The design choices for the development of an Augmented Reality (AR) game for people with visuospatial neglect

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Introduction

Visuospatial neglect(VSN):
- is common after stroke
- can seriously hamper everyday life.

Visual Scanning Training(VST):
- Most commonly used method
- Requires a lot of repetition
- Intensive and less appealing

eHealth(Augmented Reality):
- Might improve treatment in the areas of: efficacy, effectiveness, satisfaction and motivation.

Aim:
- Develop an AR-based scanning training program that will improve visuospatial search strategies in individuals affected by VSN.

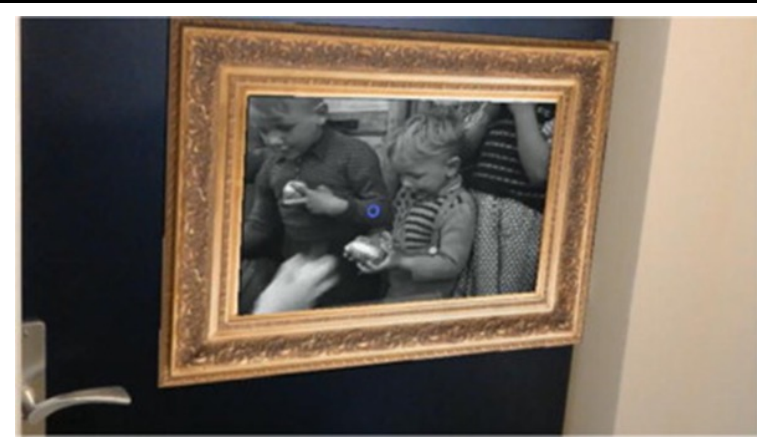Figure 1: patiënt playing the AR game with the HoloLens™.

Figure 2: a virtual painting on the wall.

Methods

Design Research approach: iterative and incremental use of prototypes with strong human-centered focus.
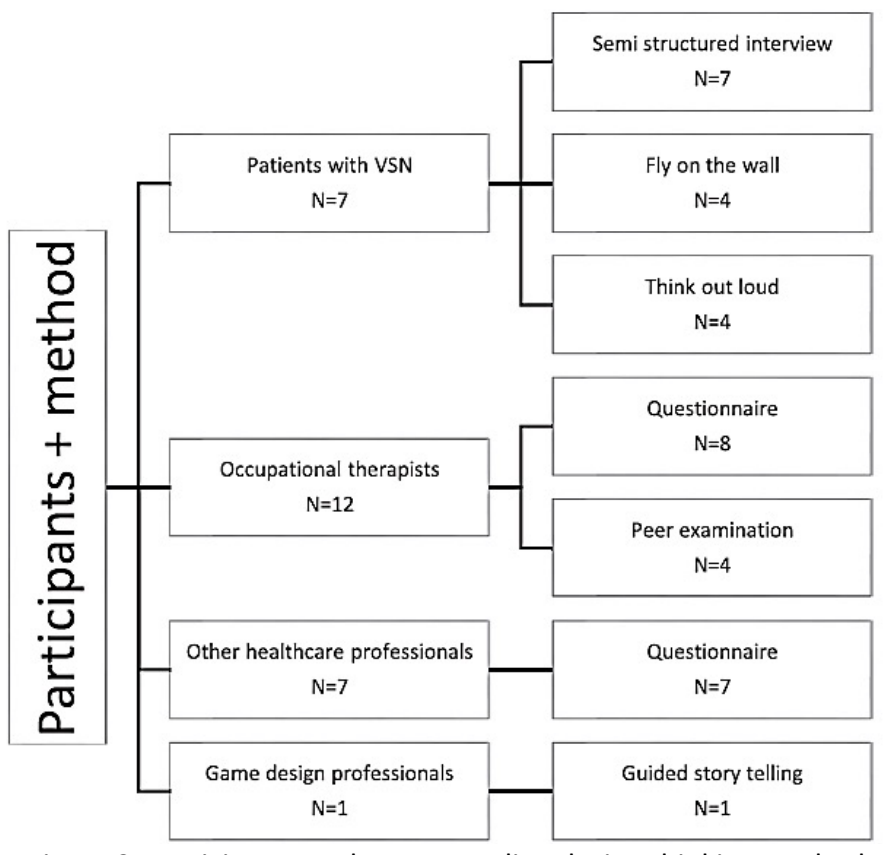

Figure 3: Participants and corresponding design thinking methods.

Results

The AR game is based on **8 design choices**:

1. **Extrinsic motivation:** can improve deficiency in self-awareness key component of VSN.
2. **Nostalgia:** stimulates certain brain areas and inspire feelings of pride.
3. **Metaphors:** In this game a museum theme is chosen as metaphor because it is a place to learn and to be entertained at the same time. (figure 2)
4. **Direct feedback:** guidance during playing the game.
5. **Independent movement:** one of the basic functions of daily activities; AR stimulates scanning and moving simultaneously
6. **Improved contrast:** for optimal interaction during the game.
7. **Search element:** is the key component of VST; AR will create extra incentive for head rotation.
8. **Competition:** necessary to increase motivation and also to give the occupational therapist insight in the scanning behavior of the patients. A first set-up paper was developed but was not incorporated in this prototype.

Conclusion

Study output consists of an AR game in which the patient searches for virtual nostalgic images (figure 2) projected onto a wall as in a museum, and during the game the patient is encouraged to scan the environment while moving around (figure 1). The AR game and method used illustrate the promising role of AR tools in geriatric rehabilitation, specifically those aimed at increasing the independence of patients with VSN after stroke.

Further development

Recommendations for further development of the AR game prototype include adding an element of competition, further personalization, and grading (on a physical and cognitive level) to improve ease and motivation for use.