

# Empirical Studies on Social Robots Assisting Physical Activities

Social Robots to Support Wellbeing and Robot Literacy

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# About Me: Chia-Hsin Wu

## Doctoral Researcher

Sep 2023 - Present

CONVERGENCE of Humans and Machines

## Project Researcher

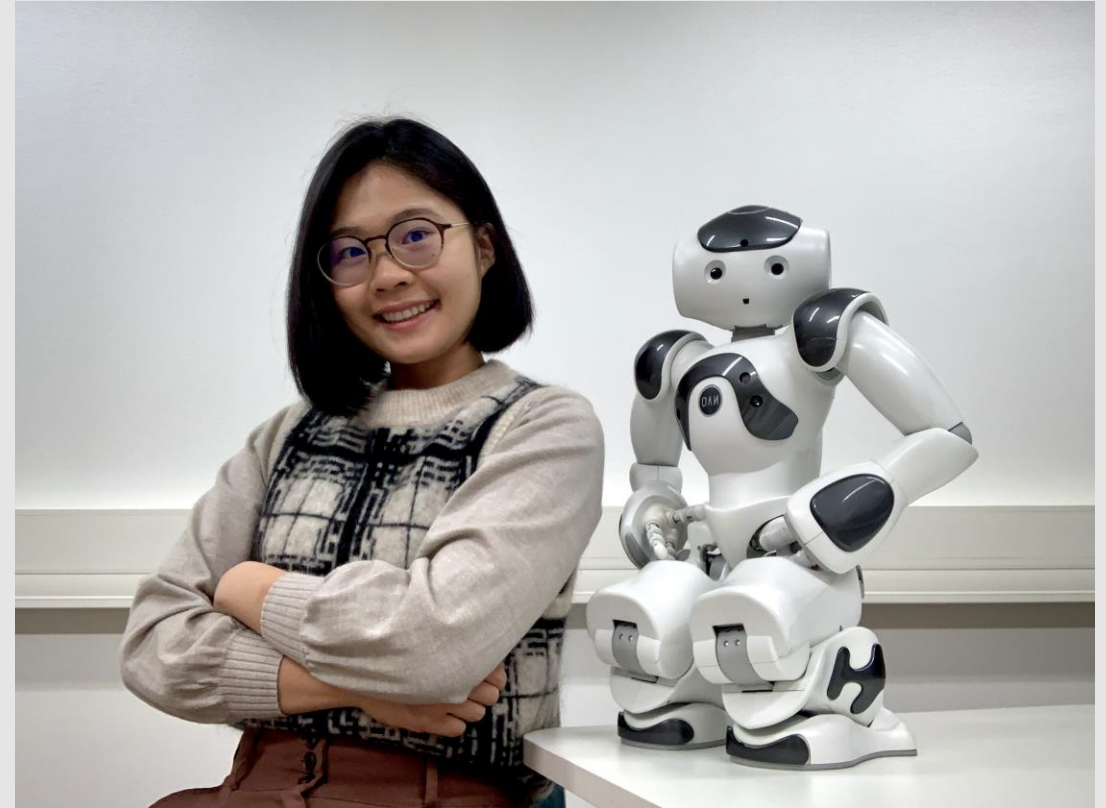
Apr 2022 – Aug 2023

AI Hub Tampere

## Master of Science

Aug 2020 – Mar 2022

Human-Technology Interaction Program



# Outline

## Introduction

- Research topic
- Target users
- Research focuses
- Social robots and contexts of use

## What I have done

- Research phases
- Three empirical studies

## Conclusion

- Summary of findings
- Q&A

# Doctoral Research

## Empirical Studies on Social Robots Assisting Physical Activities for Children and Older Adults

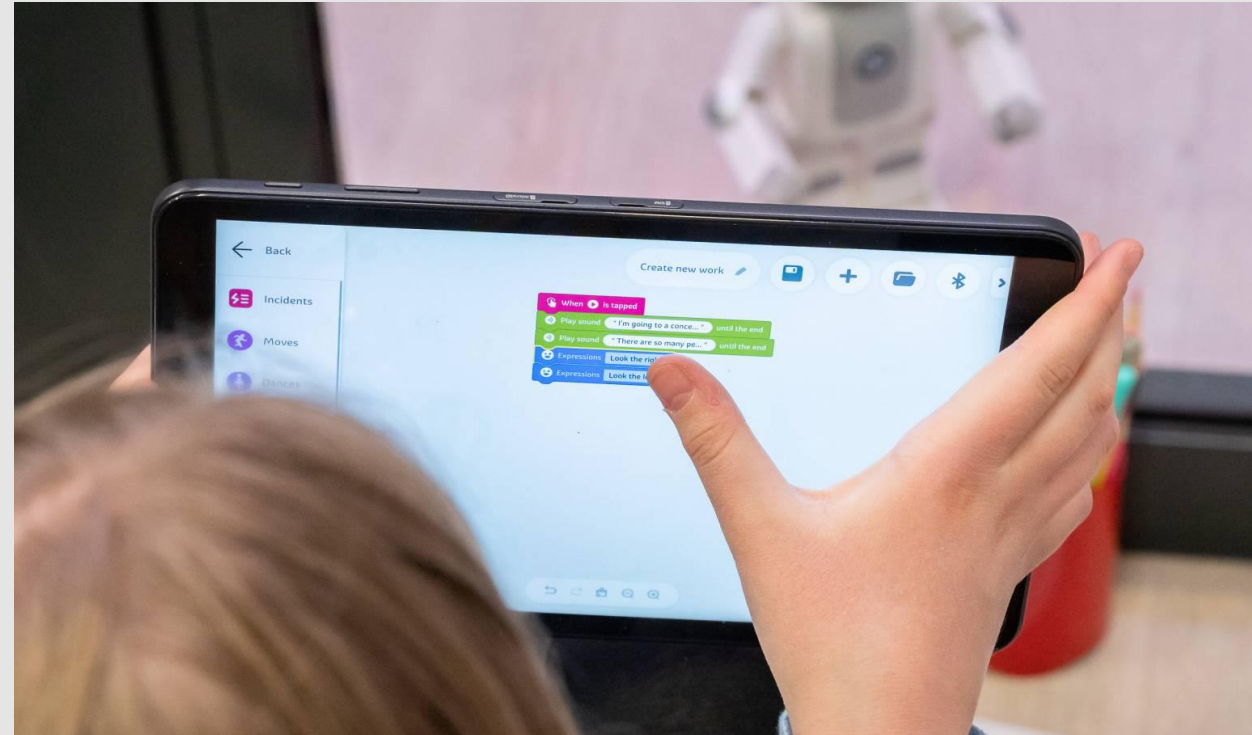
**Sedentary**



**Physically Active**

# Target Users

- Older adults 75 - 103ys
- Children 4 - 12ys



# Research Focuses



## 1 Human-Robot Interaction

How can we integrate social robots in our everyday activities?

## 2 Acceptance of Social Robots

Do we find the robots useful?

## 3 Robot Literacy

How much do we know about robots and its technical aspect?

## 4 Ethical Use of AI

What are the ethical and safe approaches to use AI?

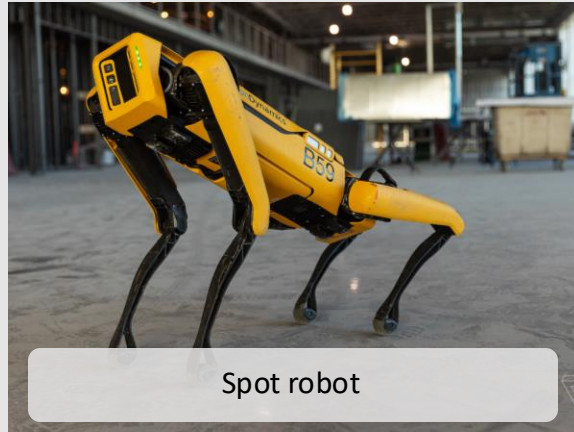
# Social Robots

## Contexts of use

Physical activities in

- summer camps
- exercise classes
- care homes

And many more...



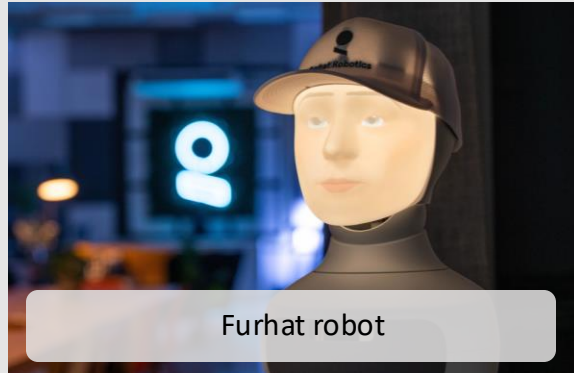
Spot robot



Paro robot



Qoobo robot



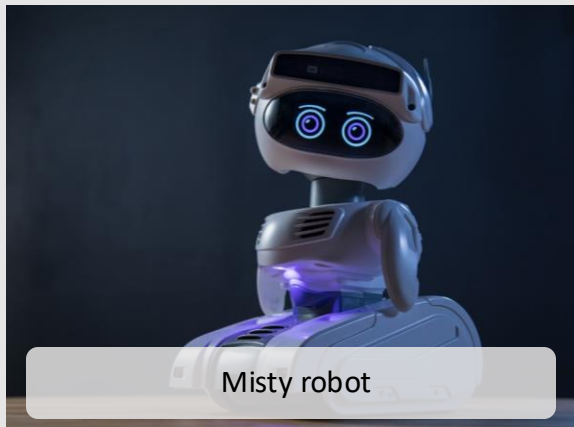
Furhat robot



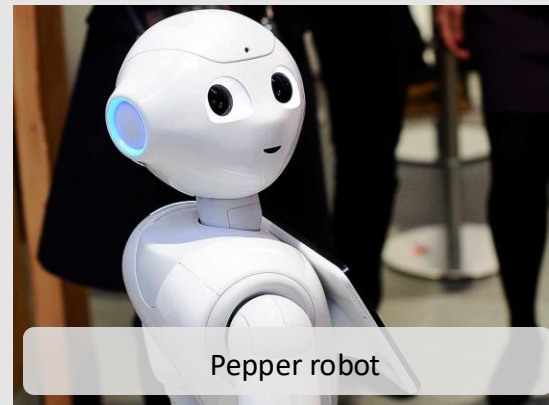
Nao robot



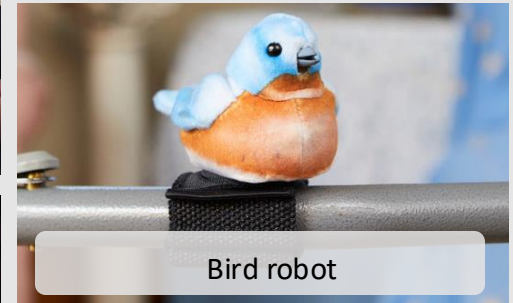
Cat robot



Misty robot



Pepper robot

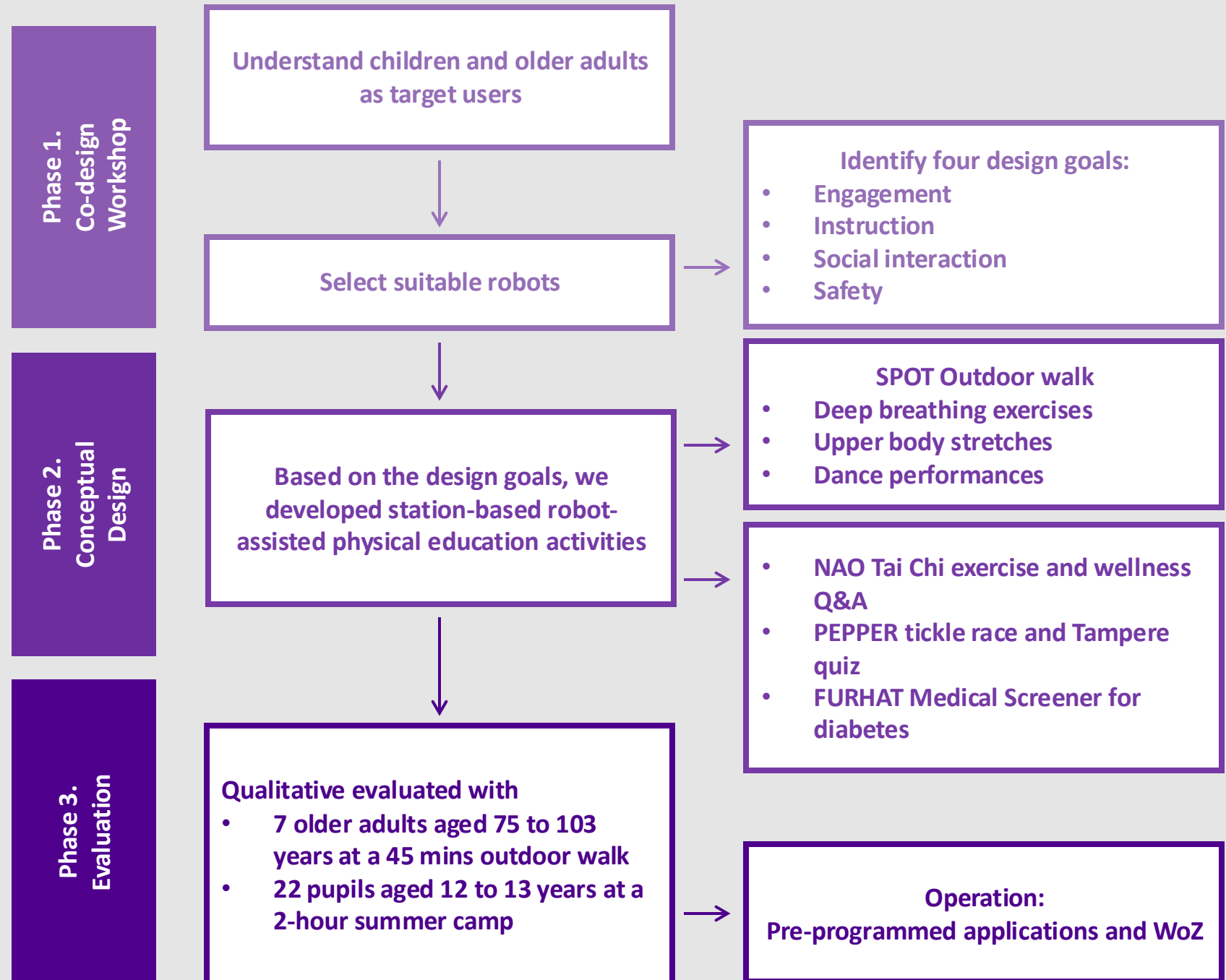


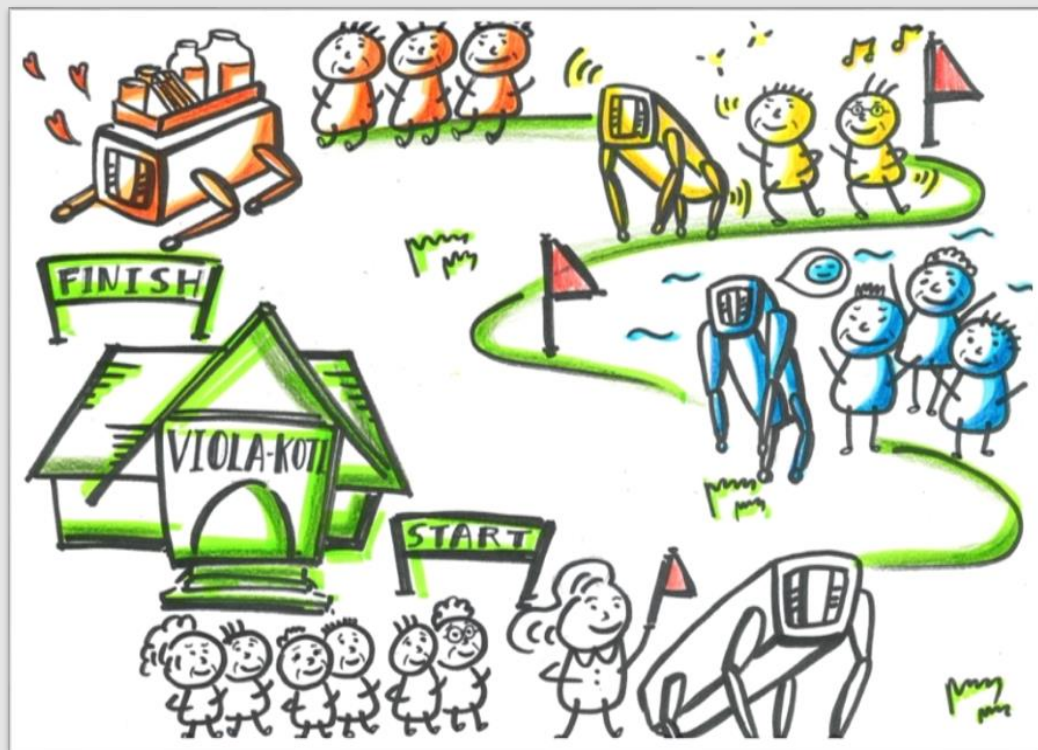
Bird robot



Moflin robot

# Research Phases





# 1 Walking Outdoor with a Zoomorphic Mobile Robot:

Exploration of Robot-Assisted Physical Activities for Older Adults

October 2022, 1 session (1 day)

**Robot Used** Zoomorphic, Spot

**Methodology** Observation, Background questionnaires, and Group interviews

## Findings

- Positive attitudes and natural interactions initiated by older adults were observed
- Presents a set of design implications to integrate robots in everyday wellness activities for older adults

# 2 Social Robots as Physical Education Instructors for Primary School Pupils: Exploration of Child-Robot Interaction at a Summer Camp

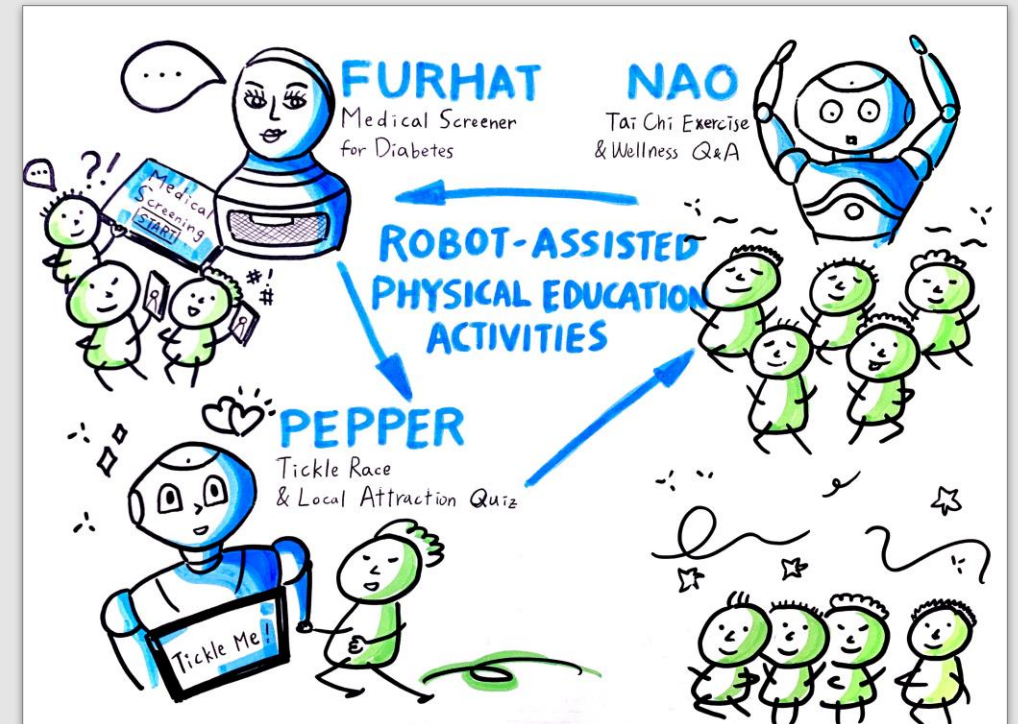
September 2023, 1 session (1 day)

**Robot Used** Humanoids, Nao, Pepper, Furhat

**Methodology** Observation, Background questionnaires, and Children's written essays

## Findings

- The multi-model interaction and physical presence of social robots were effective in sustaining children's learning motivation and engagement
- Robots motivate children to be physically active in a spontaneous way (at least in short-term interaction)





# 3 Social Robots Assisting Physical Activities for Children: A One-Week Field Study

March 2026, 17 sessions (1 week)

## Robot Used

Humanoids, **Nao** ;

Caricatured, **Misty** ;

Zoomorphic, **Paro, Spot, Moflin, Bird, Qoobo, Cat**

## Methodology

Observation and parents interviews



## Findings

- Social robots enhance children's motivation and engagement throughout the week
- Parents did not concern about the data privacy/safety issue of robots as the environment is familiar and trustworthy to them

# Summary of Findings

## 1 Positive and natural interaction

Integrating robot into familiar activities resulted positive user experience

## 2 Human facilitators are essential

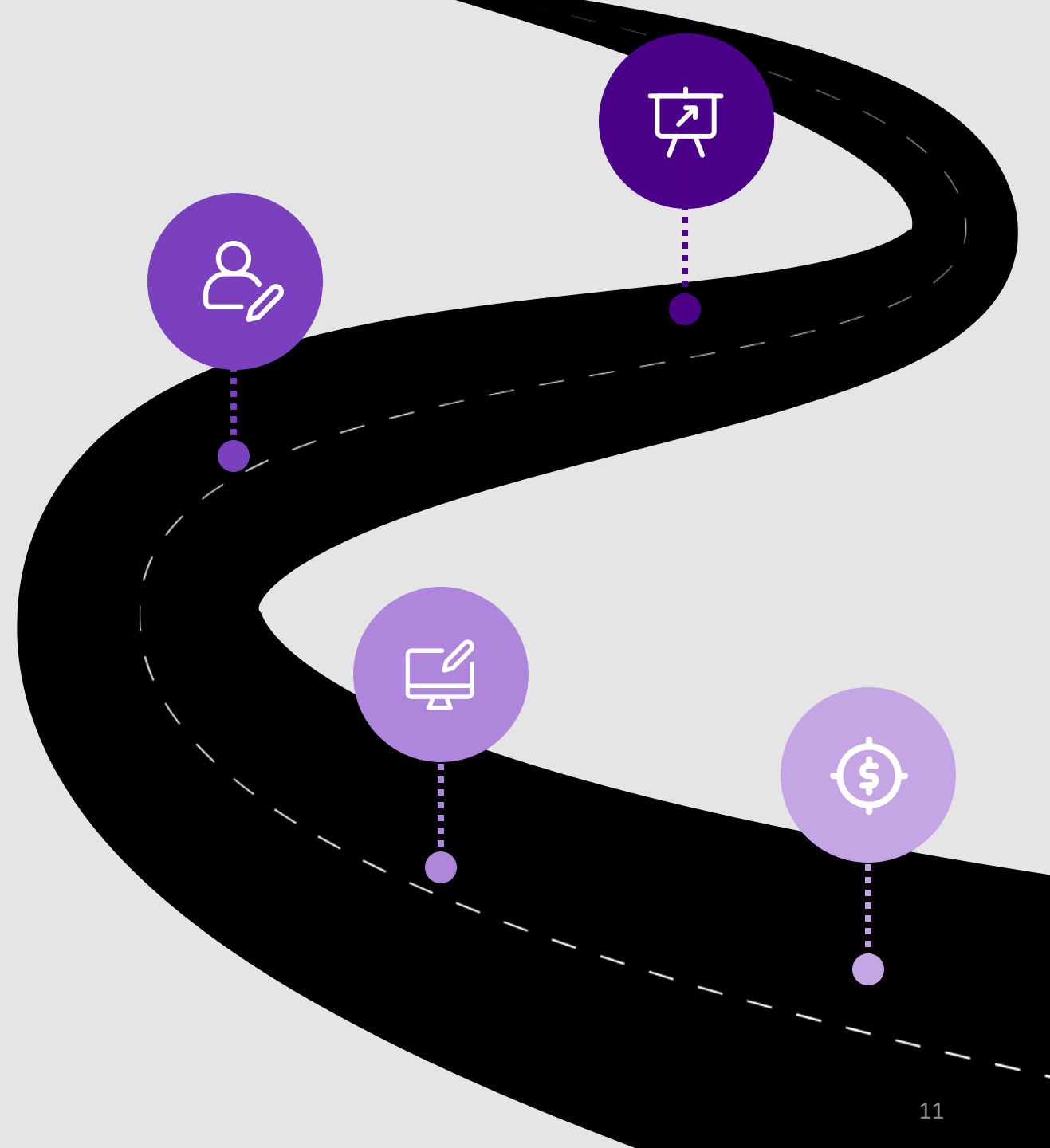
Social robots are perceived as assistants, not replacements

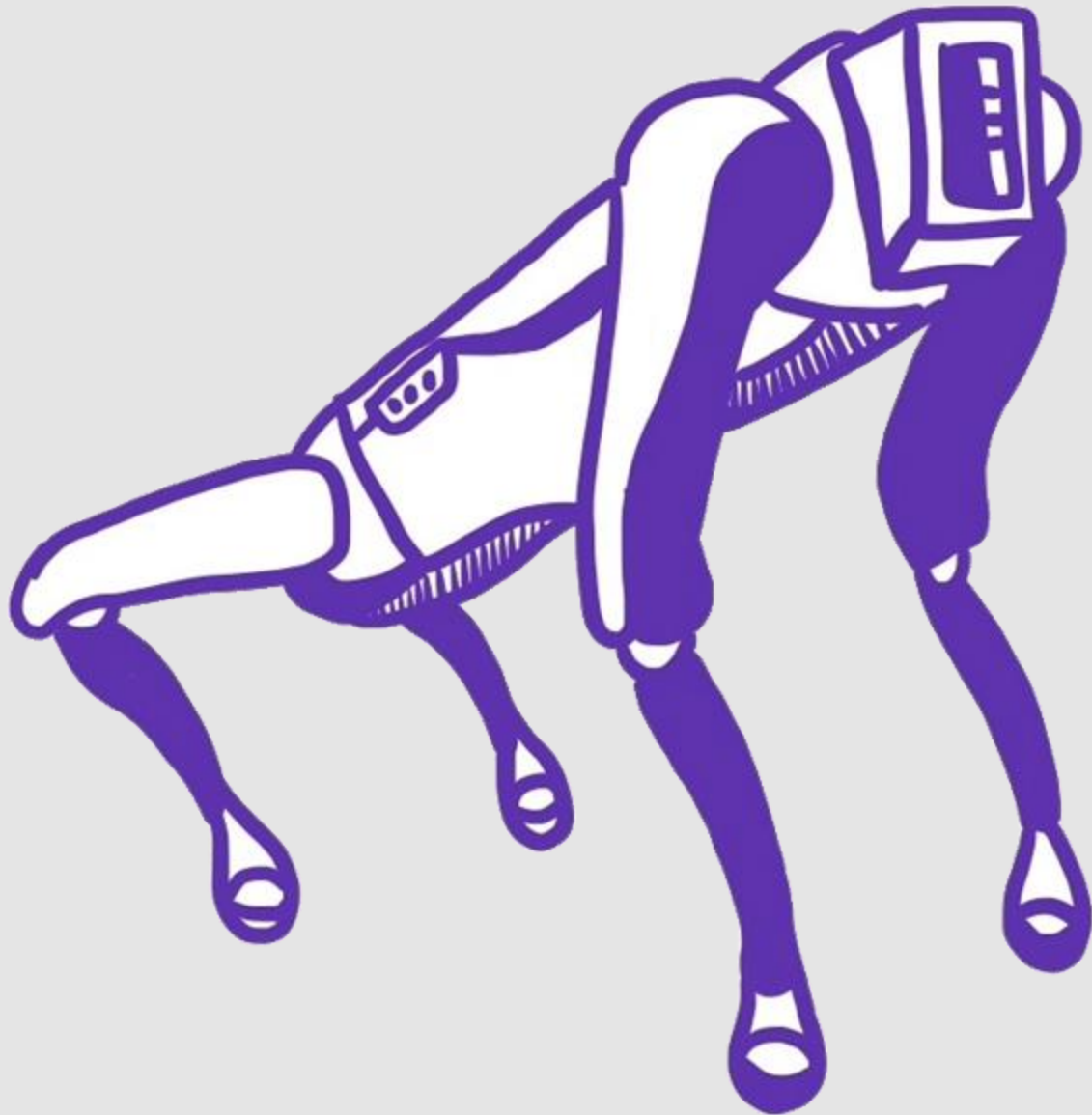
## 3 Engage through robots' physical embodiment

Embodied interaction facilitated by robots is effective for physical activities

## 4 Multifaceted learning

The promotion of both subject-specific knowledge and robot literacy





**Question?**



# Thank you!

Visit our stand to see  
the robots in action

