



VIRTUAL & AUGMENTED REALITY TOOLKIT TO ENGAGE ELDERLY BRAIN
WITH

INTER-GENERATIONAL UNDERSTANDING

ERASMUS+ PROJECT

Intellectual Output 3

An Empowering Guide to Exploiting AR/VR with Seniors

Chapter 4

Design Thinking Considering Seniors

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Contents

CHAPTER 4 – DESIGN THINKING CONSIDERING SENIORS	3
4.1 Design Thinking	3
4.2. Characteristics of Design Thinkers	4
4.3. IDEO Method.....	4
4.4. Design Thinking in Augmented Reality (AR) and Virtual Reality (VR)	5
4.5. Design Thinking Considering Seniors in VARTES Project.....	6
4.8. References.....	8



CHAPTER 4 – DESIGN THINKING CONSIDERING SENIORS

4.1 Design Thinking

Design is everywhere, in your armchair, the shoes you wear, the bicycle you ride, or the interface of your laptop. Besides, affecting on professional practices, design affects how people think and act in identifying problems and finding solutions. Accordingly, design thinking (DT) is the trend of finding better solutions to problems in the last decades. Especially in Information Technology (IT) (Brooks, 2010), Business (Martin, 2009), Education, and Medicine sectors, it is regarded as a new paradigm for dealing with problems. As Shute and Becker (2010) reported, the current technological developments in the world require a person to develop and use a different set of skills to be successful. DT is considered among these skills.

It is well understood that one-size-fits-all approach does not work in highly diverse and technological world. Therefore, there is a big tendency to apply DT to individual problems for the diverse communities.

Brown (2009) describes DT a human-centred approach to problem solving. In developing a product or service, design thinkers should firstly focus on the needs and experiences of the people. Then design thinkers use their sensibility and methods to match these needs with what is technologically feasible.

Walters (2011) underlines that for implementing DT successfully, design thinkers should rethink about their understanding of the projects, about participants, timing, and doing things. Moreover, DT is a process that must be integrated into the other processes in the organization (Gobble, 2014).

DT is about understanding the user by digging deep. Since sometimes, even users are not quite aware of their problems. Therefore, once the design thinkers understand the user, they turn observations from the user into insights and ultimately into meaningful products and services (Brown 2009).



4.2. Characteristics of Design Thinkers

According to Owen (2007), the design thinker should demonstrate specific characteristics in addition to creativity. Here are some of these characteristics:

- They must consider how what is being created will respond to human needs.
- They should look at different/multiple solutions to a problem.
- They should keep the big picture of the problem in mind while focusing.
- They should treat problems as system problems to create a holistic solution.
- They should be able to verbally explain their creative process.
- They should have skills to communicate and work across disciplines.
- They should try to find ways to come up with new configurations.

It is stated that DT can be used to address severe problems (Roberts, 2000) in collaboration with the various stakeholders. Norman (2010) states that designers working alone have a low rate of technology adoption. Since technological entrepreneurs follow the business opportunities and work hard, it is important for design thinkers to work in collaboration with technological entrepreneurs to transform new proposals into adopted practices.

4.3. IDEO Method

The first design-thinking attempt that has taken attention was started in the company IDEO in 1991 by David Kelley in collaboration with several other design firms (Kelly, 2001). The IDEO philosophy underlines three principal values:

- Many eyes: Design teams consist of multi-disciplinary expertise such as engineering, medicine, IT, communication, sociology, and more. Working in a multi-disciplinary team will help them to see things in different perspectives.
- Customer viewpoint: Design teams meet with customers in their places, interview them, observe them, identify stressful situations, and determine their actions during these situations.
- Tangibility: Design teams build models, test them, receive feedbacks, take reactions, and learn from these feedback and reactions.

Kelley (2001) introduced a development process including five steps:

1. Understanding the client, the market, the technology, the perceived constraints, the needs, and the challenges of the users



2. Observation of real people in real situations to examine how they work, confusing things, likes and dislikes, and their needs
3. Visualization of possible solutions, users, new ideas, and concepts
4. Evaluating and refining including testing ideas and then improving them
5. Implementation for understanding the consumption of the new product by users

As shown in Figure 1, IDEO method focuses on first understanding users and their problems, and then developing thoughtful and creative solutions.



Fig. 1. IDEO Design Thinking Steps

4.4. Design Thinking in Augmented Reality (AR) and Virtual Reality (VR)

Bridges and Charitos (1997) reported that designers started to use virtual reality (VR) as a new design medium. Besides being much more exciting than real world things, digital media such as VR allows design thinkers to be more creative. Therefore, DT is already deeply embedded into the AR/VR development, and a large set of research on what makes for successful AR/VR design has been produced. Design thinkers who will design AR/VR should keep the following five criteria in mind:

- Requirements: The designer should identify what job the AR/VR is intended to perform and should state the requirements precisely.
- Correctness: AR/VR should meet precise specifications. Requirements are sometimes fuzzy, which makes correctness challenging.
- Fault tolerance: The software and its host systems should continue to work in spite of small errors, and will refuse to work in case of a big error.
- Timeliness: The system does its tasks within the expected time limits.
- Fitness: Designers should pay attention to dependability, reliability, usability, safety, and security that are context sensitive.

4.5. Design Thinking Considering Seniors in VARTES Project

If a product or service will be designed for seniors, then the design team should include caregivers for seniors, technology experts, adult educators, and experts related to the product or service should be in the design team.

In VARTES project, one of the aims was to produce AR/VR tools for seniors to empower their memories. Therefore, the project team consists of caregiver educators, nurses, caregivers, AR/VR tool developers, IT staff, adult education providers, and NGO. They started with identifying the needs and problems of the seniors. A guide called IO1-2 – Care Awareness Guide was produced to help AR/VR designers to understand the problems and needs of seniors. Then IO1- 1 -VR and AR Empowerment Guide and IO1-3 Training Videos were produced to help staff (IT/Caregivers, etc.) to learn how to prepare the AR/VR tools. Next, the AR and VR Virtual Packs were prepared for seniors to empower their memories. Finally, [An Empowering Guide to Exploit AV/VR with Seniors](#) was prepared. An example of VR room from VARTES project can be seen below.





In VARTES project, here are the steps of design thinking:

Step ① See the problem from the potential seniors' perspective (weak memory)

Step ② Define what seniors need to overcome the problems (memory exercises)

Step ③ Describe different aspects of the idea solution (AR/VR support)

Step ④ Develop a Prototype (AR/VR Virtual Packs development)

Step ⑤ Test, Improve, Implement (AR/VR case studies)

On 15th March, 2022 Akdeniz University VARTES project team organised a workshop with 62 seniors at Konyaaltı Municipality Retirement Community. In the following photo, implementation step of VARTES project can be seen.



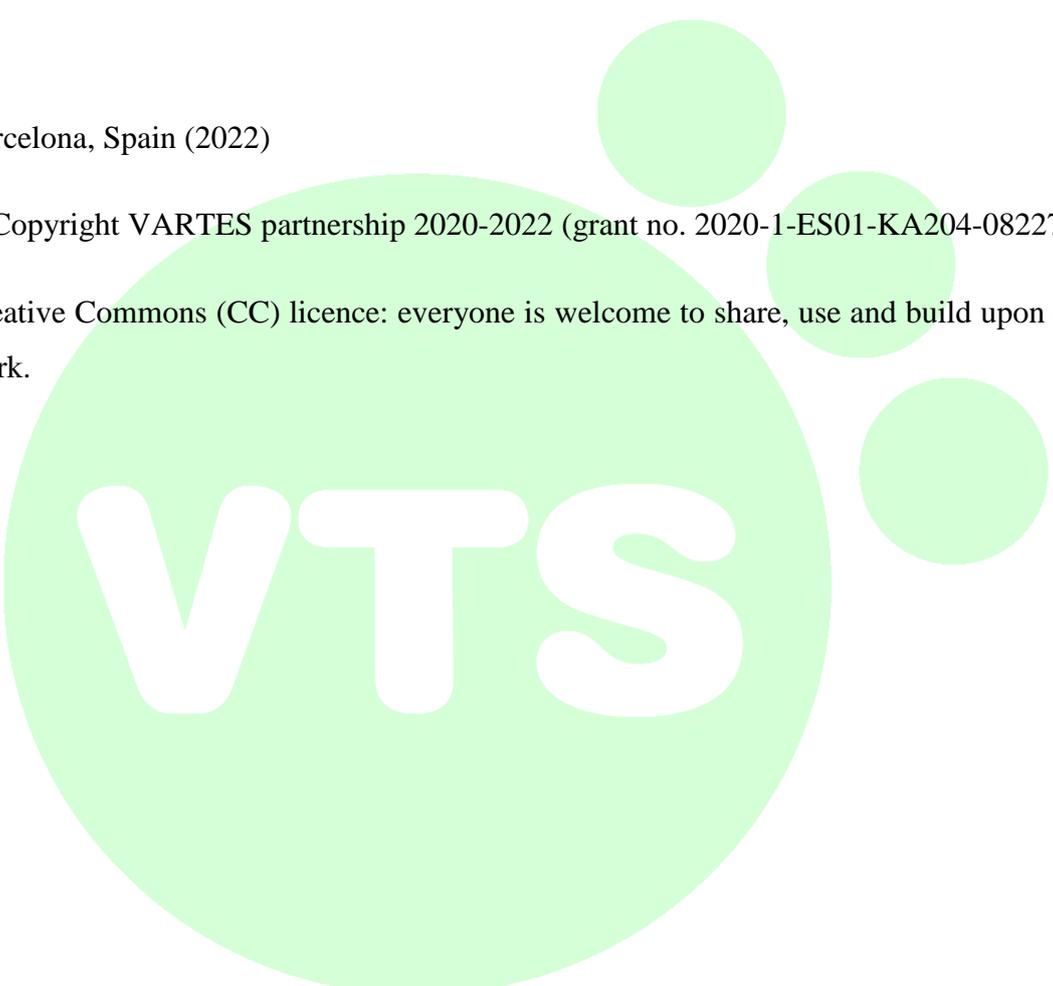
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Barcelona, Spain (2022)

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The logo features the letters 'VTS' in a bold, white, sans-serif font, centered within a large, light green circle. To the right of this main circle are three smaller, light green circles of varying sizes, arranged in a cluster.

VTS



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