Retro Jukebox: A Reflection on Designing for Cognitive Stimulation of Postoperative Elderly Patients

Wenn-Chieh Tsai

Faculty of Design, Architecture & Building,
University of Technology Sydney,
wenn-chieh.tsai@uts.edu.au
Graduate Institute of Networking and Multimedia,
National Taiwan University,
Taipei, Taiwan

Elise van den Hoven

Faculty of Design, Architecture & Building,
University of Technology Sydney,
elise.vandenhoven@uts.edu.au
Department of Industrial Design,
Eindhoven University of Technology,
e.v.d.hoven@tue.nl
Duncan of Jordanstone College of Art and Design,
University of Dundee
ARC Centre of Excellence in Cognition and its Disorders,
Macquarie University

Abstract

Retro Jukebox is a tablet-based software application designed for postoperative elderly patients and bedside nurses. The application is designed as a reminiscence aid to support patients' cognitive stimulation. In this paper, we present the lessons learned from a field study that led us to reflect beyond its utility-oriented design. We shed light on some implicit values and benefits that may not be seen as the designer's intentions but are a meaningful appropriation heading toward the same goal.

Author Keywords

Reminiscence aid; cognitive stimulation; postoperative elderly patients; hospitalization

ACM Classification Keywords

H.5.2. Information interfaces and presentation (e.g., HCI): User Interfaces.

Introduction

Older patients are vulnerable to cognitive function decline during hospitalization; even more, some of them have persistent impairment six months post hospitalization [2]. Cognitive stimulation interventions are commonly adopted in clinical practices to increase

Figure 1: The main menu of the Retro Jukebox.

Figure 2: My Collection drawers in the music player and Who Is Singing game.

patients' brain reserves and prevent decline [1]. Music stimulation can evoke strong emotions; emotions can enhance memory recall [5]. In addition, social activities of older adults are also known to be a preventive factor for cognitive decline [4]. In this paper, we explore the feasibility of incorporating auditory memory cues, i.e. old songs, into a reminiscence aid for hospitalized-postoperative-elderly patients and their nurses. The initial aim of the design is to provide a useful tool to facilitate reminiscence and conversation in a ward to benefit patients' cognitive functions. The following sections present the design of *Retro Jukebox* and the knowledge we gained through the field study, which changed our perspective in the end.

Retro Jukebox

For easy to use and carry, we implemented Retro Jukebox on a tablet computer with a touch screen. Three nurses participated in different phases of the development of the system (ideation, prototyping, and evaluation). The system has two main features: it serves as a music player and game console (Figure 1). Three cognitive games have been created: *My Collection*, *Who Is Singing?* and *Have You Heard It Today?* In *My Collection* users can drag-and-drop or delete songs in drawers tagged by levels of preference to organize their personal collections. *Who Is Singing* is a music quiz in which users have to choose the right singer from three candidate portraits while a song is playing (Figure 2). *Have You Heard It Today* will play a song and ask users if they have played the song before in today's activity session (Figure 3). We assumed these games could be a guidance that relieves some of the nurses'

burden of leading conversation all the time. We also intended to create a *serendipitous* experience for user engagement through randomly selected songs in the games. Our target patient users are over 65 years old. We collected over three hundred popular songs from 1960s-1980s, the years when our participants were young adults. Our intention was to evoke their related event memories. Their nurses could then follow the storylines to engage the patients in a reminiscence dialog.

Field Study

We assumed a simple and easy-to-use interface could help the nurses conduct cognitive stimulation activities with this device. After several usability tests with two nurses, we modified some software and hardware issues and thought we were ready to go into the wild. In the field study, a nurse who was routinely conducting cognitive orientation and stimulation conversation with patients in wards twice a day joined our study. She was requested to incorporate Retro Jukebox into her existing intervention for the postoperative patients who participated in our study. A total of 14 abdominal surgery patients in a medical center in northern Taiwan, all over 65 years old, were invited to join the field study from September to December 2011. The patients could decide whether to use Retro Jukebox during their conversation or not. All the actions performed on Retro Jukebox were logged. The nurse was responsible for observing each patient's interactions with this new device. One of the researchers interviewed the nurse every week about her experiences.

Figure 3: Have You Heard It Today game.

Findings

"I'm not feeling well!"

Six of the 14 invited patients turned down to use the device in their conversation with the nurse. Their demands were focused on their health condition although some participants are karaoke hobbyists. As for those who joined in this technology-mediated reminiscence, they only used the music player function. No patients were willing to play the other games because they had to learn the rules first. Furthermore, the patients felt that the challenges of the games made them become a training task rather than the intended playful and *self-initiated* engagement. During the period of the field study, a change in attitude of the nurse was also observed. In the beginning, she was enthusiastic about the research plan and gave us a lot of ideas about designing and modifying the system. After several weeks of intervention with the device, she *empathetically* spent more time to explain patients' illness perception and uncomfortable situation, which were the reasons they did not use the system. Finally, she said, "*I feel like a saleswoman every time I step into the ward with the device.*" This was a turning point in our perspective, and the nurse informed us a proper way of initiating a reminiscence dialog, which should be grounded on an empathetic relationship.

Situated use in the ward

Our reminiscence aid elicited some unexpected social interactions. For example, when a user did not use a headset in his multi-person ward, the music from Retro Jukebox became a trigger for an *impromptu* conversation on music-related experiences among patients in the room. Sometimes, it was used as a background music player for a collocated ensemble of patients and their visitors. All these interactions were situated and not anticipated by the original design. One patient, for example, asked to keep Retro Jukebox in his ward for individual use after the session, because he said that it was hard for him to listen to the music while in a conversation with the nurse. This reminded us that individual differences in users' cognitive capacities might require an adaptation of use in situ by the nurses. Also, the interface design should be capable of *appropriation* to some extent.

Music-mediated experiential resonance

Users could either find a song in the three-level menus of song titles or singers' names (Figure 4), or they could just pick a song from the *Daily Recommendation* folder, which randomly shows five songs everyday. At the beginning of each activity session, the nurse encouraged the patient to recall a song he/she remembered or wanted to hear. If the patient did not have a suggestion, she would name a popular singer and lead the patient to browse through the menu and play one of the singer's songs. This process established experiential resonance between the two participants. All information about a song such as its title, singer's name, lyrics, or melody can be opportunities for sharing common grounds in a conversation. This music-mediated resonance could be extended out of the ward with interpersonal relationships. For example, one patient had his own music player in the ward. He used to listen to Japanese songs in his daily walking exercise before hospitalization. However, he now had to ask his son to take his player home to update the music files and bring it back to the ward. These rituals related to listening to music connected two individuals at different locations. Therefore technology should not only mediate new experiences but also support existing practices.

Figure 4: The three-level menu of singers' names.

Discussion and Reflection

We originally intended to let our reminiscence aid "disappear" under an easy-to-use interface while helping patients recollect past memories in a conversation. In the end, the patients in this study chose the interaction they are familiar with, i.e. the music playing function. It is an interaction that users can control at their own pace and give their own meaning making. The findings show that the songs in Retro Jukebox were capable of triggering dialogs and interactions built on empathetic relationships. These dialogs and interactions were not all related to past memories and varied from patients' personal illness at present to socially music-listening ritual. Clinical nurses then had to adapt to and continue these dialogs and interactions in cognitive stimulation conversations. Therefore we suggest that the role of a system in technology-mediated reminiscence for postoperative elderly patients should be more "humble" in order to invite and encourage users to engage in a *self-initiated* interaction. In addition, the designed interaction should be a playful exploration and *ludic engagement* [3], rather than a rule-based task. The interaction should also be interwoven into patients' daily practices or special situations they are dealing with.

A reminiscence aid can be a facilitator for experiential resonance during the exploration. It can provide opportunities for patients to evoke past memories by presenting them with familiar information; moreover, it can create new experiences for collocated users or distribute actions for people to collaborate. These user experiences will be anchors for their following conversations and building blocks of their relationships. Negative perception toward a technology intervention could be a resource for designers as long as the

designers have a clear understanding of those implicit values attached to user reactions to their designs. The users might benefit from not only fulfillment of the designer's intentions but also their exploration and self-interpretation [6]. We, as designers, should remember to reflect on what we take for granted in our design practices and find an appropriate way to situate our interventions beyond our own intentions.

Acknowledgements

References

1. Karlene Ball, Daniel B. Berch, Karin F. Helmers, et al. 2002. Effects of cognitive training interventions with older adults: a randomized controlled trial. *JAMA* 288, 18: 2271–81.

2. Cheryl Chia-Hui Chen, Charlotte Wang, and Guan-Hua Huang. 2008. Functional trajectory 6 months posthospitalization: a cohort study of older hospitalized patients in Taiwan. *Nursing research* 57, 2: 93–100.

3. William W. Gaver, John Bowers, Andrew Boucher, et al. 2004. The drift table: designing for ludic engagement. In *Proc. CHI EA 2004*, 885–900.

4. Bryan D. James, Robert S. Wilson, Lisa L. Barnes, and David A Bennett. 2011. Late-life social activity and cognitive decline in old age. *JINS* 17, 6: 998–1005.

5. Lutz Jäncke. 2008. Music, memory and emotion. *Journal of Biology* 7, 6: Article 21.

6. Phoebe Sengers and Bill Gaver. 2006. Staying open to interpretation. In *Proc. DIS 2006*, 99–108.