Designing a Naturalistic and Interactive VR Museum Environment With a Realistic Avatar as a Guide for Cognitive Treatment of the Elderly.
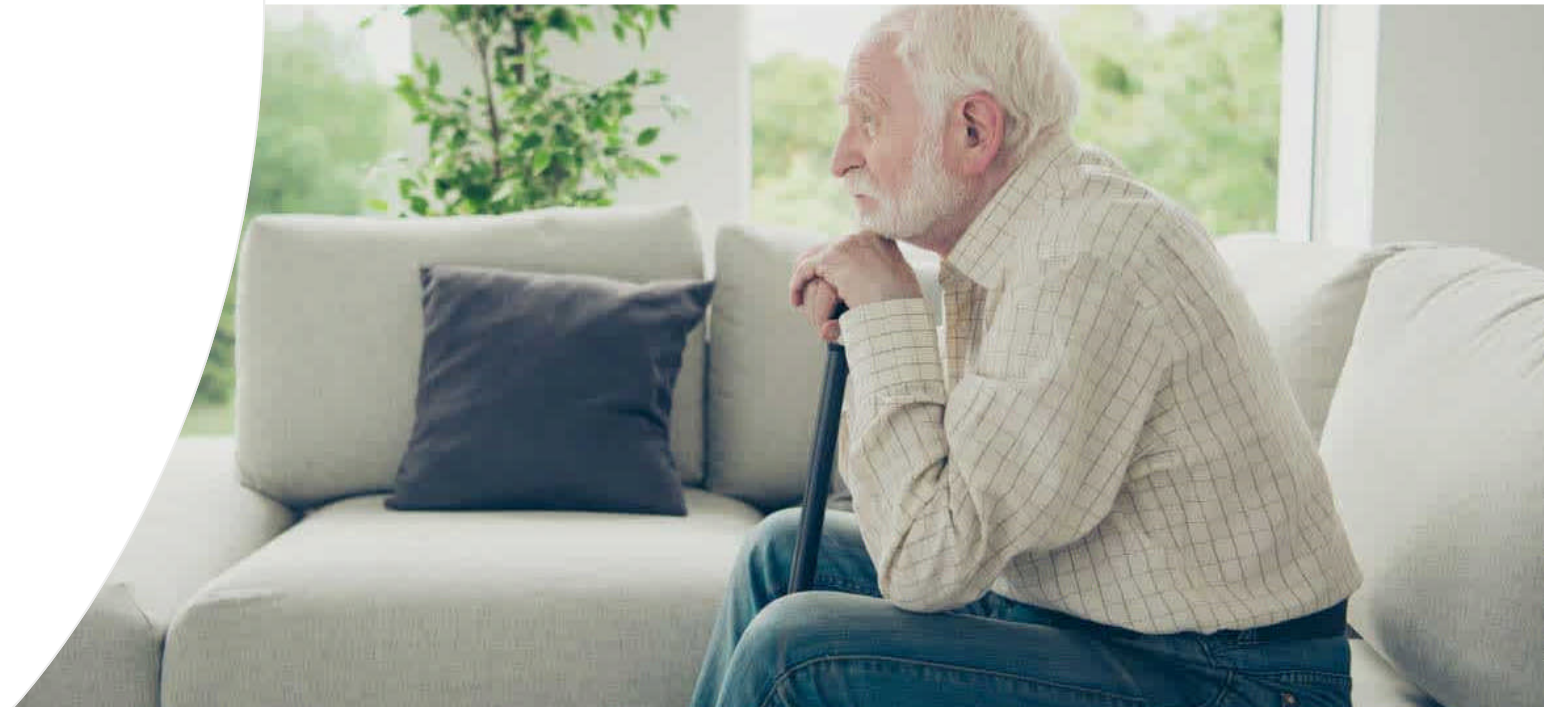
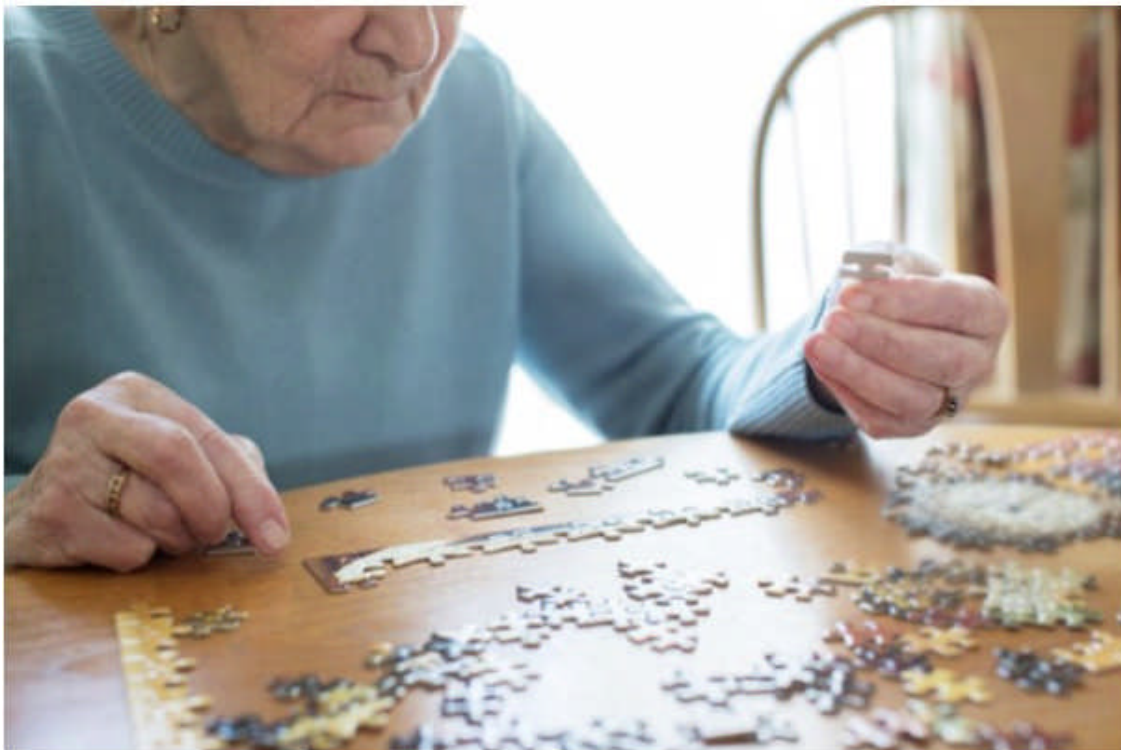Authors: Amir Bani Saeed, Dr. Zahra Moussavi

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Elderly

- Cognitive impairment
- Loneliness

[1-2]

Traditional Treatments

[3]

Virtual Reality

- Simulates the real-world conditions
- The environment reacts in real-time to user interactions
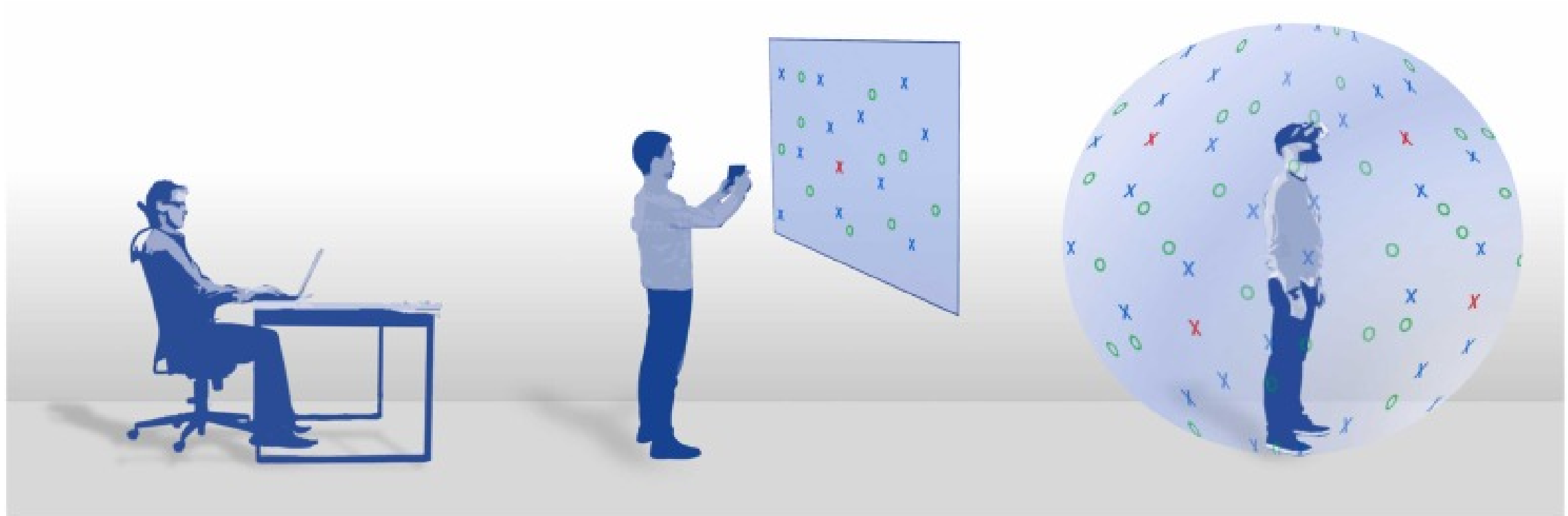
[4]

immersion

Non immersive VR   Semi immersive VR   Immersive VR

[5]

Virtual Reality

- Treatment of psychological mental disorders.

- Economically viable solution

- Expanding access to a larger group of patients

- Successful in the treatment of disorders such as anxiety, depression, eating and psychotic disorders.

[6]

Avatar

A digital representation of a person within a virtual environment.

Usage of Avatar in VR

- Sport
- Education
- Physical rehabilitation
- **Psychology**
- …

Avatar in Treatment

- The effect of using avatar in mood change was investigated.

- The participants experienced embodiment in two different avatar
  - Resembled their own body
  - Resembled dr. Freud

[7]

Avatar in Treatment

- Two scenarios:
  - They describe a problem to an avatar resembling themselves.
  - They describe a problem to an avatar resembling Dr. Freud

[7]

Avatar in Treatment

Interacted with a counselor who resembled Freud

Experienced improvement

Interacted with a counselor representing themselves.

Objective

Design a naturalistic and interactive VR museum environment with a realistic avatar as a guide for cognitive training impairment.

Game Environment

- Museum environment featuring multiple rooms.

- Each room contains a variety of paintings and sculptures

Avatar Creation

- Headshot Capture
- 3D face generation using character creator
- Animation creation and customization.
- Fine-Tune the animations in Blender.
- Facial expression and Lip Synchronization using iclone.
- Integration in VR environment.

Game Design

- Users explore exhibits
- The avatar offers hints and instructions.
- Users recall details about exhibits
- An appropriate level of challenge
- The Oculus Rift is used to deliver immersive VR experience

[8]
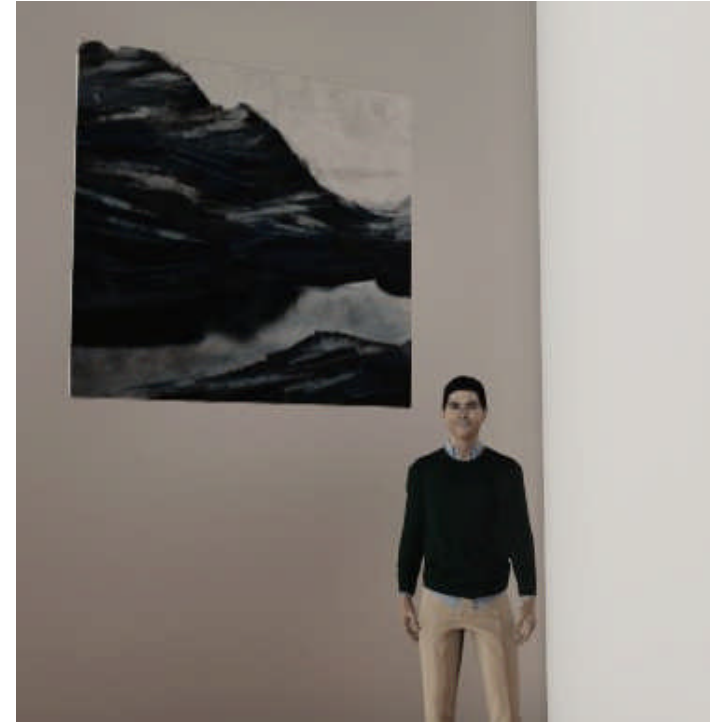
Game Scores

Scoring criteria includes:

- Responses to avatar questions
- Time taken to complete tasks
- Accuracy in recalling information
- Number of hints used

- Points are awarded based on performance, with penalties for errors, excessive time, and hint reliance.

- A cumulative score provides a measure of cognitive abilities.

Conclusion

- The project is currently under development, focusing on museum environment design and game development.

- Serves as a foundation for a larger program using VR to enhance cognitive function in the elderly.

- The next phase will involve testing the game on individuals with cognitive impairments and analyzing the data.

- This design is expected to be used in clinical trials to address cognitive impairments and depression due to isolation in the aging population

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Thank you

Questions