



# THE 2022 TECHMED EVENT



# COUNCIL OF COACHES: DIGITAL CARE BY VIRTUAL AGENTS

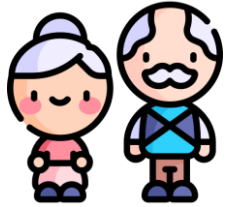
**Dr. Tessa Beinema**

University of Twente & Innovation Sprint



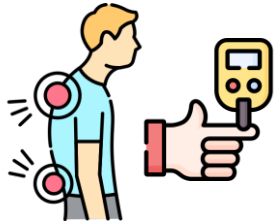
**THE 2022  
TECH-MED  
EVENT**

# Challenge



Average life expectancy is increasing

- Between 2015-2050, population >60 will nearly double (WHO, 2022)



Increased prevalence of chronic diseases

- E.g., back & neck pain, COPD, diabetes, osteoarthritis (WHO, 2022)



Shift towards prevention and self-management



Overall mission

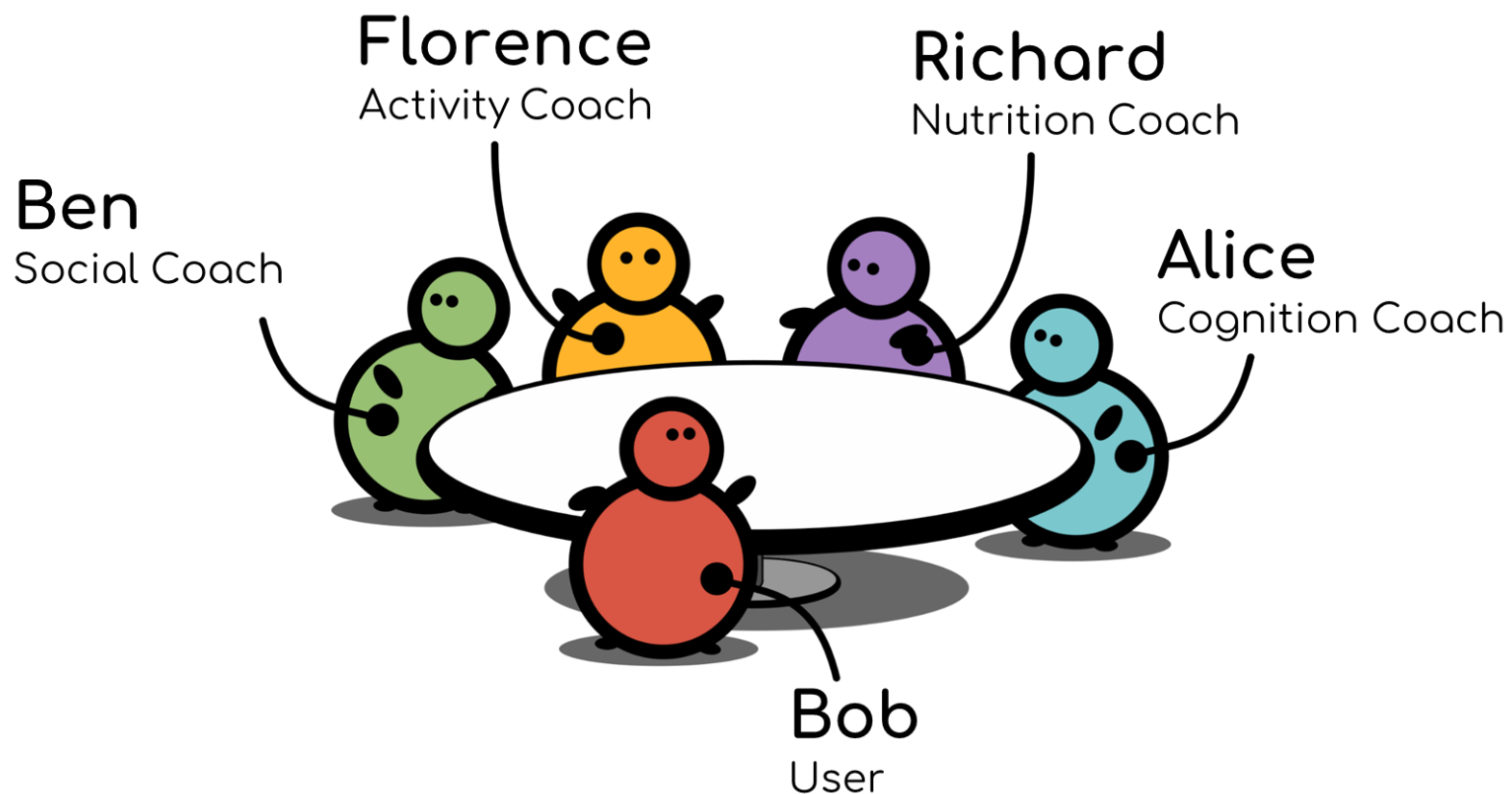
- Assist people in [changing behaviour](#) towards adopting [a healthy lifestyle](#)

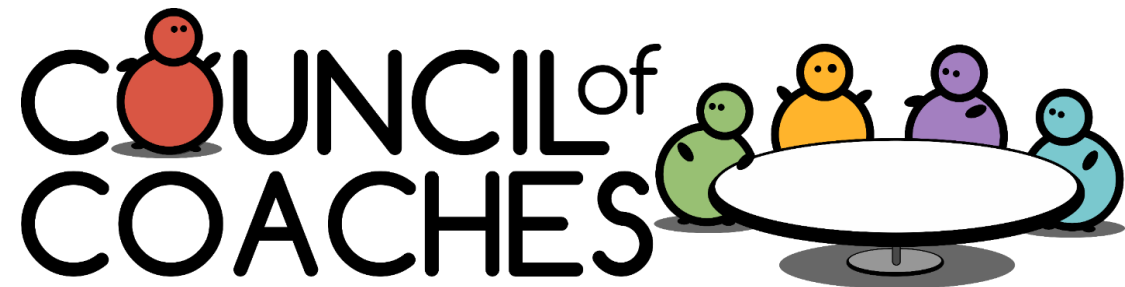
# Challenge

Tools for behaviour change exist, but are far from perfect:

- Often single domain (e.g. physical activity)
- Targeted at the young and active
- Problems with long-term engagement

How can we create a behaviour change support tool that takes into account the **multi-dimensional issues** of **age-related impairments** in a way that is fun and **engaging** in the long term?





- EU Horizon 2020 - Research and Innovation Action
- “Personalised coaching for well-being and care of people as they age”
- 36 Months (Sep. 2017 – Aug 2020)

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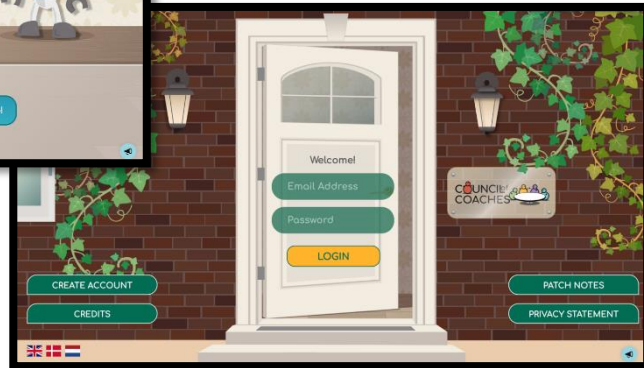
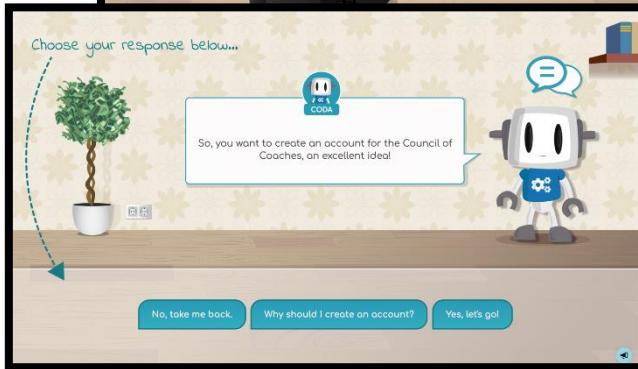


The Council of Coaches project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement #769553.

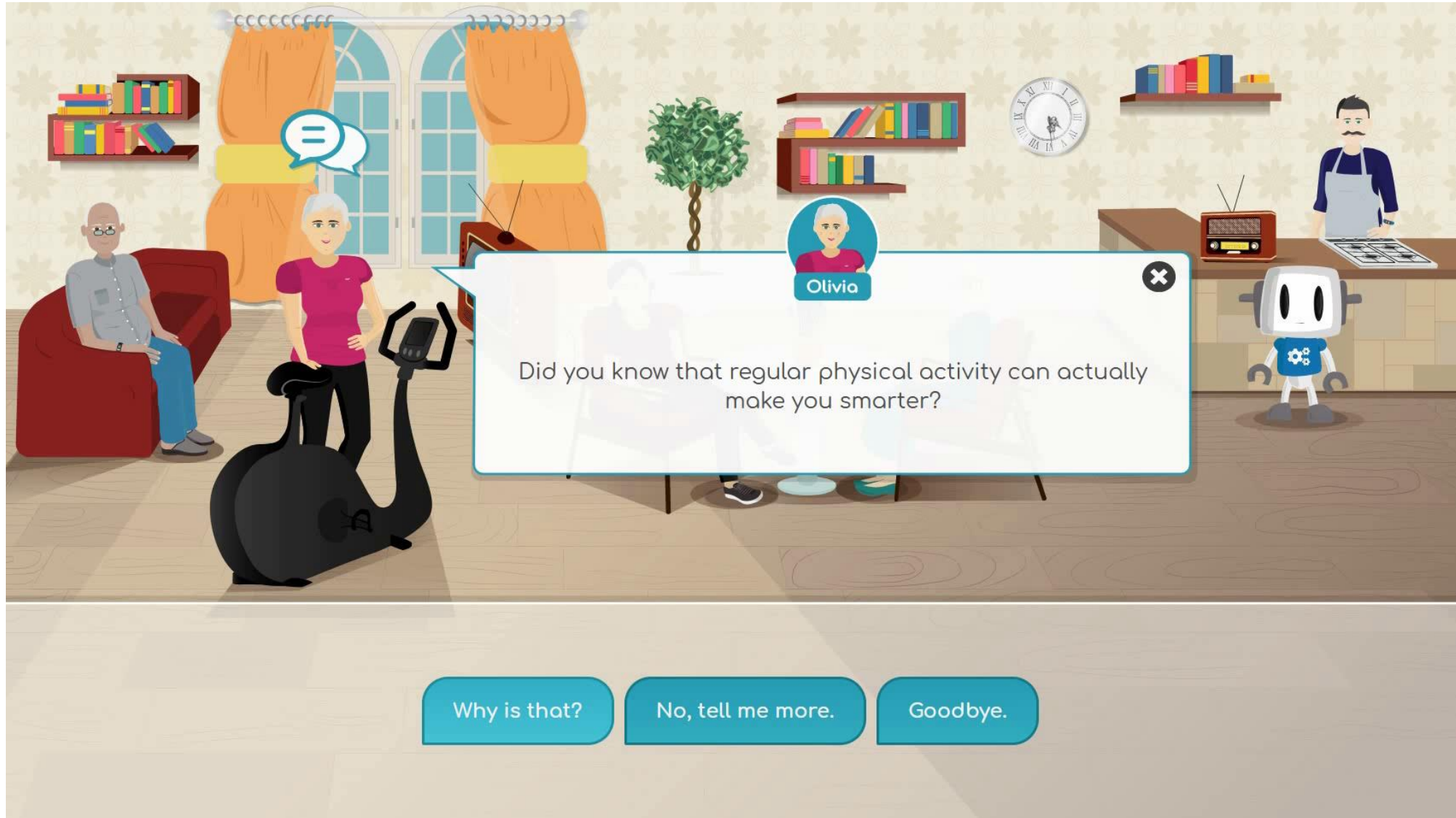


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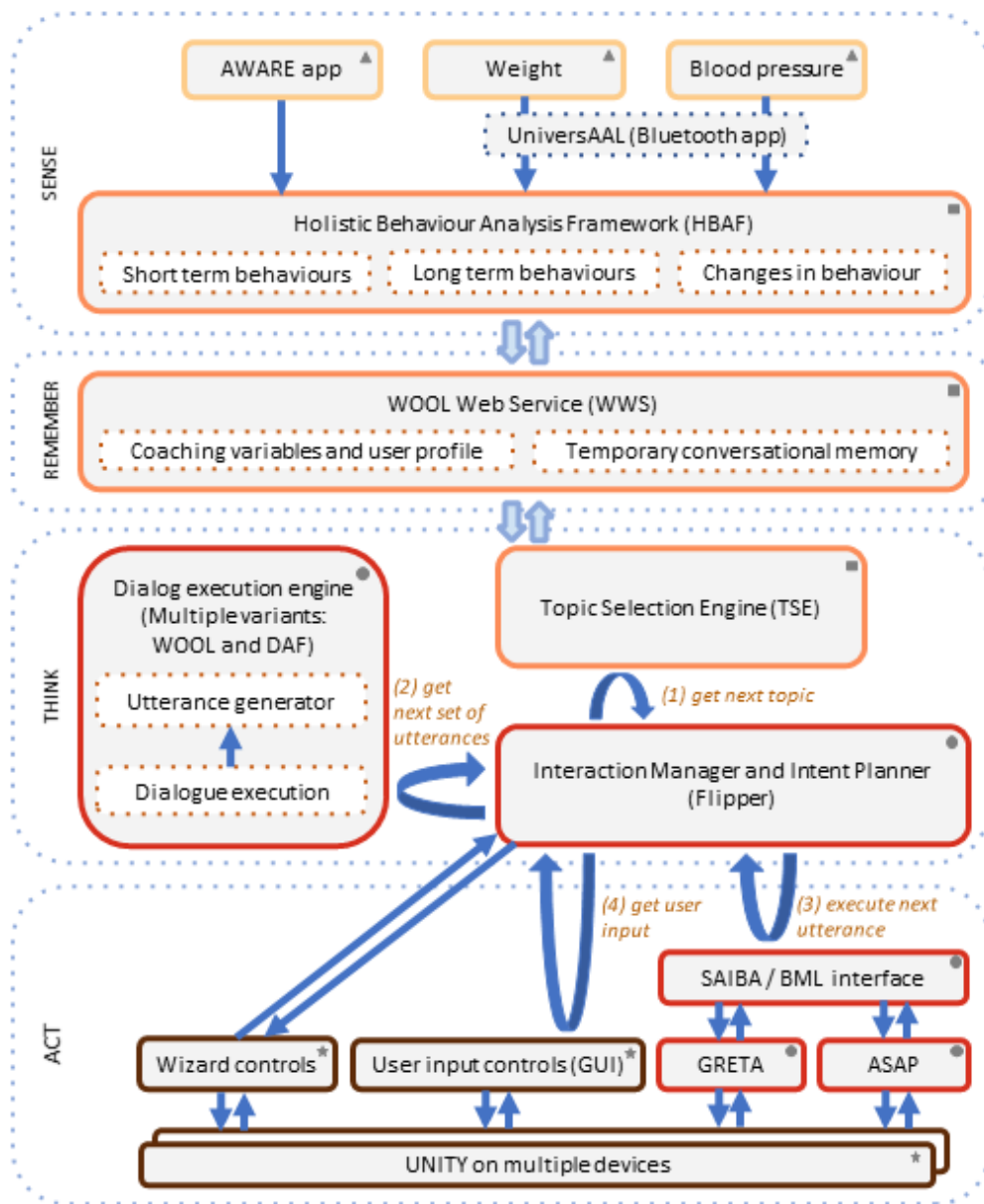
# Two types of demonstrators





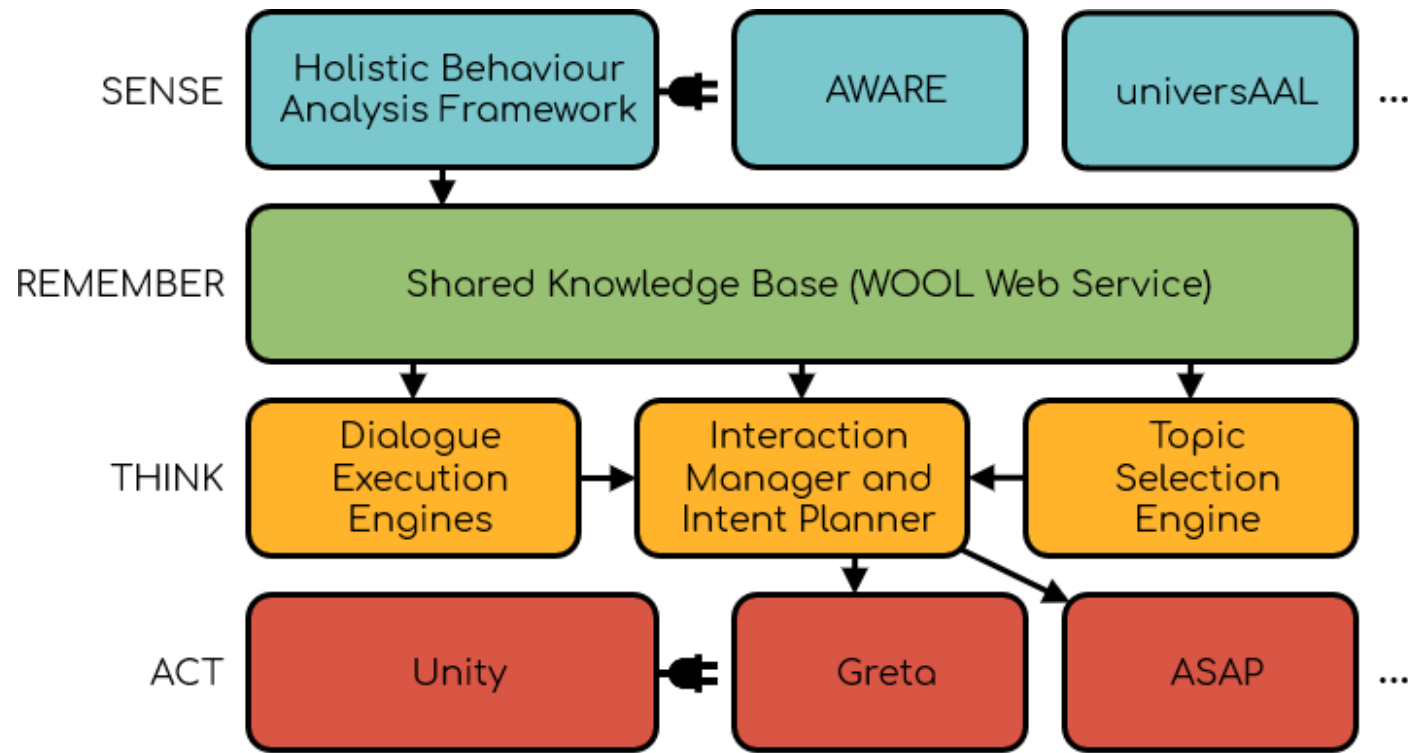






Block colours indicate components that run on:

- ▲ Smartphones, wearables, and IoT devices
- Servers
- \* PCs and mobile devices
- Experimenter's PC



Beinema, T., Davison, D., Reidsma, D., Banos, O., Bruijnes, M., Donval, B., ... & op den Akker, H. (2021, September). Agents United. In *Proceedings of the 21th ACM International Conference on Intelligent Virtual Agents*.



## Character design

Ter Stal et al.



## Character design

Huizing et al.



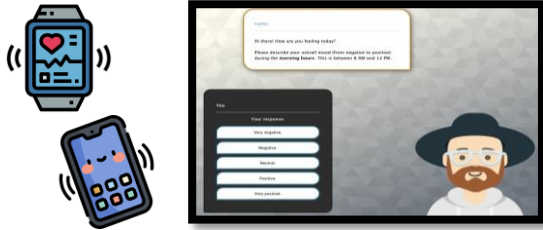
## Gesture generation

Yunus et al.



## Group cohesion & persuasiveness

Kantharaju et al.



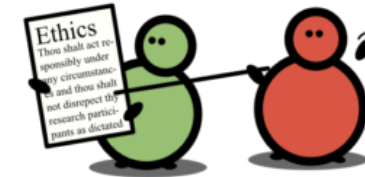
## Holistic behaviour analysis & Coach as a Sensor

Konsolakis et al.



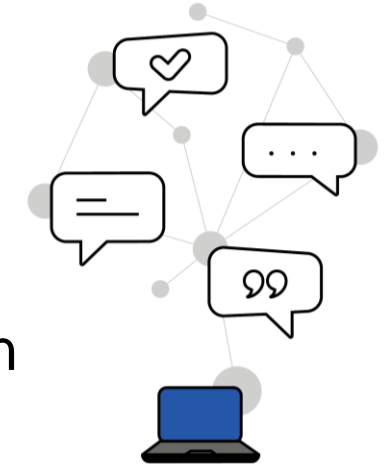
## Patient Consultation Corpus & dialogue games

Snaith et al.



## Responsible research & innovation

Bedsted, Kotnis & Nielsen

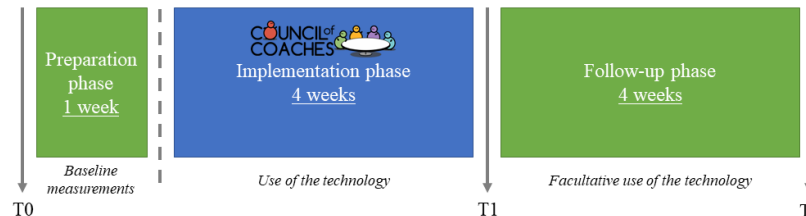


## Structure & tailoring of coaching conversations

Beinema et al.



## Two open source platforms



## Evaluation

Hurmuz et al.

# Technical results

- Two dialogue platforms that can be used interchangeably
  - Scripted and state-of-the-art
- Two agent realisers can be used jointly
  - One strong at communication between agents
  - One strong at nonverbal behaviours
- Allowing for multi-platform multi-engine multi-device multi-agent setups

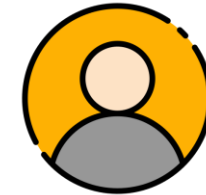


# Mixed-methods observational cohort study

- 5-9 weeks
  - 1 baseline
  - 4 use of technology
  - 4 facultative



Easy to use &  
Used once per week



Minimal clinical important  
differences in health factors

- $N=51$  in NL
  - Mean age: 65.3 (SD = 7.4)
  - 70.6% female



Improvement of investment  
behaviour & self-efficacy



Accurate monitoring &  
personalised content

# Thank you!

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