

## A Novel Holistic Behavior Change Coaching Approach

Harm op den Akker, PhD  
Roessingh Research and Development  
ICT4AWE, March 23<sup>rd</sup>, 2018 (Madeira, Portugal)

[www.council-of-coaches.eu](http://www.council-of-coaches.eu)

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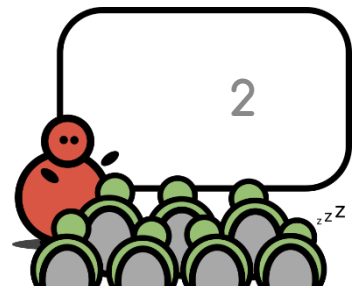


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# Disclaimer...

We present today our **Position Paper** that suggests a “novel holistic behavior change coaching approach”:

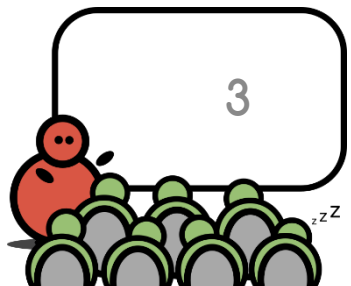
Harm op den Akker, Riëks op den Akker, Tessa Beinema, Oresti Banos, Dirk Heylen, Björn Bedsted, Alison Pease, Catherine Pelachaud, Vicente Traver Salcedo, Sofoklis Kyriazakos and Hermie Hermens, “*Council of Coaches – A Novel Holistic Behavior Change Approach*”, in Proceedings of the 4<sup>th</sup> International Conference on Information and Communication Technologies for Ageing Well and e-Health (ICT4AWE2018), Madeira, Portugal.

There is no evidence that this approach is effective, but we believe it's worth to look into...



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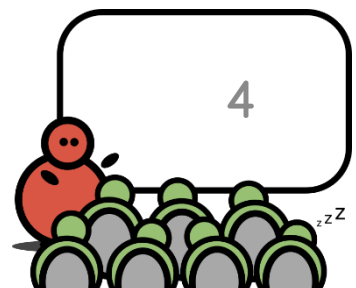
# Introduction

What is the problem?



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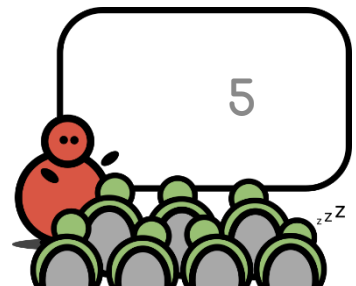
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# Introduction: the problem

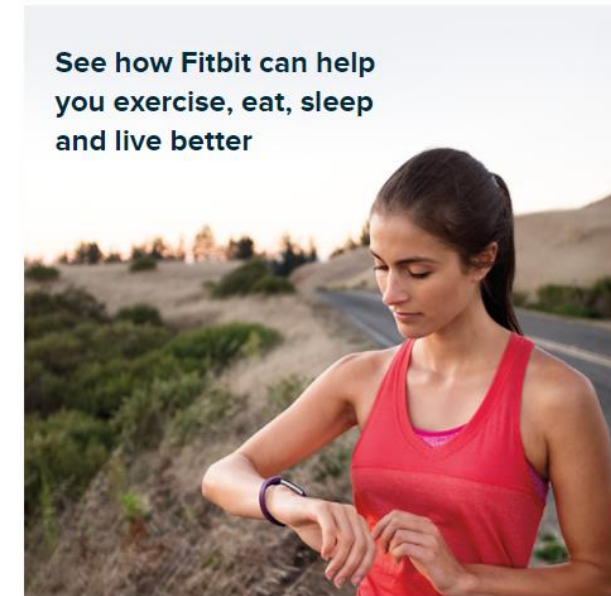
- Average human life expectancy increasing...
- Added years not always lived in good health...
- Increased prevalence of chronic disease...
- A healthy lifestyle can help in:
  - preventing “age related impairments”...
  - increasing quality of later life...

**Overall mission:** assist people in changing behavior towards adopting a healthy lifestyle.



# Introduction: behavior change coaching

- Tools for behavior change exist (many of them)...
- But existing tools are far from perfect:
  - Often focus on a single domain (e.g. physical activity)
  - Targeted at the young and active
  - Problems with long-term engagement



Question:

How can we create a behavior 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?

Answer:

Many different ways, probably.

But here's what we're doing...

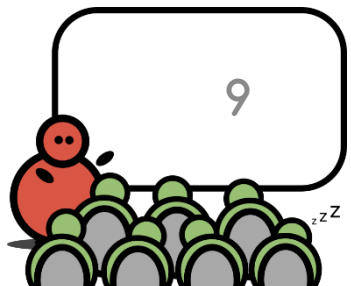
# The Council of Coaches Concept

What is the “Position”?



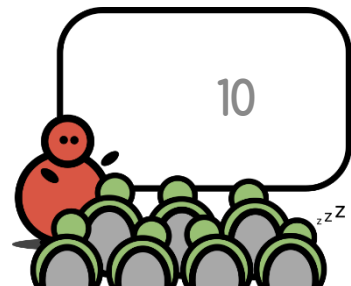
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# Some principles...

1. We believe that coaching requires more than feedback, reminders, nudges, and graphs.
2. We don't want to create *yet another app* that is vying for the user's attention all day long.



# Some principles...

3. We do believe in the power of natural Human-Computer Interaction as presented through Embodied Conversational Agents (ECAs).



Lisetti et al., I Can Help You Change! An Empathic Virtual Agent Delivers Behavior Change Health Interventions (2013).

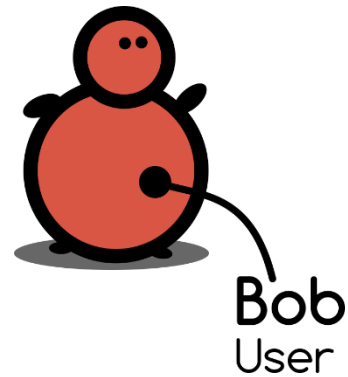


Zhou et al., Agent-User Concordance and Satisfaction with a Virtual Hospital Discharge Nurse (2014).

# Some principles...

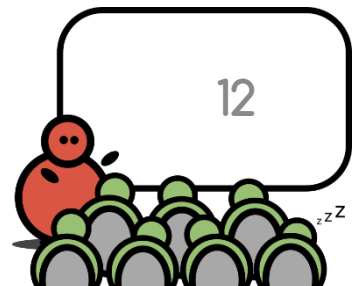
4. We also believe that traditional ECA approaches to coaching have their issues...

Florence  
Activity Coach



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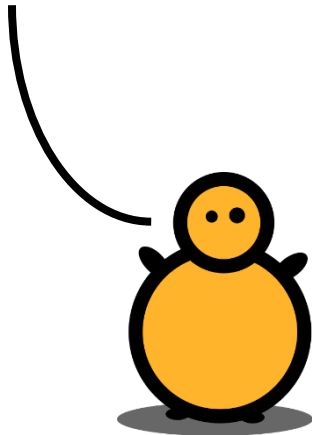
Council of Coaches



# Some principles...

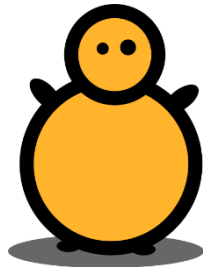
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Florence: "Why don't you go for a walk in the park?"



# Some principles...

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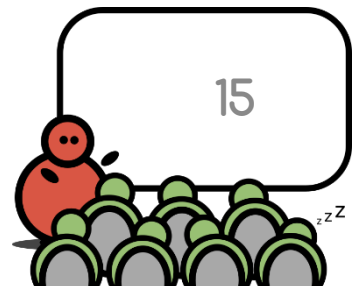
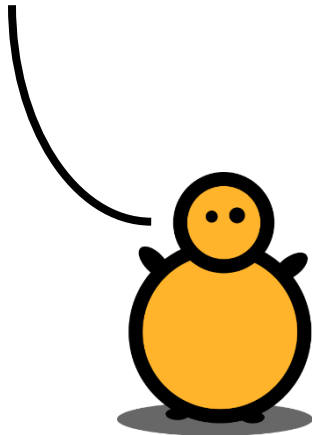
Bob: "None of your business."



# Some principles...

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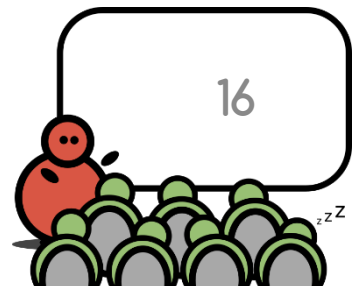
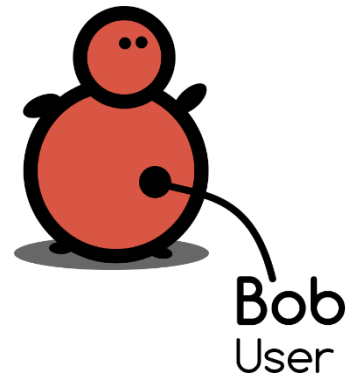
Florence: ... :(



# Some principles...

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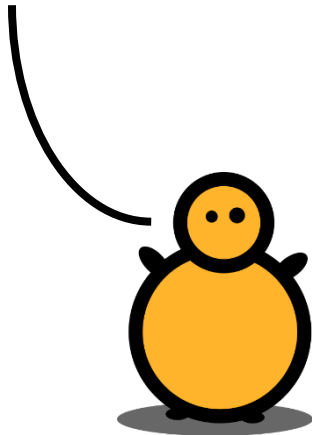
Florence  
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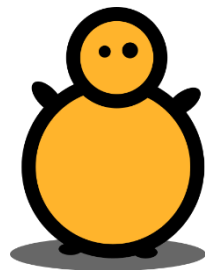
Florence: "Why don't you go for a walk in the park?"



# Some principles...

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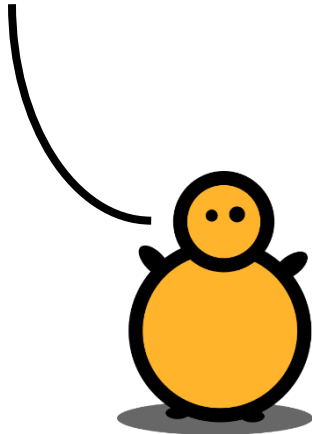
Bob: "Well, you know... I mean what's the point? I guess I could go to the park... although, park... which park? Since they decided to open up a bar there, there is no peace and quiet to be had... and I mean, what's an old man like me to do in the park? I get out of breath before I even reach it and then I'm standing there like an old fool with all the youngsters looking at me..."



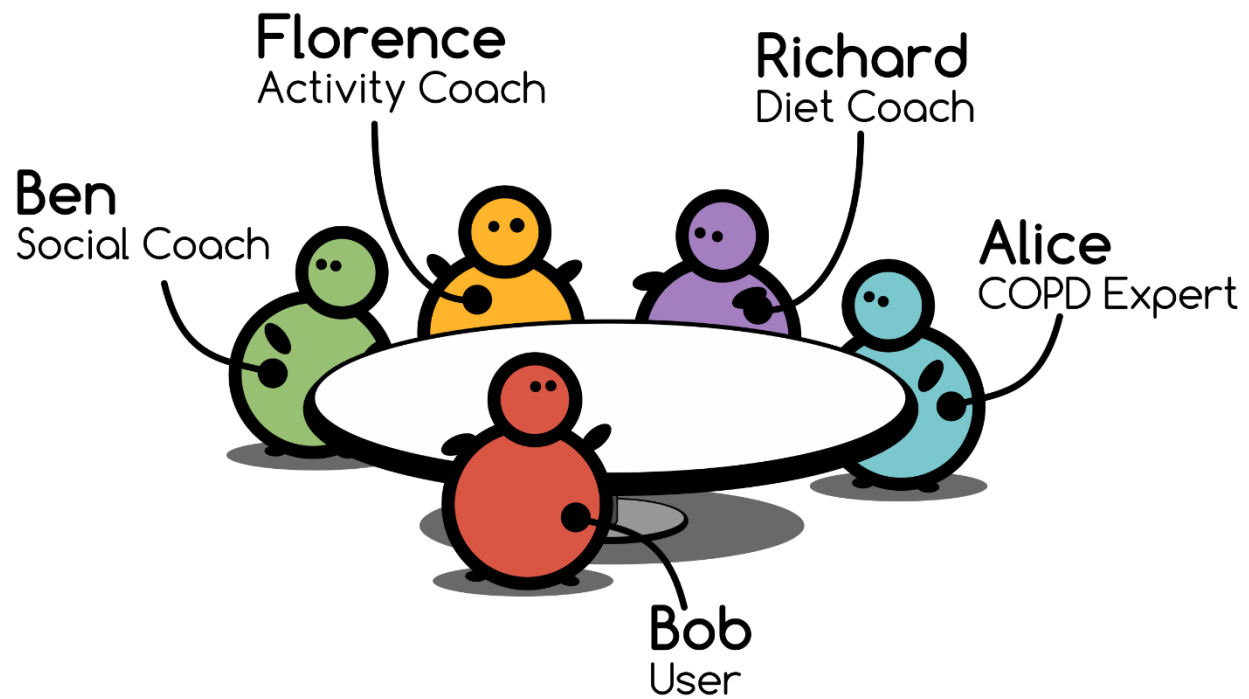
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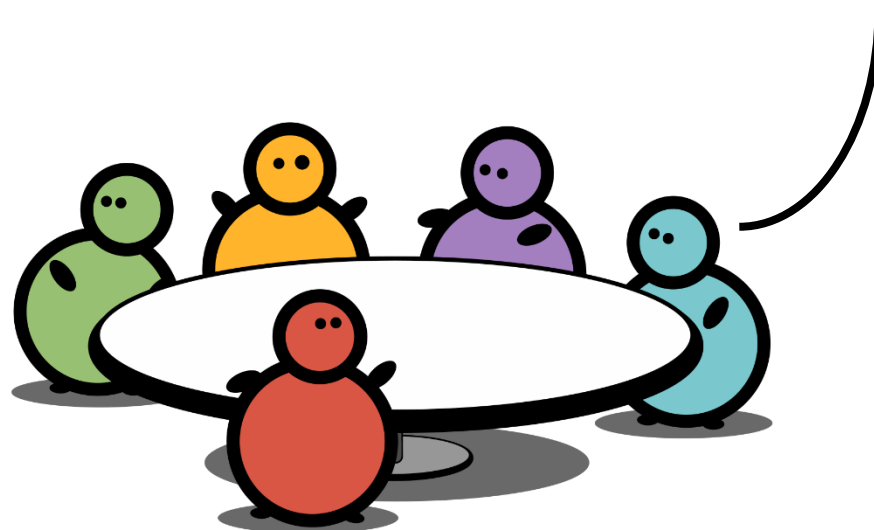
Florence: ???



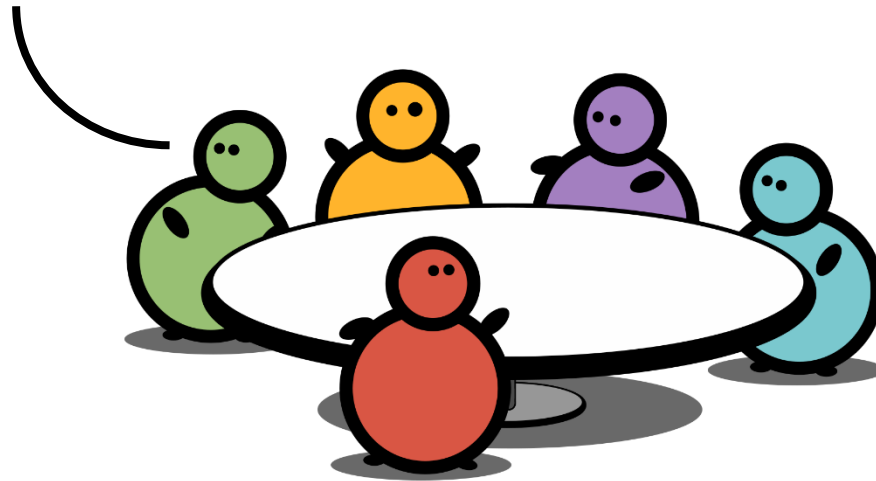
How do we keep the user engaged even though he is either non-cooperative or difficult to understand?



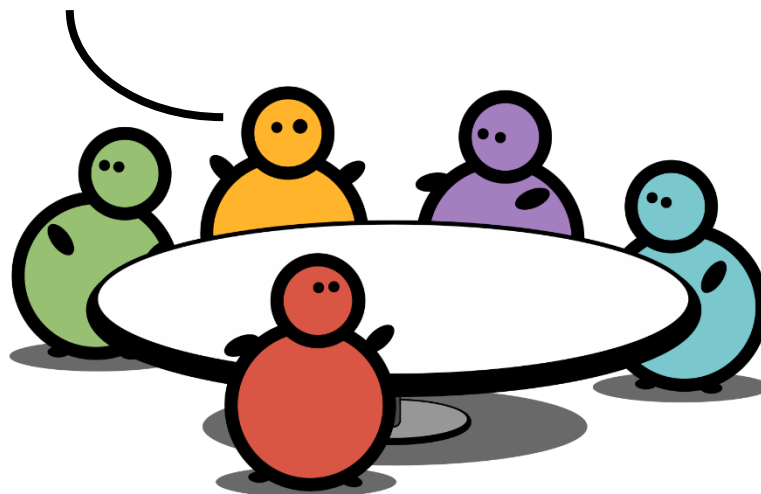
Alice: "Have you considered trying to quit smoking, Bob?"



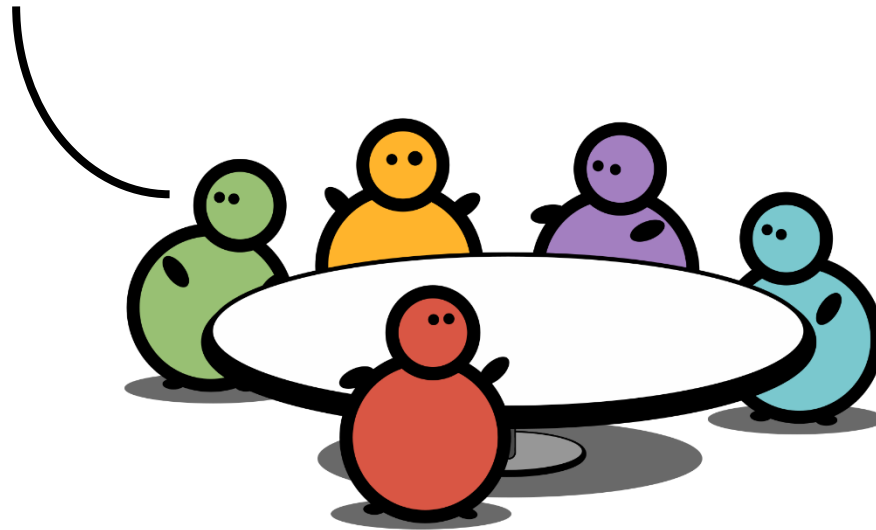
Ben: "Quit smoking... quit drinking, quit doing all the fun things in life!  
Why don't you quit whining?"



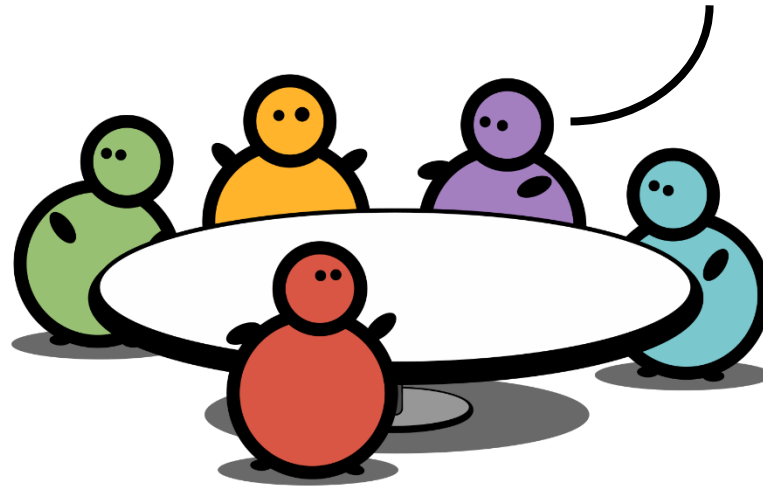
Florence: "What a stupid thing to say, Ben! Next thing you're going to tell us all about your grandfather who smoked all of his life and lived to be a 100 years old!"

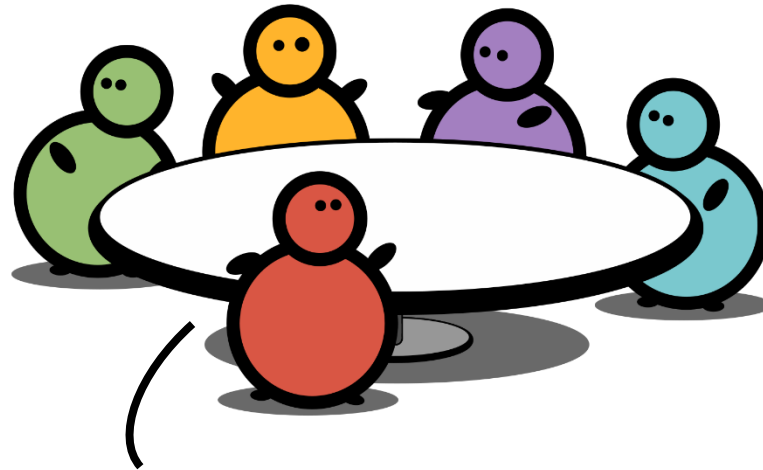


**Ben:** “Well, for your information... Florence. My grandfather was a heavy smoker and he did turn out to be 94 years old, so there.”



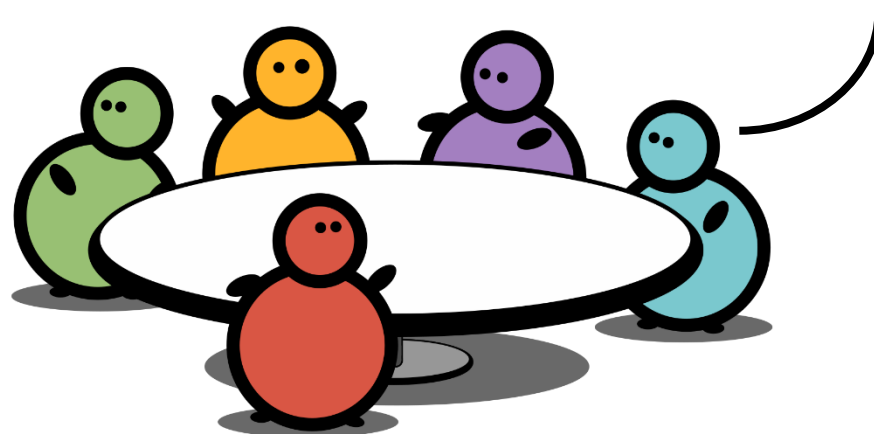
Richard: "Florence, Ben, cut it out, this isn't about you or your grandfather, we are talking about Bob, perhaps he has anything to say here?"



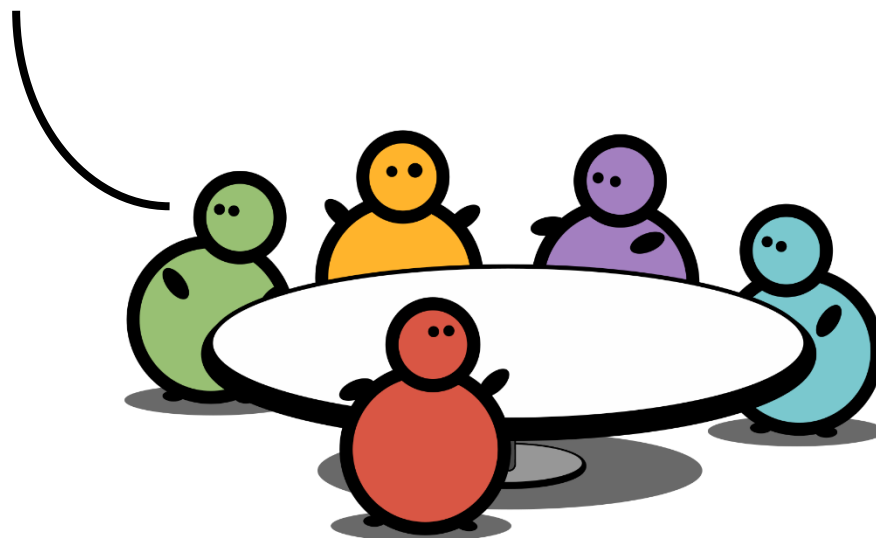


Bob: (Say Nothing)

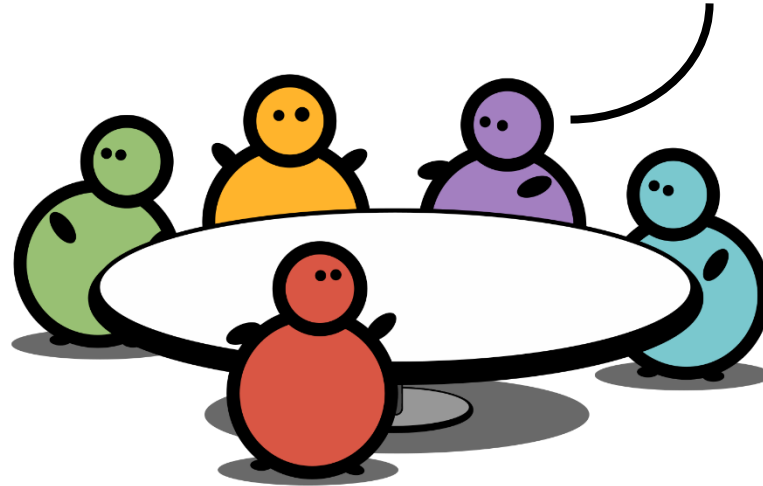
**Alice:** “Well, you know that smoking does not guarantee an early death. But Bob here recently got diagnosed with COPD, a condition that is almost always caused by long-term smoking. Although it may not be easy, it is very important to try and quit as a very first step in dealing with this.”

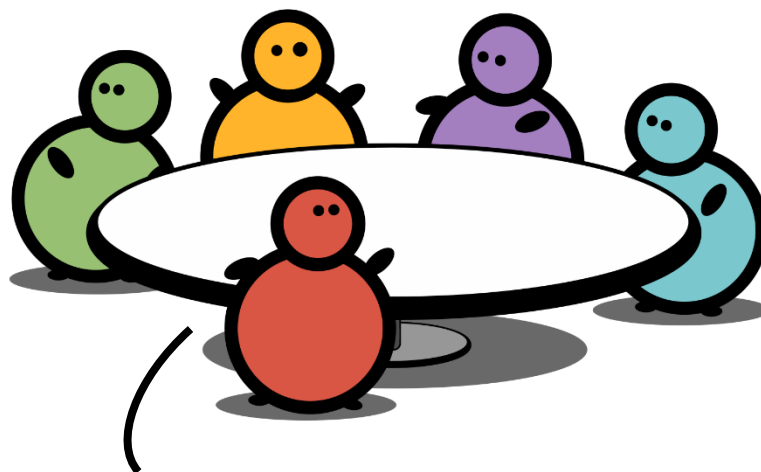


Ben: "Sure, I guess, you are the expert."



Richard: "And it has a positive effect on your taste! Think about all the delicious things we could cook together and how excellent all the flavors will work out."





Bob: I don't see a reason to quit.  
▶ I understand, but it will be difficult.  
I get it now, this will be easy.

# What's going on here?

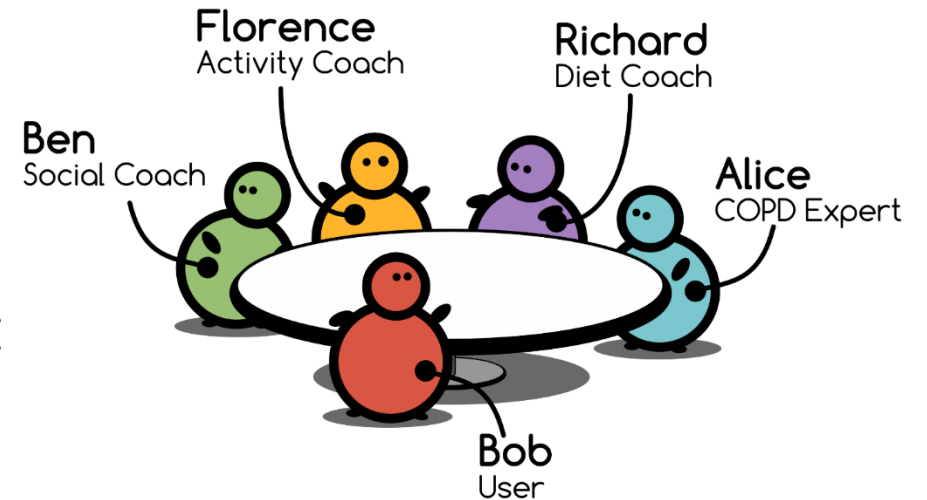
- User not participating? Our coaches will continue the conversation by themselves, allowing coaching to a passive observer.
- Allowing the user to choose from pre-selected statements can drive the discussion while avoiding errors.
- Keep the user **engaged!**



Fallout New Vegas (Obsidian Entertainment).

# What's going on here?

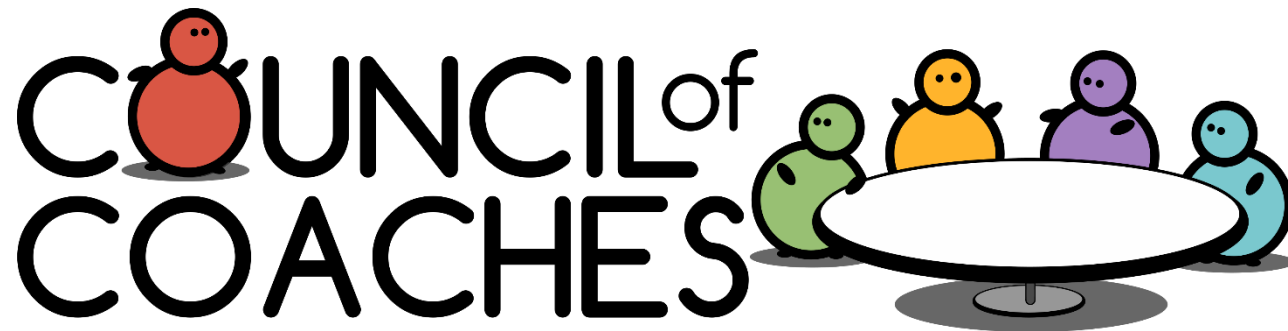
- Our **ageing population** is dealing with problems that are **multi-dimensional**, e.g.:
  - Diabetes Type II
  - Chronic Pain
  - Retirement
- Council of Coaches creates a platform that allows coaching on these different domains simultaneously – and focus on the interplay between domains (e.g. physical activity and diet).



Back to the Question:

How can we create a behavior 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?

Answer:



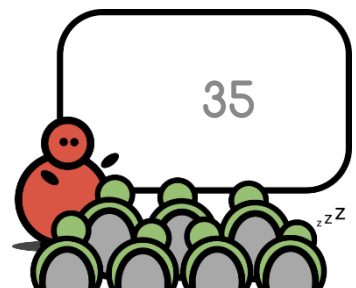
# Challenges

Which specific challenges are we addressing in the next 2½ years?



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# Challenges: Multi-Domain Virtual Coaching

- Design, develop and evaluate a Virtual Coaching System targeted at older adults that are undergoing life changing events that have a potential negative impact on **physical**, **cognitive**, **mental**, and/or **social** well-being.
- Specific use cases that will be addressed:
  - **Diabetes**
  - **Chronic Pain**
  - **Age Related Impairments**

# Challenges: A New Coaching Platform

- Introduce the **new coaching paradigm** of the Council of Coaches. In this paradigm, the virtual coach is manifested in a group of virtual characters that each represents a different knowledge domain of the coach.
- This new coaching paradigm will be demonstrated, and eventually results in the release of an **Open Agent Platform** (building on top of existing open platforms, such as FIWARE and universAAL), that will foster **Open Innovation** through the creation of an engaged community and developer eco-system.

# Challenges: Sensing++

- In order to tailor communication, the virtual coaches must understand its user. To sense the required “*psychological user information*”, the project introduces the concept of the **coach-as-a-sensor** – allowing to obtain knowledge about the use through interactive dialogues.
- The project will combine smart multimodal sensing technologies to seamlessly and opportunistically measure and model the user behaviour in a comprehensive fashion, including physical, cognitive, mental and social aspects.

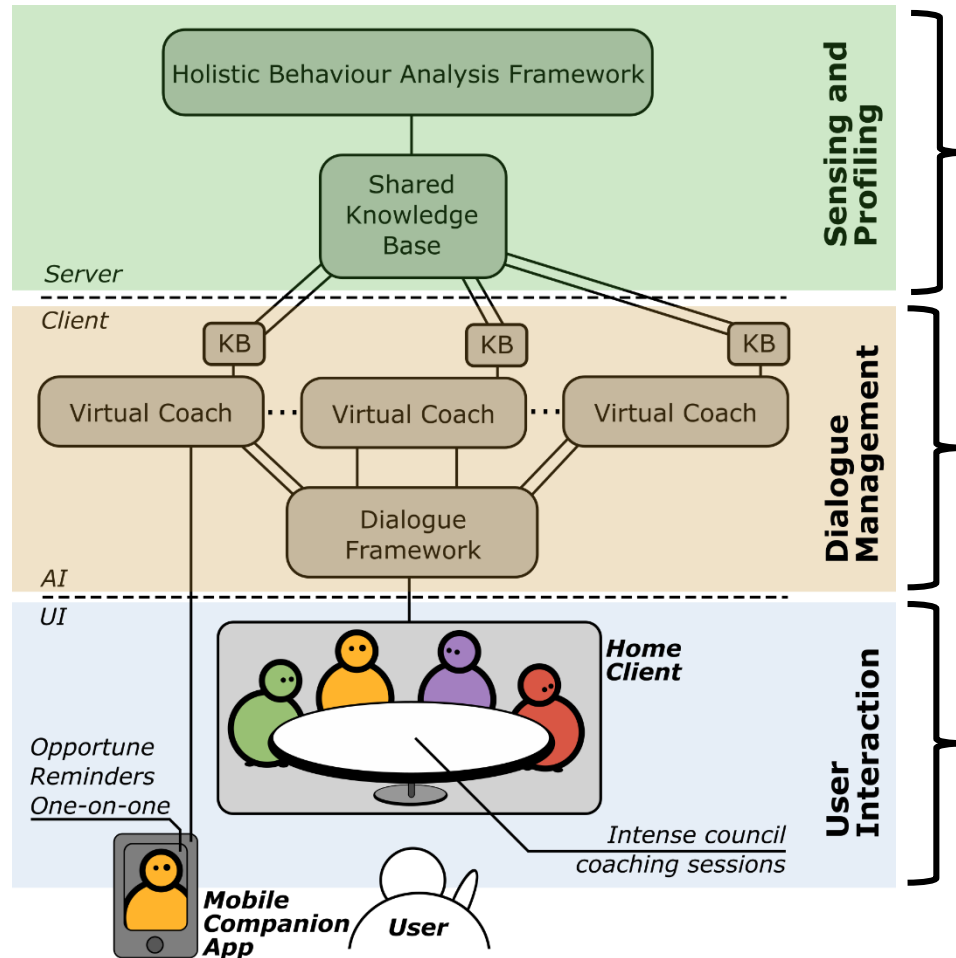
# Challenges: Character Design

- The project will emphasize **deep character design** based on sound theories from the video game and film worlds. The added value in terms of engagement will be measured and existing methods and guidelines will be adopted to the successful design of **virtual characters in coaching contexts** that have an impact beyond mere entertainment.



Sid Meier's Civilization II – High Council, MicroProse (1996).

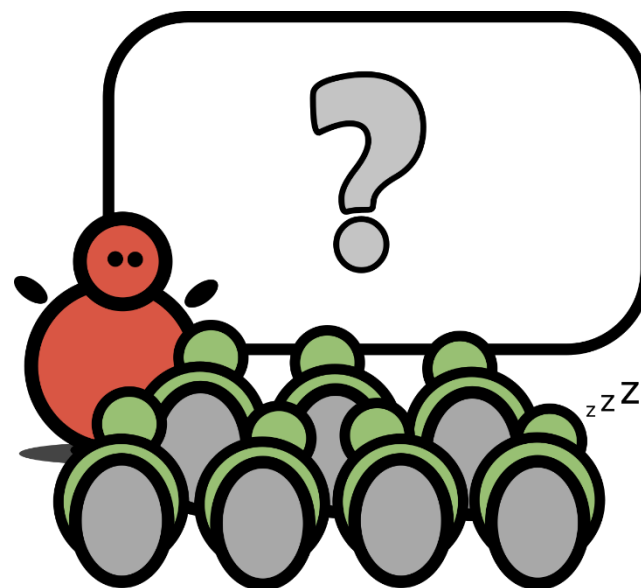
# Challenges: Summary & Design



Understanding the user's behavior and issues.  
Following the user's progress over time.  
Building up a Shared Knowledge Base.

Enabling automated multi-party dialogue.  
Allowing dynamic turn-taking and interruptions.  
Storing and learning from dialogue history.

Designing engaging and likeable virtual characters.  
Providing intuitive human-computer interaction.  
Developing a companion app for daily life.



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