

From Research to Design - Sketching a Game to Trigger Reminiscence in Older Adults

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Abstract. This contribution describes a series of design sketches for a playful digital application designed to trigger reminiscence in older adults. The goal of the intervention is to be a preventive measure against cognitive disabilities such as dementia and Alzheimer's disease. Research shows that reminiscence and cognitive activities are beneficial in this area. The presented sketches have been developed as part of a design workshop and are based upon the results of a focus group study which involved older adults, their families, experts and care personnel. The ideas are all rooted within the context of the project which revolves around the playful use of media such as photos, video clips and audio recordings. These personal media artifacts shall trigger reminiscence and engage players cognitively.

Keywords: reminiscence, dementia, older adults, play, serious games

1 About Us

The Human-Computer Interaction (HCI) group seeks to merge relevant technical/engineering and social sciences research with a practical contribution to the design of technology particularly mobile, tangible and sensor-based technologies. The group combines multiple disciplines like informatics, engineering, psychology, sociology, medical-informatics, game studies, design and media arts. The HCI group at the Vienna University of Technology is part of the Institute for Design and Assessment of Technology. The authors of this contribution combine experiences in game design, serious games and HCI-related projects. Their professional backgrounds bridge academic research with actual design practice.

2 Introduction

Today's (western) society benefits from continuous advances in the prevention and treatment of diseases. This also leads to a steadily growing demographic of older adults. As people get older the prevalence of cognitive disabilities such as dementia or Alzheimer's disease increases. This puts a heavy burden not only on people suffering from these diseases but also on their relatives and on care institutions. Presently there is no medication or cure for these diseases but it has been shown that an increase in cognitive, physical and social activities can prevent the aforementioned diseases or slow down their progress [1-4]. To further engagement across these areas, technological solutions can help by building a framework which embeds them with everyday routine, and which helps to sustain motivation.

The main focus of the designs presented here, reminiscence, is the cognitive process of remembering and reliving events from the past. This process can be caused by triggers. Memories can be sparked in conversations through words, clues or other stories. Triggers can be smells, objects or familiar impressions. Reminiscence happens interpersonally, meaning that it can be told and heard by others, or interpersonally within the person reminiscing [5]. Reminiscence serves various functions described by [6] as the social, directive and self functions. The social function of reminiscence facilitates engaging and interacting with other people. The directive function serves for problem-solving or predicting an outcome by comparing situations with the past. The self function boosts one's self-esteem, and helps to create and preserve a sense of self.

Reminiscence can be used in a therapeutic setting, also for older adults who suffer from dementia. Some memories create positive feelings, some negative. A therapist can help to reframe negative memories, so that it is easier for the patient to cope with them. Adults with dementia suffer from short time memory loss but can often remember events from their past. Reminiscence can help them train their cognitive functions and generates a feeling of accomplishment, self-worth and facilitates a reintegration into society [7].

Recent research in games designed for older people shows a tendency to positively impact their well-being [8-11]. A detailed review of literature on reminiscence and games to encourage social, cognitive and physical activities is given by [12].

This paper presents insights on research-to-design practice in the context of games for older adults. The core focus is a presentation of design sketches for a game about reminiscence intended to prevent or slow cognitive decline. The sketches were conceived in a workshop with experts from the fields of computer science, ergo therapy and game research as well as professionals in health care, game development and project management.

3 The "Lebensnetz" Project

This contribution is made in context with a particular project called 'Lebensnetz' (which could be roughly translated to the term 'life network'). The project's goal is

the user-centered development of a gesture-based application using the Microsoft Kinect sensor, which is meant to activate patients in a physical, mental and social way. The topic of the game-like application is that the users collect memories and map their life using photos as well as other auto-biographical information. The project started with a phase of investigating demands and needs of the target audience through a focus group study. The implementation takes place within an iterative design process to get permanent user feedback on the prototype. The iterative process includes two test periods and features observation and a survey. The learnings are to be looped back into game development. The result of the project will be an interactive prototype.

4 Focus Group Study

The design sketches presented here were informed by insights gathered in four focus groups. The focus groups were held separately with experts, the target audience (people 60+), caring relatives, and professional health care staff during November and December 2012. Each group was made up of 8-12 participants and two moderators and lasted for 90 minutes.

The focus group study has not yet been fully evaluated but preliminary insights indicate that the primary motivation to play is to be together with others, to have fun, to tackle challenges and to hone one's skills. There were also mentions of playing to relive or exchange memories. It seems that the understanding of play varies greatly with many differentiating strictly between work and play, cognitive training being seen as work activity. It was a common understanding that an intervention would suffer from lower acceptance if training / treatment aspects are disguised as play activities. In general there was a strong demand for the intervention to primarily be fun and playful. An emphasis was also put on the need of the system to be easily accessible, to remove technological barriers and to have as much guidance as possible. Specific game ideas included board games, musical play, puzzles, and physical play. We think that one of the biggest challenges in this context is the great age range and heterogeneity of the target audience.

5 From Research To Design

The next step of the project and core focus of this contribution was to turn the results of the focus groups into practical sketches, which then serve as basis for the iterative development of interactive software prototypes. Each of the following four sketches was produced by a group of experts with one game designer per group to facilitate the design process. The experts were comprised of researchers from the fields of computer science, ergo therapy and game research as well as professionals in (health) care, game development and project management.

The goal of the sketches was to describe an idea how biographical content like songs, pictures, photos, postcards, geographical data and more can be collected in one place and presented in a way that individuals can easily interact with them.

The workshop was structured as follows:

- Preliminary focus group results were presented and discussed
- A joint brainstorming session was held to come up with terms to base game ideas on (see table 1). The terms were supposed to relate to the previous discussion of focus group results.
- The group split into diverse teams of four. Each team included a game designer, researchers and practitioners.
- Each team chose a term from the below table and came up with a game idea.
- The whole group reconvened and each team's ideas were presented and a sketch for each idea was made collaboratively.

Table 1. Terms resulting from of a group brainstorming session during the workshop

competition	board games
self expression	musical play
virtual worlds	home(land)
tangible interface	social play
autobiographical play	media
role play	triggering memories

5.1 Sketch 1

Every user can create a timeline, which they fill with personal media contents. The timeline can represent a person's life, but can also be used to create a fictitious life story, for example a story they would have liked to live. Users can interact with other users by overlaying and comparing their timelines to talk about similarities and differences (Fig. 1). The application can be used by all generations to bring young and old together, create a safe surrounding to talk about the past and provide new topics based on the personalized content. Quizzes about one's own past can be generated in order to support people with dementia to train their cognitive abilities or to induce a reminiscence session.

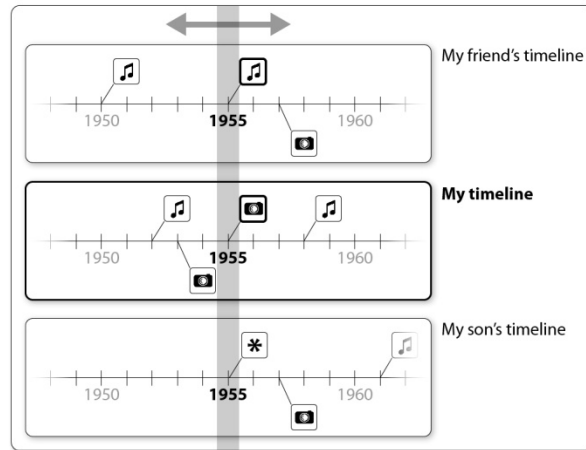


Fig. 1. Three timelines navigated together

5.2 Sketch 2

Users create a slideshow with personal content. The interface should be as simple as possible and support only creating, inserting and deleting entries (Fig. 2.). The games are played by older people and their children or grandchildren and revolve around navigating through the slideshow. Possible games are a really slow jump'n'run in which the grandchild needs to navigate through the diashow and stop and balance on one of the entries if their grandparent wants to take a closer look at it. Another game could be a quiz where three possible next entries are shown at the same time and the grandchild has to guess which of the entries their grandparent chose next.

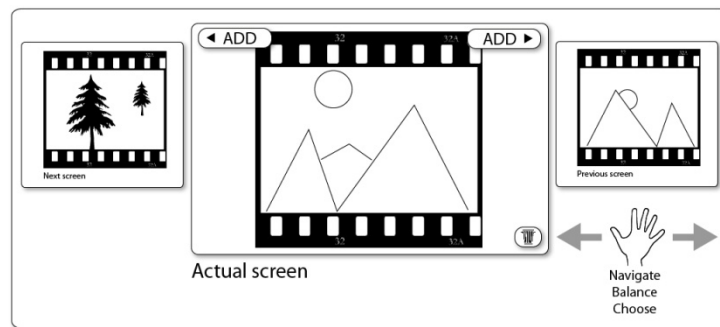


Fig. 2. A slideshow with navigation and the possibility to add contents

5.3 Sketch 3

Every user chooses an avatar and can decorate it with various objects. Each object is connected to a story that the user tells while placing the object on the avatar. The story is audio-recorded and can be replayed at any time. Avatars can be themed, for

example each resident of a retirement home can choose a tree and visitors can "walk" through the forest of tree avatars (Fig. 3). Users can play mini games together. For example players see an object and try to figure out which of three possible stories it stands for. The avatars have to be kept alive which happens by interacting with them, looking at connected stories, and answering questions about their content. Users don't only interact with their own trees, but also with others. That way they get to know their peers better while at the same time also dealing with their own past. Also avatars of deceased users are kept alive by others who interact with them.

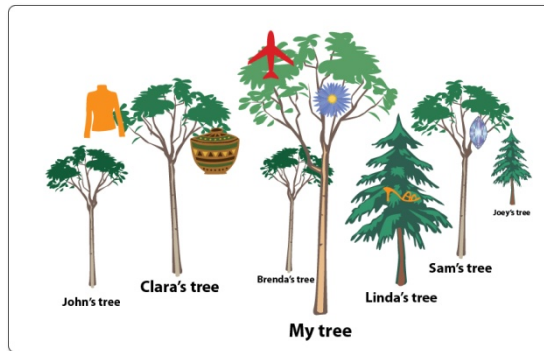


Fig. 3. Tree avatars with attached memory objects

5.4 Sketch 4

Users create "memory rooms". Each room can have a different topic, for example "my highschool years". Rooms are filled with objects from that time, for example an old gramophone or old furniture. The application provides pre filled themed rooms, like a "20s room", a "beatles room" and others, which can be looked at. Objects can be taken from the rooms and put into one's own room additionally to personal content. The content can be used in game contexts. Grandchildren can "hide" memories of their grandparents in other rooms and the grandparents have to identify and replace the missing or wrong object in the room.

An idea in this context was to reinvent the "Snakes and Ladders" board game to use the players' arranged memories. The players use the same board but are shown different content. They start in the present and work their way "back" over the board to arrive at their time and place of birth (Fig. 4). They can choose to answer questions to different categories to advance further on the board. If they just want to watch and listen to entries, they advance in their normal speed. The game could also be used to get more information for a certain time period and acts as an educational tool.

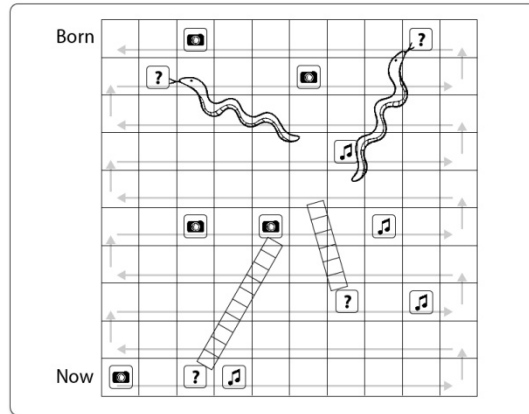


Fig. 4. A Snakes & Ladders board with memory objects

6 Discussion And Conclusion

So far we managed to transform the findings from the focus groups and our literature review into the four presented designs. The general idea was to create a biographical game and all sketches are based on a personalized database of video clips, pictures, music and similar objects. We found that the main difference between the sketches is the way data is collected and presented and the proposed gameful approaches can mostly be used in any given setting. The sketches took similar approaches in trying to present data in a way older people might find comfortable. The look and feel of the sketches was often described as old-fashioned or customizable. Metaphors like diashows as picture timelines or old radios as music players were often proposed. As mentioned before, this approach might be appropriate for parts of the target audience, but leaves out those, who are comfortable with new technologies.

Our contribution to the workshop will be to describe our particular research and design approach towards a game-like application for older adults. We will discuss how focus groups helped us build a solid basis for brainstorming and shaping several designs.

We expect to learn about related example practices in designing technology for older adults and how others involve senior participants in their design and development processes.

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