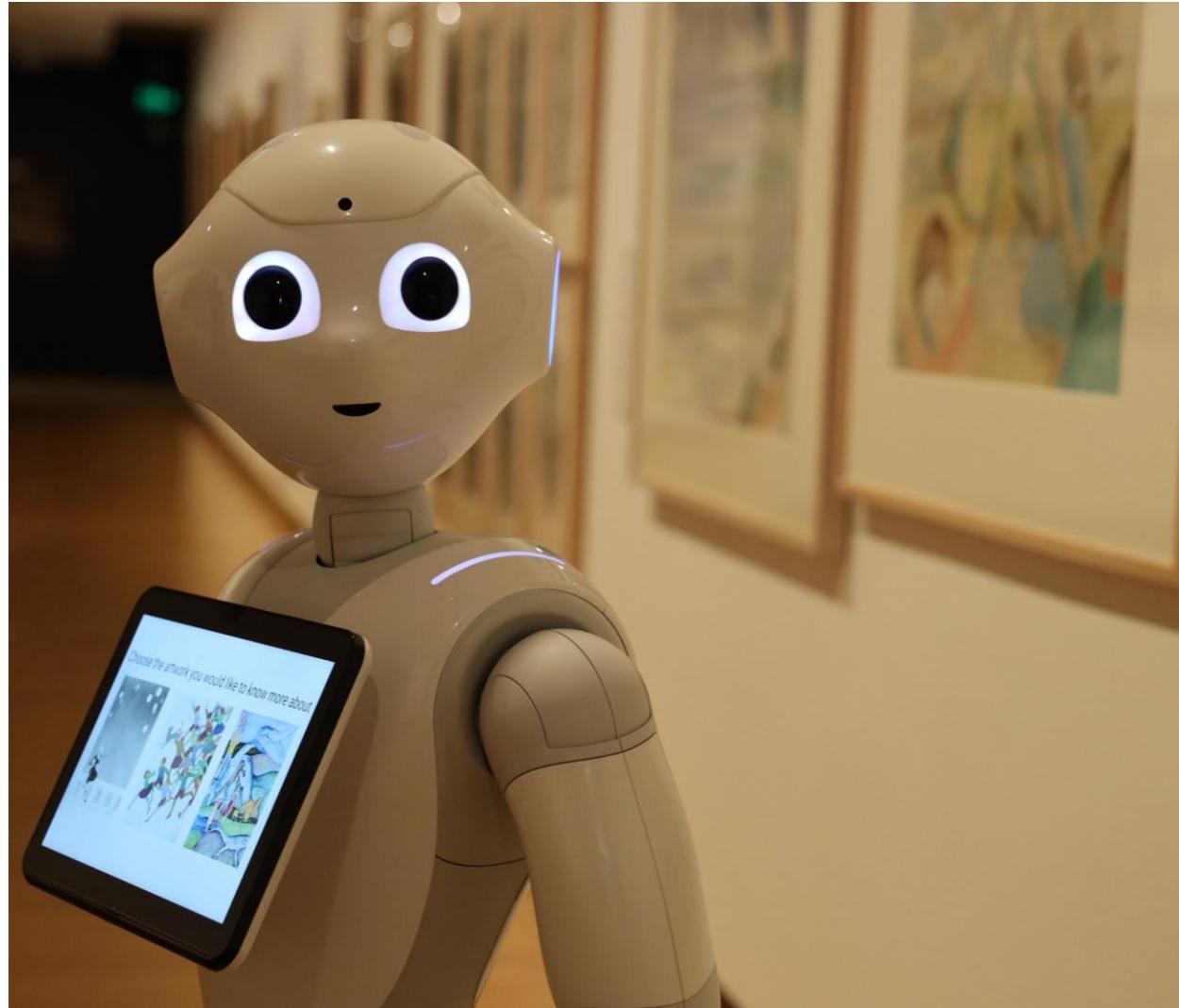
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- Museum visit divided in two groups to provide a richer experience:

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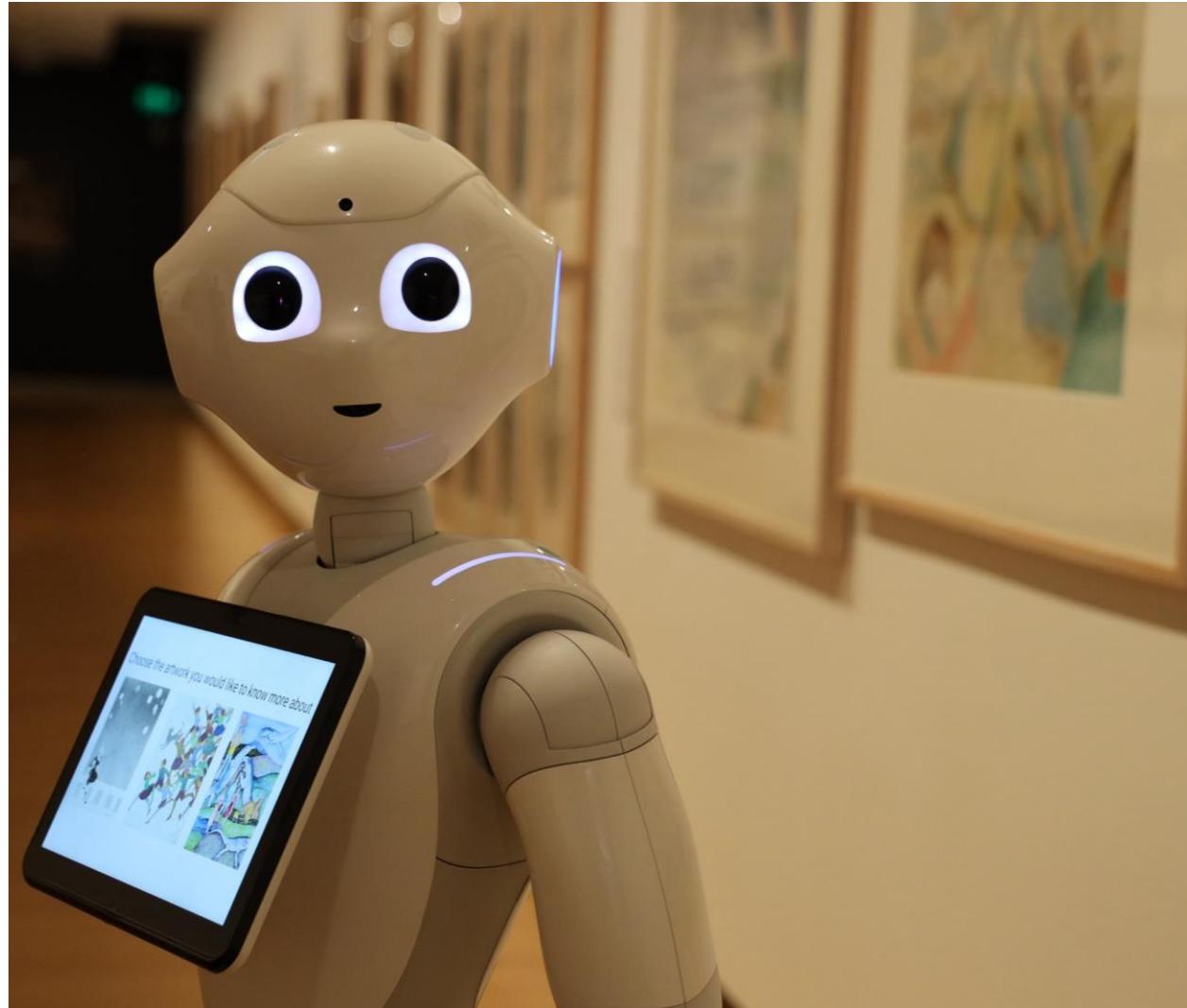
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- Museum visit divided in two groups to provide a richer experience:
  - Visiting the museum with Pepper and a museum engagement officer
  - Using a museum app and pen/paper to reflect on the artworks and Pepper's role

# W2: Interaction Design with Pepper

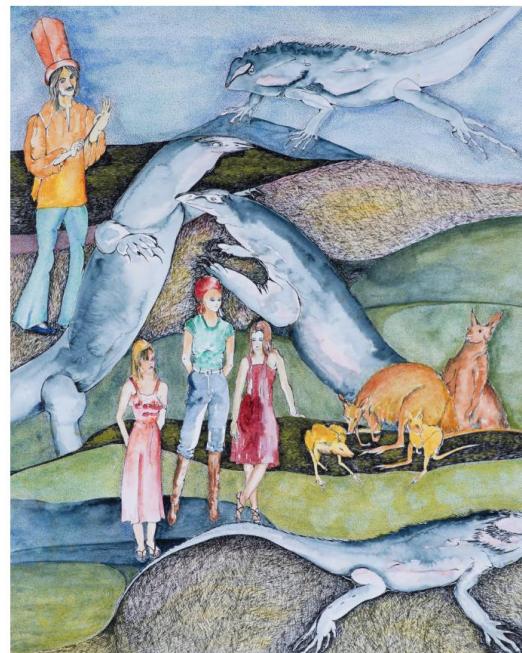
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- Configured to showcase three distinct artworks
- Each artwork displayed on a tablet page, with title, description, and interactive links

The Hills are Alive by Joyce Hyam



This work a watercolour and ink on paper. In this artwork there's a man with a red hat and a wand standing on the left side of the hills. He looks like a performer who is watching over the scene. There are also some water dragons in the picture who look calm and friendly. In the center of the picture, there are three women who look like they're posing for a picture. There are some water dragons and kangaroos nearby too.

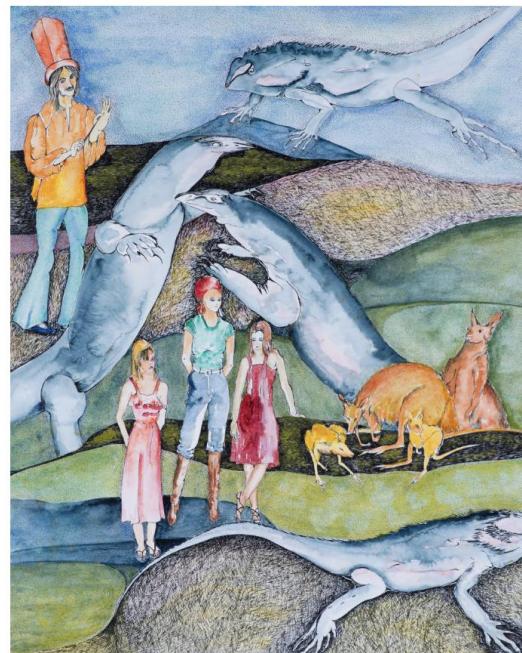
[Interaction](#)

[More artworks](#)

# W2: Interaction Design with Pepper

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  - Selecting "Interaction" led to a question page

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Interaction

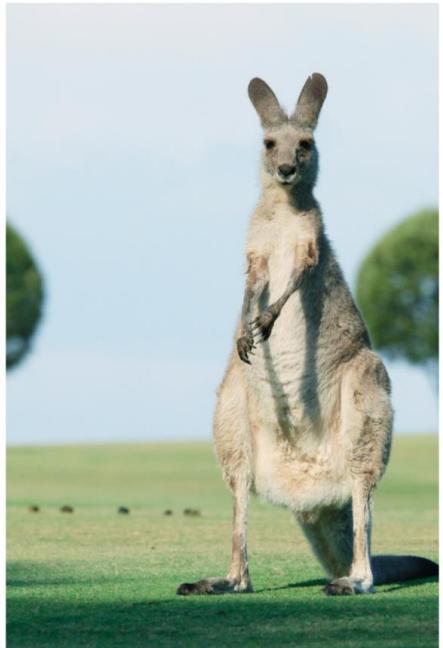
More artworks



# W2: Interactivity

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## Question



Have you ever seen a kangaroo?

[More artworks](#)

- Image and response options:
- A one-minute delay was built in to simulate an authentic interaction before Pepper responded
  - Wizard of Oz

# Third Workshop (W3)

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- Participants reflected on their favorite aspects of the museum visit through **drawings** and **optional use of the ACCESS+ app** on a tablet

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- Participants reflected on their favorite aspects of the museum visit through **drawings** and **optional use of the ACCESS+ app** on a tablet
- Engaged in a **quiz game with Pepper**, focusing on museum artworks where they chose between **two options**, identifying which artwork was in the museum

# **Findings & Discussion**

# Engagement with Museum Tech

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- **Increased Engagement:**
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- **Positive Reactions:**
  - Interactive app features and Pepper's activities (dancing, quiz) engaged participants
- **Feedback:**
  - Familiar tech like tablets enhanced involvement; tech-savvy participant highlighted the need for varied tech options

# Museum Visit & Interactive Experiences

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- **Emotional Responses:**
  - P1, P2, P3: Positive responses, especially with Pepper
  - P4: Neutral yet thoughtful
  - P5: Neutral/unhappy, discomfort with group aspects

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- **Emotional Responses:**
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  - P5: Neutral/unhappy, discomfort with group aspects
- **Technology & Art Interaction:**
  - Wizard of Oz: Paused Pepper's responses to prompt discussion.
  - Human Facilitators: Supported Pepper's role by providing info and guiding discussions

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- **P3:** Highly focused, independently completed all questions successfully
- **P4:** Mixed experience, critical of Pepper's functions, considering its suitability for different audiences
- **P6:** Non-verbal communication (gestures, nods) with Pepper, demonstrating inclusive engagement as a new participant

# Discussion

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- Critical Role of Human Facilitators:
  - Essential in enhancing the **experience** and addressing technological **limitations**
- Critical feedback from Participants:
  - Underscores the importance of **managing expectations** around technology capabilities

# Conclusions

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- Social robots can enhance engagement and participation, especially with adaptable and inclusive approaches
- Personalized tech supports diverse needs, enriching learning for varied audiences

# Thank you!

Questions to [leandro.soares.guedes@usi.ch](mailto:leandro.soares.guedes@usi.ch)