

# Designing a System to Facilitate Intergenerational Story Sharing and Preservation for Older Adults

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Prototype						
	Platform: Raspberry Pi		Platform: Raspberry Pi	Platform: Raspberry Pi	Platform: Raspberry Pi	Platform: Android
	Social interaction of older adults		Co-Design of Development of prototype	Field study : Life stories of older adults	Field study : Memento stories of older adults	Field study : Close the loop and make story sharing sustainable
	Intelligent Environments 2016, Springer:ADCH		N/A	NordiCHI, PAUC (under review)	TEI (under-review)	In-progress

Figure 1. Iterations Overview

## ABSTRACT

My PhD research focuses on intergenerational story sharing for older adults, which is conducted in a Research-through-Design manner. It includes five iterations: It started from an exploration prototype Interactive Gallery (1st iteration), and its findings helped to narrow down my research area and define my research question. To answer it, the 2nd iteration was continued, which was a co-design process of developing prototypes. 3rd and 4th iteration focused on older adults' life stories and memento stories respectively. While the 5th iteration is in the process, which aims to facilitate intergenerational story sharing and preservation in a sustainable manner.

## Author Keywords

Research-through-design; elderly; storytelling; tangible interface; social interaction

## ACM Classification Keywords

- Human-centered computing~Interaction devices
- Human-centered computing~Collaborative and social computing
- Social and professional topics~Seniors
- Hardware~Haptic devices

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## CONTEXT AND MOTIVATION

Aging society is coming. Social interaction is a critical factor affecting the quality of life of older adults. The quality and quantity of individuals' social relationships have been linked not only to mental health but also to both morbidity and mortality[6]. People lacking social contacts are more susceptible to diseases, infarction, stroke, and the onset of Alzheimer's disease[15]. However, social isolation is widespread among older adults[16], they have limited involvement in social connections[11].

Social interaction of old adults is a broad research area, and my research focuses on its subset: intergenerational storytelling of older adults. Storytelling of older adults serves multiple functions: Social function, maintaining social relationships[7], creating meaning beyond the individual and providing a sense of and in relation to family members [4]. Physiological function, improving self-esteem, mood, and well-being, and reducing loneliness as one ages [3]. Cultural function, their stories are treasured intangible source of cultural heritage [17].

However, storytelling and preservation are still problematic for older adults: First, 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[10]. Second, digital online applications and websites for story sharing are normally inaccessible for most older adults (especially for those live in nursing home), who are disconnected from the mainstream online social circles due to lack of technology that resonate with them [18]. Third, despite that sitting together to

communicate face-to-face is obviously the most common and enjoyable way to share stories[9], whereas they don't have many such opportunities because most of them live separately with their children.

### RESEARCH QUESTION AND APPROACH

Research question of my PhD research is: *How can we use technology to facilitate intergenerational story sharing and preservation of older adults?* To answer this research question, three sub-research questions are formulated: (1) *What are their stories about?* (2) *How to facilitate them to tell and preserve their stories?* (3) *How to involve the young generation to make the story sharing sustainable?*

The research approach we adopt is Research-through-Design. It is conceptualizing research done using the practice of design activity, revealing research insights [20]. It features that knowledge is gained by conducting a design exercise based on prototype [5]. In our case, each iteration broadly consists of contextual inquiry, research prototype, field study, and reflection.

### RELATED WORK

Regarding social technology for older adults, existing research indicates that their social interaction could be promoted either by strengthening connections between older adults and their existing social circles (friends, family, etc.)[13], or expanding their social circle by knowing more friends[18]. In our study, we found as personal stories were private and personal, older adults preferred to share them with their existing social circle, especially their children.

Regarding applications of intergenerational storytelling, there are smartphone applications or webs for creating multimedia stories [1], software of managing family stories[10], software for videos to be saved in real-world locations, shared with family[2], and software support digital reminiscing of the family[14]. Current applications are mostly smartphone apps or website, which are normally inaccessible for the elderly users.

Regarding research on mementos and related stories include lifelogging technologies which capture mementos memories[19]; Organizing and archiving digital mementos [8];making connections between objects and stories[12]. However, current research give more attention to personal digital content, while mementos of older adults are mostly in physical format.

### ITERATIVE DESIGN APPROACH

#### 1st iteration: Interactive Gallery

**Aim:** Our first prototype-Interactive Gallery was an explorative prototype, designed to uncover the related potential factors, narrow down research goal and define PhD research question. (Figure1-(1))

**Contextual inquiry:** To understand the basic social pattern of older adults in nursing home, we conducted semi-structured interviews with older adults and caregivers. The following are a brief overview of the findings: Older adults

encountered difficulties in connecting with their fellow residents. The nursing home was not a fully open community, which made it a relatively isolated and independent. Their daily routines remained the same, and most of them couldn't operate digital devices.

**Prototype and field study:** Interactive Gallery system consists of a set of scenery-collectors and a gallery-like interactive installation. The formers are distributed to volunteers from local communities to share real-time scenery photos with older adults, and the latter is placed in the nursing home which enables older adults to watch and start conversations. Communication between sharers and receivers will also be connected through a "postcard-sending" metaphor: The older adults could print scenery photos as postcards by simply pressing the button. They could choose to send back to sharers, or keep them. It was implemented in a local nursing home for five weeks. Direct observation method (including baseline observation and intervention observation) and semi-structured interviews were adopted successively.

**Reflection:** The field study proved tangible interface employing metaphor reduces using barriers for them. Their memories were evoked by the familiar scenery photos. They'd like to share memories with their children, as memories were personal and private. Also, memory triggers need to be highlighted.

### IDENTIFICATION OF RESEARCH QUESTION

Results of 1st iteration indicated that older adults could be deemed as story content producers, and their children were their listeners. This drove us to narrow down our research goal and further identify the research question, which guided our planning and execution of the following project.

#### 2nd iteration: Co-design process of prototype

**Contextual inquiry:** To understand the status quo of intergenerational storytelling of older adults, and define design requirement. Semi-structured interviews were conducted with both the older adults and their children.

**Design requirements:** Memory trigger. Tangible interface employing metaphor. Using audio as the storage medium of stories. Could be used either face-to-face or separately by older adults and their children.

**Mock-ups and user consultation:** Three concepts were built based on the design requirements and were developed to be mock-ups. Older adults were consulted to evaluate them. Slots-story employing metaphor of slots-machine was chosen and further detailed. (Figure1-(2))

**Final prototype:** Slots-story, a slots machine-like device, aims to facilitate inter-generational life story sharing and preservation. It utilizes with the metaphor of slots machine, and integrates functions of memory cue generator, story recording, and preservation. By default, there are 40 trigger questions covering most aspects of an entire life. It could

either be used face-to-face or separately by older adults and their children. (Figure1-(3))

### 3rd iteration: life stories of old adults

**Field study:** eight pairs of participants (each pair consisted of an old adult and his/her child) from nursing home were recruited to use the prototype for around five days. Totally 359 stories were collected. Semi-structured interviews were conducted with both older adults and the young. Stories were transcribed and analyzed.

**Reflection:** As some stories were related to their mementos, such as album, souvenir, etc., which were also ideal memory triggers as they provided visual clues. This inspired us to explore their mementos and related stories in the next iteration. Additionally, the appearance of porotype should be refined according to older adults' feedback.

### 4th iteration: memento stories of adults

**Contextual inquiry:** It aimed to gain a better understanding of the status quo of their memento storytelling, and defined design requirements. We interviewed with older adults and young adults separately. We first asked them to arrange a brief guided tour of their homes, aiming to examine their mementos for displaying and stored in hidden places. We then conducted semi-structured interviews with them.

**Design requirements:** Integrating mementos into older adults' daily environments. Cross-generational cooperation. Tangible interface employing metaphor and intuitive interaction. Using audio as the storage medium of stories. Could be used either face-to-face or separately by older adults and their children.

**Description:** We focused on memento stories of older adults in this iteration. The prototype was refined based on the feedback of the 3rd iteration: Prototype's decorative effects needed to be highlighted to make it unobtrusive when putting it at older adults' home. (Figure1-(4)). It was used in a cross-generational operation manner: the young took photos of older adults' mementos and copied them to the prototype, while older adults used the prototype to tell stories related to the mementos.

**Field study:** Ten pairs of participants (each pair consisted of an old adult and child) were recruited to use the prototype for around seven days. 283 mementos were collected. Semi-structured interviews were conducted with older adults and their children. Mementos were categorized and analyzed. Stories were firstly transcribed, then were analyzed.

**Reflection:** Sustainability of the intergenerational sharing was necessary. Next, a cellphone application will be designed for the young side.

### 5th iteration: make intergenerational story sharing sustainable (in process)

**Aim:** In this iteration, we will close the intergenerational storytelling loop by designing an App for the young generation: aiming to facilitate intergenerational story sharing and preservation in a sustainable manner.

**System:** A system consisting of a slot machine-like device used by older adults, a cellphone application used by the young. It focuses on two kinds of stories of older adults: life stories and family memento stories (Figure 2).

### CONCLUSION AND FUTURE WORK

Table 1 shows the overview progress of the five iterations. The knowledge generated in our study are threefold: First, design and implementation of a tangible system for facilitating intergenerational sharing for the elderly. Second, insights on our research question regarding intergenerational storytelling for older adults. Third, lessons learnt in our iterative research have a universal significance for RTD application study, especially for older adults. During the last 3 years, I have finished 4 iterations, and the making of the 5<sup>th</sup> iteration's prototype is in process. Before its formal implementation, an initial evaluation will be first conducted. In formal field study, it will be used by the participants in a relatively long-term manner (for 2-3 weeks). Lastly, data analyzing and interviews will be conducted.

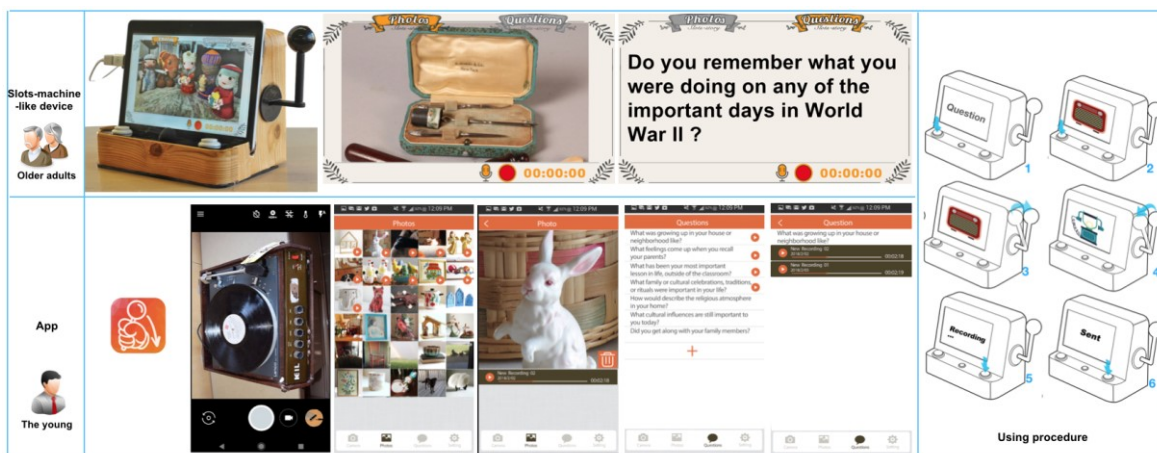


Figure 2. Prototype of 5<sup>th</sup> iteration

## REFERENCES

- [1] 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.
- [2] 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*, ACM, 31–40.
- [3] 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.
- [4] 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.
- [5] Danny Godin and Mithra Zahedi. 2014. Aspects of research through design: a literature review. *Proceedings of DRS*: 1667–1680.
- [6] Julianne Holt-Lunstad, Timothy B. Smith, and J. Bradley Layton. 2010. Social relationships and mortality risk: a meta-analytic review. *PLoS medicine* 7, 7: e1000316.
- [7] Ira E Hyman. 1994. Conversational remembering: Story recall with a peer versus for an experimenter. *Applied Cognitive Psychology* 8, 1: 49–66.
- [8] Sarah de Leeuw. 2009. Evocative Objects: Things We Think With. *Emotion, Space and Society* 2, 2: 131–132.
- [9] Siân E. Lindley and Andrew F. Monk. 2008. Social enjoyment with electronic photograph displays: Awareness and control. *International Journal of Human-Computer Studies* 66, 8: 587–604.
- [10] 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, 163–260.
- [11] V. Mor, K. Branco, J. Fleishman, et al. 1995. The Structure of Social Engagement among Nursing Home Residents. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 50B, 1: P1–P8.
- [12] Daniela Petrelli, Steve Whittaker, and Jens Brockmeier. 2008. AutoTopography: what can physical mementos tell us about digital memories? *Proceedings of the SIGCHI conference on Human Factors in computing systems*, ACM, 53–62.
- [13] Pedro C. Santana, Marcela D. Rodríguez, Víctor M. González, Luís A. Castro, and Ángel G. Andrade. 2005. Supporting emotional ties among mexican elders and their families living abroad. *CHI'05 Extended Abstracts on Human Factors in Computing Systems*, ACM, 2099–2103.
- [14] Elizabeth Thiry and Mary Beth Rosson. 2012. Unearthing the family gems: design requirements for a digital reminiscing system for older adults. *CHI'12 Extended Abstracts on Human Factors in Computing Systems*, ACM, 1715–1720.
- [15] J. Tomaka. 2006. The Relation of Social Isolation, Loneliness, and Social Support to Disease Outcomes Among the Elderly. *Journal of Aging and Health* 18, 3: 359–384.
- [16] Mary Jane Tremethick. 2001. Alone in a crowd: A study of social networks in home health and assisted living. *Journal of Gerontological Nursing* 27, 5: 42–47.
- [17] David R. Unruh. 1983. Death and Personal History: Strategies of Identity Preservation. *Social Problems* 30, 3: 340–351.
- [18] Jenny Waycott, Frank Vetere, Sonja Pedell, et al. 2013. Older adults as digital content producers. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, 39–48.
- [19] Steve Whittaker, Ofer Bergman, and Paul Clough. 2010. Easy on that trigger dad: a study of long term family photo retrieval. *Personal and Ubiquitous Computing* 14, 1: 31–43.
- [20] John Zimmerman, Erik Stolterman, and Jodi Forlizzi. 2010. An analysis and critique of Research through Design: towards a formalization of a research approach. *Proceedings of the 8th ACM Conference on Designing Interactive Systems*, ACM, 310–319.