



## Postcard Memories: an interactive tablet application for elders with early-stage dementia

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### Abstract

In this demonstration, we present ‘Postcard Memories’, an interactive tablet application to create a social space for elders with early stage dementia. The touchscreen tablet application encourages people to create, organize, and send digital postcards that combine photographs and short text with audio and video. Users can send digital or print postcards to family, friends, and caregivers to encourage memory recall and facilitate social interaction. Results from a mixed method user study indicate that people find the interaction with the application enjoyable and meaningful.

### Keywords

Digital artifacts, early stage dementia, elders, universal sensitive inclusive design, social space, postcards, tangible artifacts, touchscreen tablet application.

### Introduction

Postcard Memories is an interactive tablet application that we designed to engage elders with early stage dementia, with their family members, friends, and caregivers in the tasks of: creating, sending, organizing, and printing postcards to maintain and preserve memories.

Our research questions are, “How can the collaborative creation of narrative-based digital and physical postcards and collections of postcards enhance connection and communication with family members, friends, and caregivers? Can this process assist elders by enhancing memory, speech, and other cognitive abilities?” Users can create and send digital or physical postcards in the application, and they can create a digital “Memory Book” [1, 2] that they can also print and view. The application, although intended for elders with early stage dementia, benefits everyone interested in exploring the creation of digital or physical postcards to preserve memory.

The functionality of the Postcard Memories application follows the following three stages:

#### Stage 1: Initiation

Users create postcards with Postcard Memories. They decide to send digital or physical postcards. Music or video can be attached to a digital postcard for the recipient.

#### Stage 2: Response

Initial postcard is received; recipient can create a new postcard to respond to the initial postcard.

#### Stage 3: Organization and Review

Sent and received postcards can be organized into a coherent narrative. The narrative can be viewed in a Postcard Memories gallery. User-selected postcards can be printed individually or compiled into a digital or physical Postcard Memories book.

Early stage dementia (ESD) differs from early onset dementia (EOD); EOD occurs in adults under age 65, whereas ESD is determined at the time of, or after a diagnosis of dementia. [3] Adults with ESD can talk about their experiences of living with dementia and express what living with a diagnosis of dementia means to them. [3]

Our objectives in this study are to learn how adults with ESD engage with the experience of recalling and organizing memories with the touchscreen tablet application. We are investigating elders’ and caregivers’ preferences in the interactions with the final outputs of the digital and tangible artifacts. Additionally, we are interested to see if, and how well elders recall, share, and re-experience these narratives with their caregivers.

### Methodology

This is a mixed-methods study involving a comprehensive methodology and study design. A preliminary study at OCAD University with healthy adult students took place from June 2014 to May 2015. A second full study will be conducted in the summer of 2015 at Scarborough Community Health Centre and Toronto Rehabilitation Institute.

Each study follows a similar design, involving three phases of data collection: i) One to two user testing sessions; ii) a semi-structured interview (preliminary study) or debriefing session (full study) and iii) a self-administered questionnaire. We apply the “think aloud” method [4] during the user test sessions, wherein participants describe their interactions, outcomes, and difficulties with the application. We combined this method with thematic video analysis [5] in the preliminary study to learn how partici-

pants are progressing with the application, and about what needed to be revised in the application design (Figure 1).



Figure 1: (Top-bottom, left-right) Tap, drag, scroll, point actions from video data

The semi-structured interviews in the preliminary study were transcribed and coded using grounded theory. [6] We went through a rigorous process of axial, open, and selective coding to come up with three theoretical propositions to test against our research questions. Since the full study involves elders with ESD, we plan to extend the common iterative design methodology [7] to a “User-Sensitive Iterative Design” (USID) methodology that is catered to participants who might, or might not, be familiar with a formal design research process. [8] Similarly to iterative design, USID projects involve participants at every stage of the process, but in USID researchers use “sensitive consultation” techniques to ensure participants are able to participate at the level they are comfortable with. [8] We will interview four dyads, make changes to the application that address feedback received during our consultation with participants, then test another four dyads and continue until we have reached a point of data saturation.

Newell, Gregor, Morgan, Pullin & Macaulay state, USID “suggests that the users are firstly people and that the designer should develop an empathetic relationship with them, rather than treat them as ‘subjects’ for usability experiments.” [8, p. 237] Although the humanistic USID approach is comparable to the methodology of iterative design, additional evidence-based research needs to take place before USID replaces the methodology of iterative design. [7, 8]

## Findings and Discussion

Results from the self-administered questionnaire in the preliminary study show that participants enjoyed adding media to postcards, especially video. The video analysis findings were supported by findings from the interviews,

where most participants reported that adding media to the postcards was the most meaningful part of the experience.

The design, development and testing of a touchscreen tablet application with healthy adult volunteers has revealed intriguing questions for the full study, such as how adults with ESD might interact with touchscreen tablet applications designed for sharing events, and why and how narrative creation and postcard sharing might be meaningful. The use of the think aloud technique for data gathering has been successful for providing rich data to support our thematic video analysis (Figure 1). Future directions will involve comparison of results of the preliminary study with the full study to learn if the USID approach is supportive, or not, for adults with ESD. Likewise, data from both think aloud sessions will be useful to compare, to learn if participants in both groups experienced a greater sense of success when completing tasks.

The Postcard Memories application gives all users—friends, family—a way to create new stories and retell old stories. The experience of telling, retelling, listening, and hearing life stories is an experience that is perhaps beneficial to all people. As the study continues, and we gather feedback at our ISEA 2015 demonstration, we seek to investigate if the act of retelling specifically offers a greater sense of agency and recognition [9] to the stories that adults living with early stage dementia might share with their family, friends, and caregivers.

### Project website:

<http://research.ocadu.ca/mobilelab/project/postcard-memories>

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## Author Biographies

Martha Ladly is a Professor of Design, teaching in the Digital Futures Graduate and Undergraduate Programs at Ontario College of Art & Design University (OCADU), as well as the Interdisciplinary Master's Program. Dr. Ladly specializes in teaching and practice-based research in design, art, media, and technology. She is the former Associate Dean, Graduate Studies, at OCADU. Dr. Ladly is a senior researcher with the Mobile Experience Lab and a Network Investigator with the Graphics, Animation, New Media National Centre of Excellence. Dr. Ladly past positions at OCADU include Chair of the Research Ethics Board (2008-2011) and Graduate Program Director of the Interdisciplinary Master's Program in Art, Media, and Design (2009-2011). In addition, she recently led the development of the Graduate Program in Digital Futures. She was the Director of the Canadian digital arts and culture website HorizonZero ([www.horizonzero.ca](http://www.horizonzero.ca)). Dr. Ladly is a Registered Graphic Designer.

Dr. Frank Rudzicz is an expert in speech recognition and artificial intelligence in applications designed for individuals with special speech characteristics at Toronto Rehabilitation Institute (University Health Network). His work in natural language and speech processing is multidisciplinary and involves machine learning, human-computer interaction, artificial intelligence, computer vision, speech-language pathology, rehabilitation engineering, digital signal processing, and linguistics. His research augments existing techniques by refining the statistical relationships between neural, articulatory, and acoustic levels of speech within modern automatic speech recognition systems. These augmented speech systems can be for several applications including: i) automated human-computer dialog systems that include speech synthesis to help individuals complete daily tasks and ii) prosthetic communication aids for human-human interaction that modify the acoustics of hard-to-understand speech to make it more understandable. Dr. Rudzicz is also Assistant Professor, Department of Computer Science, University of Toronto and Associate member, School of Graduate Studies.

Bryn A. Ludlow is a PhD Student at York University in the Faculty of Graduate Studies, York and Ryerson Joint Graduate Program in Communication and Culture. She holds a BFA in Integrated Media from the Ontario College of Art & Design University (2010) and a MA in Health and Aging from McMaster University (2012). Bryn has presented her research on body mapping at national and international conferences, including at the University of the Witwatersrand, Johannesburg, South Africa (2011). Her “Body Spaces” vector illustrations are published in “The Medical Post”, and “Ars Medica: A Journal of Medicine, The Arts and Humanities”.

Ana Jofre's interdisciplinary practice is grounded in a diverse academic background, which includes a PhD in Physics from the University of Toronto. Ana started pursuing art as a professional practice and exhibiting her work while serving as a full-time faculty member in the Department of Physics at UNC Charlotte, where she conducted and published research in experimental biophysics. At this time, she also completed a BFA with a concentration in ceramics at the same university. A romantic at heart, she found herself more motivated to make a cultural contribution to society than to collect and publish additional data. She recently completed the MFA program at the Ontario College of Art and Design University in Toronto, Canada. Her current practice integrates knowledge and methodologies from various disciplines to create aesthetic experiences of ‘presence’.

Laura Wright is an artist, producer, writer, and interactive designer based in Toronto, Ontario. She completed a Masters of Fine Art in the Digital Futures Initiative at OCAD University where she explored interactive video, application design, and digital art installations. She recently took part in an international exchange with the American College of Greece in Athens where she worked to re-invigorating the 2004 Olympic venues with digital art interventions. She exhibited an interactive art installation called Arduino Disco for Toronto's 2013 Nuit Blanche. Wright has a Bachelor of Journalism degree with Honours from Carleton University in Ottawa, Ontario. She worked for several years as a news reporter and editor for CBC News, based in Yellowknife, Northwest Territories.