

Figure 1: Slots machine-like device. Its shape is designed to be wedge-shaped for ease of use. A 7-inch display and a microphone are arranged on the up side and recording button is on the front side. The lever and handle is on the right and back side respectively, together with a portable dimension, makes it easy to carry. The MDF material covered with wooden texture makes it look like old-fashioned, which is in line with the aesthetic view of the elderly.

Slots-story: Facilitate Inter-generational Life Story Sharing and Preservation of the Elderly

Cun Li

Eindhoven University of
Technology
Eindhoven, Netherlands
cun.li@tue.nl

Jun Hu

Eindhoven University of
Technology
Eindhoven, Netherlands
j.hu@tue.nl

Bart Hengeveld

Caroline Hummels
Eindhoven University of
Technology
b.j.hengeveld@tue.nl
c.c.m.hummels@tue.nl

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author.

NordiCHI'18, September 29-October 3, 2018, Oslo, Norway
© 2018 Copyright is held by the owner/author(s).
ACM ISBN 978-1-4503-6437-9/18/09.
<https://doi.org/10.1145/3240167.3240245>

Abstract

In this paper, we present Slots-story, a system consisting a slots machine-like device and a flash disk, aiming to facilitate intergenerational story sharing and preservation. The former is used by the elderly, which builds on metaphor of slots machine, and integrates functions of memory cue generator, story recording and preservation. In the flash disk, by default there are 40 trigger questions covering most aspects of an entire life course, and which could be customized by the young. The flash disk is also used to preserve story audios. Design requirements and opportunities are defined in contextual inquiry. Preliminary evaluation is conducted, discussion and future work are in the final part.

Author Keywords

Elderly; Story; Tangible Interface; Social Interaction.

ACM Classification Keywords

K.4.2 Social Issues-Handicapped persons/special needs

Introduction

Storytelling plays fundamental role in human daily communication. Intergenerational storytelling and communication not only improves psychological well-being, reduces feelings of loneliness and depression of the elderly[6], but also contributes to the development of the young, which is associated with their increased resilience, better adjustment, and improved likelihood



Figure 2: It includes two display interfaces: "Question" and "Recording". Vintage style is also applied both in the interface elements and fonts. Considering fading eyesight of the elderly, bold and huge fonts are used for the text. There are usage tips at the bottom: "Note: Press "REC/STOP" button before/after recording."

The "Question interface" displays one specific question, which will be switched to Next/Previous question by pulling down/pushing up the lever. It will be switched to "Recording interface" when the REC / STOP button are pressed. In the "Recording interface", a dynamic recording icon and timer widget are placed to provide real-time feedback.

of overcoming challenges[10]. The preservation of the life stories are also significant, stories are important part of identity preservation. The elderly hope they will be remembered, however when the elderly passed, their family members are only left with bundles of images, materials, objects, and wishes of the deceased.

While social media like Facebook helps to share and preserve the stories to some extent, these platforms are more about the "now" moments and less about the past[17]. In addition, the elderly are still disconnected from the mainstream social circles due to lack of technology and devices that resonate with them, currently most interfaces are designed to support younger users. Thus, they are confronted as passive consumers rather than active creators of content[4].

Related Work

Multiple functions of intergeneration storytelling

On the theoretical side, from a physiological perspective, storytelling and reminiscence improve self-esteem, mood, and well-being as one ages [2]. therapeutic interventions related to memories have positive effects on reducing loneliness[5]. From a social perspective, storytelling of the elderly contributes to maintaining social relationships[13], create meaning beyond the individual and provide a sense of and in relation to family members, and thus facilitate positive identity[9]. Duke's research also indicates that knowledge of family history is significantly correlated with internal locus of control, higher self-esteem, better family functioning, greater family cohesiveness[8].

From a broader perspective, stories told by the elderly are treasured intangible source of cultural heritage. When individuals regard that they approach to the end

of their lives, they tend to document segments of their personal history and issues of generativity and knowledge transmission to younger generations are considered as significant to seniors.

Applications of storytelling of the elderly

On the application side, in terms of applications and tools for the storytelling of the elderly, there is system aiming to help residents in nursing home make connections through sharing stories[16], game-based reminiscence service that enables elders to capture memories and annotate photos[15], design of encouraging reminiscence and storytelling with objects, as a tool for building connections of older residents in nursing home[1], and an interactive table for sharing memories, skills and demands[11].

Applications of intergenerational storytelling

In terms of intergenerational storytelling, current applications are mostly smartphone applications or website, which are inaccessible for the elderly users. There are smartphone applications or webs for creating multimedia stories[7] [2], a software of managing family stories[17], software for videos to be saved in user-specified real-world locations, shared with friends and family[3], and a software support digital reminiscing of the elderly.

In summary, little attention has been paid to make technology accessible for the elderly when it comes to intergenerational storytelling, nor do they considering the preservation of life stories of the elderly, with an eye on the collaboration between the elderly and the young in a sustainability manner.

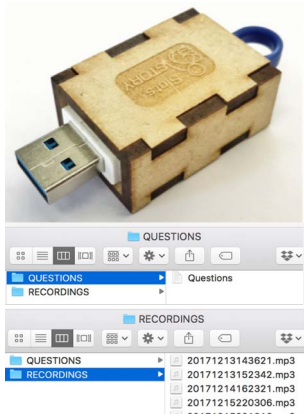


Figure 3: Flash disk and folders inside

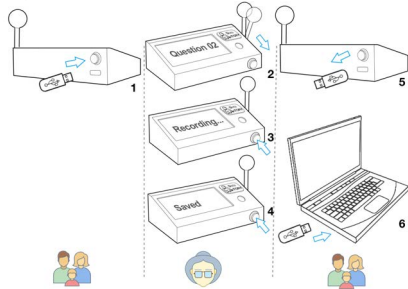


Figure 4: Operating procedures (1) The young insert flash disk into prototype and give it to the elderly. (2) The elderly pulls down the lever to switch trigger questions. (3) The elderly push the only button to record stories. (4) The elderly push the button again to save the recording. (5) Stories told by the elderly now are in flash disk. (6) The young plug flash disk into a computer to listen and keep stories, and further add and modify trigger questions. (7) The slots-story could also be used face-to-face.

Contextual Inquiry

To understand the status quo of intergenerational storytelling of elderly people, design requirements, and further identify design opportunities, semi-structured interviews were conducted with elders in a local nursing home. The elderly were ranged in age from 71 to 90 years. Interview topics are in Table 1. The following are the brief overview of results.

- Most interviewees couldn't operate computers or smartphones. The major cause was, firstly they were unfamiliar with them and lack of using experiences. Secondly, physical decline brought inconvenience to the use of digital devices. They still relied heavily on paper and preferred physical interaction.
- They had regular contact with their children, who visited them weekly. They also connected through telephone, but most of them called their children only when in emergency.
- Talking topics were usually personal and private. The elderly would like to share their life stories, but they were rarely asked specifically.
- The elderly didn't share life stories specifically and deliberately in daily lives. Life story sharing was fragmented and happens naturally, which made the stories hard to preserve.
- Memory triggers were necessary to facilitate life storytelling, their life memories were recalled by conversation topics, family mementos, etc.

Implementation: Slots-story system

Design requirements

- Tangible interface and intuitive interaction could be adopted to provide physical feedback and overcome the limitations of screen-based interfaces.

- Metaphor in interface, new product that is in familiar metaphors could reduce barriers of the elderly to use as well as reduce learning time[14].
- Memory triggers are necessary, to facilitate the elderly to recall and tell life stories. Research has reported that memory trigger is one of the keys to success in terms of facilitating and supporting remembering [12].

Concept

Metaphor of slot machine is applied in the system of Slots-story. It is a system consisting a Slots machine-like device and a flash disk, it could either be used face to face or independently by the elderly and their family members. The slot machine-like device integrates functions of memory cue generator, story recording, and preservation. The young could modify trigger questions and listen to the story audios in the flash disk.

Slots machine-like device and internal structure

As is shown in Figure 1.

Interfaces and operation procedures

They are shown in Figure 2 and Figure 4.

Flash disk

Two folders are in it: QUESTIONS and RECORDINGS, the former contains trigger questions, and the latter contains the story audios told by the elderly (Figure 3).

Trigger questions in Slots-story

Explicit questions are employed as memory cues, part of them are shown in Table 3. Compared with other types of memory cues, questions are more explicit and straightforward, targeted answers will be triggered. Trigger questions in our case are from The Life Story

Basic Information
Age, gender, physical condition
Familiarity with technology
Communication with family
Who, number, frequency, duration of contacting with family members
Way of keeping in touch (face-to-face, phone, skype,.etc)
Current story sharing situation
Whether like to share stories, why
Situations and reasons of sharing stories
Who, when, how to share stories (face-to-face, phone, skype,.etc)
Topics, duration, and frequency of story sharing
Trigger of life story sharing
problems encountering in the course of story sharing

Table 1: topics in contextual inquiry

Validity
Would you like to use it? who would you like to share with?
Do you think it could facilitate sharing stories? why?
Contents
Preference of questions provided: A. Childhood B. Family C. School and work D. Friend and Fun E. Historical Events G. Others
Appearance
What kind of appearance style would you prefer: A. Vintage B. High-tech C. Colorful D. Simple
Interaction
Do you understand the concept of it
What is the most difficult part?
Do you find it easy to use?
Comments for improvements
Which parts would you change it?
Comments and suggestions

Table 2: topics in preliminary evaluation

Interview [1], questions almost cover all aspects of an entire life course, including childhood, family, school, work, friend, fun, historical events, and others. The young could customize the trigger questions in the flash disk.

Preliminary evaluation

Purpose, functions and operation procedure were firstly introduced to them, the prototype was then operated by them. Short interviews were conducted with the elderly and their family members, aiming to understand the acceptability to them and get comments. Detailed interview topics are shown in Table2. The following are the brief overview of results.

- With respect to validity, the interviewees thought it could facilitate life story sharing. They showed great interests in it, especially its intuitive operation. The trigger questions were easy to answer and recall memories. Metaphor of slots machine was understood and accepted by them.
- After browsing the initial trigger questions, the interviewees recalled and told their past to us unconsciously. Stories they were mostly interested in were childhood, stories they were proud of, and funny things.
- With respect to appearance, they agreed that vintage style with decorative effect was unobtrusive when put it at home.
- With respect to interaction design, a timer or indicator light should be added to provide immediate feedback when the REC/STOP button was pressed. The others suggested that the sensitivity of operation should be reduced as their hands were clumsy.

- With respect to suggestions, Portability of prototype was considered important as they wanted to use it anytime and anywhere. A detailed instruction was necessary. Some young interviewees suggested that pictures of family albums and souvenirs could also be used as memory triggers.

Discussion and future work

Facilitate life story share in a sustainable way

In the process of story sharing, triggered by the mementos, the elderly tell stories and which are then conveyed to the young, the young provide feedback to the elderly, and the feedback may also act as memory cue, which makes story sharing circulation sustainable. The whole process is achieved by intergenerational collaboration, which brings intergenerational communication and conversation.

Tangible interface enables accessibility and visibility

From the perspective of design, Slots-story device is an interactive device with tangible interface. The classic aesthetic makes it unobtrusive when put it at home, which would encourage and attract the elderly to use. It not only enables them to be aware of the intergenerational life story and preservation, but also serves as a tangible reminder for them of what it holds.

Formal experiment

Prototype will be improved based on the feedback of the interviewees. A formal experiment will be conducted afterwards. Prototypes will be distributed to participants and used in real scenarios. Stories told by the elderly will be analyzed and semi-structured interviews will be conducted.

Childhood:

1. Were you ever told anything unusual about your birth?
2. What is your earliest memory?
4. What clubs, groups, or organizations did you join?

.....

Family:

1. What was going on in your family, your community, and the world at the time of your birth?
2. What beliefs or ideals your parents tried to teach you?

.....

School and Work:

1. What is your first memory of attending school?
2. What was your first experience of leaving home like?

.....

Friends and Fun:

1. What childhood friendships were most important to you?
2. Did you make friends easily?

.....

Historical Events:

1. What historical events did you participate in?
2. What has your life contributed to the history of your community?

.....

Others:

1. What gifts (tangible or intangible) are still important to you?
2. What were the crucial decisions in your life?

.....

Table 3: part of the trigger questions in Slots-story

References

1. Peter Bennett, Heidi Hinder, Seana Kozar, et al. 2015. TopoTiles: Storytelling in Care Homes with Topographic Tangibles. ACM Press, 911–916.
2. Frank R. Bentley, Santosh Basapur, and Sujoy Kumar Chowdhury. 2011. The use of StoryKit: design implications for intergenerational mobile storytelling. *Proceedings of the 13th international conference on Ubiquitous computing*, ACM, 31–40.
3. Frank R Bentley, Santosh Basapur, and Sujoy Kumar Chowdhury. 2011. Promoting intergenerational communication through location-based asynchronous video communication. *Proceedings of the 13th international conference on Ubiquitous computing*.
4. Robin Brewer and Anne Marie Piper. 2016. "Tell It Like It Really Is": A Case of Online Content Creation and Sharing Among Older Adult Bloggers. ACM Press.
5. Kai-Jo Chiang, Hsin Chu, Hsiu-Ju Chang, et al. 2010. The effects of reminiscence therapy on psychological well-being, depression, and loneliness among the institutionalized aged. *International Journal of Geriatric Psychiatry* 25, 4: 380–388.
6. Martha Driessnack. 2017. "Who Are You From?": The Importance of Family Stories. *Journal of family nursing* 23, 4: 434–449.
7. Allison Druin, Benjamin B. Bederson, and Alex Quinn. 2009. Designing intergenerational mobile storytelling. *Proceedings of the 8th international conference on interaction design and children*, ACM, 325–328.
8. Marshall P Duke, Amber Lazarus, 2008. Knowledge of family history as a clinically useful index of psychological well-being and prognosis: A brief report. *Psychotherapy: Theory, Research, Practice, Training* .
9. Robyn Fivush. 2011. Intergenerational narratives: How collective family stories relate to adolescents' emotional well-being. *Aurora. Revista de Arte, Mídia e Política. ISSN 1982-6672* 10: 51.
10. Robyn Fivush, Jennifer G. Bohanek, and Marshall Duke. 2008. The intergenerational self: Subjective perspective and family history. *Self continuity: Individual and collective perspectives*: 131–143.
11. Sabina Giorgi, Miguel Ceriani, Paolo Bottoni, Alessandra Talamo. 2013. Keeping "InTOUCH": an ongoing co-design project to share memories, skills and demands through an interactive table. In *Human Factors in Computing and Informatics*. Springer.
12. Elise van den Hoven and Berry Eggen. 2014. The Cue Is Key: Design for Real-Life Remembering. *Zeitschrift für Psychologie* 222, 2: 110–117.
13. Ira E Hyman. 1994. Conversational remembering: Story recall with a peer versus for an experimenter. *Applied Cognitive Psychology* 8, 1: 49–66.
14. Carol Irizarry, Andrew Downing, and Deborah West. 2002. Promoting Modern Technology and Internet Access for Under-Represented Older Populations. *Journal of Technology in Human Services* 19.
15. Hung-Chi Lee, Ya Fang Cheng, Szu Yang Cho, Hsien-Hui Tang, Jane Hsu, and Chien-Hsiung Chen. 2014. Picgo: designing reminiscence and storytelling for the elderly with photo annotation. ACM Press, 9–12.
16. Micah Linnemeier, Yi-Ying Lin, Gierad Laput, and Ramachandra Vijjapurapu. 2012. StoryCubes: connecting elders in independent living through storytelling. *CHI'12 Extended Abstracts on Human Factors in Computing Systems*, ACM, 1321–1326.
17. Aaron Marcus. 2015. The Story Machine: Combining Information Design/Visualization with Persuasion Design to Change Family-Story Sharing Behavior. In *Mobile Persuasion Design*. Springer London, London.