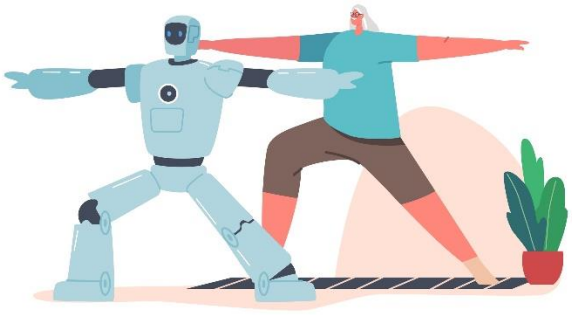
April – May 2022, eVITA starts Wave 1 – What is the adherence and usability of disruptive technologies in the homes of older adults in Europe and Japan?



In April and May 2022, e-VITA study centers in Europe and Japan will conduct a feasibility study with an intervention of six weeks, testing different technologies used in the project by 36 older adults in Europe and Japan. Novelty for e-VITA is that **for the first time an EU-Japanese funded project is testing the use of unsupervised speech technologies and active and healthy ageing (AHA) apps with small robots unsupervised in the private homes of older adults.**

Interventions will be carried out by 6 different study centers: Broca Hospital in Paris for **France**, Diocesan Caritas Association for the Archdiocese of Cologne in Cologne for **Germany**, IRCCS INRCA in Ancona for **Italy** and Tohoku University in Sendai, NCGG Center in Nagoya, J.F. Oberlin University and Misawa Homes in Tokyo Shinagawa for **Japan**.

What are the two main objectives of this first intervention ?

The experimentation will involve two evaluations before and after the intervention, to assess the following objectives:

1/ to measure adherence to the proposed intervention, calculated as the number of activities the participants attended, out of the total number of activities scheduled, and their duration.

Adherence is a major problem encountered when older people use technologies for active and healthy ageing. Indeed, it has been observed that there is a decrease in the rate of use of these devices for various reasons such as lack of motivation or frustration, and this low use limits the benefits (Cameirão et al., 2016). **We therefore seek to see if participants' engagement with the virtual coach is maintained in the medium term.**

2/ to evaluate usability, user experience, needs' fulfillment of older adults, who serves as experts of their own life when they use the e-VITA system.

We seek to explore the **conditions** of user experience and usability of the virtual coach. We also seek to determine **the subjective experience of the user in relation to the interaction with the e-VITA platform.**

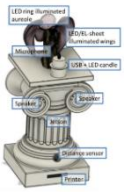
Furthermore, the **fulfilment of universal psychological needs,** such as competence, relatedness, popularity, stimulation, meaning, security, or autonomy, **can be a major source of positive experience with interactive** technologies (Hassenzahl et al., 2010). The use of interactive technology is assumed to be driven by overarching universal psychological needs and the fulfilment thereof, **which in turn improves quality of life,** life satisfaction and having a meaning in life (Diener & Ryan, 2008). **Consequently, interactive technologies can be conducive to subjective and psychological well-being when they fulfil psychological needs.**

What technologies will be tested and how will they be tested?

The e-VITA virtual coach will provide personalized recommendations and interventions, for sustainable wellbeing in a smart living environment at home **through different technologies that will be tested during the intervention with different uses cases associated.** Studies centers will use a randomization technique to randomly assign older adults to the use of the different coaches in the project.

Coaches

The coaches in e-VITA consist of social robots, that will interact with the users and are guided by apps; These are Nao Robot, Gatebox 3D-Hologram, and CelesTE a more spiritual device, substituted by DarumaTO for the Japanese culture.



How will the devices and the interaction be tested ?

- **Everyday activities:** when the user returns home, the virtual coach will welcome him/her. It will support the user in daily life by interacting with them through dialogue, singing, situationally appropriate behaviors such as comforting or motivating words. The virtual coach will also be able to provide reminders about activities of daily living.
- **The question-and-answer functionality:** The user can ask questions to the coach who will search in specific AHA knowledge graphs, and on the Wikipedia website for the answer.

Sensors

to detect physiological parameters, physical activities of the users, and safety as well as environment aspects in the private homes.

- **Wearables sensors** are Netatmo, Deltadore Tydom platform, Oura Ring, Medisana Smartband, Neu XB-01.

- **Environmental sensors**: Wireless motion detector DeltaDore DMB-TYXAL, Dual technology wireless motion detector DeltaDore DMBD TYXAL+, Opening magnetic sensor DeltaDore DO TYXAL+, DeltaDore sensors connectivity-X3D wireless protocol.

How will they be tested? Environmental monitoring: The virtual coach will be able to monitor the user's environment and alert the family or emergency services if problems are detected.

Smartphones

will be used to have access to **the end-user's platform composed of the Privacy Dashboard, the Chatbot and the Social Platform.**

Figure 1 Image of a Chatbot

Through those applications, the end-users will be capable of **managing his/her data, receive information on the healthy nutrition and physical & cognitive exercises, and information about social events encouraging users to share their interests.**

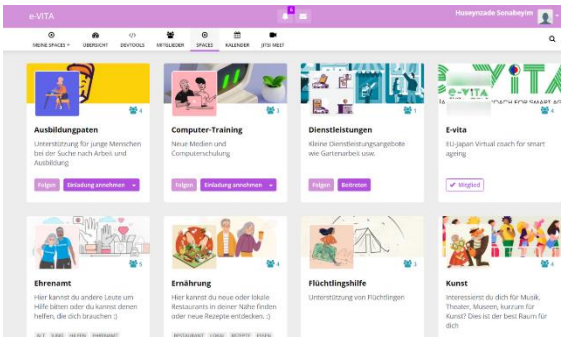


Figure 2 Screenshot from the Social Platform - Group of Interest

How will they be tested?

- **Health activities:** The virtual coach can offer the user physical exercises and cognitive training through mini games, for example. It can also offer nutritional advice and support for physical therapy exercises.
- **Social activities:** The virtual coach will participate in the user's social life by sending messages from family and/or friends, but also by responding to them with the user. In addition, the virtual coach will be able to link the user to social events.

The human coach:

e-VITA is aimed at younger older adults, it is then essential for the implementation of the intervention **to provide a support that is not only virtual but also human.** At least one human coach will be recruited by each study center and will have an important role :

Teaching users on e-VITA virtual coach (usage, maintenance, support). **Regular phone calls are planed between the human coach and the users** to answer questions and provide support (e.g. explain the appropriate use of a virtual coach). If needed, users will be contacted, trained and supported by the team of researcher daily. The human coaches will also organize real personal meeting of the older adults in the local community once a week.

Ensuring the security of users e.g. checking temperature to avoid overheating, technological devices placed into the homes in a configuration that allows older adults to use them safely.

Mentoring, creating awareness and encouraging changes in the behavior of users. End users won't be necessarily at ease with virtual coach or may not be as receptive as it could be expected. Therefore, the human coach will be a support for the research **to encourage users during the intervention.**

Reporting user's requirements, questions, feedbacks to developers. Thanks to a report shared between the different human coaches, feedbacks and **needs for improvements from the users will be available for the developers of e-VITA.**

Cooperation for data collection and further development

The strong cooperation among the partners in Europe and Japan will be the **key to reach a successful and complete data collection** for comparing the technical parameters of the coaches' performance with the users' characteristics and predisposition.

Results from this first feasibility study will be re-evaluated during Wave 2, a proof of concept study with 180 participants in four countries, and in a real condition of use. The first wave will serve also for a preliminary confirmation of the outcomes and tools that were chosen, for describing the impact of the e-VITA solution.